Expected stock returns and loan contracting

Azizjon Alimov
IESEG School of Management, Univ. Lille, CNRS, UMR 9221 - LEM - Lille Economie Management, F-59000 Lille, France
Email: a.alimov@ieseg.fr

Abstract

This paper explores the effect of firm-level *forward-looking* expected stock return measures derived from equity option prices on the cost of syndicated loans. The results show that option-based expected returns are an economically important determinant of loan pricing: lenders charge significantly higher spreads and fees on loans issued to firms with higher expected returns. The effect of expected returns is distinct from and as important as the effects of the credit market factors, borrower credit ratings, and other measures of borrower credit risk. The impact of expected returns on loan pricing is pervasive across different loan types and is stronger for borrowers with higher likelihood of default. There is also evidence that expected returns affect the ownership structure of loan contracts.

Keywords: *Expected returns; Options; Loans*
JEL classification: *G21, G30*

1. Introduction

Understanding the determinants and implications of firm-level expected rate of return on equity capital is central to financial economics. Developing empirically valid measures of forward-looking expected returns (risk premia) has long been one of the main objectives in asset pricing research (Elton 1998). In theory, expected returns should also play a key role in corporate finance: for example, firms should use expected (required) returns determined in financial markets as their cost of capital when evaluating investment opportunities. While the link between expected returns and the firms' cost of capital is widely accepted, there is surprisingly little empirical research on this topic (see, for example, Gormsen and Huber (2022). Furthermore, we know relatively little about the effect of expected returns on the pricing and structure of debt capital to corporations. This is an important gap in our knowledge because external debt, and the loan market in particular, is the most important source of external capital to firms in the U.S. (e.g., Chava et al. 2009; Federal Reserve Flow of Funds 2020) and a firm's ability to obtain debt capital can be crucial for its operations and performance. Documenting such effects of expected returns on the cost of borrowing is also important to our understanding of the costs and benefits of monetary policy that influence or might be influenced by stock market valuation (Cieslak and Vissing-Jorgensen, 2021). The contribution of this paper is to provide new evidence on whether and how *forward-looking* measures of expected returns implied by current equity option prices affect the cost of syndicated loans. Such investigation stands in stark contrast to existing literature that mainly focuses on the role of various credit risk factors in loan contracting.

A priori, it is not clear that public equity and option market participants' estimates of the expected risk premium and thus return on an individual firm's stock should be priced in loan contracts above and beyond the traditional proxies for the key risk in lending-the risk of borrower default. It is widely held that loan market participants such as banks receive privileged access to firm-specific information than may not be available to public markets (e.g., Fama 1985; Diamond 1991; Rajan 1992). Lenders can also demand inside information from firm managers during credit negotiations. As such, one might argue that the information on expected returns implied by current market prices, after controlling for all relevant credit risk measures, is already known to sophisticated lenders and thus should not systematically affect loan contracting. Addoum and Murfin (2020) provide evidence consistent with information advantage of loan market participants compared to equity investors. Lenders might also choose to ignore investors' subjective expectations if those expectations are systematically biased and incorrect (e.g., Greenwood and Shleifer, 2014).

On the other hand, lenders might use information contained in *forward-looking* expected risk premium on a firm's stock to form their expectations about the future volatility of firm assets and thus the firm's ability to meet their debt obligations (that is, its default risk). In a seminal paper, Merton (1974) developed a corporate debt valuation model in which the debt issued by a firm is equivalent to risk-free debt less a put option on the value of the firm's assets. In this model, total volatility of firm assets is arguably the most important variable for determining default risk. Since lenders have limited upside potential, an increase in the volatility of firm assets increases the value of the put option but decreases the value of debt (by increasing the probability of a default state). Therefore, if changes in expected returns reflect changes in future (systematic) volatility of firm assets in the same direction then lenders recognizing this link should indeed use expected stock returns when pricing loans. Campbell and Taksler (2003) and Chung, Wang, and Wu (2019) provide evidence that idiosyncratic equity volatility is reflected in bond yields.

Whether or not the level and variation in expected returns influence the cost of corporate borrowing in practice, therefore, remains an open and unexplored question. This paper attempts to remedy this deficiency by conducting an in-depth investigation of the role of expected returns in the market for syndicated loans. Loan contracting provides an interesting setting for studying expected returns because the multiple pricing dimensions of loan contracts allow a fuller examination of lender responses to shifts in firm-level equity risk premium. Thus, in addition to providing novel evidence on the direct pricing effects of loans effects of expected returns, this is the first study to examine how expected returns also effect the non-price terms of loan contracts.

The key empirical challenge is the accurate estimation of *forward-looking* measures of expected returns. Finance scholars largely agree that the widely used proxies for expected return estimation, such as the CAPM or other factor models, do not reflect variation in future returns (e.g., Fama and French 1997; Welch and Goyal 2008). I instead use a direct measurement of the forward-looking expected stock returns derived from the market prices of individual equity options. The idea behind the option-implied measures is that option prices contain information about investors' assessment of future risk and risk premia and therefore information about expected returns on the underlying stocks. I compute the expected return estimates in excess of the risk-free rate using recently developed approaches in Martin and Wagner (2019) and Chabi-Yo, Dim, and Vilkov (2022). Both of these approaches rely on current option market prices and are thus able to accurately reflect changes in return-relevant information. I confirm that information in option prices is a reliable source for identifying expected (future) stock returns: the option-implied return measures are highly correlated and are both strong predictors of future realized returns (after controlling for relevant firm characteristics). This finding stands in stark contrast to the failure of traditional factor-based measures such as the CAPM.

The main analysis focuses on the effect of option-based expected return measures on loan contracting using a large panel of US publicly traded firms between 1996 and 2020. I start by examining loan spreads, defined as the interest rates including all annual fees in excess of the London Interbank Offered Rate (LIBOR). I find that firms that have higher option-implied expected returns averaged over the previous three months are charged a higher interest rate on their loans obtained in the subsequent month. The results are robust to the inclusion of controls for the key determinants of loan spreads such as credit market conditions (as measured by the Treasury rate, default and term spreads), borrower credit ratings, and other borrower financial characteristics as well as the industry (or firm) fixed effects. The results are also robust to additional controls for contemporaneous and expected cash flow shocks as measured by past realized returns and their volatility, and analysts' future earnings growth forecasts.

The effect of option-based expected returns on loan spreads is economically significant: a one standard deviation increase in the expected return measure is associated with about 25 basis points increase in the average loan spread. With an unconditional average loan spread of around

142 basis points over LIBOR, these estimates suggest that loan spreads are about 18 percent higher when expected returns increase by one standard deviation. The results further suggest that expected returns explain as much variation in loan spreads as do borrower credit ratings or credit market factors.

I also examine another important component of the overall price of loans- various loan fees (e.g., Berg et al. 2016). I find that higher option-implied expected returns are also strongly and positively associated with the amounts of different fees charged by lenders. Taken together, these results suggest that higher expected returns are passed along by lenders to borrowers in the form of higher total cost of the loan.

The impact of expected returns on loan pricing is pervasive across loan types with different pricing structure such as term loans and credit lines. Consistent with the notion that lenders might be using information contained in forward-looking expected returns to form their beliefs about future risk changes of the borrowing firms, the impact of expected returns is attenuated in the subsample of loans containing contingent performance pricing provisions (which means that the loan spread after initiation can fluctuate depending on some measure of the borrower's future financial performance).

Overall, these results are broadly consistent with Merton (1974) framework in which lenders use information contained in expected returns to form their views about the volatility of firm assets. To providence further evidence on this mechanism for the observed effect, I examine the cross-sectional implication of the default risk channel that the effect of increased equity risk premia should be greater for borrowers closer to default boundary since elevated volatility of the firm assets is more likely increase the value of default options for such firms. The evidence supports this conjecture: the impact of expected returns is greater for borrowers with higher likelihood of default (as measured by the Altman's Z-score).

I also examine whether the degree of information asymmetry between lenders and borrowers plays a role in expected return-cost of loan relation. I follow Bharath et al. (2009) and use the frequency of borrowing from the same lender as a proxy for information asymmetries between the lender and borrower. There is no evidence that the expected returns-loan spreads sensitivity differs across subsamples of borrowers with different levels of prior lending relation with their lead arrangers.

Finally, in addition to changes in contractual terms of loans, expected returns affects how loans are structured. Specifically, the syndicate structure of loans issued by firms with higher expected returns is, on average, more concentrated with the lead loan arranger holding a greater share of the loan. This finding is consistent with the idea that a concentrated lending structure serves to improve monitoring in response to increased risk and/or uncertainty (Sufi, 2007).

To summarize, this paper is the first to provide evidence on how *forward-looking* expected returns implied by current prices of options affects the price and non-price terms of corporate loans. The findings of this paper therefore primarily contribute to the extensive loan contracting literature as referenced throughout this paper. This paper also builds on and contributes to a growing stream of research that attempts to recover and apply forward-looking stock returns from options, including Martin (2017), Martin and Wagner (2019), and Chabi-Yo, Dim, and Vilkov (2022).

2. Data

The data used in the analysis falls into three major categories: (1) data on the individual equity option prices from OptionMetrics, (2) loan data from Dealscan, and (3) financial information from Compustat Quarterly required to compute the control variables as of the most recent fiscal quarter preceding the loan date. Accordingly, the analysis is restricted to the firms that are in the intersection of these databases. Due to the U.S. option exchange requirement this means the sample is therefore limited to the firms in the S&P 500 index. These firms are among the largest firms in the U.S. and they account for a significant fraction of total economic activity. The option price data are available from 1996 onward, thus dictating the beginning date of my sample period. Below, I describe each data source in detail and outline the construction of the variables used in the paper along with descriptive statistics for the variables.

2.1 Option-implied expected returns: measurement and empirical properties

It is well recognized that option markets provide an important trading opportunity for informed investors seeking to exploit their informational advantage (e.g., Black 1975). As a result, individual option prices contain valuable forward-looking information and has long been used by researchers and practitioners to study important economic questions (e.g. Easley et al., 1998; Dew-Becker and Giglio 2022). In an influential paper, Ross (2005) shows that under some stationarity assumptions and a regularity condition on the pricing kernel, option prices can be used to recover the physical probability distribution of underlying stock returns. Inspired by Ross' insight, Martin (2017), Martin and Wagner (2019), and Chabi-Yo, Dim, and Vilkov (2022) develop approaches that allow researchers derive forward-looking, high-frequency lower bound estimates of expected stock returns from current option prices.

My main approach for estimating expected returns is based on Martin and Wagner (2019), who derive their measure as lower bounds for the conditional expected return in excess of the risk-free rate in terms of the risk-neutral variance of the market (as measured by the S&P 500 index) and the stock's excess risk-neutral variance relative to that of the average stock in the market portfolio. As such, these bounds derived in Martin and Wagner capture the expected returns of investors who consider variance to be a sufficient risk statistic. Formally, Martin and Wagner's expected return ($E(R$) for stock *i* at the end of the day or month *t* in excess of the contemporaneous risk-free rate ($R_{f,t}$) is defined as:

$$E(R_{i,t+1}) - R_{f,t} = Var_{m,t+1} + \frac{1}{2}\left(Var_{i,t,t+1} - \sum_{i=1}^{N} w_{i,t} Var_{i,t,t+1}\right)$$

where $w_{i,t}$ is the value weight of stock i in the market index, $Var_{m,t+1}$ is the implied variance of market returns (S&P 500), and $Var_{i,t,t+1}$ is stock i's implied variance (please see Martin and Wagner (2019) for full details).

I also use an alternative measure based on the generalized lower bounds developed by Chabi-Yo, Dim, and Vilkov (2022). The main difference between the two approaches is that while Martin and Wagner assume that variance is the sufficient risk statistic for investors, Chabi-Yo et al. assume that investors also consider higher moments (extreme risks) and thus their approach accounts for the entire risk-neutral distribution (please see Chabi-Yo, Dim, and Vilkov

(2022) for full details). The data for both option measures has been graciously made available to researchers by Chabi-Yo, Dim, and Vilkov (please see Vilkov' website https://www.vilkov.net).

Both measures compute the expected return for each individual stock using daily prices for the S&P 500 index and individual stock options. Because the accurate computation of option-based measures requires sufficient observations of individual equity option prices for each firm, the sample is restricted to large S&P 500 firms. the expected returns are primarily computed from prices of options with maturities of 90 days because these options are among the most liquid and thus allow the more reliable estimation. It is important to note that even though these options have maturities of 90 days the underlying stocks are valued based on long-term expectations of cash flows and discount rates. In unreported analysis, I also used returns derived from options with maturities of 30 and 180 days and obtained almost identical results. The daily expected return estimates are averaged over the calendar month(s) in the subsequent tests. The final sample includes 200,000 firm-month observations for 1,185 unique firms, each of which has, on average, 183 monthly estimates of the option-based expected returns.

Prior to the main analysis, I describe empirical properties of the option-implied estimates of expected returns. Figure 1 shows substantial time variation in the cross-sectional averages of the monthly option-based expected return estimates. For comparison purpose, the graph also includes the risk-free rate as measured by the yield on the 1-year Treasury Bill. The expected return estimates are clearly volatile, with sudden and rapid changes, particularly during the 2007-08 financial and 2020 COVID health crises. Note that these observed fluctuations are determined solely by the actual option prices and not from any regression model assumptions as is the case for the factor-based estimates. These variations in the data support the view that expected returns vary over time, due to variation in risk premium or investor risk aversion (Cochrane 2011).

I examine the empirical validity of these measures as to whether they are indeed able to forecast future realized returns better than traditional factor-based model such as the CAPM. To this end, I perform an admittedly simple regression of the realized stock returns over the subsequent three-month period on each of the option-implied ER proxies in month *t*. The results are similar when I use the subsequent six- or 12-month period returns instead. The regressions also include firm market capitalization and firm book-to-market that are known to be associated with the return patterns (Fama and French 1992).

For the comparison purpose, I have also included an expected return measure based on the commonly used CAPM. Following Levi and Welch (2017), each stock's market betas are measured using one-year rolling-window regressions of the stock's realized daily returns on the market portfolio, and the expected market risk premium is calculated using its historical average over the previous 30 years.

Table 1 reports the regression results with firm and year-by-month fixed effects. The firm fixed effects remove any persistent firm-specific return factors and the calendar month fixed effects control for shifts in market-wide risk premium and the risk-free rate. The regressions therefore test whether the expected return proxies explain the time-series variation in the stock returns. The main finding is that option implied expected return measures significantly predict within-firm changes in the expected return. In Model (1), the coefficient on $\textit{Expected Return}_{\textit{Martin-Wagner}}$ (computed using the Martin-Wagner (2019) approach) is 0.419 and significant at better than the 1% level (standard error is 0.057). In Model (2), the expected return measure computed using Chabi-Yo et al. (2021) approach enters the regression with a similar magnitude and statistical significance. In stark contrast, the results in Model (3) show that the CAPM measure is negatively associated with the realized return, that is in the opposite direction of the expected relation. Model (4) runs a horse-race test between the option and CAPM-based measures and produce similar results.

In sum, consistent with Martin and Wagner (2019) and Chabi-Yo et al. (2022), these results highlight the substantial advantage of the implied option-implied measures over the CAPM in detecting shifts in future return-relevant information.

2.2 Loan Data

Information on individual commercial loan facilities extended to the sample firms with valid data on options is obtained from the Refinitiv Eikon's Dealscan database. The Dealscan covers all or large majority of all commercial loans in the U.S. and around the world and is standard database in the empirical loan contracting research (e.g., Berg e al. 2016).

The Dealscan provides detailed information on the borrowing and lending companies and the various terms of the loan contract such as the loan interest rate (spread), loan amount, the maturity of the loan, the share of each lender, whether or not the loan has collateral, the type and purpose of loan. Each observation in the Dealscan represents a separate loan facility (or tranche). Because the key loan terms are typically set at the tranche level, the relevant unit of observation is a loan facility as is common in the loan literature (e.g., Berg et al., 2016; Murfin and Petersen, 2016). There are a total of 15,074 loan facilities with non-missing loan amount information obtained by 979 firms. 11,782 loans have information on loan spread over the three or six-month LIBOR, the standard benchmark in the loan literature. The loan terms available for each of the loans in our sample include loan type, loan purpose, and loan maturity.

2.3 Research design and regression specification

The following equation describes the main regression model:

Loan term= f(Expected Return-Options, Credit Market Conditions, Borrower Credit Rating, Borrower Financial Characteristics, Loan characteristics, Industry (or firm) Fixed Effects **(1)**

The key dependent variable is the loan all-in-drawn spread (in basis points) at origination, computed as the sum of the annual interest rate and any recurring pro-rated facility fees for each dollar drawn down from the loan in excess of LIBOR. The all-in drawn spread is a measure of the overall cost of the loan because it considers both the interest rate and the relevant fees associated with the loan. As suggested by Berg et al. (2016), I also separately examine another important components of the loan pricing structure – different types of loan fees.

The main independent variable is the option-based expected return in (%) on the borrower's stock averaged over the three months preceding the month of the loan origination- *Expected Return-Options.* This variable is computed from option prices using the methodology in Martin and Wagner (2019) as described in Section 2.1. All results in this paper are virtually the same when using the alternative measure developed by Chabi-Yo et al. (2022) (these results are not tabulated to conserve space).

The regressions include an exhaustive set of credit market conditions, borrower- and loan-specific control variables to capture various factors that might affect the cost of loans across industries, time, borrowers, and tranches.

I include the following controls for market-wide credit conditions that are known to influence the loan terms: *Yield on 1-year Treasury Bill* which measures the risk-free rate, *Term Spread*, constructed as the difference in yields between 10-year and 1-year Treasury, and *Default Spread*, constructed as the difference in yields between BAA and AAA corporate bonds. Longstaff and Schwartz (1995) argue that the risk-free rate should be negatively related to the loan spread because higher interest rates increase the drift of the risk-neutral process in the firm value equation. *Default Spread* and *Term Spread* capture the current market-wide price of default risk and the market views of future economic performance and the path of risk-free rates, respectively (e.g., Collin-Dufresne e al., 2001). Therefore, loan spreads are expected to be positively associated with *Default Spread* and negatively associated with *Term Spread*. All these credit market measures are obtained from the Federal Reserve Economic Data (FRED) and averaged over the three months preceding the month of the loan origination.

Borrower credit ratings issued by rating agencies are perhaps the most important metric used by lenders to measure a firm's default risk as well as for subsequent monitoring purposes. I obtain long-term credit ratings issued by the S&P at the loan origination date from S&P's Compustat supplemented with firm S&P ratings in Capital IQ and loan ratings in the RatingsXpress database. According to the S&P, the credit ratings are based on its assessment of a firm's creditworthiness using a wide range of financial indicators, including the firm's private information revealed during the rating process (that unobservable to the public). I create eight dummy variables across major credit categories- one dummy each for AAA, AA, A, BBB, BB, B, CCC or worse ratings, and one dummy for firms without a rating.

To control for the other relevant borrower credit risk characteristics, I follow the literature (e.g., Murfin and Petersen 2016) and include firm-specific financial characteristics such as firm size (*Log of Book Assets*), operating profitability *(EBIT/ Assets)*, market-to-book assets (*(Market Value of Equity +Book Debt)/Assets)*, tangibility (*Inventory +Plant, property, and equipment)/Assets)*, and financial leverage (*Book Debt/Assets*). Larger firms are typically more mature with better established product market position, and thus less risky and could pay lower spreads. More profitable firms have more cash flow to service debt payments and thus could have lower interest rate. Firms with more tangible assets relative to total assets potentially suffer lower losses in the event of default than do firms with more intangible, and thus such firms could pay lower spreads. The firm's market-to-book ratio reflects market valuation of its future growth opportunities and thus potential future cash flows that could service debt (or be accessed by lenders in the event of default). Thus, a higher value of the market-to-book could be negatively associated with loan spreads. Firms with higher leverage could have a greater chance of default and thus pay higher spreads. The source of firm financial characteristics is the quarterly COMPUSTAT database. I use Chava and Roberts (2008) linking file to merge Dealscan with Compustat. All financial data are lagged by one quarter so that they are available at the time of loan origination.

Finally, I include controls for loan type and purpose indicators (fixed effects) that may reflect differences in the risk level of individual loan facilities. The loan type indicators reflect whether the loan is a term loan, whether the loan is secured with collateral, and whether the loan contains performance pricing provisions. Loan purpose indicators measure whether the loan is ,provided for capital expenditures, refinancing, back-up line, working capital, mergers and acquisitions and general purposes. The regressions also include the log of loan maturity (in years) because banks may charge higher interest rate on longer-term debt to compensate for higher liquidity risk and default risk. Since all those loan characteristics can be set jointly with the loan spread, I estimate regressions with and without loan-specific controls.

I estimate most specifications with the borrower Fama-French 48 industry fixed effects. The industry fixed effects remove the permanent unobserved industry-specific factors that may affect the cost of corporate borrowing. I show that the results are similar when the firm fixed effects are used instead. I compute heteroscedasticity-robust standard errors clustered at the firm level to account for non-independent observations within firms. Clustering standard errors at the industry level has no bearings on any of the inferences in this paper.

2.4 Descriptive Statistics

Table 2 provides main descriptive statistics for the sample of borrowers and their loan facilities used in this paper. The average loan spread is 142 basis points over LIBOR and its standard deviation is quite large-125.87 bps. The large variation in the loan spread underscores the economic importance of understanding all key determinants of loan pricing. The average loan size is around $847 million dollars with the median loan size at $400 million. Almost 80%

(13164) of the sample loan contracts have an S&P credit rating: of those, approximately 9.5% have AAA-AA rating, 26.4% have A rating, 32% have BBB rating, 17% have BB rating, 5% have B rating, and just over 1% have CCC rating. All these numbers are sensible given that my sample consists of S&P 500 firms with traded liquid options which are larger than the average COMPUSTAT firm. The median maturity of the loans is around four years. The average upfront fees (one-time fee for structuring and processing the loan) are 0.79% of the loan amount.

Insert Table 2 about here

The proportion of secured loans is approximately 25% and about 35% of the loans include performance pricing provisions. The four most common types of loans are revolving lines of credit with greater than one year maturity (43% of the sample), 364-Day revolving lines of credit with less than one year maturity (18%), and various term loans (22%). The most commonly cited primary purpose of the loans are corporate purposes, debt repayment, working capital, and for acquisition The distribution of our sample loans amongst types and purposes is generally consistent with prior research using the Dealscan database (e.g., Berg et al., 2016).

The average option-implied expected return is 6.1 percent, and the median is 3.8 percent. There is a significant dispersion in expected returns as its standard deviation is 7.6 percent. In contrast, the three proxies for the credit market conditions (Treasury rate, Default and Term spreads) and the real quarterly GDP growth rate have much lower average values and lower volatility. To ensure that option-implied expected returns and credit market measures do not reflect the same information, Panel B of Table 2 reports the average monthly pairwise correlations across those measures. Most notably, the pairwise correlations of the expected return measures with the credit market measures and the GDP growth are quite low, ranging from negative 0.049 with *1-year Treasury Rate* to positive 0.31 with *Default Spread*.

3. Expected returns and the cost of loans

3.1 Expected returns and loan spread

Table 3 contains the results of regressions described by Equation (1) that examine the effects of option-implied expected returns (in percentage) averaged over the previous three months on loan spreads. As some of the controls can be determined jointly with loan spreads, I first estimate models without any controls and then gradually include the controls for the credit market conditions, borrower credit ratings, other borrower-specific financial characteristics, and loan characteristics.

Insert Table 3 about here

I start the analysis Model (1) with *Expected Return-Options* as the only independent variable. The estimates show that higher expected returns are strongly associated with higher loan spreads: the coefficient on *Expected Return-Options* is positive 5.985 and statistically significant at better than the 1% level (robust standard error (s.e.) is 0.350). The other notable observation is that the adjusted R-squared is 12.6 percent, which is relatively high considering the size of the dispersion of the loan spread variable that was noted earlier.

Model (2) includes controls for the credit market conditions, also averaged over the previous three months. I also include industry fixed effects at the Fama-French 48 industry classification level. The inclusion of these controls has no almost no effect on the magnitude of the coefficient estimate on *Expected Return-Options*: it is 5.975 and remains highly significant (robust s.e. of 0.366), which indicates that the effect of the option-based expected returns on loan spreads is distinct from any concurrent and potentially confounding changes in the market-wide financial and macroeconomic conditions. Furthermore, we can observe that expected returns matter as much as all the credit market conditions proxies: the adjusted R-squared in Model 2 with the credit market controls and industry fixed effects increases to 25.2 percent.

With respect to credit market conditions, we can observe that the loan spreads are strongly negatively associated with the risk-free rate (the yield on 1-year Treasury Bill) and strongly positively associated with the default spread. All these results are consistent with prior findings in the literature as discussed in Section 2.3.

Model (3) expands the specification by including seven dummy variables for the long-term credit rating categories to control for the borrower creditworthiness. The dummy variable for firms without a credit rating is supressed and its effect is picked up by the constant term. The inclusion of credit rating fixed effects reduces the coefficient estimate of *Expected Return-Options* to 3.341 but it remains significant at better than the 1% level. The adjusted R-squared of the specification with the rating fixed effects increases by about another 10 percent suggesting that the typical borrower’s expected returns matter for loan spreads at least as much as the borrower’s credit ratings. This is a potentially sensible result if an expected return is indeed a forward-looking continuous measure of relevant borrower risk which may not yet be reflected in the credit rating agency's views on the borrower's default risk. The coefficients on credit rating fixed effects are as expected: firms with AAA, AA, and A ratings pay significantly lower spreads compared to firms without a credit rating. In contrast, lenders consider firms with BB, B, and CCC or worse credit ratings to be riskier and charge higher spreads on loans to those firms.

The point estimate of the coefficient suggests that, holding all else constant, a one standard deviation increase in expected returns (7.6 percent in Table 2) from its mean (6.7%) translates into an increase in the average loan spread of 25.4 basis points. With an unconditional average loan spread of around 142 basis points over LIBOR, these point estimates suggest that, controlling for contemporaneous credit market conditions and borrower credit ratings, loan spreads are about 18 percent higher when expected returns increase by one standard deviation. To put these effects in context, given that the sample mean loan amount is $847 million, this 25.4 basis point increase means that the average borrower is charged about $2.2 million more in interest payments (over the benchmark LIBOR) in response to an increase in option-implied expected stock returns. The relation is thus statistically significant and economically meaningful, indicating that the expected return on a firm's stock matters to lenders: higher expected returns are passed along to the borrower in the form of higher loan spreads.

Because ratings are an incomplete measure of borrower risk, Model (4) further saturates the specification by including borrower-specific financial characteristics as well as the loan type and loan purpose fixed effects to further pin down borrower creditworthiness. This slightly reduces the sample size and the coefficient on *Expected Return* drops to 2.746 but remains significant at better than the 1% level. With all these control variables, the adjusted R-squared of the estimation increases to 56.7 percent, which suggests that the set of the independent variables is reasonably exhaustive. Overall, these findings provide further evidence that that my results are not being driven by other factors that could independently affect the sensitivity of loan spreads to expected stock returns. The shrinking magnitude of the coefficient on expected returns after conditioning out borrower- and loan-specific characteristics indicates that variation in borrower and loan type is clearly an important part of loan spreads, all else equal, observationally identical borrowers receive economically significant different loan spreads depending on the magnitude of their expected returns *before* the loan origination.

The point estimate of the coefficients from this regression specification with the full set of control variables suggests that a one standard deviation increase in expected returns translates into an increase in the loan spread of about 21 basis points. This estimate, which is quite similar to the estimated earlier for Model 3, further confirms that the relation between firm-level expected returns and the price of loans is not only statistically significant but also economically important.

Some of the estimated effects of borrower and loan-specific characteristics on loans spreads are in line with the expected direction and some are inconsistent. Consistent with expectation, firms with higher leverage pay higher interest rates and firms with higher market-to-book assetds pay lower spreads. . Firms on average pay higher interest rates on term loans, secured loans, and longer maturity loans.

Model (5) replaces industry fixed effects with firm fixed effects to absorb any time invariant firm-level factors that could be important determinants of loan spread. The inclusion of the firm fixed effects (which subsume industry fixed effects) means that the main coefficient of interest is now identified from the *time-variation* in *Expected Return-Options* within the same firm over time. The sample in this regression is therefore restricted to firms that during the sample period have obtained at least two loans *and* those two loans are at least three months apart. This requirement reduces the sample size only slightly.

Similar to other specifications, Model (5) shows a strongly positive impact of expected returns: the coefficient on *Expected Returns* is 2.417 and it is remains significant at the 1% level. The adjusted R-squared of the regression with firm and time fixed effects further increases to 64.7 percent.

3.3 Controlling for cash flow shocks and other robustness checks

The established link between option-implied expected returns on firm stocks and the spread on their loans appears to be robust as it is derived from specifications that control for a comprehensive set of credit market factors, firm-, and loan-specific characteristics as well as for industry or firm fixed effects. Nevertheless, once might argue that option-implied expected returns are simply picking up the effect of the contemporaneous and/or future cash flows rather than the expected risk premia on the stock. It is important to point out that the regression specifications already include measures of operating profitability as well as the borrower's market-to-book assets ratio (Tobin's Q) which at least partially controls for forward-looking estimates of future cash flows implied in the current stock prices. Nevertheless, to address this concern, I further saturate the specification by including firm-level stock returns realized over the three-month period preceding the loan origination as well as the volatility of those returns. Vuolteenaho (2002), among others, argues that firm-level realized returns are largely driven by cash flow news. I also include analysts' one-year-ahead earnings growth forecasts as an additional proxy for lender expectations of future cash flows. Analyst estimates are obtained from the Institutional Brokers' Estimate System.

To see if the effects of option-implied returns on loan spreads can be explained by these variables, I re-run the base regression specification with these additional covariates. The results are reported in Table 4. The most notable result in this table is that options-based expected returns continue to be positively and significantly associated with loan spreads. In fact, the magnitude and statistical significance of *Expected Return-Options* is only marginally affected by the adjustment for the additional controls for cash flow shocks. Among the three additional controls, only the realized return volatility variable has a statistically significant and positive impact on loan spreads. Using six- or nine-month realized returns and volatility produces similar results. Overall, these results suggest that the effect of option-based expected returns is important over and beyond the effects of conventional default risk and cash flow factors.

Insert Table 4 about here

Table 5 presents the results of additional tests to further prove the robustness of that link. The main tests treat each loan facility in Dealscan as a different loan with a separate pricing structure as it is common in the loan literature (e.g., Berg et al.; 2016; Santos 2011). However, there could be a concern that because several facilities can be packaged into a single loan package or deal, facilities within the same deal are not completely independently priced. Model (1) of Table 5 investigates this concern using the individual deals as the unit of observation. For the deals made up of multiple facilities, I follow Ivashina (2009) and retain only the largest facility in each deal (note that different facilities within the same deal cannot be aggregated because of different purposes and pricing structure). Despite the reduced power from the lower sample size, we continue to observe that the coefficient on the *Expected Return* variable is positive and highly significant.

Empirical studies in corporate finance typically remove financial firms because of regulatory restrictions on their activities as well as different balance sheet structure. While there is no strong reason to expect that loans spreads of financial and non-financial firms to react differently to option-implied stock returns, Model (2) of the table shows that the results are robust to the exclusion of financial firms from the sample.

Despite the inclusion of different proxies for credit market conditions, there could still be some lingering concerns that results are driven by some other unobservable market-wide or industry wide shifts in loan terms. I address this concern in Model (3) by including calendar year-month by industry fixed effects as of the date of the loan origination. This allows me to be agnostic about the source of any remaining contemporaneous market-or industry-level shocks not captured by the control variables. The inclusion of time fixed effects has only minimal effect on the coefficient of option-implied expected returns. As expected, the coefficients on the proxies for the overall credit market conditions are no longer identified when calendar year-month fixed effects are used.

Santos (2011) and others have document changes in the loan pricing mechanism following the 2008 financial crisis. To test whether the effects of expected returns on loan pricing differ before and after the 2008 financial crisis, I split the sample into before and after the 2008 financial crisis periods. The results in Models (4) and (5) show that the positive effect of option-implied expected returns on loan spreads is present and strong in both sub-periods.

In Model (6), I examine the dynamics of the effect (as well as the possibility of reverse causality) by including two additional lags and one additional lead of expected return. I find that while the coefficient on the lead expected returns is not statistically significant at conventional levels. In contrast, the first two lagged expected returns enter the regression with a positive and significant coefficient. This suggests that lenders respond to information in the most recent innovations in borrower expected returns.

Insert Table 5 about here

3.2 Expected returns and loan fees

The loan all-in-drawn spread is potentially an incomplete measure of the total payments that the lenders expect to receive. The other important component of the price of loans is various fees. As noted by Berg et al. (2016), loan fees are included by lenders to price risks associated with granting the borrower various contractual option features as well as information asymmetry problems between the lender and the borrower. The descriptive statistics in Table 2 show that the amounts of the most frequently reported loan fees in Dealscan are economically significant. For example, the average reported one-time up-front fee for structuring and processing the loan is 50.7 basis points of the loan amount, the average commitment fee that is paid by borrowers on unused loan commitment is 28 basis points of the loan amount, and the average facility or annual fee that is paid by borrowers on the entire committed loan amount is 13 basis points of the loan amount[1]. Overall, these numbers suggest that lenders might be using a combination of fees and loan spread over LIBOR as the two components of the overall complex loan pricing mechanism.

To provide additional insights on the full loan pricing effects of option-implied expected returns, I estimate Equation (1) with the reported loan fees as the dependent variable. Table 6 report results of the regressions showing the effect of Expected Returns on the reported up-front [loan fee, commitment fee, utilization fee, and facility fees in separate regressions. The regressions include the same credit market factors, loan characteristics, borrower characteristics, and credit rating fixed effects as in Model 5 of Table 3. Finally, the last model in the table analyzes the loan spread computed without the annual fees to test whether lenders indeed use spread and fees as substitutes.

Insert Table 6 about here

[1] Note that the number of loans with valid data on various fees is far smaller that reporting loan spread. For example, only about 25% of loans that report information on the loan spread also report the amount of facility fee. While the information in Dealscan is likely to be incomplete, Berg et al. (2016) find that the Dealscan correctly identified and reports fees for more than 95% of loans.

The main finding in this table is that the key independent variable *Expected Returns* receives a positive and highly significant coefficient estimate in all five regressions. The results are also economically significant. For example, holding all else constant, a one standard deviation increase in expected returns translates into an increase in the average facility fee of nearly 3 basis points which in turn represents almost 22.4% of its an unconditional sample mean. This finding tells us that firms pay significantly higher spreads and fees on the loans they take out following an increase in their expected returns. Regarding the coefficients on the credit market, loan and borrower controls, they are generally consistent with those documented for the loan spread in Table 3.

3.3 Expected returns and loan spread: loan types

My sample includes different types of loans that may have pricing characteristics that are not captured by the specification with the full set of controls. In this section, I explore differences across different loan types with the purpose of furthering our understanding of the mechanism through which option-implied expected stock returns might affect loan pricing.

In particular, credit lines and term loans-the two most popular types of loans in my sample-have inherently different characteristics and therefore pricing structure. Term loans are fully withdrawn by the borrower at the loan origination, and the borrower pays the contractually obligated loan spread on the full amount of the loan. In contrast, credit lines (also known as revolving credit facilities) represent a nominal amount of credit committed by lenders from which the borrower has an option to draw in the future. The firm pays a commitment fee at the credit line origination and then pays a prespecified spread on any drawn amounts. The borrower is more likely to exercise the provided option and draw down on its existing line of credit when the spot-market rate increases. Lenders therefore are likely to request an additional compensation for providing such option.

I test whether my main results are driven by a particular loan type by repeating the base test (dropping the term loan indicator variable) using the all-in drawn spread separately for term loans and credit lines with maturity of less than one year and credit lines with maturity of more than one year. These results are reported in Table 7.

Insert Table 7 about here

The coefficients on the *Expected Return* variable are 3.796 (s.e. =0.657) in the term loan sample, 1.722 (s.e.= 0.769) in the short-term credit line sample, and 2.424 (s.e.= 0.298) in the long-term credit line sample. All these coefficients are statistically significant at the 1% level. Therefore, the results in Table 7 provide evidence that the impact of the expected return on loan pricing is pervasive across different loan types (even when the line of credit is not fully in use). In unreported tests, further explored the difference between Term Loan A, which are amortized loans typically syndicated to banks, and Term Loan B, which are bullet loans syndicated to institutional investors, and found similar results.

I next examine the difference in the pricing effects of option-implied expected returns across contracts with different contingent performance pricing provisions (pricing grid). Since the early 1990s such provisions have become increasingly popular features in loan contracts and they link a loan spread to the firm's financial performance: the spread decreases if the performance improves and increases if the performance worsens. In contrast, traditional loan contracts specify a single spread that can be modified only through renegotiation of the original pricing terms. Asquith et al. (2005) argue that pricing grid reduces debt renegotiation costs due to adverse selection, moral hazard, or unanticipated changes in the borrower's credit risk. Manso et al. (2010) show that such provisions are used as a signaling device for a firm's credit quality. In sum, it is reasonable to expect that because contingent pricing provisions allow lenders to adjust loan pricing in response to future change in borrower default risk, spreads on loans with such provisions would be less sensitive to any relevant information contained in forward-looking expected stock risk premia.

Roughly 35% of the loans in my sample include pricing grid, which is consistent with other studies such as Manso et al. (2010). The pricing grids tie the loan spreads primarily either the borrower's senior credit rating (65% of the sample) or the debt to cash flow ratio (about 25% of the sample). The remaining performance pricing grids are mostly other leverage ratios.

Table 8 reports the results of the regressions estimated separately for the two subsamples for loans with and without such pricing grids. We can observe that higher expected returns in the previous three-month period are associated with a much smaller increase in loan spreads in the subsample of loans with pricing grid compared to loans without such provisions. The coefficient of *Expected Return* is 3.088 (with a s.e. of 0.545) in the sub-sample of loans without pricing grid and it is 1.747 (with a s.e. of 0.372) in the sub-sample of loans with pricing grid. The Chow test suggests that the difference of these two coefficients is statistically significant at the 1% level. These results therefore support the hypothesis that forward-looking expected returns are less relevant in settings when lenders include provisions that adjust loan spreads to future changes in borrower default risk.

Insert Table 8 about here

----

4. Heterogeneity of the main effect across borrowers

4.1 The effect of borrower distance to default

The evidence strongly indicates that the level of and variation in firm-level expected returns implied by current option prices are reflected in the cost of loans. One potential explanation for why lenders may charge higher interest rates in response to higher expected returns (above and beyond traditional measures proxies for default risk) is that lenders believe that option-implied equity risk premium provides incremental information about expected *future* probability and severity of default. As noted in the introduction, the traditional argument for the link between risk premia in equity and credit markets is based on the Merton's (1974) structural model of corporate debt pricing. In this model, asset volatility is arguably the most important variable for determining default risk of the borrowing firm. Borrowers with higher asset volatility are more likely to reach the default boundary and thus pay higher interest rates. Guided by the implications of the model, Campbell and Taksler (2003) and Chung, Wang, and Wu (2019) provide evidence suggesting that idiosyncratic equity volatility is priced by bond investors[2].

To gain deeper insights into the relation between the option-implied measure of risk premium and loan pricing, I build on these studies and conduct a cross-sectional analysis across firms with different levels of probability of default at the time of loan origination. Borrowers with a higher likelihood of financial distress are more likely to find themselves in bad states, and lenders thus may charge them a higher interest rate to compensate for higher lending risk. In the context of Merton's model, the closer a firm is to the default boundary the more likely it is that increases in volatility of firm assets will push the firm to default. Therefore, the cost of loans for riskier firms should be more sensitive to changes in expected volatility of firm assets as measured by the option-implied expected stock returns.

I measure the likelihood of borrower default using Altman's *Z*-score, which is widely used in the literature to forecast corporate bankruptcy and default (e.g., Roberts 2015). The Z-score is a linear function of important borrower fundamentals, such as working capital, profitability, tangibility of assets and firm size[3]. A higher Z-score indicates a lower likelihood of financial distress and default. I assign firms in the bottom, medium and top *terciles* of the Z-score distribution to high, medium, and low default risk groups, respectively. I separately

---

[2] Finance scholars have also studied the link between measures of default risk and stock returns and produced mixed results. Vassalou and Xing (2004), Chava and Purnanandam (2010) and Friewalds et al. (2014) provide evidence consistent with default risk being positively priced in realized equity returns and om the implied cost of capital, Campbell et al. (2008) and others find contrary evidence.

[3] Altman's Z-score =1.2*((actq - lctq)/atq) + 1.4*(req/atq) + 3.3*(piq/atq)+ 0.6*[(mcap)/ltq) + 0.999*(saleq/atq)

estimate the loan pricing regression for each subsample to allow all coefficient estimates to vary across subsamples and report the results in Table 9.

Insert Table 9 about here

The estimates show that the coefficient estimate on *Expected Return-Options* is large (2.880) and highly significant in the lowest Z-score tercile (high default risk) and it decreases across Z-score terciles to 1.691 in the top Z-score tercile (low default risk). I performed a Chow test of differences across the coefficient estimates on *Expected Return* and found that the difference in estimates between the low and high default risk samples is significant at better than the 10% level. This result thus shows that the positive effects of higher expected returns on loan spreads are stronger among borrowers with higher likelihood of default. This finding is thus consistent with the argument that the information about *borrowers' distance to default* that is likely contained in expected stock returns is a potential channel through which returns get priced in loan contracts.

4.2 The effect of information asymmetry between a borrower and lender

If relevant borrower credit characteristics are not readily observable to lenders, one can expect the information in expected stock returns to play a more important role when the information gap between a borrower and lenders to be larger. I measure the information gap between a borrower and lender with the prior lending relation intensity variable (*Relationship Intensity)*, defined as the number of loans obtained by the firm from the lead bank over the past five years (if there are multiple lead banks, I use the highest relationship intensity with any of these banks). This variable is based on the idea that the lender's information about the borrower increases with the number of prior relationship loans and conversely that the lender faces greater information asymmetry when dealing with a new borrower.

I assign firms in the top, medium, and bottom terciles of the *Relationship Intensity* distribution to high, medium, and low information asymmetry risk subsamples and estimate Equation (1) separately for each subsample. Table 10 reports the regression results.

Insert Table 10 about here

The estimates show that the coefficient on the options-based expected return variable is similar in magnitude and significance across both groups. The difference in coefficient on *Expected Return-Options* between the high and low relationship intensity subsamples is not statistically distinct from zero at conventional levels. We can thus conclude that the difference in prior lending relationship across borrowers are unlikely to be related to the observed effect of option-implied expected returns on loan spreads.

5. Do expected returns affect loan structure

The analysis so far focused only on the effect of expected returns on the loan pricing terms. However, the syndicated loans are complex financial contracts and participating lenders can adjust not only the price but also the ownership structure to manage their exposure to the borrowers' credit risk. It is well-known that the one of the main advantages of the syndication loan process is that it enables participating lenders to diversify the risk of individual loans. Nevertheless, while the syndication limits the exposure of participating lenders to individual borrower's credit risk it creates a potentially costly additional layer of agency problems between the participants and the lead arranging lender who is the most informed lender and who screens and monitor the borrower on behalf of the syndicate (please see Ivashina (2009) and Sufi (2007) for a detailed analysis of loan syndicate structure). To mitigate this information asymmetry, participants require lead arrangers to take a larger share of the loan and form more concentrated ownership structure, so that informed lenders have more incentives to engage in greater due diligence and monitoring (Diamond, 1984; Holmstrom 1979; Holmstrom and Tirole 1997).

Hence, to the extent that higher option-based expected returns provide incremental information about relevant lending risks we can expect the syndicated loan structure to be affected as well. Specifically, if higher expected returns signal heightened lending risks and thus the need for more intense due diligence and monitoring, the lead arranger is expected to retain a larger share of the loan and form a more concentrated syndicate.

Table 11 presents the results of the loan syndicate analysis. The dependent variable is the natural logarithm of the number of lenders in the loan syndicate in Model (1), the concentration ratio of the lending syndicate as measured by the Herfindahl index in Model (3), and the percentage share of the loan retained by lead arranger(s) in Model (3). Lead lenders are credit providers which Dealscan identifies as "lead arranger credit" or "lender role" is either "agent", "administrative agent", "arranger" or "lead bank". The regressions include all the control variables and fixed effects used in the loan pricing regressions.

Insert Table 11 about here

The estimates indicate that the main variable of interest *Expected Return-Option* is indeed significantly related to the ownership structure of loans. The results show shows that firms with higher expected returns have a significantly lower and more concentrated loan syndicate size with lead arrangers retaining a greater fraction of the loan. This finding is consistent with the idea that a more concentrated lending structure serves to improve monitoring in response to increased risk environment (Sufi, 2007).

6. Conclusion

Understanding the determinants and implications of the firm-level expected stock return is a central question in financial economists. While the theoretical literature has long recognized the importance of expected returns in determining the cost of capital of firms, we know very little about the effect of expected returns on the cost of syndicated loans. This issue is important because syndicated loan market remains the most importance source of financing for business of all sizes and allocating scarce capital to their most productive uses is the fundamental function of loan market participants. This paper provides a novel and important evidence showing that options-based expected returns are associated with higher loan spreads and fees. The results are robust to the inclusion of controls for the key determinants of loan spreads such as credit market conditions (such as the Treasury rate, default and term spreads), borrower credit ratings, realized stock returns and volatility, analyst earnings growth forecasts, and other borrower financial characteristics as well as the industry or firm fixed effects. Importantly, the forward-looking expected return estimates are computed using recently developed approaches in Martin and Wagner (2019) and Chabi-Yo, Dim, and Vilkov (2022).

The evidence provided in this paper should be of interest not only for scholars, but also for credit managers and policymakers given that understanding of the variation in firms' cost of capital is of first-order importance for monetary policy (Cieslak and Vissing-Jorgensen, 2021).

References

Adam, T. R., Streitz, D. 2016. Hold-up and the Use of Performance-sensitive Debt. Journal of Financial Intermediation, 26, 47-67. https://doi.org/10.1016/j.jfi.2016.01.004

Addoum, J., and J. Murfin, 2020, Equity price discovery with informed private debt, Review of Financial Studies 33, 3766–3803.

Altman, E. I., 1968, Financial ratios, discriminant analysis and the prediction of corporate bankruptcy, Journal of Finance 23, 589–609.

Asquith, P., A. Beatty, and J. Weber (2005). Performance pricing in bank debt contracts. Journal of Accounting and Economics 40, 101–128.

Berg, T., A. Saunders, S. Steffen, and D. Streitz, 2016, Mind the gap: The difference between U.S. and European loan rates, *Review of Financial Studies* 30, 948–987.

Berg, T., A. Saunders, S. Steffen, 2016. The total cost of corporate borrowing in the loan market: Don't ignore the fees." The Journal of Finance 71 (): 1357-1392.

Berger, A.N., and Udell, G.F., 1990. Collateral, loan quality, and bank risk. *J. Monet. Econ*. 25, 21–42.

Bharath, S. T., S. Dahiya, A. Saunders, and A. Srinivasan (2011). Lending relationships and loan contract terms. Review of Financial Studies 24, 1142–1203.

Bharath, S., Shumway, T. (2008). Forecasting default with the Merton distance to default model. Review of Financial Studies, 21, 1339–1369.

Black, F. Fact and Fantasy in the Use of Options. Financial Analysts Journal, 31 (1975), 36–41.

Campbell, J. Y. and G. B. Taksler, 2003. Equity volatility and corporate bond yields." The Journal of Finance 58: 2321-2350.

Cieslak, A., Vissing-Jorgensen, A., 2021. The Economics of the Fed Put. The Review of Financial Studies Volume 34, Issue 9, September 2021, Pages 4045–4089

Chabi-Yo, F., C. Dim, G. Vilkov, 2022. Generalized Bounds on the Conditional Expected Excess Return on Individual Stocks. Management Science. https://doi.org/10.1287/mnsc.2022.4367

Chava, S., and M.Roberts, 2008, How Does Financing Impact Investment?, Journal of Finance, 63(5), 2085-2121

Chava, S.; Livdan, D.; and Purnanandam, A.. "Do Shareholder Rights Affect the Cost of Bank Loans?" Review of Financial Studies, 22 (2009), 2973–3004.

Chava, S., Purnanandam, A., 2010. Is default risk negatively related to stock returns? Review of Financial Studies 23, 2523‒2559.

Chung, K. H., J. Wang, and C. Wu. 2019. Volatility and the cross-section of corporate bond returns. Journal of Financial Economics 133:397–417.

Collin-Dufresne, P., Goldstein, R., and Martin, J. (2001) The determinants of corporate credit spreads, Journal of Finance 56, 2177-2207.

Dew-Becker, I. & Giglio, S. (2020), Cross-sectional uncertainty and the business cycle: evidence from 40 years of options data, American Economic Journal: Macroeconomics, forthcoming.

Diamond, D., 1984, Financial intermediation and delegated monitoring, Review of Economic Studies 51, 393–414.

Diamond, D., 1991, Monitoring and reputation: The choice between bank loans and privately placed debt, Journal of Political Economy 99, 689–721.

Easley, D., O'Hara, M., and Srinivas, P. S. Option Volume and Stock Prices: Evidence on Where Informed Traders Trade. Journal of Finance, 53 (1998), 431–465.

Elton, E. J. , 1999. Expected Return, Realized Return, and Asset Pricing Tests. Journal of Finance vol. 54, :1199–1220

Fama, E. 1985. What's different about banks? Journal of Monetary Economics 15, 29–34.
Friewald, N., Wagner, C., Zechner, J., 2014. The cross-section of credit risk premia and equity returns. Journal of Finance 69, 2419−2469.
Gormsen, N., Huber, K., 2022. Equity Factors and Firms' Perceived Cost of Capital. Working paper, University of Chicago
Greenwood, R., and A. Shleifer (2014): "Expectations of Returns and Expected Returns," Review of Financial Studies, 27(3), 714–746.
Hart, O., and Moore, J., 1994. A theory of debt based on the inalienability of human capital. *Quarterly Journal of Economics* 109, 841–879.
Holmstrom, Bengt, and Jean Tirole, 1997, Financial intermediation, loanable funds, and the real sector, Quarterly Journal of Economics 112, 663–691.
Ivashina, V., 2009, Asymmetric Information Effects on Loan Spreads, Journal of Financial Economics, 92, 300{319.
Levi, Y., Welch, I., 2017. Best practice for cost-of-capital estimates. Journal of Financial and Quantitative Analysis 52, 427–463.
Manso, G., B. Strulovici, and A. Tchistyi 2010. Performance-sensitive debt. Review of Financial Studies 23, 1819–1854.
Martin, I., 2017. What is the expected return on the market? Quarterly Journal of Economics 132, 367-433.
Martin, I., Wagner, C., 2019. What is the expected return on a stock? Journal of Finance 74, 1887- 1929.
Merton, R. C. 1974. On the pricing of corporate debt: The risk structure of interest rates. Journal of Finance 29:449-70.
Murfin, J., and M. Petersen. 2016. Loans on sale: Credit market seasonality, borrower need, and lender rents. Journal of Financial Economics 121:300–326.
Petersen, M. A., and R. G. Rajan, 1994. The Benefits of Lending Relationships: Evidence from Small Business Data. *Journal of Finance*, 49(1), 3–37.
Rajan, R., 1992, Insiders and Outsiders: The Choice between Informed and Arm's-Length Debt, Journal of Finance, 47, 1367-1400
Roberts , M. 2015. The role of dynamic renegotiation and asymmetric information in financial contracting. Journal of Financial Economics 116, 61–8.
Ross, S. A. Options and Efficiency. The Quarterly Journal of Economics, 90 (1976), 75–89
Santos, J. 2011. Bank corporate loan pricing following the subprime crisis. Review of Financial Studies 24:1916-43.
Stiglitz, J. E., and A. Weiss. 1981. Credit rationing in markets with imperfect information. *American Economic Review* 71: 393–410.
Sufi, A., 2007. Information asymmetry and financing arrangements: evidence from syndicated loans. Journal of Finance 62, 629–668.
Vassalou, M., Xing, Y., 2004. Default risk in equity returns. Journal of Finance 59, 831−868.
Vuolteenaho, T., 2002, What drives firm-level stock returns? Journal of Finance, 42: 233-264.

Figure 1 Time-variation in the average firm-level option-implied expected return and the yield on 1-year Treasury bill over the period 1996-2020

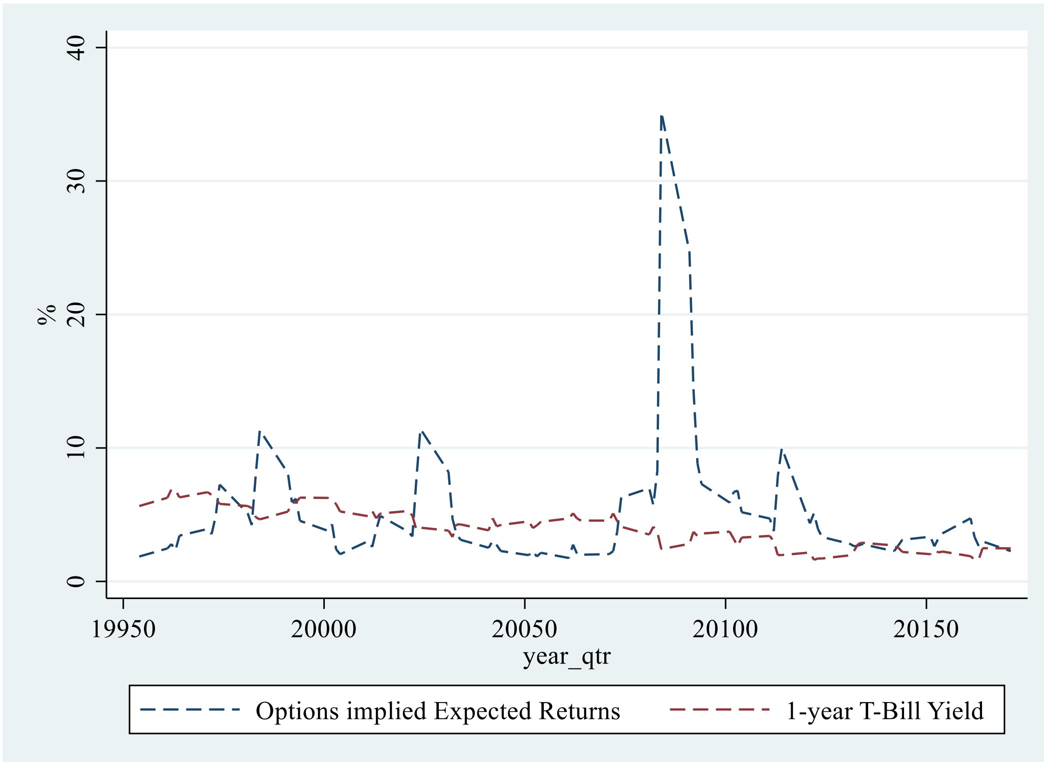

Table 1: Do option-implied expected-return predict future realized returns

This table presents regressions of subsequent realized returns in excess of risk-free rate on the expected-return estimates on month *t* . The dependent variable is the realized excess return over three months from month t. The explanatory variable in each regression is one of the three proxies for expected returns: the option-based measure *Expected Return*$_{Martin\text{-}Wagner}$ computed using Martin-Wagner (2019) approach, the option-based measure *Expected Return*$_{CDM}$ computed using Chabi, Dim, and Vilkov (2022) approach, and the standard CAPM measure. Standard errors are corrected for clustering of observations at the firm level and presented in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

VARIABLES	(1)	(2)	(3)	(4)
Expected Return$_{\text{Martin-Wagner}}$	0.419***			0.578***
	[0.057]			[0.065]
Expected Return$_{\text{CDM}}$		0.523***		
		[0.065]		
CAPM Return			-0.132*	-0.689***
			[0.080]	[0.095]
Log of Market equity	-0.074***	-0.084***	-0.086***	-0.071***
	[0.005]	[0.005]	[0.005]	[0.005]
Book-to-market equity	-0.011*	-0.009	-0.007	-0.017***
	[0.006]	[0.006]	[0.007]	[0.006]
Firm Fixed Effects	Yes	Yes	Yes	Yes
Calendar Month Fixed Effects	Yes	Yes	Yes	Yes
Constant Term	Yes	Yes	Yes	Yes
Observations	203,757	203,757	203,754	203,742
Adjusted R-squared	0.109	0.106	0.102	0.113

Table 2 Summary Statistics and Correlation

This table provides summary statistics of key variables used in regressions in Panel A and pairwise correlations of option-implied expected returns and credit market measures in Panel B.

Variables	N	Mean	p50	SD	p25	p75
Loan spread over the LIBOR (basis points)	11782	142.14	112.5	125.8	47.5	200
Loan upfront fee (basis points)	2170	50.7	30	67.11	12.5	65
Commitment fee (basis points)	4008	28.1	22.5	22.63	12.5	37.5
Utilization fee (basis points)	1896	11.72	10	12.113	5	12.5
Facility fee (basis points)	4780	13.36	10	15.45	7	15
Facility amount in $Mil	15072	847.03	400	1576.6	150	1000
Loan maturity in years	14138	3.87	4.8	2.68	1	5
Number of lenders	15001	10.819	8	9.527	4	15
S&P credit rating dummy	15074	0.899	1	0.302	1	1
Investment grade rating dummy	15074	0.673	1	0.469	0	1
Secured loan dummy	15074	0.244	0	0.429	0	0
Performance pricing dummy	15074	0.346	0	0.476	0	1
Borrower book assets (U.S.$ mil)	15074	64997	10499	207000	4054.6	28948
Market-to-book assets	15074	1.488	1.169	1.305	0.803	1.778
Borrower Oper. Income/Assets	15074	0.024	0.021	0.024	0.011	0.034
Borrower PP&E/Assets	15011	0.571	0.486	0.448	0.226	0.859
Expected Return-Option in %	15074	6.113	3.843	7.562	2.065	7.284
Yield on 1-year T-Bill in %	15074	2.701	2.22	2.202	0.37	4.96
Default Spread in %	15074	2.442	2.423	0.679	1.81	2.878
Term Spread in %	15074	1.677	1.713	1.127	0.78	2.631
Real GDP Growth in %	15074	1.157	1.217	0.616	0.861	1.588

Panel B: Pairwise correlation matrix

	Expected Return-Option	Yield on 1-year T-Bill	Default Spread	Term Spread
Yield on 1-year T-Bill	-0.0494***	1		
Default Spread	0.3194***	-0.6016***	1	
Term Spread	0.0553***	-0.7609***	0.4876***	1
Real GDP Growth	-0.2076***	0.3569***	-0.3445***	-0.0511***

, **, and * indicate significance at the 10%, 5%, and 1% level, respectively.*

Table 3 Options-based expected returns and loan spreads

This table reports the results of regressions of the all-in-drawn loan spreads (in basis points) on the borrowing firms' expected return measure computed from option prices and a set of control variables. The specification and all independent variables are described in Section 2.3.The standard errors given in brackets below coefficients are adjusted for heteroskedasticity and clustering at the firm level. ∗, ∗∗, and ∗∗∗ indicate significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)
VARIABLES			ratings		firm FE
Expected Return-Options	5.985***	5.975***	3.341***	2.746***	2.417***
	[0.350]	[0.366]	[0.375]	[0.341]	[0.398]
Credit Market Conditions:					
Yield on 1-year T-Bill		-23.248***	-15.412***	-11.278***	8.718
		[1.566]	[1.434]	[1.258]	[10.775]
Default spread		11.554***	8.802***	7.838***	24.679
		[3.609]	[3.229]	[2.743]	[18.486]
Term spread		-9.797***	-4.882**	1.385	0.201
		[2.413]	[2.278]	[1.715]	[8.856]
Borrower Credit Ratings					
AAA rating (1/0)			-50.467***	-29.246**	-32.953**
			[18.328]	[13.601]	[14.452]
AA rating (1/0)			-44.029***	-32.742***	-27.071**
			[10.377]	[7.920]	[11.744]
A rating (1/0)			-45.099***	-27.898***	-23.289***
			[8.293]	[6.144]	[8.723]
BBB rating (1/0)			-16.003**	-3.037	6.083
			[6.871]	[5.320]	[8.189]
BB rating (1/0)			51.555***	8.697	22.970**
			[7.195]	[6.108]	[9.219]
B rating (1/0)			115.031***	52.742***	61.515***
			[10.882]	[9.934]	[11.605]
CCC rating (1/0)			149.344***	85.648***	111.936***
			[28.080]	[25.227]	[26.683]
Loan characteristics:					
Secured loan (1/0)				83.432***	73.757***
				[5.891]	[5.897]
Term loan indicator (1/0)				42.598***	38.626***
				[3.353]	[3.315]
Purpose: Capex (1/0)				-42.410**	-48.304***
				[17.914]	[18.416]

Purpose: Refinancing (1/0)				-18.891***	-16.558***
				[2.931]	[3.092]
Purpose: Acquisition (1/0)				8.292	8.155
				[9.617]	[9.037]
Purpose: Backup line (1/0)				-55.069***	-47.565***
				[3.583]	[3.757]
Purpose:working capital(1/0)				-34.538***	-32.982***
				[4.144]	[5.032]
Purpose: corporate (1/0)				-37.770***	-37.520***
				[3.996]	[4.157]
Performance pricing (1/0)				-29.400***	-30.777***
				[2.405]	[2.692]
Log of loan maturity				11.290***	9.578***
				[2.075]	[2.093]
<u>Borrower characteristics:</u>					
Log of total book assets				1.002	1.149
				[1.614]	[3.691]
Market-to-book ratio				-5.454***	-2.071
				[1.266]	[1.501]
Oper. Income/Assets				-18.266	-133.690
				[68.453]	[91.519]
PP&E/Assets				-5.850	2.618
				[4.464]	[8.108]
Debt/Assets				20.904**	34.903**
				[8.736]	[14.451]
Industry Fixed Effects	No	Yes	Yes	Yes	no
Firm Fixed Effects	No	No	No	No	Yes
Constant term	yes	yes	yes	yes	yes
Observations	11,782	11,768	11,768	11,400	11,250
Adjusted R-squared	0.126	0.249	0.341	0.567	0.648

Table 4 Expected returns and loan spreads: additional controls for cash flow shocks
This table reports the results of regressions of the all-in-drawn loan spreads (in basis points) on the borrowing firms' expected return measure computed from option prices and a set of control variables. The specification and all independent variables are described in Section 2.3.The standard errors given in brackets below coefficients are adjusted for heteroskedasticity and clustering at the firm level. ∗, ∗∗, and ∗∗∗ indicate significance at the 10%, 5%, and 1% level, respectively.

VARIABLES	(1)	(2)	(3)
Expected Return-Option	2.720***	2.380***	2.182**
	[0.321]	[0.429]	[0.706]
Realized return-past 3 months	-0.295	-4.335	5.551
	[7.064]	[7.222]	[8.874]
Realized return volatility		0.77**	0.481
		[0.315]	[0.363]
Analyst earnings' growth forecasts			6.625
			[6.275]
Yield on 1-year T-Bill	-11.281***	-13.600***	-13.546***
	[1.254]	[1.470]	[2.052]
Default spread	17.828***	12.185***	13.229***
	[2.745]	[3.322]	[4.611]
Term spread	1.382	-0.118	-0.512
	[1.711]	[1.706]	[2.146]
AAA rating (1/0)	-29.243**	-24.569*	-39.618***
	[13.595]	[14.010]	[13.977]
AA rating (1/0)	-32.740***	-30.227***	-29.237***
	[7.914]	[7.812]	[10.241]
A rating (1/0)	-27.897***	-25.934***	-29.139***
	[6.140]	[6.119]	[7.492]
BBB rating (1/0)	-3.033	-2.196	-3.392
	[5.316]	[5.274]	[6.430]
BB rating (1/0)	8.702	8.997	5.379
	[6.110]	[6.076]	[7.775]
B rating (1/0)	52.751***	49.593***	39.049**
	[9.904]	[9.895]	[16.328]
CCC rating (1/0)	85.644***	79.436***	29.635
	[25.208]	[23.590]	[34.561]
Loan type and purpose indicators	Yes	Yes	Yes
Borrower characteristics:	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes
Constant	Yes	Yes	Yes
Observations	11,400	11,400	9,020
Adjusted R-squared	0.538	0.541	0.533

Table 5 Robustness Checks

This table reports the results of regressions of the all-in-drawn loan spreads (in basis points) on the borrowing firms' expected return measure computed from option prices and a set of control variables. The specification and all independent variables are described in Section 2.3.The standard errors given in brackets below coefficients are adjusted for heteroskedasticity and clustering at the firm level. ∗, ∗∗, and ∗∗∗ indicate significance at the 10%, 5%, and 1% level, respectively.

VARIABLES	(1) Deal level	(2) non-financials	(3) time FE	(4) Year<2009	(5) Year>2008	(6) lead-lags
Expected Return-Options (averaged over prior 3 months)	2.768***	2.281***	2.745***	2.276***	2.396***	1.565***
	[0.411]	[0.294]	[0.635]	[0.370]	[0.618]	[0.457]
Expected Return -1 lag						0.874**
						[0.343]
Expected Return -2 lag						0.040
						[0.625]
Expected Return -lead						0.229
						[0.555]
Credit Market Conditions	Yes	Yes	Yes	Yes	Yes	Yes
Borrower Credit Ratings	Yes	Yes	Yes	Yes	Yes	Yes
Borrower Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Loan type and purpose indicators	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	No	Yes	Yes	Yes
Calendar Month x Industry Fixed Effects	No	No	Yes	No	No	No
Constant term	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,886	8,632	11,335	7,233	4,102	10,851
Adjusted R-squared	0.537	0.547	0.584	0.587	0.490	0.571

Table 6 Expected returns and loan fees

This table reports the results of regressions of loan fees (in basis points) on the borrowing firms' expected return measure computed from option prices and a set of control variables. The specification and all independent variables are described in Section 2.3.The standard errors given in brackets below coefficients are adjusted for heteroskedasticity and clustering at the firm level. ∗, ∗∗, and ∗∗∗ indicate significance at the 10%, 5%, and 1% level, respectively.

	Dependent Variable:				
VARIABLES	Commitment fee	Utilization fee	Facility fee	Upfront Fee	Loan spreads sans fees
Expected Return-Options	0.368***	0.359***	0.392***	0.818*	2.122***
	[0.078]	[0.084]	[0.133]	[0.459]	[0.566]
Credit Market Conditions					
Yield on 1-year T-Bill	4.761	0.641	1.945	6.916	4.413
	[4.967]	[2.826]	[1.871]	[36.835]	[9.874]
Default spread	12.558	-0.602	4.197	-18.003	-6.855
	[8.413]	[6.616]	[5.083]	[47.348]	[19.384]
Term spread	2.223	-4.890*	4.376*	21.706	15.799**
	[5.448]	[2.713]	[2.237]	[23.981]	[7.517]
GDP Growth	0.037	0.143	0.200	-0.823	1.433
	[0.721]	[0.330]	[0.249]	[1.977]	[1.343]
AAA rating (1/0)	-9.248***	0.195	-5.516***	-12.106	-24.320***
	[2.935]	[3.615]	[1.121]	[11.549]	[5.565]
AA rating (1/0)	-8.007***	-1.480	-4.569***	2.423	-22.694***
	[2.004]	[2.639]	[1.071]	[12.801]	[5.370]
A rating (1/0)	-6.230***	1.860	-4.499***	-2.410	-23.227***
	[1.505]	[2.365]	[0.995]	[7.259]	[4.105]
BBB rating (1/0)	-1.108	6.086**	0.355	4.629	0.807
	[1.273]	[2.784]	[1.015]	[6.318]	[4.218]
BB rating (1/0)	6.356***	2.883	10.815***	3.382	28.510***
	[1.348]	[2.969]	[2.491]	[7.779]	[7.925]
B rating (1/0)	15.826***	13.923	57.751*	27.557*	54.213***
	[2.655]	[9.503]	[29.626]	[15.577]	[15.525]
CCC rating (1/0)	5.156	4.027	-0.102	0.348	-1.740
	[3.956]	[3.379]	[4.730]	[16.325]	[14.967]
Borrower Characteristics	yes	yes	yes	yes	yes
Loan type and purpose indicators	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	yes	yes	yes	yes	no
Constant term	yes	yes	yes	yes	yes
Observations	3,944	1,888	4,664	2,146	4,534
Adjusted R-squared	0.487	0.568	0.390	0.29	0.730

Table 7 Expected returns and loan spreads: Loan Types

This table reports the results of regressions of loan spreads (in basis points) on the borrowing firms' expected return measure computed from option prices and a set of control variables. The specification and all independent variables are described in Section 2.3.The standard errors given in brackets below coefficients are adjusted for heteroskedasticity and clustering at the firm level. ∗, ∗∗, and ∗∗∗ indicate significance at the 10%, 5%, and 1% level, respectively.

VARIABLES	Term loans	Credit Lines: <1 year	Credit Lines: >1 year
Expected Return-Options	3.796***	1.722**	2.424***
	[0.657]	[0.769]	[0.298]
Credit Market Conditions			
Yield on 1-year Treasury Bill	-12.491***	-2.777**	-11.658***
	[2.904]	[1.348]	[1.220]
Default spread	17.208***	17.934***	19.951***
	[6.170]	[3.759]	[3.117]
Term spread	5.120	-2.367*	2.070
	[4.280]	[1.389]	[1.565]
AAA rating (1/0)	103.105	-28.934***	-31.891**
	[71.928]	[7.576]	[12.378]
AA rating (1/0)	-12.957	-22.833***	-34.765***
	[28.525]	[6.570]	[7.528]
A rating (1/0)	37.729**	-19.661***	-32.497***
	[17.264]	[5.396]	[4.821]
BBB rating (1/0)	0.716	9.485*	-10.399**
	[13.504]	[5.657]	[4.280]
BB rating (1/0)	-18.884	62.094***	13.511***
	[13.082]	[10.087]	[5.088]
B rating (1/0)	23.622	75.325***	39.981***
	[17.426]	[25.861]	[8.121]
CCC rating (1/0)	152.157***	225.971**	-3.852
	[42.070]	[95.541]	[13.811]
Borrower Characteristics	Yes	Yes	Yes
Loan type and purpose indicators	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes
Constant term	Yes	Yes	Yes
Observations	2,604	2,409	5,762
Adjusted R-squared	0.500	0.604	0.675

Table 8 Expected returns and loan spreads: Performance Pricing Grid

This table reports the results of regressions of loan spreads (in basis points) on the borrowing firms' expected return measure computed from option prices and a set of control variables. The specification and all independent variables are described in Section 2.3.The standard errors given in brackets below coefficients are adjusted for heteroskedasticity and clustering at the firm level. ∗, ∗∗, and ∗∗∗ indicate significance at the 10%, 5%, and 1% level, respectively.

VARIABLES	(1) Without Pricing Grid	(2) With Pricing Grid
Expected Return-Options	3.088***	1.747***
	[0.545]	[0.372]
Credit Market Conditions		
Yield on 1-year T-Bill	-12.955***	-9.123***
	[1.793]	[1.143]
Default spread	9.445**	29.812***
	[4.094]	[3.111]
Term spread	-0.307	0.310
	[2.559]	[1.421]
AAA rating (1/0)	-30.010*	-39.115***
	[15.361]	[12.631]
AA rating (1/0)	-32.776***	-43.957***
	[11.486]	[7.346]
A rating (1/0)	-25.448***	-38.099***
	[9.593]	[4.973]
BBB rating (1/0)	-1.790	-12.349***
	[8.473]	[4.459]
BB rating (1/0)	6.583	22.572***
	[9.731]	[5.570]
B rating (1/0)	50.959***	62.444***
	[14.651]	[9.218]
CCC rating (1/0)	107.274***	21.861
	[29.366]	[27.386]
Borrower Characteristics	Yes	Yes
Loan type and purpose indicators	Yes	Yes
Industry Fixed Effects	yes	yes
Constant term	yes	yes
Observations	6,385	4,950
Adjusted R-squared	0.551	0.639

Table 9 Expected returns and loan spreads: Distance to Default

This table reports the results of regressions of loan spreads (in basis points) on the borrowing firms' expected return measure computed from option prices and a set of control variables. The specification and all independent variables are described in Section 2.3. A higher Z-score indicates a lower likelihood of financial default. The standard errors given in brackets below coefficients are adjusted for heteroskedasticity and clustering at the firm level. ∗, ∗∗, and ∗∗∗ indicate significance at the 10%, 5%, and 1% level, respectively.

VARIABLES	low Z-score	med Z-score	high Z-score
Expected Return-Options	2.880***	1.869***	1.691***
	[0.546]	[0.413]	[0.655]
Yield on 1-year T-Bill	-13.716***	-11.507***	-10.858***
	[2.313]	[2.194]	[2.134]
Default spread	14.018**	25.452***	18.790***
	[5.420]	[4.221]	[4.452]
Term spread	-1.500	-0.025	-2.134
	[2.822]	[3.157]	[2.872]
AAA rating (1/0)	-16.257	-49.142***	2.777
	[26.180]	[16.531]	[17.342]
AA rating (1/0)	-28.816*	-60.523***	-21.158**
	[15.189]	[16.981]	[10.622]
A rating (1/0)	-38.899***	-55.538***	-11.031
	[13.239]	[10.795]	[7.928]
BBB rating (1/0)	-10.551	-28.281***	4.671
	[12.500]	[9.842]	[6.978]
BB rating (1/0)	42.944***	-8.393	-3.928
	[13.898]	[9.718]	[10.757]
B rating (1/0)	85.652***	45.988***	-1.267
	[15.764]	[14.237]	[18.960]
CCC rating (1/0)	125.030***	33.925	145.467
	[31.793]	[38.769]	[119.489]
Borrower Characteristics	Yes	Yes	Yes
Loan type and purpose indicators	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes
Constant term	Yes	Yes	Yes
Observations	3,370	3,617	3,572
Adjusted R-squared	0.565	0.570	0.551

Table 10 Expected returns and loan spreads: Information Asymmetry

This table reports the results of regressions of loan spreads (in basis points) on the borrowing firms' expected return measure computed from option prices and a set of control variables. The specification and all independent variables are described in Section 2.3. The standard errors given in brackets below coefficients are adjusted for heteroskedasticity and clustering at the firm level. ∗, ∗∗, and ∗∗∗ indicate significance at the 10%, 5%, and 1% level, respectively.

VARIABLES	low lending relation	med lending relation	high lending relation
Expected Return-Options	2.703***	2.222***	3.081***
	[0.538]	[0.604]	[0.537]
Yield on 1-year T-Bill	-14.557***	-17.640***	-8.371***
	[1.456]	[3.230]	[2.388]
Default spread	16.408***	18.814**	18.507***
	[3.521]	[7.575]	[4.682]
Term spread	-1.167	-7.234	-0.148
	[1.833]	[4.711]	[3.609]
AAA rating (1/0)	-13.350	-23.212	-30.541*
	[19.109]	[22.391]	[15.837]
AA rating (1/0)	-37.067***	2.524	-38.810**
	[8.332]	[18.950]	[15.155]
A rating (1/0)	-39.948***	-2.102	-22.945*
	[6.288]	[14.315]	[11.997]
BBB rating (1/0)	-13.453**	14.516	-6.324
	[5.945]	[12.242]	[10.685]
BB rating (1/0)	15.346**	4.263	11.564
	[7.725]	[13.843]	[11.512]
B rating (1/0)	61.335***	41.059*	53.229***
	[12.881]	[21.467]	[16.150]
CCC rating (1/0)	95.362**	53.727	114.394**
	[38.291]	[33.703]	[47.826]
Borrower Characteristics	Yes	Yes	Yes
Loan type and purpose indicators	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes
Constant term	Yes	Yes	Yes
Observations	5,755	1,854	3,698
Adjusted R-squared	0.534	0.588	0.574

Table 11 Expected return and loan ownership structure

This table reports the results of regressions of loan ownership structure on the borrowing firms' expected return measure computed from option prices and a set of control variables. The specification and all independent variables are described in Section 2.3. The standard errors given in brackets below coefficients are adjusted for heteroskedasticity and clustering at the firm level. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively.

	Dependent Variable:		
VARIABLES	Log of number of lenders	Lender concentration ratio	Lead lender share (in %)
Expected Return-Options	-0.007**	0.014***	0.006***
	[0.003]	[0.004]	[0.002]
Yield on 1-year Treasury Bill	-0.040***	-0.038**	-0.111***
	[0.014]	[0.016]	[0.014]
Default spread	0.017	0.027	0.006
	[0.030]	[0.045]	[0.034]
Term spread	-0.004	-0.017	-0.111***
	[0.021]	[0.018]	[0.016]
AAA rating (1/0)	-0.477	0.122	0.633**
	[0.287]	[0.153]	[0.242]
AA rating (1/0)	-0.119	-0.022	-0.014
	[0.130]	[0.117]	[0.138]
A rating (1/0)	0.091	-0.082	-0.197**
	[0.075]	[0.080]	[0.085]
BBB rating (1/0)	0.265***	-0.168***	-0.262***
	[0.052]	[0.061]	[0.065]
BB rating (1/0)	0.221***	-0.252***	-0.233***
	[0.058]	[0.077]	[0.086]
B rating (1/0)	0.061	0.075	0.129
	[0.058]	[0.189]	[0.104]
CCC rating (1/0)	-0.033	-0.576**	0.113
	[0.098]	[0.285]	[0.114]
Borrower Characteristics	Yes	Yes	Yes
Loan type and purpose indicators	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes
Constant term	Yes	Yes	Yes
Observations	14,046	14,046	13,191
Adjusted R-squared	0.295	0.223	0.348