

# Evidence on the Tradeoff between Risk and Return for IPO and SEO Firms\*

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First Draft: April 4, 2005  
This Draft: September 21, 2005

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\* We thank Michael Brandt, John Graham, Chris James, Manju Puri and seminar participants at Duke University for comments and suggestions. Please address correspondence to Brav or Zarutskie at Fuqua School of Business, Duke University, Box 90120, Durham, North Carolina 27708, Michaely at Cornell University, Johnson Graduate School of Management, Ithaca, NY 14853-6201, or Roberts at the Wharton School, University of Pennsylvania, 3620 Locust Walk Philadelphia, PA 19104. Brav can be reached at phone: (919) 660-2908, email: [brav@mail.duke.edu](mailto:brav@mail.duke.edu), Michaely at phone: (607) 255-7209, email [rm34@cornell.edu](mailto:rm34@cornell.edu), Roberts at phone: (215) 573-9780, email: [mrrobert@wharton.upenn.edu](mailto:mrrobert@wharton.upenn.edu), and Zarutskie at phone: (919) 660-7981 email: [rebeccaz@duke.edu](mailto:rebeccaz@duke.edu). Roberts gratefully acknowledges financial support from the Rodney L. White Center. Brav and Zarutskie gratefully acknowledge the Hartman Center for the Study of Medium-Sized Enterprises for financial support.

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## **Abstract**

A center of debate is whether the low long-run average returns of equity issues reflect underperformance due to mispricing or whether these returns reflect the risk characteristics of the issuing firms. We shed new light on this debate by examining how institutional lenders price loans of equity-issuing firms. We find that equity-issuing firms' expected debt return is equivalent to the expected debt return of non-issuing firms with similar characteristics, implying that institutional lenders perceive equity issuers to be as risky as similar non-issuing firms. We find that institutional lenders perceive small and high book-to-market borrowers as systematically riskier than larger borrowers with low book to market ratios, consistent with the asset pricing approach in Fama and French (1993). Finally, we find that firms' loan yields and expected debt returns decline after equity offerings, consistent with recent arguments that firm risk should decline following an equity offering if equity is issued to exercise a real option. Our analysis provides out-of-sample evidence consistent with risk explanations of IPO and SEO equity returns.

# Evidence on the Tradeoff between Risk and Return for IPO and SEO Firms

## I. Introduction

Firms conducting initial and seasoned equity offerings have historically experienced relatively low long-run equity returns (Ritter (1991), and Loughran and Ritter (1995)). Two explanations have been offered for this. The first explanation argues that investors are rational and that the low average returns are commensurate with the issuing firms' risk characteristics. The second explanation argues that firms are able to time their equity offerings and raise capital by selling overvalued equity. The poor long-term performance of the equity issues reflects the gradual correction of asset prices to their true fundamental value.

Whether issuer average equity returns reflect rational asset pricing or not hinges critically on agreement about the correct asset-pricing model relative to which issuer equity returns should be benchmarked. It is well known that over a three to five year period subsequent to the equity offering both IPOs and SEOs underperform relative to the market as a whole (Ritter (1991)). Thus, conditional on the Sharpe-Lintner CAPM, the evidence strongly suggests that issuers underperform relative to peers. However, following Fama and French (1992, 1993), when a three-factor model that includes firm size and book-to-market is used to measure benchmark returns, Brav and Gompers (1997) and Brav, Geczy, and Gompers (2000) find that issuers perform similar to their peers.<sup>1</sup> This type of evidence, however, has been criticized on the ground that the book-to-market characteristic may not reflect an additional dimension of systematic risk but rather security mispricing.

By examining the initial pricing of loans to firms that have recently issued equity, we are able to shed new light on this controversy. Our goal is to test whether large financial institutions, the major players in the private debt market, view key firm characteristics such as firm size and book-to-market in a manner that is consistent with that observed in the equity market. For

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<sup>1</sup> Jay Ritter provides a comprehensive summary of IPO average abnormal return measured against a size and book-to-market benchmark. For the period 1970 through 2002 there is no reliable difference (-2.8%) in abnormal return consistent with the idea that IPOs average returns are similar to other seasoned firms with the same size and book-to-market ratio. See <http://bear.cba.ufl.edu/ritter/IPOs2004-5years.pdf>.

example, small size, low book-to-market issuers tend to have low average returns. We ask whether lenders demand, ex-ante, such low average returns.

Our focus on the private debt market as a laboratory within which to study the risk of issuing firms and non-issuing seasoned firms is intentional. First, prices in this market are less likely to suffer from behavioral biases that might affect the public equity markets since private debt is held primarily by large financial institutions rather than individuals. Because of the size of their investment and the frequency with which those investors evaluate and transact in securities, they are presumed to be more rational.<sup>2</sup>

Second, institutions are more likely to have more precise information about the companies they hold (e.g., Shleifer and Vishny (1986); Allen, Bernardo, and Welch (2000)). In particular, private lenders often specialize in gathering information about borrowers. The literature on financial intermediation has identified specific channels through which lending institutions may acquire information about and monitor firms (e.g., Diamond (1984, 1991), Rajan (1992), and Rajan and Winton (1995)) and have empirically documented that lending institutions serve these functions (e.g., Fama (1985), James (1987), James and Weir (1992), and Puri (1996)). Moreover, the repeated interaction between borrowers and lending institutions often results in the formation of lending relationships that can further ameliorate informational asymmetries that afflict firms, especially small growth firms such as those going public (e.g., Petersen and Rajan (1994) and Berger and Udell (1995), Schenone (2004)). The close interaction between private lenders and borrowers suggests that it is more likely that lenders will price assets according to their intrinsic value, implying that any differences in expected returns between issuing and non-issuing firms' private debt are less likely due to behavioral biases relative to equity returns. Thus, our analysis provides a new perspective on the risk associated with firms raising equity capital by examining the expectations of well-informed investors whose security pricing is less subject to behavioral biases.

We begin by showing that conditional on firm characteristics and features of the loan contract, the pricing of loans to issuing firms (both IPOs and SEOs) does not differ from that of

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<sup>2</sup> A potential disadvantage of the debt market is the lack of liquidity of its secondary market. While we do not have access to data on secondary market liquidity of the loans in our sample, Altman et al (2005) indicate that the market for most secondary loan is highly illiquid. Thus the first order effect of illiquidity is on the pricing level of all loans. Since our focus is on differential pricing of loans, this issue is not likely to affect our results.

non-issuing firms, suggesting that institutional lenders view issuing and non-issuing firms in a similar light with regard to *total* risk (i.e., systematic plus idiosyncratic).

Turning to a comparison of the *expected* loan return (rather than the total loan yield) we find that our inferences regarding the relative risk of issuing firms is unchanged from above: IPO and SEO firms' expected loan returns are indistinguishable from those of seasoned non-issuing firm. This result is robust to numerous specifications including alternative expected loan return estimates corresponding to changes in the assumed recovery rates and estimated default probabilities, alternative model specifications for the expected loan return, and endogeneity of the expected loan return with other loan contract features, such as covenants and maturity.

Our third finding concerns the recent literature that argues that raising capital and investing that capital is tantamount to the exercise of a call option and acquisition of the underlying asset. Hence, the firm's overall risk is reduced (Benninga, Helmantel and Sarig (2005), and Carlson, Fisher and Giammarino (2004)). It is difficult to assess the validity of this claim in the equity market since change in the underlying firm risk characteristics are difficult to detect in the short sample period around the offerings. Using the loan market we show that the expected yield for issuing firms changes around the offerings in a manner consistent with the above models: both the total yield and the expected return show a significant decline around the time firms raise additional equity capital.

Finally, we show that firm characteristics, such as size and book-to-market, are related to private debt expected returns in a manner similar to their relation with equity average returns. In particular, small value firms are deemed riskier, thus requiring higher expected rates of return, *ex-ante*. This evidence is important as it provides an out of sample test corroborating the interpretation of these firm characteristics as proxies for systematic risk (Fama and French (1993)). Put differently, using private debt rather than public equity and focusing on pricing by institutions, such as banks and insurance companies that specialize in gathering information about borrowers, we are able to provide evidence that is consistent with the idea that size and book-to-market capture exposure to systematic risk that is compensated in expected returns.

In sum, firms raising equity capital are perceived by institutional lenders to be as risky as control firms with similar characteristics. This is true when we examine both the total yields charged on loans and our estimated expected returns on the loans. This finding is important as it

corroborates the evidence from the equity market showing that issuing firms' average returns are similar to that of seasoned firms with similar characteristics.

The rest of the paper is organized as follows. We present our data and variable definitions in Section II. In Section III, we examine the determinants of loan yields and ask if IPO and SEO loan yields are determined by the same factors as those of non-issuing firms. In Section IV, we describe our decomposition of loan yields into expected returns and default risk premia and examine whether IPO and SEO loan expected returns are similar to those of similar non-issuing firms. We further explore the robustness of our findings in Section V. We examine how expected loan yields change around the time of equity issuances in Section VI. We conclude the paper in Section VII.

## **II. Data**

We use four separate databases in our analysis. Our primary database is DealScan, which contains loan-level information. Loan information in DealScan varies across loans but almost always includes the borrower, participating lenders, lender role, loan type, deal purpose, loan amount, maturity and promised yield. To obtain financial information on borrowing firms, we match DealScan to the merged CRSP/Compustat database by company name, stock ticker and loan date using the CRSP/Compustat historical header file. To identify IPO and SEO dates for our sample of borrowing firms we link the SDC Global New Issues database to the CRSP/Compustat database by cusip, stock ticker, company name, and issuance date using the historical header file. Finally, we link a database of bankruptcy filings, which will be used in our default estimation and expected debt return calculations, to the CRSP/Compustat database by company name and bankruptcy date.

We restrict our analysis to loans whose borrowers are not in the farming (SIC codes less than 1000), financial (SIC codes between 6000 and 6999), and utility (SIC codes between 4900 and 4999) sectors. We further narrow our sample to include loans whose borrowers have common shares (share code 10 or 11 in CRSP). In addition, we only include loans whose borrowers can be found in the merged CRSP/Compustat database and which have a strictly positive yield, maturity and loan amount. Our final sample of loans consists of 5,337 firms entering into 22,048 loans.

### *A. Loan Information: DealScan*

Our loan data is an extract of the Loan Pricing Corporation (LPC) DealScan database. The basic unit of observation in DealScan is a loan. The data consists of dollar denominated private loans made by bank (e.g., commercial and investment) and non-bank (e.g., insurance companies and pension funds) lenders to U.S. corporations during the period 1987-2003. According to Carey and Hrycray (1999), the database contains between 50% and 75% of the value of all commercial loans in the U.S. during the early 1990s. From 1995 onward, DealScan coverage increases to include an even greater fraction of commercial loans. According to LPC, approximately half of the loan data are from SEC filings (13Ds, 14Ds, 13Es, 10Ks, 10Qs, 8Ks, and registration statements). The other half is obtained from LPC's contacts within the credit industry and from borrowers and lenders.

Table I presents a longitudinal view of our sample of loans. In Panel A, we report the number of borrowers in our sample by year, as well as the number of loans and packages. A package is a bundle of loans issued to a borrowing firm at the same time. The number of loans and borrowers in our sample increases dramatically between 1987 and 1996. This is due to the fact that LPC's coverage has improved over time, particularly prior to 1995. To ensure that our empirical findings are not driven by this increase in loan coverage, we control for time fixed effects in our regressions.

Panel B summarizes the most common types of loans in our sample.<sup>3</sup> Revolving loans enable borrowers to draw down capital over time. They comprise the majority (61%) of loans in our sample. Term loans, requiring a complete withdrawal of funds at inception, represent roughly 25% of the loans. Finally, 364-day facilities – short-term, revolving credit used to avoid the capital allocation banks are required to make on un-funded commitments of a year or more – are the third major loan type in our sample comprising 8% of the sample. These short-term loans have grown increasingly popular over time. However, revolving and term loans continue to make up the majority of loans throughout the sample period.

Panel C summarizes the most common loan purpose categories for our sample of loans. Corporate purposes, debt repayment, takeovers and working capital together comprise just fewer than 80% of the loans in our sample. General-purpose loans (i.e. corporate purposes and working

capital) represent 24% of our sample, whereas debt repayment is the single most popular loan purpose in our sample (26%). Examination of time-variation in loan purpose reveals that debt repayments are pro-cyclical and general-purpose loans are counter-cyclical. In our regression analysis below, we control for both loan type and deal purpose with fixed effects.

Panel D summarizes loan promised yield, amount and maturity over our sample period. Promised yields, measured in basis points above the six-month LIBOR at the time the loan is issued, range from a low of 188 in 1995 to a high of 264 in 1989.<sup>4</sup> LPC computes this figure as the sum of the coupon spread and any recurring fees (e.g. annual fee). For loans not based on LIBOR, LPC converts the coupon spread into LIBOR terms by adding or subtracting a constant differential reflecting the historical averages of the relevant spreads.<sup>5</sup> The All-in-Drawn Spread enables comparisons across multiple facilities, independent of the underlying fee and rate structure. In the empirical analysis we use Alldrawn as the promised yield of the debt. Loan maturities are, on average, approximately 3.5 years long and vary relatively little over the duration of our sample (the maturities are reported in Panel D in months). Average loan sizes (Amount), all deflated to year 2000 dollars, range from \$99 million in 1991 to \$241 million on 2001, with a grand average (over all years and loans) of \$171 million.

Panel E presents information on loan covenants, which are available for a subsample of loans in DealScan.<sup>6</sup> Since covenants are potentially important determinants of loan yields, we describe these features here and incorporate this information into robustness checks of our results below. In our analysis, we focus on seven specific covenants: secured, dividend restricted, financial ratio restrictions, net worth, and three sweep provisions (asset, debt, and equity). Secured debt provides collateral for the loan, usually in the form of the physical assets of the firm. Dividend restrictions restrict the ability of the firm to distribute cash to its shareholders by

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<sup>3</sup> There are 23 different types of loans represented in our sample, which differ in the basic details of the loan (e.g., maturity, repayment, purpose, etc.).

<sup>4</sup> Dealscan refers to this measure as the All-in-Drawn Spread, which represents the cost to the borrower for each dollar withdrawn. LPC also reports a measure All-in-Spread Un-drawn, which represents the cost to the borrower for each dollar available under commitment but not withdrawn. Since this measure primarily reflects an opportunity cost for the bank, we use the All-in-Spread Drawn measure in our analysis.

<sup>5</sup> As of 12/31/2003, the differentials used in the calculation of AIS reported by LPC are: +255 basis points (BP) for the prime rate, +3 BP for the commercial paper rate, -34 BP for the T-bill rate, -18 BP for bankers' acceptance rate, -6 BP for the rate on CDs, and 0 BP for the federal funds rate, cost of funds rate and money market rate. Hubbard, Kuttner, and Palia (2002) show that replacing these constants with time-varying differentials based on year-specific average spreads has a minimal effect on any pricing implications.

requiring that certain conditions (e.g., minimum earnings or working capital) are met before paying dividends. These two covenants are measured by indicator variables representing their presence in the contract. Panel E shows that 82% (86%) of loans with covenant information contain a security provision (dividend restriction).

Financial ratio restrictions impose bounds or ranges on certain accounting ratios. For example, a firm may be required to keep its leverage ratio (debt to assets) less than 30% for the duration of the loan. Or, a firm may be forced to keep its interest coverage ratio above 5%. In many instances firms have more than one ratio restricted at time, as indicated by the average number of ratios restricted in our subsample of loans: 2.56. Net worth covenants impose a floor on the net worth of the company, often measured in terms of tangible assets or both tangible and intangible assets. Approximately 25% of loans with covenant information contain net worth covenants.

Finally, sweep covenants are effectively prepayment provisions that mandate early retirement of all-- or a portion-- of the loan conditional on an event, such as a security issuance or asset sale. We have information on three types of sweeps: asset, debt, and equity. Asset sweeps impose restrictions on asset sales, while debt and equity sweeps restrict security issuances. Sweeps are stated as percentages, which correspond to the fraction of the loan that must be repaid in the event of a violation of the covenant. For example, a contract containing a 50% asset sweep may specify that if the firm sells more than a certain dollar amount of its assets, it must repay 50% of the principal value of the loan. For ease of interpretation and consistency with the analysis below, Panel E presents the fraction of loans containing a particular sweep, independent of the fraction of the loan covered by the sweep. We see that asset sweeps are the most popular prepayment provisions (66% of loans) followed by equity (49%) and debt (48%).

#### *B. Borrower Information: CRSP/Compustat and SDC*

We obtain accounting data and equity market data for our sample of DealScan borrowers from the merged CRSP/Compustat database. All borrower information, when available, is lagged one quarter from the inception of the loan to ensure that this information was known to the lender prior to the structuring of the loan. Matching IPO/SEO data from SDC to

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<sup>6</sup> Depending on which covenant, the number of loans with nonmissing information ranges from just over 12,000 to approximately 2,500.

CRSP/Compustat produces a final sample of 5,129 IPOs between 1987 and 2003 after excluding unit offerings and firms whose share codes on CRSP differ from 10 or 11. We then identify the subset of these issuers that take on private debt any time between the issuance day and two years after the issuance. While the choice of two years is admittedly arbitrary, we also examine alternative window lengths (2.5 years, 1.5 years, 1 year) with little effect on our results.<sup>7</sup> We are able to identify 1,166 firms that entered into a loan agreement in the two years after their IPO and 1,158 firms in the two years after their follow-on offerings corresponding to a total of 2,152 “IPO loans”; 2,911 “SEO loans”; and, 16,985 “Non-Issuer” loans.

Panel A of Table II summarizes loan characteristics across the subsamples of IPO, SEO and non-issuing loans in our DealScan sample. The average (median) IPO loan yield is 232 (225) basis points above Libor; the average (median) SEO loan yield 180 (163) basis points above Libor. For non-issuing loans the average (median) yield is 225 (225) basis points above Libor. The average loan size for IPOs is \$91million, \$199 million for SEOs, and \$177 million for non-issuing firms. IPO firms tend to take out large loans (relative to book value of assets), of approximately the same maturity as non-issuing firms, while SEO firms take out smaller loans (relative to their book value of assets) for slightly longer maturity than non-issuing firms.

Panel B of Table II summarizes covenant types for the subsamples of loans with covenant information. We see that IPO and SEO loans contain slightly more financial covenants than non-issuing loans. Overall, the information presented in Panels A and B of Table II suggests that unconditionally our sample of IPO loans is on average as risky as our sample of non-issuers loans, and that SEO loans might be in fact on average slightly less risky than non-issuing loans. One might conjecture then that institutional lenders view the total risk of a typical equity issuing firm to be similar to that of a typical non-issuing firm. We will explore these conjectures in a more formal manner below and in the next section by controlling for borrower characteristics as well as other macro and time variables.

Panel C of Table II provides information about borrower characteristics across our subsamples of issuing and non-issuing loans. The columns labeled Dealscan, Dealscan IPOs,

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<sup>7</sup> Using private loan transactions prior to the IPO/SEO is problematic as it introduces a selection bias (at the time the loan is taken the market does not know that it is about to raise equity capital). Nevertheless, we also repeat the experiment with loans taken in the year prior to the equity issuances, and there is no significant impact on the results we report.

Dealscan SEOs and Dealscan Non-Issuers correspond to the DealScan samples described in Panel A. The column labeled ‘Compustat’ provides both average and median firm characteristics for all nonfinancial, nonutility firms in the merged CRSP/Compustat database during the period 1987 to 2003.

A comparison of columns titled Dealscan IPOs, Dealscan SEOs and Dealscan non-issuers provide information about the differences between non-issuers firms that use the private debt and issuing firms that use the private debt market. IPO borrowers are smaller, have lower book-to-market ratios, and have fewer tangible assets. SEO firms’ characteristics are more similar to non-issuers than to the IPO firms.

Focusing on the Compustat and Dealscan columns in Panel C enables a comparison of the Dealscan database with the merged CRSP/Compustat database. The median firm included in the Dealscan database tends to be slightly more levered (total debt / total assets) than the median firm on Compustat, a result that is not surprising given that our sample conditions on a debt issuance. Dealscan firms tend to be somewhat larger than the average or median Compustat firm and their mean book to market ratio is lower. This latter finding is likely to be the outcome of outliers since the median book to market ratio of the two samples are quite similar. A comparison of the medians also indicates that with respect to tangible assets, profitability, and cash flow volatility, Dealscan and Compustat firms are not qualitatively different. An examination of the distribution across industries (not reported) also does not reveal substantial differences. However, all of our regression analysis below incorporates industry fixed effects for the 38 Fama and French industries.

Finally, focusing on the Dealscan IPOs and non-Dealscan IPOs enables a comparison of IPOs that appear in the Dealscan database and those that do not. IPO firms in our sample are larger, more profitable, have higher book-to-market ratios, and have a higher fraction of tangible assets and lower cash-flow volatility. A comparison of our samples of DealScan SEOs and non-DealScan SEOs yields similar differences. These differences are consistent with the notion that the more speculative IPOs and SEOs are less likely to tap the private debt market. Our analysis, which is conditioned on IPO firms’ access to the private debt market, is therefore indicative of the pricing behavior of slightly larger, and perhaps less speculative, issuers. Nonetheless, while our sample of IPOs represents approximately one third of all IPOs during 1987 and 2003,

meeting the criteria mentioned above, the proceeds generated from our sample of IPOs represent almost half of the total proceeds generated. Thus, our IPOs represent a significant economic share of IPO activity.

### **III. Loan Yields**

#### *A. Two-Way Sorts on Size and Book-to-Market*

While the above summary statistics are suggestive, they fail to account for the differences between the characteristics of the issuing and non-issuing samples. Thus, we begin our examination of the loan pricing differential between IPO, SEO and non-issuing firms with a non-parametric analysis. We sort all borrowers into size (total assets) and book-to-market quintiles each year.<sup>8</sup> For each of the resulting 25 portfolios of loans, we separate the IPO and SEO loans from the non-issuer loans and compute the average yield, which is presented in Table III, along with the number of loans in parentheses. Several aspects of the results are worth highlighting.

First, there is a large “size effect” in loan yield spreads. For almost every book-to-market quintile, yield spreads decline significantly and monotonically with firm size. For example, non-issuing (IPO) firms in the lowest book-to-market and smallest size quintile pay, 347 (256) basis points above Libor whereas large non-issuing (IPO) firms in the low book-to-market pay 103 (157) basis points above Libor. When we average across book-to-market quintiles (unreported), small non-issuing (IPO) firms pay, on average, 310 (275) basis points above Libor. Non-IPO (IPO) firms in the largest size quintile pay, on average, 99 (147) basis points above Libor. A similar pattern is found for SEO loans.

Second, the association between book-to-market and loan yield spreads appears to be positive, but is less distinct than the relation between size and yield spreads. For small non-issuing firms, yield spreads are mostly flat across the book-to-market quintiles. As we move to larger-quintile firms, a positive association between book-to-market and yields begins to emerge, becoming stronger with each successive size quintile. While the relation between book-to-market and yield seems to be positive for issuing firms as well, the relation is weaker and

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<sup>8</sup> Book value of equity to market value of equity is calculated as book equity plus deferred taxes and investment tax credit, when available, all divided by market capitalization. We use total assets as a measure of size to maintain consistency with the banking literature (Drucker and Puri (2004), Drucker (2005)) and because of near zero

depends upon the particular size quintile. [formatting seems to have changed past this point]

In drawing comparisons of these two-way sorts with similar sorts for equity returns, it is important to remember that the yield on a loan is the sum of both an expected return and a default risk premium. To the extent that book-to-market ratios reflect collateral values, with high book-to-market firms having higher collateral values and recovery rates, we might expect book-to-market to be negatively related to the default premium on loans. However, if value firms are more likely to enter financial distress and default on their loans, then book-to-market may be positively associated with the default premium. Hence, book-to-market may have opposing effects on the systematic and default premium components of loan yields, which might explain the weak relation between book-to-market and loan yield spreads observed in our two-way sorts.

Third, holding fixed size and book-to-market quintiles, the difference in IPO and non-issuing loan yield spreads is not always positive. In the first two size quintiles, IPO loans have slightly lower yield spreads than non-issuing loans and SEO loans have the lowest spreads. In the middle size quintile, IPO and non-issuing loan yield spreads are roughly similar. In the top two size quintiles, IPO loan yield spreads are larger than non-issuing loan yield spreads.

### *B. The Determinants of Loan Yield Spreads*

We next examine whether there is a difference in the loan yields of issuing and non-issuing firms after controlling for firm characteristics and other features of the loan contracts in a regression framework. This analysis enables us to re-examine the differences in yield spreads across IPOs, SEOs and non-issuing firms in a setting that accounts for the confounding effects of multiple factors, beyond size and book-to-market examined above.

We first regress the loan yield spread on various proxies for risk and additional control factors using the largest sample of loans, which we call our base regressions. The first column of Table IV provides estimated coefficients and robust t-statistics for the base regression.<sup>9</sup> The inclusion of size and book-to-market are motivated by asset pricing specifications (Fama and

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correlation with book-to-market. We also examine a measure of market capitalization, orthogonalized to book-to-market by a univariate regression, in our analysis and find very similar results that we do not present.

<sup>9</sup> The t-statistics are robust in the sense that our standard errors are computed by assuming that within firm observations are dependent with a constant correlation. We control for longitudinal dependence by incorporating year dummies into the regression specification.

French (1992)) and can be interpreted in this framework as capturing systematic risk factors. Similarly, equity beta is a standard measure of systematic risk which we use as a proxy for assets' systematic risk (we control for the leverage effect by including a debt ratio in the regression as well). We control for the maturity and relative size of the loan to account for contractual differences, as well as the type of loan using fixed effects (not reported). Asset tangibility (net physical plant, property and equipment dividend by total assets) is used to capture the firm's ability to secure the loan and, thus, as another proxy for the risk of the loan. Book leverage, is a control for capital structure effect on risk. Profitability (EBITDA / total assets), and cash flow volatility (historical standard deviation of EBITDA / total assets) are proxies for information asymmetry and default risk. Leverage and profitability may also proxy for potential agency costs (e.g., Jensen and Meckling (1976) and Jensen (1986)). Finally, also included in the specification, but not reported, are fixed effects for calendar years and Fama-French 38 industries.

The regression results provide several important insights, beginning with confirmation of the evidence in Table III. Loan yield spreads are strongly inversely related to firm size consistent with the view that small firms are riskier. We also see a significantly positive association between yields and book-to-market, consistent with the evidence found in the equity markets: value firms experience higher costs capital (e.g., Fama and French (1992)). If the assumption that institutional investor are more rational than investors in the equity market is correct, then this evidence might suggests that risk is a dominant force behind the higher expected return we observe here. The coefficient on equity beta is positive but insignificant, consistent with the findings in the equity market.

Not surprisingly, measures of total risk such as cash flow volatility and idiosyncratic risk have a positive effect on promised yield. While those variables' coefficients are positive under all regression specifications, they are not always significant. Firms that borrow relatively more, (measured by book leverage) experience lower yields, perhaps a consequence of economies of scale. Interestingly, loan maturity is inversely related to yield, a result that is persistent even after including a measure of the term spread in an expanded specification.<sup>10</sup> This evidence is consistent with the view that firms that are perceived as less risky are able to issue longer-term

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<sup>10</sup> In particular, we include the yield difference between the 10-year Treasury bond and the 1-year T-bill.

debt.

Most importantly, the base regression results indicate that IPO firms command roughly the same yield as otherwise similar seasoned firms, as revealed by the IPO indicator variable. Under most specifications, SEO firms' yield is significantly below the bond yield of non-issuing firms. The evidence from the base regression suggests that the unconditional results reported earlier are not driven by differences in firm characteristics and the type of loan into which these sets of firms enter. After accounting for these differences, we see that IPO and Non-issuing firms face similar interest rates on their loans.

In the third column of the table we add dummy variables for the identity of the lead lenders on the loans as well as the log of the loan syndicate size. The lead lender in a loan syndicate is the lender responsible for the management of the deal and for the ultimate pricing and contract terms of the loan. The type of lead lending institution may influence the contract terms of the loan. For example, Drucker and Puri (2004) present evidence that commercial banks are more likely than investment banks to discount loan yields to win underwriting business.

Most of the loans in our sample are syndicated. The average number of lending institutions participating in a loan in our sample is 6. Often the lender role recorded in DealScan will explicitly identify one member of the syndicate as the lead lender. For those syndicates where the recorded lender role does not give an unambiguous lead lender, we take as the lead lender the institution with the largest stake in the loan. The vast majority (around 85%) of loans with lead lender information have depository institution lead lenders (SIC codes between 6000 and 6099), most of which are commercial banks. Other lead lender types are non-depository institutions (SIC codes 6100 to 61999), security broker dealers (SIC codes 6200 to 6299), and insurance companies (SIC codes 6300 to 64999). The excluded lender type in the regressions is all other lender types (SIC codes 6500 to 6999). Because most loans are missing lead lender type information, our estimation sample drops from 13,228 loans to 5,780 loans in our lender regression specification. However, importantly, the basic results are similar to those reported for the base regression.

Interestingly, depository institutions, which are primarily commercial banks, charge much lower yield spreads (almost 100 basis points) than non-depository institutions, mainly

investment banks. This finding is consistent with claims that commercial banks may discount loans to win underwriting or other types of business (e.g., Drucker and Puri (2004)). Most importantly, however, the inclusion of lender type controls does not alter our main finding that issuing firms are charged different yields than similar non-issuing firms.

Finally, we test the robustness of our findings on the determinants of loan yield spreads to the inclusion of loan covenant restrictions. As we saw in the previous section, there are multiple types of covenants than can be included in a loan contract. Instead of reporting a dummy variable coefficient for each type of covenant in the loan yield spread regression, we follow Bradley and Roberts (2003) and form a loan covenant index which simply adds the total number of covenants contained in the loan contract. Doing so does not affect our findings and enables us to more easily model yields, covenants, and maturity in a simultaneous regression framework (as we do later in the paper). Column 4 of Table IV presents the results. Because so many loans are missing covenant information, our estimation sample drops to 2,877 loans. However, again our basic findings remain unchanged. The IPO dummy is statistically and economically insignificant and the SEO dummy is negative and significant— even after controlling for covenants, of which IPO loans have more. The covenant index enters the regression positively and significantly consistent with riskier firms being charged both higher loan yields and being subject to more restrictive covenants on their loans. Of course, there is a potential endogeneity issue with our covenant variable (see Bradley and Roberts (2003) and Chava, Kumar, and Warga (2004)). We explore this possibility below but briefly note that our results are largely unaffected by relaxing the exogeneity assumption on covenants, as well as maturity.

As a final check, we estimate a regression with both lender and covenant variables (the sample now drops to 1,147 loans). The coefficient estimates and robust t-statistics for this specification are reported in the last column of Table IV. Our findings remain mostly unchanged. The IPO dummy variable is once again insignificantly different from zero, but the SEO dummy also becomes insignificant. That is, after controlling for borrower characteristics, lender type, loan covenants and maturity, there is no difference in loan yield spreads for issuing firms (both IPOs and SEOs) and non-issuing firms.

## IV. Loan Expected Returns

The evidence thus far suggests that issuing firms' loans are viewed as being of equal risk to that of non-issuing firms' loans by institutional lenders. Our analysis, however, has not distinguished between systematic and idiosyncratic risk. Of crucial importance in the debate over why IPOs and SEOs earn low equity average returns is distinguishing between these two types of risks. One way to view the results we have presented so far is that we have implicitly assumed all default risk is systematically driven. The more realistic alternative, however, is that at least some of the default risk is idiosyncratic. As such, we now turn to a decomposition of the yield into two components: expected return unrelated to default and a default risk premium. The latter component is a function of the likelihood of default and the loan recovery rate.

Our approach to computing the expected return follows Benninga (2000) by computing the internal rate of return corresponding to each loan's expected cashflows. We compute a loan's expected cashflows using information on the loan yield (i.e., coupon rate), principal, and probability of default. First, we calculate the semi-annual coupon payments, conditional on the loan not defaulting, by adding the loan's coupon rate and the realized six-month LIBOR. Then, using estimated probabilities that the borrower defaults in each 6-month period and an assumed loan recovery rate, we calculate the expected cash flow in each 6-month period of the loan's maturity. The difference between our estimated expected return and the corresponding loan yield is our estimate of the loan default risk premium.<sup>11</sup>

We next discuss our estimation of default probabilities. Before continuing, however, we note that our approach to computing expected returns differs from several previous attempts to estimate expected debt returns which using historical default rates tables and transition matrices for public bonds of different credit ratings, published by Moody's (see, e.g. Elton, Gruber, Agrawal, and Mann (2001) and Campello, Chen, and Zhang (2005)). Instead, we model firm default and use borrower information at the time a loan is undertaken to predict the probability the borrowing firm defaults over the life of the loan. We do this for two reasons. First, modeling default at the firm-level allows us to use firm characteristics to assess the likelihood a loan will

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<sup>11</sup> We note that if different lenders face different marginal tax rates and taxes are impounded in asset returns then part of the variation in our estimates of expected returns may be attributable to variation in these taxes. However, we believe that this issue is of relatively little concern for two reasons. First, the majority of lenders in our sample are commercial banks, which likely face similar tax rates. Second, by incorporating lender dummies into the specification we implicitly capture any variation in tax rates across the lenders.

default, which is what credit scorers do when they assign a credit score to a bond. Thus, our estimation procedure offers a significantly finer estimate of default risk relative to the coarse grid used in previous studies. Second, the use of credit rating information will reduce the size of our sample significantly as most of our sample consists of private loans.

#### *A. Estimating the Probability of Default*

To estimate firm-level models of default, we must first obtain data on bankruptcies. We use two data sources to identify bankruptcies. We use BankruptcyData.com to obtain Chapter 11 filings by publicly traded companies between 1987 and 2004, which we merge to the CRSP/Compustat database using firm name and bankruptcy filing date in conjunction with the historical header file. Since BankruptcyData.Com does not collect information on Chapter 7 bankruptcy filings until the late 1990s, we use Compustat footnote 35 to identify firms that were deleted from Compustat due to Chapter 7 liquidations from 1987 to 2003.<sup>12</sup> We classify a loan as having defaulted if the borrowing firm files for bankruptcy prior to the maturity of a loan. While this definition is intuitively appealing, it can be a noisy measure of loan defaults for several reasons. First, loans can be prepaid prior to maturity. Second, revolving loans may not be drawn down before the bankruptcy event. These two types of errors will tend to overstate loan defaults. Third, loans maturing after 2004 (the end of our bankruptcy data) may eventually default but we cannot observe this future event. This censoring will lead to an understatement of defaults, as will the final source of noise in our estimate: loan renegotiations. Loans in the Dealscan database can, in fact, experience technical default (e.g., due to a covenant violation), be renegotiated, and then re-appear as a new loan in the database.<sup>13</sup> Unfortunately, we do not have information to identify such loans. However, this type of error does not contaminate the yield analysis since all loans taken out by the same firm are assumed to be dependent observations. Indeed, a renegotiated loan is technically a new loan that reflects the changed characteristics of the firm and perception by the bank.

With our bankruptcy measure, we estimate four different models of firm default that we briefly describe here. A more detailed discussion of the models, estimation and results are postponed until the Appendix. We estimate two types of default models – a panel logit model

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<sup>12</sup> We assume that the Chapter 7 bankruptcy filing date happens during the last quarter the firm has information in Compustat.

<sup>13</sup> We thank Chris James for pointing this out.

similar to that estimated by Shumway (2001) and a Cox proportional hazard model. For each type of model, we estimate two different specifications, one of which contains the explanatory variables in Altman (1968) and one of which contains the explanatory variables of Zmijewski (1984). We estimate the panel logit because it enables us to more easily use time varying covariates. However, a drawback of this model is that it requires that we explicitly form estimates of the private lender's forecasts of the evolution of the borrower's characteristics over the life of its loan in order to predict loan default probabilities. We, therefore, also estimate Cox proportional hazard models, which only use information about the borrower in the quarter in which it takes out a loan to forecast loan default probabilities.

We use the estimates from our four firm default models to predict four sets of default probabilities over each six-month interval of each loan's life. For the panel logit, this requires that we have predictions of the firm's financial statement variables that appear in the model for each six-month interval of the loan's life. In our two panel logit models presented here, we assume that lenders have rational expectations and use the actual realizations as our private lender predictions when these data are available. If we run out of Compustat data because the maturity of the loan ends after our sample, for example, we assume that future values of the firm-level variables are equal to their last values. For our Cox proportional hazard models, we require the private lender to use only the previous quarter's information about the firm in forecasting the probabilities of default in each six-month interval.<sup>14</sup>

Panel A of Table V reports the average predicted cumulative probabilities of default over the life of the loans in our sample from each of our four models, as well as the fraction of loans undertaken in each year of our sample whose borrowers ultimately default (i.e., empirical probabilities). We report these default probabilities separately for IPO; SEO; and non-issuers loans. There are several insights that emerge from Panel A. IPO loans are, on average, more likely to default (6.46%) than either SEO loans (5.37%) or non-issuers loans (4.85%). Loans reveal cyclicalities in their default rates, reflected in higher default rates for loans taken out in the first several years of sample and in the period 1998 to 2000. Additionally, issuers default rates appear to exhibit greater variation over time than those of non-issuers loans. Overall, the initial evidence appears consistent with the possibility that lenders set higher yields for IPO firms due

to higher default risk. More generally, default probabilities appear to increase during the 1997 - 2000 period, contemporaneous with the increase in average yield spreads (see Panel A of Table I). We also mention that the predicted hazard model probabilities are closer in magnitude to the empirical fraction of loans that ultimately default. This result is due to the sample used for the estimation, which consists only of firms that appear in our DealScan sample. For the panel logit model, our estimation sample uses information on any firm that ever took out a loan on DealScan, both before and after the firm appeared on DealScan.

While our subsequent results are robust to all four of our estimated default models, we only present results using the panel logit with the Zmijewski variables as our model of firm default

### *B. Loan Recovery Rates*

In addition to our estimates of the loan default probability in each six month period we need an estimate of the loan recovery rate, or fraction of loan value that the lender can recover in the event of a bankruptcy. Unfortunately, information on private debt recovery rates is sparse in comparison to the information available for public debt (see Moody's Investors Service (1998, 2000)). As such, we follow the latter Moody's studies and assume a recovery rate of 70% throughout the analysis. However, we also examine the effect of alternative recovery rates (60%, 80%) and varying the recovery rate across firm types (lower recovery rates for small, growth firms and higher recovery rates for large value firms). None of these perturbations have a significant effect on our results.

### *C. Loan Expected Returns*

Panel B of Table V presents the average and median expected excess (over LIBOR) loan returns corresponding to our different estimates of default probabilities. The expected excess loan returns provide an estimate of that part of the loan yield spread corresponding to systematic risk. The unadjusted yield spread statistics are also presented for ease of reference. Focusing on the second row containing the expected excess loan return using our baseline measure of default likelihood, we see that the magnitude of the expected excess loan returns is approximately 75% that of the raw yield spreads. IPO firms experience an average expected excess loan return that is

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<sup>14</sup> This is the same as saying the lender assumes the firm characteristics will remain constant over the life of the loan.

significantly larger (17.1 basis points) than that faced by non-issuing firms. As importantly, SEO firms experience an average expected excess loan return that is significantly lower (48.3 basis points) than that faced by non-issuing firms. Whether these differences remain after controlling for differences in firm characteristics and loan features is examined below.

#### *D. Determinants of Loan Expected Excess Returns*

Using our estimates of loan expected excess returns we now repeat the regression analysis conducted in Section III.B but the dependent variable is now the loan expected return rather than the loan total return (or promised yield). Estimation of this regression allows us to uncover differences in systematic risk between issuing and non issuing firms while controlling for heterogeneity in loans and the characteristics of the underlying firms. Additionally, we also wish to see whether the key variables that lead to large differences in total yield (e.g., firm size, leverage, and book-to-market ratio) retain their explanatory power. To avoid spurious correlations, we drop book leverage and profitability from the right hand side of the regressions, as they appear implicitly on the left hand side through the estimated default probabilities. The results are presented in Table VI, whose format mimics that of Table IV.

We see that the results from Table IV are largely unaffected by the default risk adjustment. The IPO indicator is insignificant across all specifications, and the SEO indicator is significant but negative in all but one of the specifications, suggesting that institutional investor view SEO firms' loans to be less risky than otherwise identical non-issuing firms' loans. The estimated coefficient on firm size is unaffected by the adjustment, as is the book-to-market ratio: Small firms and high book-to-market firms have higher expected loan returns. Loan maturity and tangible assets both still exhibit significantly negative coefficients, though the magnitude of these estimates has been amplified by the adjustment. The covenant index coefficient is still positive and significant, indicating that riskier firms' loans have both higher yield and more restrictive covenants. The simultaneous determination of covenants and yield may cause an endogeneity problem and therefore the results of this regression should be interpreted with caution. (In the next sub-section we address the endogeneity issue directly.)

In sum, the default adjustment to yields has little effect on our previous results and conclusions. Therefore, it appears as though institutional lenders view IPO firms and non-issuing firms in a similar light with respect to risk, both total and systematic. SEO firms are being

viewed as less risky.

## **V. Endogeneity of Contract Features**

Many studies suggest that lenders can adjust the maturity of the loans and vary the number of covenants in conjunction with the pricing of the loans (see, for example, Smith and Warner (1979), Berger and Udell (1990), Booth (1992), Barclay and Smith (1995a)). This idea that certain loan features are determined simultaneously also has empirical support from studies by Bradley and Roberts (2003) and Chava, Kumar, and Warga (2004). While previous work examining expected bond returns has largely ignored this issue, it remains an empirical question as to whether the endogeneity of maturity and covenant structure has a meaningful effect on any inferences concerning expected returns. Therefore, we model the determination of loan yield, maturity, and covenants jointly to determine the impact of endogeneity on our results and conclusions thus far.

The challenge, of course, is in finding exogenous variation in loan maturity and covenants. Our instruments for the covenant index are lender variables, such as syndicate size and dummy variables corresponding to the lead bank SIC code. Our instruments for loan maturity are deal purpose dummies. The motivation for the covenant instruments is that the market for loans is priced competitively but where banks can more easily differentiate themselves is on the covenant specification. Indeed, in discussions with commercial lenders, loans often begin with boiler plate covenant specifications, most likely unique to the lender. Additionally, some firms may prefer more monitoring or information gathering than others and this is indirectly reflected in the covenant provisions. The maturity instruments are motivated by the idea that firms match asset and liability durations. Thus, the maturity of the loan will likely be dictated by the use of its funds.

Table VII reports coefficient estimates from a system of equations for loan expected excess return, loan covenants, and loan maturity. We first estimate a Poisson regression for the covenant index and use the predicted values from this regression in a second stage seemingly unrelated regression of loan maturity and yield. Because so many loans (over half of our sample) have missing covenant information, estimating the covenant equation first enables us to use imputed values for the second stage. Additionally, the nonlinearity and nonnormality

associated with the Poisson regression would make simultaneous estimation of all three equations extremely burdensome, as joint normality is no longer an appropriate assumption.

Turning to the results, the syndicate size variable and depository institution and brokerage dummy variables enter significantly in the covenant index equation. Similarly, the deal purpose dummies in the maturity equation are statistically significant, except for the *takeover* variable. In the covenant equation, both the IPO dummy coefficient and the SEO dummy coefficient are statistically insignificant. Issuing firms are treated in the same way as similar seasoned firms when institutional lenders set their loan covenants. The maturity equation, however indicates that both IPOs and SEOs firm, issue debt with longer maturity than non-issuing firms, as both the IPO dummy coefficient and the SEO dummy coefficient are statistically significant.

The IPO indicator variable in the expected excess return equation is also insignificantly different from zero. Consistent with prior results, the SEO dummy is negative and significant; suggesting SEO firms' loans are issued with lower expect rate of returns—even with other loan and firm characteristics are held constant. This result confirms that allowing for endogeneity does not alter our main conclusion that IPO loans have similar expected returns to those of similar non-issuing firms and SEO loans have lower yield than non-issuing firms. Most of the sensitivities on the remaining independent variables are similar to those reported in Tables IV and VI. Firm size is inversely related to loan yield while book-to-market ratio is positively related to the yield. Cash flow volatility retains its sign but loses significance in the joint estimation. Overall, our results are very similar to those presented earlier and our conclusions unchanged.

## **VI. Changes in Equity-Issuer Loan Yields over Time**

We have so far provided evidence that the private debt market, which is dominated by well-informed institutional lenders, does not price equity-issuing firms' loans differently than non-equity-issuing firms' loans after accounting for firm characteristics, such as size and book-to-market, and default risk. Moreover, our evidence suggests that institutional lenders view firm characteristics, such as size and book-to-market, when pricing loans in a manner consistent with the asset pricing model of Fama and French (1993).

We finally use our loan data to examine whether firms' loan yields change around the time of equity offerings. Several recent papers (Benninga, Helmantel and Sarig (2005), and Carlson, Fisher and Giammarino (2004)) have argued that equity issuance should be associated with lower exposure to risk since raising capital and investing that capital is tantamount to the exercise of a call option and acquisition of the underlying asset. These arguments imply that we should observe a decline in loan yield for a firm after it has issued equity from the period before the firm has issued equity.

To test this implication, we require each equity-issuing firm in our sample to have at least one pair of loans with 18 months to two years difference in the loan dates and one loan occurring before the equity issuance and one after. Using this sample of loan pairs we can examine how loan yields change around an equity issuance while keeping the equity-issuing firm identity constant. For each pair of loans, we calculate the differences in loan yields between these two dates.<sup>16</sup> We do this for all equity issuer loan pairs in which the later loan is taken out in any of the four six-month event windows following the firm's equity issuance – event windows  $[0,0.5)$ ,  $[0.5,1.0)$ ,  $[1.0,1.5)$ , and  $[1.5,2.0]$ .

The average loan yield changes are reported in Table VIII for each of the four six-month post-equity issuance intervals. Panel A reports yield changes for IPOs; panel B reports yield changes for SEOs. Concentrating on the IPO firms, the results indicate an economically meaningful drop in loan yields after equity issuances, consistent with the theories mentioned above. Of the 44 IPO firms in our sample that took out a loan in the 6 months following their IPOs and also took out a loan two years to 18 months prior to their IPOs, the average drop in yield between the two loans is 56 basis points. Of the 66 IPO firms that took out a loan 6 months to one year after their IPOs and also took out a loan 18 months to one year prior to their IPOs, the average drop in yields between the two loans is 64 basis points. Of the 93 IPO firms that took out a loan one year to 18 months after their IPOs and also took out a loan one year to 6 months prior to their IPOs, the average drop in yields between the loans is 31 basis points. Of the 86 IPO firms that took out a loan 18 months to two years after their IPOs and also took out a loan 6 months prior to or at their IPOs, the average change in yields between the two loans is

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<sup>16</sup> If the firm takes out more than one loan at the same time, we take the weighted average (by loan amount) of the loan yields.

actually positive, though small.

This pattern indicates that most of the negative yield change occurring after an IPO happens around the time of the IPO and in the year following. Yields decline less and ultimately stop declining in the second year following an IPO. The pattern for SEO firms is similar, though the yield changes are smaller in magnitude.<sup>17</sup> This pattern is consistent with the real options models mentioned above. However, it is also possible that the pattern could be driven by something else, such as greater bargaining power of IPO firms vis-à-vis banks after going public or due to a decrease in firm leverage following an equity issuance.

To address these concerns we also examine the change in *predicted* loan yields using the base regression (estimated without the IPO and SEO indicator variables, but estimated on the full sample of 13,228 loans) reported in Table IV. Since we observe how firm characteristics change around the equity offering, we ask which of these changes lead to an economically meaningful change in loan yield as predicted by our base regression. Examining changes in predicted loan yields allows us to investigate whether changes in predicted yield can be largely attributed to changes in certain firm-level factors such as size, book-to-market and leverage.

The last four columns of Table VIII report the total change in predicted yield for both IPO and SEO firms as well as the change in predicted yield due to changes in size, book-to-market and leverage of the equity-issuing firms. The change in predicted yield due to these firm characteristics are calculated by multiplying the estimated coefficient by the firm-level change in the characteristic between the two loan dates. Several of the findings are worth mentioning. First, the change in predicted yield, like the change in actual yield is negative, though its magnitude is lower for IPO firms. Second, the majority of the change in predicted yield can be attributed to the size factor: at least 50% of the change in the predicted yield can be attributed to this factor. Third, the book-to market variable is not a significant factor in the yield change. Fourth, the leverage effect is economically significant, but its effect is always lower than the size effect. Thus, while reduction in leverage following an equity issuance does lower predicted yield (especially on IPO loans), it can not explain the majority of the yield reduction. The findings on changes in predicted yields once again support the interpretation of the decline in loan yield stemming from a reduction in underlying asset risk following an equity issuance.

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<sup>17</sup> The pattern for loan expected returns is also very similar to the pattern for total loan yields.

## VII. Conclusions

We have examined how institutional lenders perceive the risk of firms equity-issuing equity relative to non-issuing firms by examining the pricing and contract structure of loans to these two groups of firms. We find, first, that equity-issuing and otherwise similar non-issuing firms face comparable yields on their loans, even after adjusting for default risk and accounting for potential endogeneity between the various components of the loan contract. This evidence is consistent with that from the equity market in which it has been shown that IPOs and SEOs earn returns similar to seasoned firms with the same characteristics, including size and book-to-market.

Second, we find that firm characteristics that have been identified in equity market research, such as size and book-to-market, play a similar role in the pricing of private debt. In particular, small, high book-to-market “value” firms are deemed riskier, thus requiring higher expected rates of return, *ex-ante*. This evidence is important as it provides an out-of-sample test corroborating the interpretation of these firm characteristics as proxies for systematic risk (Fama and French (1993)). Recently, Campello, Chen, and Zhang (2004) have shown, using publicly traded debt, that firm size and book-to-market ratio are priced consistent with the idea that smaller firms and those with high book-to-market ratios are expected to earn higher rates of return. Our evidence, which relies on a markedly different set of firms and pricing by institutions such as banks and insurance companies, who specialize in gathering information about borrowers, provides an additional piece of evidence consistent with the idea that size and book-to-market capture exposure to systematic risk that is compensated in expected returns.

Finally, we find that firms’ loan yields decline following equity issuances and that this decline in yield is due in large part to an increase in the size of the equity-issuing firm. This corroborates models, such as Benninga, Helmantel and Sarig (2005), and Carlson, Fisher and Giammarino (2004), in which firms issue equity to exercise a real option and after so doing experience a reduction in the risk of their underlying assets.

Overall, our analysis indicates that institutional lender pricing of loans to equity-issuing firms is consistent with claims that low equity returns of IPOs and SEOs reflect the underlying risk characteristics of the equity-issuing firms. Our analysis provides important out-of-sample tests that offer additional evidence in favor of risk explanations of IPO and SEO equity returns.

## Appendix: Default Model Estimation

We estimate four different models of firm bankruptcy. We estimate two panel logit models, one with the covariates of Altman (1968) and one with the covariates of Zmijewski (1984). Similarly, we estimate two Cox proportional hazard models. In this appendix, we describe the estimation of the models and the calculation of the predicted loan default probabilities.

### A. Panel Logit Models

The panel logit models take the form of

$$\Pr(\text{Firm } j \text{ defaults in quarter } t) = \Lambda(b_0 + b_1 X_{j,t-1} + e_t) \quad (\text{A1})$$

$\Lambda$  is the standard cumulative logistic distribution function, and  $X$  is a matrix of firm level accounting information taken from the previous quarter.

In the Altman specification of the panel logit the covariates are WC/TA (WC = working capital=current assets – current liabilities; TA = total assets), RE/TA (RE = retained earnings), EBITA/TA (EBITA = earnings before interest, taxes and amortization), ME/TL (ME = market equity; TL = total liabilities), S/TA (S = sales).

In the Zmijewski specification the covariates are NI/TA (NI = net income), TL/TA, and CA/CL (CA = current assets; CL = current liabilities). We estimate these two panel logit models on the subsample of firms in Compustat that also appear at some point in the 1987 to 2002 period in DealScan. We include all quarters for which we have data for firms that at some point took out a loan as recorded in DealScan. In both models, we also include a dummy variable LOAN, which equals one in the quarter(s) in which a firm takes out a loan recorded in DealScan. The estimated coefficients for both the Altman and Zmijewski models are reported in Table VIII.

For each loan in our sample we calculate the cumulative probability that the borrowing firm defaults over each six-month interval for the maturity of the loan. The predicted probability that a firm defaults in a given quarter is

$$PP_{i,t} \equiv \text{Predicted Prob Firm } j \text{ defaults in quarter } t = \Lambda(\hat{b}_0 + \hat{b}_1 X_{j,t-1}) \quad (\text{A2})$$

Where  $\hat{b}$  are the estimated coefficients. The cumulative probability of default in a six month interval is simply  $1 - ((1 - PP_{j,t}) * (1 - PP_{j,t-1}))$ .

When predicting probabilities using the panel logit estimates, we use realized financial

statement numbers and assume that banks can accurately predict the evolution of firms' characteristics. Thus, the predicted loan default probability is a function of the borrowing firm characteristics at the time of the loan, the bank's prediction of the firm's future characteristics and the loan maturity. If future data for a firm is not available, then we assume future values of the covariates equal the final observed values.

*B. Cox Proportional Hazard Models*

The Cox proportional hazard model takes the form of

$$h(t, X_j) = h(t, 0) \exp[\beta' X_j] \quad (A3)$$

The function  $h(t, X_j)$  is the hazard rate at time  $t$  for a firm  $j$  with covariates  $X$ , or the probability that a firm with covariates  $X$  defaults conditional on surviving to time  $t$ . The dependent variable in our Cox proportional hazard models is the time it takes a firm to default from the point at which it takes out a loan on DealScan and we measure time to default of the loan, where a loan is classified as defaulting if the borrower files for bankruptcy before the maturity of the loan. The maximum likelihood estimation accounts for right censoring in the time to default dependent variable. Table IX reports the estimated coefficients for two different hazard models using the Altman and Zmijewski covariates as defined above.

To predict the probability of default for each six month interval of a loans maturity, we compute the survival function for the end of the interval of interest and subtract it from the survival function six months prior to the end of the interval of interest. The survival function is defined as

$$S(t) = \exp(-H(t)) \quad (A4)$$

And  $H(t)$  is the integrated hazard function given by

$$H(t) = \int_0^t h(s, 0) \exp(\beta' X_j) ds \quad (A5)$$

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**Table I**

**Dealscan Loan Data Summary Statistics**

The sample consists of all nonfarm, nonfinancial, nonutility domestic firms entering into US dollar denominated loans between 1987-2003 and appearing in both the Dealscan and merged CRSP/Compustat databases. The table presents summary statistics for our sample of loans by year and across all years. Panel A presents the number of loans, the number of packages (one or more loans entered into by a firm at the same point in time), and the number of companies in our sample. Panel B presents the fraction of loans that are 364-day loans, term loans, and revolving loans, which represent the most popular loan types of the 23 in our sample. Panel C presents the fraction of loans that are for general corporate purposes, debt repayment, takeover financing, and working capital, which represent the most popular purposes of the 26 in our sample. Panel D presents the average promised spread in basis points over the 6-month LIBOR (Promised Yield), loan Amount, and loan Maturity. Panel E presents summary statistics for various covenants. Secured is the fraction of loans that are secured. Dividend Res. is the fraction of loans that contain a dividend restriction. # Fin. Rest. is the average number of accounting ratios that are restricted to lie within a certain range. Net Worth is the fraction of loans containing a minimum net worth covenants. Sweep provisions (asset, debt, equity) are pre-payment provisions.

Panel A: Loans, Packages and Borrowers

Variable	All Years	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
# of Co.s	5,337	268	533	513	558	496	670	812	942	860	1,125	1,311	1,043	976	964	941	900	763
# of Loans	22,048	445	990	897	903	790	1,022	1,269	1,476	1,365	1,796	2,120	1,761	1,664	1,570	1,481	1,351	1,148
# of Packages	15,758	328	682	632	676	604	796	946	1,072	965	1,271	1,493	1,174	1,090	1,098	1,071	989	871

Panel B: Loan Type

Variable	All Years	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
364-Day	0.08	0.00	0.00	0.01	0.01	0.01	0.01	0.04	0.07	0.06	0.04	0.06	0.10	0.11	0.18	0.19	0.19	0.17
Term	0.25	0.22	0.26	0.27	0.27	0.24	0.23	0.24	0.22	0.23	0.23	0.24	0.27	0.29	0.24	0.20	0.25	0.26
Revolver	0.61	0.59	0.55	0.60	0.63	0.62	0.69	0.67	0.67	0.67	0.70	0.67	0.60	0.54	0.52	0.54	0.51	0.54

Panel C: Deal Purpose

Variable	All Years	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Gen. Purp.	0.24	0.19	0.22	0.19	0.25	0.35	0.37	0.33	0.36	0.27	0.23	0.19	0.15	0.14	0.16	0.22	0.28	0.32
Debt Repay	0.26	0.15	0.20	0.17	0.24	0.23	0.23	0.20	0.20	0.35	0.41	0.39	0.33	0.28	0.30	0.21	0.11	0.06
Takeover	0.12	0.10	0.13	0.13	0.09	0.05	0.05	0.05	0.10	0.14	0.14	0.17	0.22	0.20	0.11	0.06	0.05	0.05
Work Cap.	0.17	0.36	0.20	0.29	0.27	0.24	0.20	0.21	0.15	0.10	0.08	0.09	0.08	0.09	0.11	0.21	0.31	0.34

Panel D: Loan Details

Variable	All Years	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Promised Yield	219.54	221.78	260.44	263.93	239.04	259.68	248.04	235.39	192.41	187.94	203.34	189.68	194.99	224.76	213.02	217.21	238.76	235.22
Amount	171.47	169.40	174.57	181.33	110.34	99.17	95.01	113.50	164.98	173.26	152.61	175.67	175.28	183.90	227.94	241.49	187.17	209.71
Maturity	42.43	45.73	46.31	47.13	43.34	36.81	40.36	40.40	44.99	46.19	44.96	45.48	45.99	44.13	40.58	35.01	34.36	37.68

Panel E: Covenants for a Subsample of Loans

Variable	All Years	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Secured	0.82	0.76	0.88	0.93	0.89	0.91	0.87	0.85	0.79	0.80	0.79	0.80	0.85	0.81	0.76	0.76	0.81	0.80
Dividend Rest.	0.86	.	1.00	1.00	1.00	1.00	0.71	0.84	0.78	0.89	0.88	0.91	0.89	0.88	0.85	0.81	0.83	0.84
# Fin Rest.	2.56	.	.	1.00	1.75	2.00	1.60	2.35	2.04	2.30	2.43	2.38	2.55	2.89	2.73	2.58	2.62	2.69
Net Worth	0.25	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.06	0.30	0.48	0.47	0.41	0.37	0.31	0.30	0.36	0.29
Asset Sweep	0.66	.	.	1.00	1.00	.	1.00	0.32	0.47	0.42	0.44	0.51	0.72	0.86	0.92	0.95	0.98	0.99
Debt Sweep	0.48	.	.	.	1.00	.	.	0.18	0.33	0.22	0.26	0.36	0.51	0.69	0.70	0.79	0.89	0.94
Equity Sweep	0.49	.	.	.	1.00	.	.	0.24	0.36	0.24	0.29	0.37	0.53	0.71	0.72	0.75	0.86	0.92

Table II

**IPO and Non-IPO Loan and Firm Characteristics**

The sample consists of all nonfarm, nonfinancial, nonutility domestic firms entering into US dollar denominated loans between 1987-2003 and appearing in both the Dealscan and merged CRSP/Compustat databases. Panel A presents mean and median (Med) loan characteristics for four samples: the entire Dealscan sample (Dealscan), the subsample of Dealscan loans occurring within two years after the IPO (Dealscan IPOs), the subsample of Dealscan loans occurring within two years after the SEO (Dealscan SEOs), and the subsample of Dealscan loans not occurring within the two years following the IPO or SEO (Dealscan Non-Iss). The variables are as defined above, except Obs which corresponds to the number of observations in the particular sample. Panel B presents mean and median (Med) information on loan covenants. Panel C presents mean and median (Med) firm characteristics for these three samples and three additional samples: the entire merged CRSP/Compustat database during the period 1987-2003 (Compustat), all IPO firms on the SDC database that are matched to CRSP/Compustat (All IPOs), and SEO firms on the SDC database that are matched to CRSP/Compustat (All SEOs). "DS" denotes Dealscan and corresponds to firms also in the Dealscan database. Book leverage is the ratio of total debt (short-term + long-term) to total assets. Firm Size is the gdp-deflated market capitalization. Book-to-Market is the ratio of book equity to market equity. Tangible Assets is the ratio of net PPE to total assets. Profitability is the ratio of EBITDA to total assets. Cash Flow Volatility is the standard deviation of historical (or future when missing) operating cash flows.

Panel A: Loan Characteristics

Variables	All Firms		Non-Issuers		IPOs		SEOs	
	Mean	Med	Mean	Med	Mean	Med	Mean	Med
Promised Yield	219.54	225.00	224.86	225.00	231.69	225.00	179.55	162.50
Loan Amount	171.47	44.79	176.91	43.97	91.16	23.45	198.72	82.63
Loan Amount / Assets	0.31	0.16	0.30	0.16	0.42	0.22	0.26	0.18
Maturity	42.43	36.00	41.49	36.00	44.22	36.00	46.59	48.00
364-Day Loan	0.08	.	0.09	.	0.02	.	0.07	.
Term Loan	0.25	.	0.25	.	0.24	.	0.22	.
Revolving Loan	0.61	.	0.59	.	0.67	.	0.65	.
Corporate Purposes	0.24	.	0.24	.	0.23	.	0.24	.
Debt Repayment	0.26	.	0.25	.	0.26	.	0.30	.
Takeover	0.12	.	0.11	.	0.13	.	0.15	.
Working Capital	0.17	.	0.17	.	0.18	.	0.15	.
Obs	22048.00	.	16985.00	.	2152.00	.	2911.00	.

Panel B: Covenants

Variables	All Firms		Non-Issuers		IPOs		SEOs	
	Mean	Med	Mean	Med	Mean	Med	Mean	Med
Secured	0.82	.	0.82	.	0.87	.	0.79	.
Dividend Restricted	0.86	.	0.85	.	0.94	.	0.89	.
Number Financial Cov.	2.56	2.00	2.52	2.00	2.75	3.00	2.67	2.50
Net Worth	0.25	.	0.25	.	0.26	.	0.25	.
Asset Sweep	0.66	.	0.67	.	0.66	.	0.64	.
Debt Sweep	0.48	.	0.49	.	0.47	.	0.44	.
Equity Sweep	0.49	.	0.51	.	0.52	.	0.40	.

Panel C: Firm Characteristics

Variables	Dealscan Sub-Samples																				
	Compustat			All IPOs			All SEOs			All Firms			Non-Issuers			IPOs			SEOs		
	Mean	Med	Mean	Med	Mean	Med	Mean	Med	Mean	Med	Mean	Med	Mean	Med	Mean	Med	Mean	Med	Mean	Med	
Book Leverage	0.58	0.24	0.38	0.27	0.27	0.26	0.29	0.29	0.33	0.30	0.31	0.26	0.30	0.31	0.26	0.30	0.30	0.29	0.30	0.29	
Firm Size (Mcap)	1165.83	77.70	385.43	113.79	1216.59	297.28	1793.08	188.43	1985.85	171.39	476.82	125.04	1724.05	438.54	1724.05	438.54	1724.05	438.54	1724.05	438.54	
Firm Size (Assets)	1260.96	70.42	208.63	23.75	1339.63	150.15	1716.05	243.98	1873.44	260.97	623.98	98.04	1738.93	389.02	1738.93	389.02	1738.93	389.02	1738.93	389.02	
Book-to-Market	2.06	0.54	0.36	0.29	0.37	0.28	0.58	0.49	0.61	0.52	0.51	0.41	0.52	0.44	0.41	0.52	0.44	0.52	0.44	0.44	
Tangible Assets	0.32	0.24	0.24	0.17	0.32	0.24	0.32	0.26	0.32	0.27	0.27	0.20	0.32	0.26	0.20	0.32	0.26	0.32	0.26	0.26	
Profitability	-0.08	0.03	-0.01	0.03	0.02	0.04	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	
Cash Flow Volatility	0.30	0.04	0.16	0.04	0.15	0.03	0.04	0.03	0.04	0.03	0.04	0.02	0.03	0.02	0.02	0.03	0.03	0.02	0.03	0.02	
Cons NonDur	0.04	.	0.05	.	0.05	.	0.09	.	0.09	.	0.10	.	0.08	.	0.10	.	0.08	.	0.08	.	
Cons Dur	0.02	.	0.02	.	0.03	.	0.04	.	0.04	.	0.03	.	0.03	.	0.03	.	0.03	.	0.03	.	
Manuf	0.08	.	0.07	.	0.10	.	0.18	.	0.19	.	0.14	.	0.14	.	0.14	.	0.14	.	0.14	.	
Enrgy,Oil,Gas,Coal	0.03	.	0.02	.	0.06	.	0.06	.	0.05	.	0.04	.	0.08	.	0.04	.	0.08	.	0.08	.	
Chem & Allied Prods	0.01	.	0.01	.	0.02	.	0.03	.	0.03	.	0.02	.	0.03	.	0.02	.	0.03	.	0.03	.	
Bus Equip	0.12	.	0.20	.	0.19	.	0.16	.	0.16	.	0.18	.	0.14	.	0.18	.	0.14	.	0.14	.	
Tel & TV Trans	0.02	.	0.03	.	0.05	.	0.05	.	0.04	.	0.07	.	0.07	.	0.07	.	0.07	.	0.07	.	
Utilities	0.02	.	0.00	.	0.07	.	0.00	.	0.00	.	0.00	.	0.00	.	0.00	.	0.00	.	0.00	.	
Whlsl, Ret, & Serv	0.07	.	0.11	.	0.13	.	0.17	.	0.17	.	0.17	.	0.18	.	0.17	.	0.18	.	0.18	.	
Hlth, Med Eq, & Drugs	0.06	.	0.11	.	0.14	.	0.08	.	0.07	.	0.08	.	0.08	.	0.08	.	0.08	.	0.08	.	
Money,Finance	0.01	.	0.01	.	0.00	.	0.00	.	0.00	.	0.00	.	0.00	.	0.00	.	0.00	.	0.00	.	
Other	0.11	.	0.13	.	0.16	.	0.15	.	0.15	.	0.17	.	0.17	.	0.17	.	0.17	.	0.17	.	
Obs	883292.00	.	4446.00	.	5182.00	.	22048.00	.	16985.00	.	2152.00	.	2911.00	.	2152.00	.	2911.00	.	2911.00	.	

**Table III**  
**Average Yield Spreads for Size and Book-to-Market Portfolios**

The sample consists of all nonfarm, nonfinancial, nonutility domestic firms entering into US dollar denominated loans between 1987-2003 and appearing in both the Dealscan and merged CRSP/Compustat databases. The table presents average yields, measured in basis points above the 6-month LIBOR, for portfolios of loans formed on gdp-deflated total assets and book-to-market quintiles. The number of loans in each portfolio is presented in parentheses below the average yield. The Non-Issuing Loans sample consist of all loans not occurring within two years after an IPO or SEO. The IPO Loans sample consists of all loans occurring within two years after the IPO (but not an SEO). The SEO Loans sample consists of all loans occurring within two years after the SEO. The portfolio breakpoints are determined from quintiles based on the entire Dealscan sample (i.e., common breakpoints are used for both IPO and Non-IPO loans).

Size	Non Issuing Loans					Book-to-Market									
	Low	2	3	4	High	Low	2	3	4	High					
Small	347 (702)	308 (527)	295 (516)	291 (497)	297 (611)	256 (141)	287 (178)	284 (132)	259 (87)	285 (49)	323 (58)	270 (31)	286 (42)	265 (25)	270 (25)
2	270 (434)	220 (487)	235 (557)	244 (641)	273 (761)	223 (156)	216 (157)	226 (156)	222 (97)	263 (82)	241 (103)	195 (128)	196 (105)	233 (97)	229 (47)
3	217 (434)	184 (540)	195 (544)	203 (632)	253 (706)	218 (103)	214 (113)	223 (93)	191 (77)	246 (79)	172 (127)	185 (133)	176 (137)	191 (118)	200 (68)
4	180 (463)	144 (528)	154 (634)	170 (603)	220 (594)	212 (58)	159 (41)	200 (47)	169 (50)	191 (40)	158 (93)	149 (181)	162 (184)	171 (148)	184 (92)
Big	103 (563)	71 (562)	90 (592)	99 (661)	139 (447)	157 (21)	136 (19)	155 (18)	156 (20)	138 (40)	108 (105)	96 (79)	109 (128)	117 (130)	131 (60)

## Table IV

### Raw Spread Regressions: IPOs Versus Non-IPOs

The sample consists of all nonfarm, nonfinancial, nonutility domestic firms entering into US dollar denominated loans between 1987-2003 and appearing in both the Dealscan and merged CRSP/Compustat databases. The table presents the estimated coefficients from a regression of loan yield, measured in basis points above the 6-month LIBOR, on various determinants. Four different regressions are presented, varying only in the specification of the right-hand side variables. The Base specification present our primary specification. The Lender specification further conditions on the availability of lender data. The Covenant specification further conditions on the availability of covenant data. The All specification further conditions on the availability of both lender and covenant data. IPO Indicator is an indicator variable equal to one if the loan occurred within two years after the IPO (but not SEO). SEO Indicator is an indicator variable equal to one if the loan occurred within two years after the SEO. Maturity is the loan maturity, measured in months. Loan Amount / Assets is the ratio of the loan principal to the total assets of the firm in the quarter preceding the loan. Book leverage is the ratio of total debt (short-term + long-term) to total assets expressed in percent. Log(Assets) is the log of the gdp-deflated total assets. Log(Book-to-Market) is the log of the ratio of book equity to market equity. Tangible Assets is the ratio of net PPE to total assets expressed in percent. Profitability is the ratio of EBITDA to total assets expressed in percent. Cash Flow Volatility is the standard deviation of historical (or future when missing) operating cash flows expressed in percent. Equity Beta is estimated using 24-60 months (as available) of monthly returns data over the period beginning in the month after the issuance. The beta is the sum of the estimated coefficients on the contemporaneous and lagged excess market return. Equity Idiosyncratic Vol is the RMSE from the beta regression. Depository Inst (Insurance Co.; Non-Depository Inst, Brokerage) is an indicator variable equal to one if the lead bank on the deal is of the corresponding type denoted by their SIC code. Syndicate Size is the number of bank in the lending syndicate. Covenant Index equals the number of covenants present in the loan contract. Obs is the number of observations. Also included in the regressions but not reported are fixed effects for the Fama-French 38 industries, calendar year, deal purpose and type of loan. All standard errors are cluster-adjusted for dependence within firms.

Variable	Base	Beta/Vol	Lender	Covenant	All
Intercept	534.09 ( 7.17)	497.17 ( 4.95)	515.13 ( 5.94)	274.10 ( 7.98)	412.10 ( 7.29)
IPO Indicator	-0.35 ( -0.11)	-2.87 ( -0.80)	5.22 ( 1.13)	1.52 ( 0.26)	9.77 ( 1.24)
SEO Indicator	-6.40 ( -2.24)	-8.49 ( -2.74)	-6.45 ( -1.78)	-10.37 ( -2.10)	-0.27 ( -0.04)
Log(Maturity)	-21.21 ( -9.25)	-17.75 ( -7.59)	-19.72 ( -5.57)	-39.33 ( -5.97)	-24.88 ( -2.79)
Loan Amount / Assets	-0.01 ( -5.70)	-0.01 ( -4.35)	-0.01 ( -11.30)	-0.01 ( -3.20)	-0.01 ( -3.98)
Book Leverage	1.24 ( 17.26)	1.22 ( 14.97)	1.19 ( 13.12)	1.10 ( 10.23)	0.91 ( 6.79)
Log(Assets)	-36.26 ( -41.39)	-33.17 ( -33.51)	-29.37 ( -20.90)	-25.67 ( -14.47)	-16.13 ( -5.83)
Log(Book-to-Market)	13.43 ( 8.55)	10.75 ( 5.83)	15.66 ( 7.99)	15.91 ( 6.13)	9.34 ( 2.60)
Tangible Assets	-0.15 ( -2.13)	-0.01 ( -0.10)	-0.02 ( -0.28)	0.20 ( 1.88)	0.14 ( 1.08)
Profitability	-4.41 ( -9.81)	-3.13 ( -7.05)	-2.97 ( -4.24)	-5.69 ( -6.39)	-3.87 ( -4.03)
Cash Flow Volatility	0.30 ( 1.44)	1.00 ( 3.17)	0.87 ( 2.81)	1.38 ( 2.42)	1.15 ( 1.47)
Equity Beta	. ( .)	2.30 ( 1.52)	. ( .)	. ( .)	1.40 ( 0.41)
Equity Idiosyncratic Vol	. ( .)	2.30 ( 7.45)	. ( .)	. ( .)	1.00 ( 1.80)
Depository Inst	. ( .)	. ( .)	-20.95 ( -2.45)	. ( .)	-21.85 ( -1.75)
Insurance Co	. ( .)	. ( .)	16.27 ( 0.32)	. ( .)	0.00 ( .)
Non-Depository Inst	. ( .)	. ( .)	95.79 ( 9.21)	. ( .)	10.54 ( 0.60)
Brokerage	. ( .)	. ( .)	35.51 ( 5.83)	. ( .)	16.26 ( 1.89)
Log(Syndicate Size)	. ( .)	. ( .)	-1.81 ( -0.98)	. ( .)	-5.39 ( -1.79)
Covenant Index	. ( .)	. ( .)	. ( .)	9.62 ( 8.22)	12.06 ( 8.23)
Adj. $R^2$	0.50	0.53	0.59	0.56	0.66
Obs	13,228	9,396	5,780	2,877	1,147

Table V

**Default Probabilities and Adjusted Loan Spreads**

**Rebecca: Update** The sample consists of all nonfarm, nonfinancial, nonutility domestic firms entering into US dollar denominated loans between 1987-2003 and appearing in both the Dealscan and merged CRSP/Compustat databases. Panel A presents default probabilities by year for IPO firms, SEO firms and Non-issuing firms. Empirical Fraction is the ratio of the number of defaults to total loans issued in a particular year. Hazard Zmijewski (Altman) is the average probability of default averaged across all loans issued in a year, where the individual loan default probabilities are obtained from an estimated hazard model whose covariate specification is the same as in Zmijewski (1984) (Altman (1968)). Logit Zmijewski (Altman) is the average probability of default averaged across all loans issued in a year, where the individual loan default probabilities are obtained from an estimated panel logit model whose covariate specification is the same as in Zmijewski (1984) (Altman (1968)). We use “Zmi” and “Alt” to denote Zmijewski and Altman, respectively. Panel B presents averages (medians in brackets) of the unadjusted (Raw) and default adjusted yield spreads for the entire sample (Pooled), Non-issuing loans, IPO loans, and SEO Loans. Non-Issuing loans consist of all loans not occurring within two years after an IPO or SEO. IPO Loans sample consist of all loans occurring within two years after the IPO (but not an SEO). SEO Loans sample consist of all loans occurring within two years after the SEO. Default adjusted spreads are computed as the internal rate of return to the loan, based on the par value and expected cash flows (see Section 4). The assumed recovery rate is 70%.

Panel A: Average Default Probabilities by Year

Year	Non-IPO Loans						IPO Loans						SEO Loans					
	Empirical		Hazard		Logit		Empirical		Hazard		Logit		Empirical		Hazard		Logit	
	Fraction	Zmi	Hazard	Alt	Zmi	Alt	Fraction	Zmi	Hazard	Alt	Zmi	Alt	Fraction	Zmi	Hazard	Alt	Zmi	Alt
1987	5.72	5.40	5.85	4.33	5.22	4.33	2.17	4.76	2.93	2.88	3.59	2.99	5.21	5.29	4.34	5.68	4.34	5.68
1988	7.90	5.27	5.73	4.70	5.02	4.70	2.70	5.86	5.18	4.39	5.04	3.19	5.23	5.21	4.52	5.01	4.52	5.01
1989	5.89	5.87	6.02	4.79	5.34	4.79	2.38	5.01	4.97	3.52	3.87	5.41	5.05	5.10	4.40	5.32	4.40	5.32
1990	4.46	5.45	5.60	4.23	4.93	4.23	1.49	5.18	4.85	3.39	3.92	6.85	4.54	4.79	2.67	3.82	2.67	3.82
1991	3.96	5.00	4.88	3.71	4.01	3.71	0.00	4.13	3.35	2.76	3.18	4.00	4.01	3.90	2.98	3.12	2.98	3.12
1992	2.24	5.66	5.33	3.76	4.23	3.76	2.63	6.17	3.69	2.96	3.09	0.67	5.10	4.68	3.42	3.70	3.42	3.70
1993	2.43	5.51	5.55	3.74	3.99	3.74	3.83	5.77	4.56	3.26	3.69	3.35	5.84	5.24	3.64	4.21	3.64	4.21
1994	2.99	5.76	5.60	4.21	4.45	4.21	3.27	6.17	5.27	3.70	4.37	3.93	5.53	5.38	3.68	4.20	3.68	4.20
1995	5.24	5.51	5.92	4.62	4.65	4.62	2.08	6.10	5.39	4.51	4.45	3.93	5.80	5.80	4.33	4.85	4.33	4.85
1996	5.78	5.53	5.50	4.21	4.43	4.21	6.06	6.33	4.78	4.22	4.00	4.24	6.17	5.17	4.96	4.89	4.96	4.89
1997	6.32	5.72	5.89	4.41	4.70	4.41	10.03	5.97	4.67	4.59	4.53	7.94	5.68	5.43	4.84	4.89	4.84	4.89
1998	7.18	5.58	5.56	4.69	4.82	4.69	12.25	6.64	5.11	4.39	4.81	9.93	6.09	5.18	4.96	5.21	4.96	5.21
1999	6.79	5.18	5.17	4.03	4.39	4.03	11.51	5.77	5.40	5.06	5.47	8.73	6.19	5.73	4.91	5.69	4.91	5.69
2000	6.55	4.94	4.96	4.11	4.35	4.11	16.67	6.88	4.79	5.32	4.68	10.59	6.34	5.46	4.34	4.45	4.34	4.45
2001	3.50	4.24	4.49	3.50	3.58	3.50	4.17	5.00	4.04	2.89	2.44	4.88	4.45	4.23	3.91	3.91	3.91	3.91
2002	3.18	4.26	4.52	3.13	3.35	3.13	0.00	6.42	4.58	3.06	2.97	0.71	5.15	4.78	3.65	3.76	3.65	3.76
2003	1.53	4.93	4.94	3.21	3.34	3.21	0.00	6.38	7.90	8.09	6.36	0.62	6.13	5.56	3.88	3.81	3.88	3.81
All Years	4.85	5.24	5.32	4.06	4.33	4.06	6.46	5.99	4.88	4.06	4.25	5.37	5.64	5.23	4.27	4.59	4.27	4.59

Panel B: Loan Yield Spreads (Raw and Default Adjusted)

Variable	Pooled	Non-Issuer	IPOs	SEOs
	219.54 [ 225.00]	218.23 [ 212.50]	231.69 [ 225.00]	179.55 [ 162.50]
Default Adj. Spread (Hazard Zmi)	165.91 [ 155.75]	164.21 [ 152.71]	181.30 [ 175.53]	132.98 [ 116.19]
Default Adj. Spread (Hazard Alt)	164.01 [ 153.89]	162.10 [ 150.72]	181.48 [ 177.20]	134.83 [ 120.34]
Default Adj. Spread (Panel Logit Zmi)	175.77 [ 172.84]	173.68 [ 170.24]	194.79 [ 192.36]	141.45 [ 131.52]
Default Adj. Spread (Panel Logit Alt)	174.32 [ 168.58]	171.99 [ 165.33]	195.64 [ 188.18]	139.94 [ 128.17]
Empirical Adjusted Spread	164.94 [ 170.40]	162.43 [ 156.70]	173.49 [ 166.80]	128.25 [ 111.20]

## Table VI

### Default Adjusted Spread Regressions: Issuers Versus Non-IPOs

The sample consists of all nonfarm, nonfinancial, nonutility domestic firms entering into US dollar denominated loans between 1987-2003 and appearing in both the Dealscan and merged CRSP/Compustat databases. The table presents the estimated coefficients from a regression of the default adjusted loan yield, measured in basis points above the 6-month LIBOR and assuming a loan recovery rate of 70%, on various determinants. The Base specification present our primary specification. The Lender specification further conditions on the availability of lender data. The Covenant specification further conditions on the availability of covenant data. The All specification further conditions on the availability of both lender and covenant data. IPO Indicator is an indicator variable equal to one if the loan occurred within two years after the IPO (but not SEO). SEO Indicator is an indicator variable equal to one if the loan occurred within two years after the SEO. Maturity is the loan maturity, measured in months. Loan Amount / Assets is the ratio of the loan principal to the total assets of the firm in the quarter preceding the loan. Log(Assets) is the log of the gdp-deflated total assets. Log(Book-to-Market) is the log of the ratio of book equity to market equity. Tangible Assets is the ratio of net PPE to total assets expressed in percent. Cash Flow Volatility is the standard deviation of historical (or future when missing) operating cash flows expressed in percent. Equity Beta is estimated using 24-60 months (as available) of monthly returns data over the period beginnging in the month after the issuance. The beta is the sum of the estimated coefficients on the contemporaneous and lagged excess market return. Equity Idiosyncratic Vol is the RMSE from the beta regression. Depository Inst (Insurance Co.; Non-Depository Inst, Brokerage) is an indicator variable equal to one if the lead bank on the deal is of the corresponding type denoted by their SIC code. Syndicate Size is the number of bank in the lending syndicate. Covenant Index equals the number of covenants present in the loan contract. Also included in the regressions but not reported are fixed effects for the Fama-French 38 industries, calendar year, deal purpose and type of loan. All standard errors are cluster-adjusted for dependence within firms.

Variable	Base	Beta/Vol	Lender	Covenant	All
Intercept	486.99 ( 5.82)	442.21 ( 4.22)	515.32 ( 5.70)	317.36 ( 8.99)	475.97 ( 7.66)
IPO Indicator	-0.31 ( -0.09)	-2.43 ( -0.66)	4.54 ( 0.96)	-3.62 ( -0.58)	10.86 ( 1.35)
SEO Indicator	-7.28 ( -2.45)	-9.11 ( -2.75)	-7.42 ( -1.96)	-11.90 ( -2.27)	0.84 ( 0.11)
Log(Maturity)	-14.49 ( -6.27)	-11.10 ( -4.67)	-13.24 ( -3.78)	-31.70 ( -5.13)	-19.64 ( -2.21)
Loan Amount / Assets	-0.01 ( -5.67)	-0.01 ( -4.70)	-0.01 ( -12.53)	-0.01 ( -3.82)	-0.01 ( -4.84)
Log(Assets)	-37.21 ( -41.95)	-33.85 ( -33.17)	-31.37 ( -21.55)	-25.27 ( -13.50)	-17.53 ( -5.59)
Log(Book-to-Market)	16.52 ( 9.75)	13.91 ( 6.88)	17.39 ( 7.97)	14.23 ( 4.46)	10.87 ( 2.52)
Tangible Assets	-0.43 ( -5.29)	-0.27 ( -2.90)	-0.26 ( -2.57)	-0.14 ( -1.07)	-0.21 ( -1.16)
Cash Flow Volatility	0.26 ( 1.58)	0.55 ( 1.18)	-0.01 ( -0.03)	0.74 ( 1.37)	-0.29 ( -0.31)
Equity Beta	. ( .)	2.75 ( 1.78)	. ( .)	. ( .)	0.88 ( 0.22)
Equity Idiosyncratic Vol	. ( .)	2.37 ( 7.42)	. ( .)	. ( .)	0.64 ( 0.98)
Depository Inst	. ( .)	. ( .)	-20.31 ( -2.30)	. ( .)	-31.87 ( -2.69)
Insurance Co	. ( .)	. ( .)	12.82 ( 0.28)	. ( .)	0.00 ( .)
Non-Depository Inst	. ( .)	. ( .)	96.91 ( 9.19)	. ( .)	13.50 ( 0.80)
Brokerage	. ( .)	. ( .)	38.73 ( 5.49)	. ( .)	16.88 ( 1.60)
Log(Syndicate Size)	. ( .)	. ( .)	-0.94 ( -0.49)	. ( .)	-4.10 ( -1.25)
Covenant Index	. ( .)	. ( .)	. ( .)	11.70 ( 9.58)	13.91 ( 8.99)
Adj. $R^2$	0.48	0.52	0.58	0.51	0.61
Obs	13,198	9,372	5,759	2,868	1,141

## Table VII

### Simultaneous Equations: Issuers Versus Non-IPOs

The sample consists of all nonfarm, nonfinancial, nonutility domestic firms entering into US dollar denominated loans between 1987-2003 and appearing in both the Dealscan and merged CRSP/Compustat databases. The table presents coefficient estimates from a system of equations for covenant index, loan maturity (measured in months), and default adjusted loan yield, measured in basis points and assuming a loan recovery rate of 70%. Covenant index, which assigns one point for each covenant present in the loan, is estimated separately in a first stage using a Poisson regression. The predicted values from this regression are then used in a second stage seemingly unrelated regression of maturity and loan yield. The instruments for the covenant index equation include lender variables, such as syndicate size and lead bank SIC code. The instruments for the maturity equation include deal purpose dummies. The table presents the estimated coefficients for the three equations: loan yield (measured in basis points above 6-month LIBOR), covenant index, and maturity (measured in months). IPO Indicator is an indicator variable equal to one if the loan occurred within two years after the IPO (but not SEO). SEO Indicator is an indicator variable equal to one if the loan occurred within two years after the SEO. Loan Amount / Assets is the ratio of the loan principal to the total assets of the firm in the quarter preceding the loan. Book leverage is the ratio of total debt (short-term + long-term) to total assets expressed in percent. Log(Assets) is the log of the gdp-deflated total assets. Log(Book-to-Market) is the log of the ratio of book equity to market equity. Tangible Assets is the ratio of net PPE to total assets expressed in percent. Profitability is the ratio of EBITDA to total assets expressed in percent. Cash Flow Volatility is the standard deviation of historical (or future when missing) operating cash flows expressed in percent. Depository Inst (Non-Depository Inst, Brokerage) is an indicator variable equal to one if the lead bank on the deal is of the corresponding type denoted by their SIC code. Syndicate Size is the number of lenders in the lending syndicate. Workcap is an indicator variable equal to one if the deal purpose is for working capital. Corpurp is an indicator variable equal to one if the deal purpose is for corporate purposes. Debtrepay is an indicator variable equal to one if the deal purpose is for debt repayment. Takeover is an indicator variable equal to one if the deal purpose is for a takeover. Also included in the regressions but not reported are fixed effects for the Fama-French 38 industries, calendar year, and type of loan. All standard errors are cluster-adjusted for dependence within firms.

Variable	Yield	Covenant Index	Log(Maturity)
Intercept	402.73 ( 17.28)	17.69 ( 32.69)	1.63 ( 10.09)
Def Adj Yield	. ( . )	. ( . )	-0.00 ( -3.77)
Log(Maturity)	-9.84 ( -4.36)	. ( . )	. ( . )
Covenant Index	5.43 ( 2.92)	. ( . )	0.09 ( 6.76)
ipovar	3.45 ( 0.85)	-0.02 ( -0.13)	0.05 ( 2.28)
seovar	-8.12 ( -2.31)	0.05 ( 0.29)	0.05 ( 2.70)
Loan Amount / Assets	-0.01 ( -3.83)	-0.00 ( -8.22)	0.00 ( 4.17)
Book Leverage	. ( . )	0.02 ( 5.35)	0.00 ( 1.57)
Log(Assets)	-32.59 ( -26.36)	-0.72 ( -9.38)	0.09 ( 10.43)
Log(Book-to-Market)	18.81 ( 12.33)	0.19 ( 2.96)	-0.05 ( -5.29)
Tangible Assets	-0.27 ( -4.06)	0.00 ( 0.56)	0.00 ( 2.32)
Profitability	. ( . )	-0.04 ( -2.05)	0.02 ( 7.78)
Cash Flow Volatility	0.32 ( 1.20)	-0.02 ( -0.85)	-0.00 ( -2.01)
Depository Inst	. ( . )	0.71 ( 2.49)	. ( . )
Non-Depository Inst	. ( . )	-0.34 ( -0.99)	. ( . )
Brokerage	. ( . )	0.83 ( 5.84)	. ( . )
logsyndicateSize	. ( . )	0.41 ( 5.30)	. ( . )
Work Cap	. ( . )	. ( . )	-0.25 ( -8.88)
Corp Purp	. ( . )	. ( . )	-0.20 ( -8.27)
Debt Repay	. ( . )	. ( . )	-0.05 ( -2.12)
Takeover	. ( . )	. ( . )	0.03 ( 1.39)
Adj $R^2$	0.46	.	0.47
Obs	5,758	1,691	5,758

**Table VIII****Change in Equity Issuer Loan Yields in Event Time**

The sample consists of all nonfarm, nonfinancial, nonutility domestic firms entering into US dollar denominated loans between 1987-2003 and appearing in both the Dealscan and merged CRSP/Compustat databases. The change in loan yield for a firm is calculated by taking the difference between the loan yield it was charged in the relevant window following its equity issuance and loan yield it was charged in the eighteen months to two years prior to the event window. Predicted yields use the coefficient estimates from the base regression in Table IV, estimated excluding the SEO and IPO indicator variables. The change in predicted yield is analogous to the change in yield. The change in predicted yield due to size, book-to-market and leverage is calculated by multiplying the relevant coefficient in the base regression by the change in the relevant firm characteristic between the relevant event window and two years prior.

Panel A: IPOs

Event Window (IPO = 0)	# of Firms	$\Delta$ Yield	# of Firms	$\Delta$ Predicted Yield	$\Delta$ Predicted Yield due to		
					Size	Book-to-Market	Leverage
[0, 0.5)	44	-56.0	6	-15.8	-8.7	0.0	-7.3
[0.5, 1.0)	66	-63.9	15	-30.1	-26.4	4.6	-8.9
[1.0, 1.5)	93	-31.4	50	-12.1	-20.2	4.3	-10.2
[1.5, 2.0]	86	11.7	56	1.0	-15.9	5.5	-1.2

Panel B: SEOs

Event Window (SEO = 0)	# of Firms	$\Delta$ Yield	# of Firms	$\Delta$ Predicted Yield	$\Delta$ Predicted Yield due to		
					Size	Book-to-Market	Leverage
[0, 0.5)	67	-35.8	33	-22.7	-16.7	-6.0	1.7
[0.5, 1.0)	79	-38.6	35	-42.7	-20.9	-0.6	-2.5
[1.0, 1.5)	87	-25.4	46	-31.0	-20.3	4.4	-2.6
[1.5, 2.0]	96	20.4	53	12.8	-10.3	4.7	0.7

**Table IX**  
**Default Probability Models**

The sample consists of all nonfarm, nonfinancial, nonutility domestic firms entering into US dollar denominated loans between 1987-2003 and appearing in both the Dealscan and merged CRSP/Compustat databases. The table presents coefficient estimates from four empirical models of default differing in the econometric method employed (hazard model or panel logit) and covariate specification (variables used by Zmijewski (1984) or Altman (1968)). The hazard specifications are estimated on the Dealscan sample only. The panel logit specification is estimated on the entire Compustat database over the period 1987-2003, using an indicator variable (LOAN) to identify Dealscan firms. WC/TA is the ratio of working capital (current assets - current liabilities) to total assets. RE/TA is the ratio of retained earnings to total assets. ME/TL is the ratio of market equity to total liabilities. S/TA is the ratio of sales to total assets. NI/TA is the ratio of net income to total assets. TL/TA is the ratio of total liabilities to total assets. CA/CL is the ratio of current assets to current liabilities. Obs is the number of observations.

Variable	Hazard	Hazard	Logit	Logit
	Zmijewski	Altman	Zmijewski	Altman
Constant			-4.785 (-24.12)	-5.488 (-17.90)
WC/TA		0.150 (0.61)		-0.573 (-8.08)
RE/TA		-0.134 (-1.96)		0.054 (4.58)
EBITA/TA		-2.296 (-7.11)		-1.659 (-8.76)
ME/TL		-0.081 (-3.99)		-0.361 (-1.32)
S/TA		0.217 (3.75)		0.133 (0.87)
NI/TA	-1.125 (-6.71)		-0.998 (-7.95)	
TL/TA	1.268 (7.61)		0.092 (2.53)	
CA/CL	0.064 (1.99)		-0.930 (-6.31)	
LOAN			0.920 (7.24)	0.928 (7.32)
Obs	13,515	11,624	250,725	250,725
Pseudo-R2			0.086	0.087