Project no. CIT1-CT-2004-506392

NEWGOV
New Modes of Governance

Integrated Project
Priority 7 – Citizens and Governance in the Knowledge-based Society

Banks and Bonds: The Impact of Bank Loan Announcements on Bond and Equity Prices

reference number: 21/D25

Due date of deliverable: April 2008
Actual submission date: 31 May 2008

Start date of project: 1 September 2004 Duration: 48 months

Organisation name of lead contractor for this deliverable:
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Project co-funded by the European Commission within the Sixth Framework Programme (2002-2006)		
Dissemination Level		
PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
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Summary

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Keywords: Asymmetric Information, Credit Markets, Loans, Bonds, Credit Spreads

JEL classification: G14, G21, G24

Banks and Bonds: The Impact of Bank Loan Announcements on Bond and Equity Prices

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Abstract

We study the effect of bank loan announcements on the borrowing firms' bond and equity prices. Our sample consists of 896 loan deals signed between 1997 to 2003 involving 364 different U.S. firms. We report the first comprehensive evidence that also firm bond prices react to bank loan announcements. The cumulative abnormal reaction of bond credit spreads equals minus 11 bps on average in the two-day period comprising the day prior to and the event day itself. The cumulative abnormal return on the firm stocks equals plus 26 bps on average in the same period. While stock returns are unaffected by firm risk, credit spreads react less negatively for risky or small firms. The bondholders of the riskier firms are more sensitive to the loss given default which increases with bank borrowing. The overall positive effect on the value of equity is due to two forces. First, bank certification reduces information asymmetry. Second, there is a transfer of bondholder's welfare to the shareholders as a results of claim dilution. Finally, our analysis provides an estimate of the net impact on firm value of bank loan announcements, between minus 5 bps for riskier and smaller firms and plus 18 bps for safer and larger companies.

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1 Introduction

The special role banks play as providers of private debt has long been emphasized in the literature. Diamond (1984), Ramakrishnan and Thakor (1984), Boyd and Prescott (1986), and Fama (1985), for example, stress the key advantage banks have over public investors in terms of monitoring efficiency and access to private information. Mikkelson and Partch (1986), James (1987), Lummer and McConnel (1989), followed by many others, document that bank loan announcements generate positive abnormal returns on the borrowing firms' stocks. The combination of theoretical work on the causes and benefits of private borrowing and the empirical stylized facts linking bank loan announcements to positive excess stock returns has led many researchers to label bank loans "special" among other corporate financing alternatives.[1]

While the empirical work convincingly shows that equityholders in publicly-traded firms assess new bank loans to increase firm equity value, it is unclear how other providers of firm debt, public bondholders in particular, are affected. This paper addresses this question. The impact on the current firm bondholders is ex ante ambiguous. On the one hand, new banks loans may provide an additional and timely certification that the firm is still of an *acceptable* credit quality. On the other hand, new bank loans affect the firm's capital structure increasing not only the value of its assets but also its leverage ratio and consequently the expected *loss given default* for bondholders. In addition, the frequent seniority of bank debt over public debt further disadvantages the current bondholders in case of default, exacerbating their expected losses.

Employing standard event study methodology, we document the effect of bank loan announcements on the borrowing firms' bond and equity prices. Our sample consists of 896 loan deals reported between 1997 to 2003 involving 364 different U.S. firms. As such we report the first comprehensive evidence that also firm bond prices react to bank loan announcements. The cumulative abnormal reaction of bond credit spreads equals minus 11 basis points (bps) on average in the two-day period comprising the day prior to and the event day itself. In accordance to the rest of the literature the cumulative abnormal return on the firm stocks equals a positive 26 bps on average in the same time period.[2] While the generated stock returns are mostly unaffected by firm risk, credit spreads react less negatively for risky

[1]See Boot (2000), Ongena and Smith (2000), and Degryse and Ongena (2006), for example, for reviews.

[2]This cumulative abnormal return is smaller than the 193 bp documented by James (1987), for example, but is in line with recent findings by Fields, Fraser, Berry and Byers (2006). They show that the reaction of stock markets to bank loan announcements has considerably decreased over time, possibly because of

or small firms. Hence our analysis suggests that bondholders are sensitive to the loss given default, which may increase when new bank loans are obtained by the firm. Risky and highly levered firms may actually end up losing firm value on net. This effect of bank borrowing had been overlooked in the literature.

The rest of the paper is organized as follows. Section 2 briefly summarizes the relevant literature. A theoretical background and the implications are laid down in Section 3. Section 4 describes the sample and variables, while section 5 introduces the methodology. Section 6 presents our empirical results and Section 7 their robustness. Section 8 concludes.

2 Related Literature

We review the literature dealing with the impact of bank loan announcements on stock and bond returns. We start by outlining the existing theoretical arguments on the specialness of banks and then summarize the main empirical findings regarding excess firm stock returns following bank loan announcements. Next, since bond price reactions to bank loan announcements have been overlooked by the literature, we summarize some of the recent related findings that link bank loans and bond markets.

2.1 Bank Loan Announcements and Equityholder Wealth Effects

Financial markets are suffused with informational asymmetry between the various market participants. Firms seeking financing, for example, may know more than their current or future financiers about the quality or even the outcomes of their projects. A substantial literature has argued that informational asymmetry is one of the main reasons why financial intermediaries exist (Leland and Pyle, 1977; Campbell and Kracaw, 1980; Diamond, 1984; Ramakrishnan and Thakor, 1984).[3] Financial intermediaries solve moral hazard problems through the production of private information that is not available to outsiders. Fama (1985) is the first to highlight the specialness of banks among all other corporate financiers. Fama emphasizes the unique role banks play in the production of information, implying that bank lending by itself may serve as a credible signal of firm quality to outside investors.

increased competition and the changing nature of the banking sector. However, the impact may remain considerable for small, poorly performing firms and during periods of high economic risk and uncertainty.

[3]Other reasons for institutionalized intermediation can be transaction costs and the protection of confidentiality, for example.

Motivated by Fama's hypothesis on the uniqueness of bank lending, and following piquant evidence by Mikkelson and Partch (1986), James (1987) compares the stock price responses to bank loan announcements and other types of debt offerings. His findings suggest a positive, statistically significant and economically relevant stock price response to bank loan announcements, but a non-positive response for public issues of straight debt. According to James, these results are not driven by loan type, credit quality or size of the borrower. Supporting Fama's conjectures, James concludes that a bank loan serves as a signal about the expected increase in the firm's cash flows and hence a decrease in the firm's probability of default.

Many papers followed up on the study by James (1987). Lummer and McConnel (1989), for example, differentiate between new loan agreements and loan renewals. The authors find that the positive response is solely due to the second group of loan renewals. Slovin, Johnson and Glascock (1992), on the other hand, find a significantly positive share price reaction for loan initiations *and* renewals, but only for small firms. Announcements of bank loans to large firms do not result in significant valuation effects. These findings are consistent with Diamond (1984) and Fama (1985) in that firms that face more severe adverse selection and moral hazard problems will gain most from the screening and monitoring that are part and parcel of any bank lending relationship. Small firms may face more severe problems acting as strong barriers in their search for external financing.

Bank characteristics may play a crucial role as well in determining the magnitude of the announcement effect. Billet, Flannery and Garfinkel (1995), for example, find evidence that the banks' credit ratings determine the level of the borrowers' stock price reactions.[4] Hence equity investors react to the quality of the lending bank when assessing the announcement of new bank loans.

While lender creditworthiness arguably plays a role in determining the impact of the bank loan announcements on the borrowers' equity returns, borrower creditworthiness itself may also matter. Best and Zhang (1993), for example, analyze if the presence of a rating for the borrower's bonds influences the size of the impact of the bank loan announcements but find no statistically significant effect of a bond rating dummy on the excess stock returns. We revisit this issue by studying how bond credit spreads, reflecting borrower credit quality as perceived by the market, determine the size of the bank loan announcement effects.

[4] Preece and Mullineaux (1994) on the other hand find no statistical difference in the firms' stock price reactions to loan announcements from different lenders.

2.2 Bank Loan Announcements and Bondholder Wealth Effects

The literature, reviewed so far, that analyzes the reaction of equity prices following bank loan announcements suggests that shareholders react positively as the certification provided by the bank through the granting of the loan may imply a higher current firm value and/or future cash flows. Not unlike shareholders, bondholders also have limited access to firms' inside information. Hence when a firm obtains a bank loan (and new information is revealed), there could also be a significant bond price reaction following its announcement.

There are currently no papers studying the reaction of bond prices to bank loan announcements (to the best of our knowledge). One explanation for this gap in the literature is the illiquidity in many parts of the bond market. This partial unavailability of daily bond prices complicates the pursuit of an event study analysis comparable in data frequency to the existing loan announcement studies that use equity returns.

One exception is a recent paper by Altman, Gande and Saunders (2004). They use daily bond prices to analyze the informational efficiency of loans relative to bonds using evidence from secondary market prices. Their main finding is that the loan market is informationally more efficient prior to and surrounding information intensive events such as corporate loan/bond defaults and bankruptcies. Moreover, the authors find that loan prices Granger cause bond prices, but that the opposite does not seem to hold. This last finding further motivates our study of the effects of bank loan announcements on the pricing of corporate bonds. In the next section, we elaborate on this issue and develop a number of theoretical arguments to differentiate between bond and stock price reactions to bank loan announcements.

3 Theoretical Background

In this section we intuitively extend the existing theoretical arguments to bond pricing and highlight the different expected reaction of stock and bond prices following the extension of bank credit. Finally, we present a set of testable implications differentiating the effects of bank loan announcements for stock and bond returns.

We expect bond price reactions to differ from equity price reactions. The intuition underpinning this expectation is straightforward. Bank loans may not only imply lower default probabilities, but also greater expected losses for certain groups of debt holders.

Bondholders may incur an increase in the expected loss given default when new bank loans are senior and collateralized, for example, which is often the case (Longhofer and Santos, 2000, 2003). For shareholders however, the loss given default does not change because shareholders are residual claimants and in case of default they loose everything, with or without a new bank loan. To formalize this intuition let the *expected loss*, EL, be equal to:

$$EL = PD \times LGD, \tag{1}$$

where PD is the *probability of default* and LGD is the *loss given default*. Assuming that the two are independent we can express the *change in expected loss* to equal:

$$\mathrm{d}EL = LGD \times \mathrm{d}PD + PD \times \mathrm{d}LGD. \tag{2}$$

When a new bank loan is announced, shareholders assess the default probability to decrease due to the bank's certification, i.e., $\mathrm{d}PD < 0$. Equity holders are the regular residual claimants on firm's assets after all obligations are met, and can consequently be viewed as holders of a call option on the firm's assets. The strike price of the call option is the book value of the firm's liabilities. When the value of the firm's assets is smaller than the the book value of the firm's liabilities, the value of the equity equals zero. This implies that in default the shareholders' loss given default is 100% ($LGD = 100\%$) with or without a new bank loan, and hence that $\mathrm{d}LGD = 0$. $\mathrm{d}PD < 0$ and $\mathrm{d}LGD = 0$ following a new bank loan implies that $\mathrm{d}EL < 0$, i.e., lower expected losses and consequently a positive stock price reaction.

Bondholders, on the other hand, become residual claimants in the case of default. Bondholders then receive the value of the assets less the value of the debt that is senior to their claims. Bank loans are most often senior. Hence, a new bank loan not implies only that $\mathrm{d}PD < 0$, but also that $\mathrm{d}LGD > 0$. Consequently, the sign of $\mathrm{d}EL$ will be determined by the net effect of both $LGD \times \mathrm{d}PD$ and $PD \times \mathrm{d}LGD$. While the change in default probability following a new bank loan is typically small, the change in the loss given default may play a decisive role in determining the sign of the change in expected loss. Ceteris paribus, the change in the loss given default is more important for risky firms as their default probabilities, PD, are higher. Hence, the change in the expected loss is more likely to be positive for riskier firms.

3.1 Debt and Equity Reactions in Merton's Framework

So far, we have not been specific about exactly how the new bank loan may affect the bondholders, we have only argued that the bond price reaction most likely will differ from the equity price reaction and that the risk of the firm will be an important determinant. We now explore in greater detail the effect of a new bank loan in the Merton (1974) classical structural model. The key assumption in this model is that the value of firm's assets follows a stochastic differential equation and is independent of the firm's liabilities.[5] Consequently, an increase in the firm's liabilities will be offset by a decrease in the firm's equity, such that the value of debt and equity will be always equal to the value of firm's assets.

We generalize Merton's framework by assuming that the value of the firm's assets can be an increasing function of the debt that is being newly issued: if the firm's liabilities increase, the value of its assets increase commensurately or by a greater amount. We then simulate the sensitivity of the changes in the value of debt and equity to the increase in debt over a wide range of parameter values. We tabulate the results in Table 1 and Table 2 and provide the corresponding plots in Figure 8.

Our simulations highlight at least three key insights arising from this generalized framework. First, there is a considerable wealth transfer from bondholders to shareholders. Second, if the new debt is value increasing (e.g., if the new bank debt certifies higher future firm cash flows), the benefits are shared by the two parties and the bondholders will lose less than in the previous case when there was no increase in asset value. Third, these wealth effects of the new debt for the current bondholders are a nonlinear function of the firm's risk and leverage. More firm risk and lower leverage decrease the offsetting effect. To conclude, new debt transfers wealth from bondholders to equityholders, but the effect on the value of debt need not be that negative if the firm value increases as a result of the new debt, and the firm is not too risky but is highly levered.

3.2 The Role of Informational Asymmetries

In the last section we have shown that, according to Merton (1974), debt and equity holders react differently to new loans. Merton's setting however ignores the fact that the borrower's default risk itself may be an important element about which borrower and the lender are asymmetricaly informed. In this respect, it is unclear how risk affects the sensitivity of

[5]See the Appendix for a formal description of the model.

debt and equity to an issuance of new debt. It is reasonable to believe, however, that the information asymmetries have a crucial impact on the lender's pricing such that bondholders with superior screening abilities should have a more precise estimate of a firm's default risk. Consequently, the expected yields on their lending will be more sensitive to this risk, i.e. the expected loss as perceived by the bondholders.

To represent this intuition, we supplement our reasoning so far with a modification of the example presented in Panetta, Schivardi, and Shum (2004). First of all, let us consider a bondholder with no screening ability. This bondholder treats all potential borrowers the same and hence the yield required on her investment are all identical and independent of firm's risk. However, if the bondholder improves its screening ability she will start to discriminate between the borrowers depending on the perceived default risk. Thus, higher yields will be required from loans to risky borrowers and lower yields will be charged to the high-quality borrowers with smaller expected losses. Finally, a bondholder with only partial access to information will adjust its pricing function somehow in between the ones of the uninformed and the informed bondholders. More precisely, she will overestimate the risk of the high-quality borrowers by expecting greater losses and will underestimate the creditworthiness of the low-quality ones with expectations of smaller losses.

Figure 2 depicts the uninformed bondholder charging the borrower the pooling rate, r^u. The pooling rate is independent of the borrower's risk as the investor uninformed about the firm's risk does not discriminate and consequently charges every borrower the same break-even rate. If investors possess some information about their borrowers and are willing to discriminate somewhat according to the firm's risk, the pricing function may become steeper and equal to r^b. Investors in the bond market may not observe the value of the firm's assets directly. Accounting reports may be delayed or even cooked, other publicly available information may be scarce, and there may be many barriers to direct monitoring. Instead, bondholders may free ride on the monitoring efforts by other and already better informed lenders, such as commercial banks.

New bank debt and its observable conditions informs the investors further about the creditworthiness of the borrower and should be included in the pricing policies of the public bondholders. Bondholders in Figure 2 who underestimated their borrower's risk will readjust their pricing function from r^b, which is the rate of return required before a public release of private information, to r^a, which is the rate of return required after the informational release, when more information is available about the borrowers credit quality. Clearly, the shift in the required rate of return on their investment will be positive for risky borrowers and negative for the safer borrowers.

Figure 8 depicts how bondholders react to the new information they obtain from observing the new bank debt depending on the risk of the borrowers. When new information about the quality of the firm is revealed, bondholders will adjust their pricing functions accordingly. In terms of Figure 2, the pricing schedule of the less informed investor, r^b, will approach the schedule of the better informed investor, r^a, whose pricing function is more sensitive to borrower's risk. Consequently, according to Figure 8, the change in the required rate of return is given by:

$$\Delta r = r^a - r^b.$$

Consequently, Δr is larger in cases with more informational asymmetry and moral hazard and will be positive for low quality borrowers and negative for the high quality borrowers.

Note that this intuition is consistent with the formalization on how bondholders' expected losses change when bank loans are announced. According to (2), firms with higher default probabilities have larger loadings on the changes in the loss given default. Thus, there is greater chance for the second term in (2) to be larger than the first term which leads an increase in expected loss, $\mathrm{d}EL$. As such, a positive Δr corresponds to an increase in the *expected loss*, $dEL < 0$, while a negative Δr implies a decrease in the *expected loss* on the investment. To conclude, the level of risk or creditworthiness is a potential cross-sectional determinant of the impact of bank loan announcements on bond returns.

To conclude, the literature dealing with loan announcements and equity returns documents that equity prices react positively to loan announcements, i.e. $\partial E(V)/\partial L > 0$. However, our theoretical framework suggests that the debt holders reaction might be different, i.e. $\partial D(V_t)/\partial L \neq \partial E(V_t)/\partial L$. The overall impact on firm value will henceforth be given by the sum of these two components, an issue so far neglected in the literature.

3.3 Implications

The theoretical framework discussed so far suggests a number of implications on how bond prices may respond to bank loan announcements. First, corporate *bond prices* may react to the announcements of bank loans. In an efficient market security prices will reflect all available public information. Any new information revealed to the market participants will be instantly incorporated in the security prices. Since shareholders, as outsiders with limited access to the firm's private information, react (positively) to bank loan announcements, bondholders, having a similar outsider position, may also react to such announcements as well. As usual, our event study comprises a joint assessment of market efficiency and the informativeness of the event.

Second, bond price reactions may be a function of *firm risk*. Bank loans increase (decrease) the expected losses for risky (safe) firms ceteris paribus (Figure 8). To the extent that banks have access to private information, we expect that the bank loan announcements will provide the market with information about the true credit quality of the firm. Consequently, the less informed investors will adjust their pricing schedule such that higher rates of return will be demanded from riskier firms, while the required rates of return for safer firms may be lowered. We can test whether firm risk matters for changes in both equity and bond returns. According to (2) we expect the bond price reactions to be a function of the firm's risk, while stock price reactions should be independent of it.

Third, the corresponding change in yields may be a function of the informational asymmetry and *firm transparency*. Smaller firms face more severe moral hazard problems, hence bond price reactions may decrease with firm size ceteris paribus.

Finally, *loan size* may play an important role. This is intuitively clear from equation (2) where greater changes in losses given default have a greater effect on the changes in expected losses. Consequently, bond price reactions will increase with the size of the bank loan ceteris paribus. This reaction will depend though on wether the firms are optimally leveraged. New loans that lead to optimal capital structure should have positive effects on both stock and bond prices while those that depart from the optimal leverage ratio might lead to greater expected losses. Which effect dominates seems ultimately an empirical issue.

4 Data and Sample Selection

Expected losses are a key concept of our theoretical framework. Expected losses are a function of *default probabilities* and *expected losses given default*, hence to test the set of implications we analyze bond credit spreads. Credit spreads reflect both the default probabilities and the severity of default. Consequently, our main objective is to test for the abnormal behavior of credit spreads around bank loan announcement dates and compare the credit spread reactions to the stock price reactions.

Security Data Company (*SDC*) *Platinum New Issues Database* lists 19,626 public non-convertible bonds issued by US industrial firms between 1970 and 2004. *Loan Pricing Corporation* (*LPC*) *DealScan* records 39,397 different firms obtaining loans during the period 1987 to 2003. We match the two datasets and arrive at 2,437 bond issuers obtaining 17,457 different loan facilities. For the resulting sample, we download corporate bond time series information from *Datastream*. As a result, our final sample comprises 364 firms with 3,590 bonds outstanding that participated in 894 different loan deals during the sample years 1997 to 2003 (i.e., on average firms have almost ten different bonds outstanding and obtain between two and three loan deals during the sample period).

We collect other firm characteristics from *Compustat* and the equity prices and proxies for market return data (equally and value weighted market returns as well as the S&P 500 return) from the *Center for Research in Security Prices* (*CRSP*). We obtain the daily series of 10-year Benchmark Treasury rates from the *Federal Reserve Bank of Saint Louis Database*.

Tables 3 to 7 summarize the sample selection process, the definition of the variables, the descriptive statistics and the correlation matrix for the variables employed in the empirical specifications.

5 Methodology

We now present the methodology we employ to study the effect of loan announcements on bond and equity prices. Our approach is based on the standard event study methodology. Following Karafiath (1988), our model is based on the dummy variable technique which allows obtaining cumulative prediction errors in one step by including a vector of dummy variables to the right-hand side of the corresponding equity market model. Using the returns on stocks in the equity markets, we estimate the market model:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \sum_k \gamma_k D_k + \epsilon_{it}, \tag{3}$$

where R_{it} is the individual firm stock return, R_{mt} is the return on a market-wide index, and D_k is a dummy variable that equals one on day k in the event window and equals zero otherwise. Consequently, γ_k is the abnormal stock reaction on day k. Hence, the cumulative average abnormal return on equity is just the sum of the coefficients γ_k over the event window of interest.

For the credit spreads on the bond markets we specify a model similar to Collin-Dufresne, Goldstein and Martin (2001). We again include a vector of dummy variables and estimate the model:

$$\begin{aligned} Credit\ Spread_{it} = a_i + \delta_0 r_{it} + \delta_1 r_t^{10} + \delta_2 (r_t^{10})^2 \\ + \delta_3 slope_t + \delta_4 VIX_t + \delta_5 S\&P_t \\ + \sum_k \tau_k D_k + \varepsilon_{it}, \end{aligned} \quad (4)$$

where $Credit\ Spread_{it}$ is the credit spread of the corporate bond of firm i at date t, r_{it} is the return of firm's stock, r_t^{10} is the yield on a 10-year Treasury bond, $slope_t$ is the 10-year minus 2-year Treasury bond yields, VIX_t and $S\&P_t$ are the implied volatility and return on the S&P 500, and D_k is a dummy variable that equals one on day k in the event window and equals zero otherwise. In this case τ_k represents the abnormal bond reaction on day k. Here, the sum of coefficients τ_k over k days will represent the cumulative average abnormal reaction of credit spreads for the respective event windows. Notice that the independent variables included in the Collin-Dufresne, Goldstein and Martin (2001) model proxy for overall economic performance, expectations of future short rates as well as future economic performance, firm specific volatility, and the overall state of the economy, respectively.

Estimating (3) and (4) will yield the stock and bond cumulative abnormal reactions, $CAAR_i$ and $\Delta Credit\ Spread$, in various time windows. If these are statistically and economically significant, we can explain the cross sectional variation in a multivariate specification using a set of firm specific characteristics. For equity markets we will estimate:

$$\begin{aligned} CAAR_i = \alpha^e + \theta_1^e Credit\ Spread_i + \theta_2^e Firm\ Size_i + \theta_3^e Loan\ Amount_i \\ + \theta_4^e Debt\ Amount\ Outstanding_i + \theta_5^e (r_f)_i + \theta_6^e (r_f)_i^2 \\ + \theta_7^e Bond\ Maturity_i + \theta_8^e Loan\ Maturity_i + \nu_i^e. \end{aligned} \quad (5)$$

Additionally, we replace $Credit\ Spread_i$ with several other proxies for firm's risk, i.e. *Leverage* and *Volatility*, as well as include several interaction terms and year and industry dummies in the specification above. For bond markets the specification is similar, i.e.:

$$\begin{aligned}\Delta CreditSpread_i = \alpha^b &+ \theta_1^b Credit\ Spread_i + \theta_2^b Firm\ Size_i + \theta_3^b Loan\ Amount_i \\ &+ \theta_4^b Debt\ Amount\ Outstanding_i + \theta_5^b (r_f)_i + \theta_6^b (r_f)_i^2 \\ &+ \theta_7^b Bond\ Maturity_i + \theta_8^b Loan\ Maturity_i + \nu_i^b. \end{aligned} \quad (6)$$

We will draw inference based on the estimates $\hat{\theta}^e$ and $\hat{\theta}^b$. Since there are several firms with more than one loan-bond combination in the sample, we are forced to drop the classical assumption of independence of the error term for different observations. As a result, we assume independence of errors across firms but allow for correlation within firms. Equivalently, we will estimate equations (5) and (6) using the cluster regression procedure.

6 Empirical Results

In this section we describe the results of the comparative event study analysis of equity and bond price reactions to bank loan announcements. We first look at the average abnormal behavior of equity prices and bond prices separately. Next, we turn our attention to the cross sectional explanation of the variation in returns and test the consistency of the proposed theory by a comparative analysis of stock versus bond market reactions in a multivariate regressions setting.

6.1 Univariate Results

We estimate equation (3) using the equally weighted market index. We use the loan activation day minus five days as the loan announcement day.[6] The pre-estimation period starts 180 days prior to the loan announcement date and ends ten days after this date. We use a similar estimation period for equation (4).

Table 8 presents detailed descriptive statistics for the estimated daily reactions while Table 9 reports the cumulative abnormal returns for different event windows around the bank loan announcement dates. Shareholders earn substantially positive abnormal returns in the days surrounding the bank loan announcements. In the three-day window around the event for example (reported in Table 9) cumulative abnormal returns equal 39 bps,

[6] We investigate a representative matched sample of press releases from Lexis/Nexis and find that announcements were made on average 5 to 7 days prior to the loan facility activation date.

statistically significant at the 5% level. While smaller than the bank loan announcement returns in Mikkelson and Partch (1986) and James (1987), for example, our findings are comparable in magnitude to the returns found in Fields, Fraser, Berry and Byers (2006). They document a considerable decrease in loan announcement returns over the last decades. In their sample returns equal around 30 bps in the 1990s and seem close to zero now. Also, consistent with previous results, our sample has around 50% of the events with positive stock price returns. And, in unreported regressions we find that the results hold for the various proxies of the market return.

The second column of Table 9 presents the cumulative bond price reactions. The results show that the abnormal reactions of the bond credit spreads are negative around the bank loan announcement events. In the three-day window for example, the cumulative abnormal spread equals -17 bps, for the eleven-day window the excess spread equal -58 bps. All abnormal spreads are statistically significant at the 1% level. Clearly, the event had a considerable impact on the bond prices. In our estimation, we also consider longer event windows by extending the market model with three types of dummy variables: a dummy variable equal to one during 30 days prior to the event window, eleven dummy variables that will control for each pricing error during the event window, and the last dummy variable equal to one for a 30-day period after the event window. This allows to compare the pricing errors during the event window with the average pricing errors before and after the event window. Results are unaffected. Finally, we also find that negative credit spread reactions dominate the positive ones in proportion of about 60%, whereas on the stock market these proportions were about equal. Overall, these findings suggest that bond prices respond to bank loan announcements and that the reaction is reflected by a change in the credit spreads on corporate bonds.

To summarize, so far we have shown that both shareholders and bondholders react when bank loans are announced. Consistent with the previous literature, we find that shareholders gain following bank loan announcements. We also find that credit spreads decrease following the announcements. Consequently, bond prices increase and as a result also bondholders gain (on average) following bank loan announcements. Our findings therefor suggest that both equity and bondholders benefit from bank loans. In what follows, we will investigate the cross sectional determinants of these reactions.

6.2 Multivariate Results

In this section we explain the equity and bond price reactions to bank loan announcements employing a set of macroeconomic and firm specific characteristics among which the risk of the firm. Table 10 presents the results. Models 1, 2, and 3 in both tables differ in the risk proxy variable being used. Since our theoretical framework centered on *expected loss*, Model 1 is of particular interest, while Models 2 and 3 serve as auxiliary specifications to assess robustness.

Most of the variables in our regression analysis explain, to varying degrees, stock as well as the bond price reactions. The sign of the estimated coefficients generally corresponds with our theoretical priors, though there are some exceptions. The overall fit of the cross-sectional models is rather low, it is below 4%, but this lack of fit is a recurrent finding in the empirical literature explaining excess returns. Still, the estimated coefficients provide interesting insights in the determinants of abnormal stock and bond price reactions around bank loan announcements. We summarize the major findings.

Both stock and bond prices react positively with respect to the firm risk variables. However, when we use the firm's *credit spread* prior to the event window as a proxy for risk (i.e., to capture default probabilities *and* loss given default), the stock price reaction becomes economically insignificant. For an average firm, the economic effect of the credit quality of the firm on the cumulative abnormal equity price reaction, during a three-day event window around the announcement, is approximately one basis point. The economic effect of the credit spread on the bondholder's reaction is much stronger. For an average firm, the marginal economic effect of an announcement is approximately 30 basis points. This result implies that the credit spread reaction to bank loan announcement increases with the riskiness of the firm. In particular, it is clear that the risk variable defines the sensitivity of bondholders to the provision of new information, while this is not necessarily the case for stockholders.

Figure (8) in the appendix presents the partial effects of risk on the bond price reactions for various levels of firm size. Interestingly, the figure suggests riskier firms face an increase in credit spreads, while safer firms face a decrease in spreads after the bank loan was announced ceteris paribus. This is in partial contradiction with the previous literature which identified only short term gains from relationships with banks. Rather, bondholders take bank signals as benchmarks and, consequently, they readjust the beliefs about the firm's credit quality, asking for a higher yield on their lending to riskier firms.

Our second main variable is *firm size*. In all specifications, firm size is positive, statistically significant and economically relevant. Again the partial effects plotted in Figure (8) suggests, that although for riskier firms, *firm size* has a larger effect on the overall bond reaction, for safer firms the reaction is smaller (in absolute value) for the larger firms. This suggests, that informational asymmetries are are less severe for safe, large firms. For riskier firms, however, the bond price reaction is significantly larger and more sensitive to *firm size*. Larger and riskier firms may involve more information asymmetry or more likely end up causing a larger *loss given default*.

Loan amount has a positive, statistically significant, and economically relevant effect on excess returns in the stock markets, but is insignificant explaining excess bond spreads the bondholders. Indeed greater loans allow stockholders to undertake more projects which is in line with their objectives, hence the positive effect. On the other hand, when controlling for expected loss and default probability in the credit spreads regression (Model 1, Table 11) it is apparent that greater loans increase credit spread reactions. This is indeed the case if we consider Model 1 where greater changes in loss given default induce greater changes in expected loss.

The *amount outstanding* is another variable of interest. If we interpret this variable as exposure at default, or loss given default, then the results are consistent with Model 1. Indeed, greater exposure induces greater reactions for both stockholders and bondholders. The economic impact is considerably smaller in the case of stock price reactions, as conjectured earlier.

Loan and bond maturities appear to make a difference as well. The maturity of public debt seems to have little impact on bond price reactions, both economically and statistically. The maturity of the loan, on the other hand, is economically and statistically significant. In line with intuition, our regression estimates suggest that the longer the maturity of the loan, the less is the reaction in the bond price. For equity price reactions *loan maturity* is not a significant determinant, neither economically nor statistically. The *bond maturity* however is important for equity prices. We believe the reason for this is that bondholders of longer maturities of debt are less sensitive, which imply less wealth transfers. Consecutively, the stock price reaction is smaller and is most probably associated to the certification effect suggested by the bank lending signal.

Our specifications also include the risk free rate, r_f, as a measure of the general macroeconomic environment. Following Collin-Dufresne, Goldstein and Martin (2001) we also include

$(r_f)^2$ to account for convexity of bond spreads. The predicted sign however is inconsistent with theory. Other variables like bond maturity, loan maturity, leverage, book-to-market and stock volatility are either insignificant or have signs opposite to general theoretical priors.

6.3 Net Effect on Firm Value

Now, that we have estimated both, the bond and equity price responses to loan announcements, we are able to compute its net effect on firm value. According to our extension to Merton (1974) as described in the appendix, the value of the firm is just a sum of firm's equity and debt. Therefore,

$$V_t = E(V_t) + D(V_t).$$

Consequently, the change in the value of the firm is given by summing up the corresponding changes in the values of firm's equity and debt. As such, the overall impact of a loan on the value of firm is

$$\begin{aligned} \partial V_t/\partial L &= \partial E(V_t)/\partial L + \partial D(V_t)/\partial L \\ &= \alpha. \end{aligned}$$

This is Proposition 2 in the appendix. Empirically, we can estimate this effect by

$$\begin{aligned} \Delta V_t &= \Delta E(V_t) + \Delta D(V_t) \\ &= CAAR^S \times E_t + CAAR^B \times D_t, \end{aligned}$$

Here $CAAR^s$ and $CAAR^B$ stand for the stock and bond (not credit spread) price reaction. $CAAR^B$ has been obtained by estimating equation (4) with bond returns being the dependent variables for the corresponding event windows. Also, E_t is the market value of equity and D_t is the *total liabilities* of the firm. The average, median, minimum and maximum of the sample changes in firm value are given in Table 11. The table suggests that the net impact of a loan announcement ranges between - 5 bps and +18 bps. While the average firm with a modest equity to debt ratio (of approximately 0.5) benefits from bank borrowing, small and highly levered firms are negatively affected!

7 Robustness

We subject the main results reported in Tables 10 and 11 to a number of robustness checks. There are a number of concerns we have. First, our proxy for loan announcement dates might be inaccurate. A second, but related, concern is that the event windows might be used inappropriately. Third, our data set is based on dealer quotes that often contain matrix prices.

Extending the length of the event windows is an appropriate solution to all of the above problems. Indeed, wider event windows will more likely contain the announcement day. Matrix prices, on the other hand, are not driven by firm specific information. In this case, it is less likely that our analysis returns significant results. Nevertheless, extending event windows also increases the likelihood of picking up an actual trade. Consequently, we estimate similar regressions as in Table 10 for the event windows (-20,+20), (-10,+10), (-10,+50), and (-5,+5). Though in most of the cases our estimates are somewhat larger in absolute size, the main results are virtually unaffected.

8 Concluding Remarks

A wide set of papers shows that capital markets respond positively to bank loan announcements. However, these analyses focus on stock market reactions only. We find evidence that the previous conclusions can not be simply extended to the bond market. Bank loan announcements convey information to bond market investors regarding the value and the credit quality of the firm. But the bondholders' reaction to bank loan announcements is strikingly different for risky than for safe firms. Our empirical analysis suggests that bondholders already correctly perceive the credit quality of the firm, but strenghten their beliefs following bank loan announcements. Consequently, compared to the yields observed before the announcements, higher yields are paid by riskier firms and lower yields are paid by safer firms. These results are consistent with the fact that loan prices are informationally more efficient than bond prices and that, as documented by Altman, Gande and Saunders (2005), loan prices 'cause' bond prices 'in a Granger sense'. Our results further show that equity price reactions are independent of firm risk, as measured by credit spreads. Contrary, to bond holders, equity holders are residual claimants, winning in case of additional successful projects being undertaken, but mostly cannot lose more when the firm is already in serious distress.

Overall our results illustrate that bank loans may not always increase firm value. In particular, we document that risky and highly levered firms may end up losing value on net, a possibility so far mostly ignored in the literature.

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Appendix: Structural Model by Merton (1974)

The classical structural model as proposed by Merton (1974) assumes that the risk neutral dynamics of the value of firm's assets, V_t, is given by:

$$\mathrm{d}V_t/V_t = (r - \kappa)\mathrm{d}t + \sigma_V \mathrm{d}W_t, \quad V_0 > 0,$$

where κ is the constant dividend ratio, and W is the standard Brownian motion under the martingale $\mathbb{Q}$. Consequently, firm's value at T is given by:

$$V_T = V_0 \exp\left\{(r - \sigma_V^2/2)T + \sigma_V W_T\}\right\}.$$

The firm has a single liability in the form of a zero-coupon corporate bond which matures at T and has a face value of $L > 0$. This implies that default might occur at time T only, and in case $\{V_T < L\}$. This means that the payoff at maturity is:

$$D_T = \min\{V_T, L\} = L - \max\{L - V_T, 0\} = L - (L - V_T)^+,$$

and thus, bondholders are viewed as a holders of a put option on firm's value with strike price L. Up to T, however, the value of firm's debt, $D(V_t)$ is given by:

$$D(V_t) = D(t,T) = LB(t,T) - P_t,$$

where $B(t,T)$ is the default free zero coupon bond and P_t is the price of a put option with strike L and expiration T. Shareholders, on the other hand, get at time T:

$$E(V_T) = V_T - D(V_T) = V_T - \min\{V_T, L\} = (V_T - L)^+,$$

and are viewed as holders of a call option on firm's assets. The value of firm's equity up to T is:

$$E(V_t) = V_t - D(V_t) = V_t - LB(t,T) + P_t = C_t,$$

where C_t is the price of a call on firm's assets with strike L and exercise date T.

Let us consider the situation when the firm increases its liabilities at some time, $t < T$. We assume that the characteristics of new debt are no different from the old debt. Respectively, the only thing that changes is the face value of (old plus new) debt. The effects on firm's debt and equity are given by:

$$\partial D(V_t)/\partial L = B(t,T) - \partial P_t/\partial L, \quad \text{and} \quad \partial E(V_t)/\partial L = \partial V_t/\partial L + \partial P_t/\partial L - B(t,T).$$

which leads to the following proposition.

Proposition 1 $\partial D(V_t)/\partial L + \partial E(V_t)/\partial L = \partial V_t/\partial L.$

Proof 1 *Follows trivially after substitution.* ■

Clearly, in a traditional Merton setting, the debt and equity responses are offsetting since $\partial V_t/\partial L = 0$. This case is uninteresting for our study. In what follows, we relax this assumption and assume $\partial V_t/\partial L = \alpha$. Additionally, we abstract from stochastic interest rates, however this our results can be easily extended to this case. After tedious calculations we are able to rewrite the effects on firm's debt and equity as follows:

$$\partial D(V_t)/\partial L = e^{-r\tau}\big(1 - N(-d_2)\big) + \alpha N(-d_1), \quad \text{and} \tag{7}$$
$$\partial E(V_t)/\partial L = \alpha\big(1 - N(-d_1)\big) - e^{-r\tau}\big(1 - N(-d_2)\big), \tag{8}$$

where

$$\tau = T - t, \quad d_1 = \frac{\ln(V_t/L) + (r + \sigma_V^2/2)\tau}{\sigma_V\sqrt{\tau}}, \quad d_2 = d_1 - \sigma_V\sqrt{\tau},$$

and $N(\cdot)$ is the standard normal cumulative distribution function.

Proposition 2 *If $\partial V_t/\partial L = \alpha > 1$ then:*

$$\partial D(V_t)/\partial L < 1 \quad \textit{and} \quad \partial D(V_t)/\partial L > 0.$$

Proof 2 *First, let us rewrite the value of equity as:*

$$E(V_t) = E_t^{\mathbb{Q}}\left[e^{-r\tau}\max\{0, V_T - L\}\right].$$

Taking derivative yields:

$$\begin{aligned}\partial E(V_t)/\partial L &= E_t^{\mathbb{Q}}\left[e^{-r\tau} I_{V_T \geq L}\left(\alpha V_T/V_t - 1\right)\right] \\ &= E_t^{\mathbb{Q}}\left[e^{-r\tau}\left(\alpha V_T/V_t - 1\right)\right] E_t^{\mathbb{Q}}\left[I_{V_T \geq L}\right] + Cov_t^{\mathbb{Q}}\left[e^{-r\tau}\left(\alpha V_T/V_t - 1\right), I_{V_T \geq L}\right] \\ &= \left[\alpha - B(t,T)\right] Q(V_T \geq L) + e^{-r\tau} Cov_t^{\mathbb{Q}}\left[\left(\alpha V_T/V_t - 1\right), I_{V_T \geq L}\right] > 0\end{aligned}$$

The first term is greater then zero if $\alpha \geq 1$, while the second is positive if $\alpha > 0$. The sum of two positive numbers is always positive, hence $\partial E(V_t)/\partial L > 0$. This result together with Proposition 1 yields $\partial D(V_t)/\partial L < 1$ which concludes the proof. ■

Table 1 and 2 below simulate the sensitivity of debt and equity as given by equation (**??**) to a wide range of parameter values. Table 1 corresponds to $\alpha = 1$, i.e. the case when new debt is not value increasing. In this situation the increase in firm value will be equal to the amount of new debt. Table 2 corresponds to the case when $\alpha > 1$, i.e. contacts with banks are value increasing. In this case, the fact that firm's value will increase with more than the value of new debt is induced by the characteristics of banks being special. Consequently, $\alpha - 1 > 0$ is attributed to the value of the signal.

Table 1: **Sensitivity Analysis of Debt and Equity Reaction to New Debt,** ($\alpha = 1$)
The table presents the simulation results for a 7 and 8 where α has been set to 1.

Panel A: $V = 100$; $r = 3\%$; $\tau = 1/2$; $\sigma = .1$						
			L			
	0	20	40	60	80	100
$\partial E(V_t)/\partial L$	0.01489	0.01489	0.01489	0.01489	0.02846	0.03606
$\partial D(V_t)/\partial L$	0.98511	0.98511	0.98511	0.98511	0.97154	0.96394
Panel E: $r = 3\%$; $L = 60$; $\sigma_V = .1$; $\tau = 1/2$						
			V_t			
	0	60	80	100	120	150
$\partial E(V_t)/\partial L$	0.0	0.03606	0.01489	0.01489	0.01489	0.01489
$\partial D(V_t)/\partial L$	1.0	0.96394	0.98511	0.98511	0.98511	0.98511
Panel C: $V_t = 100$; $\tau = 1/2$; $L = 60$; $\sigma_V = .1$						
			r			
	0	0.01	0.02	0.03	0.04	0.05
$\partial E(V_t)/\partial L$	0.0	0.00499	0.00995	0.01489	0.0198	0.02469
$\partial D(V_t)/\partial L$	1.0	0.99501	0.99005	0.98511	0.9802	0.97531
Panel D: $V_t = 100$; $r = 3\%$; $L = 60$; $\sigma_V = .1$						
			τ			
	0	3/4	2/3	1/2	1/3	1/4
$\partial E(V_t)/\partial L$	0.0	0.02225	0.0198	0.01489	0.00995	0.00747
$\partial D(V_t)/\partial L$	1.0	0.97775	0.9802	0.98511	0.99005	0.99253
Panel B: $V_t = 100$; $r = 3\%$; $\tau = 1/2$; $L = 60$						
			σ_V			
	0	0.1	0.2	0.3	0.4	0.5
$\partial E(V_t)/\partial L$	0.01489	0.01489	0.01494	0.01871	0.03445	0.06044
$\partial D(V_t)/\partial L$	0.98511	0.98511	0.98506	0.98129	0.96554	0.93956

Table 2: **Sensitivity Analysis of Debt and Equity Reaction to New Debt,** ($\alpha = 1.1$) The table presents the simulation results for a 7 and 8 where α has been set to 1.1.

Panel A: $V = 100$; $r = 3\%$; $\tau = 1/2$; $\sigma = .1$						
			L			
	0	20	40	60	80	100
$\partial E(V_t)/\partial L$	0.11489	0.11489	0.11489	0.11489	0.11495	0.0958
$\partial D(V_t)/\partial L$	0.98511	0.98511	0.98511	0.98511	0.98505	1.0042
Panel E: $r = 3\%$; $L = 60$; $\sigma_V = .1$; $\tau = 1/2$						
			V_t			
	0	60	80	100	120	150
$\partial E(V_t)/\partial L$	0.0	0.0958	0.11489	0.11489	0.11489	0.11489
$\partial D(V_t)/\partial L$	1.1	1.0042	0.98511	0.98511	0.98511	0.98511
Panel C: $V_t = 100$; $\tau = 1/2$; $L = 60$; $\sigma_V = .1$						
			r			
	0	0.01	0.02	0.03	0.04	0.05
$\partial E(V_t)/\partial L$	0.1	0.10499	0.10995	0.11489	0.1198	0.12469
$\partial D(V_t)/\partial L$	1.0	0.99501	0.99005	0.98511	0.9802	0.97531
Panel D: $V_t = 100$; $r = 3\%$; $L = 60$; $\sigma_V = .1$						
			τ			
	0	3/4	2/3	1/2	1/3	1/4
$\partial E(V_t)/\partial L$	0.1	0.12225	0.1198	0.11489	0.10995	0.10747
$\partial D(V_t)/\partial L$	1.0	0.97775	0.9802	0.98511	0.99005	0.99253
Panel B: $V_t = 100$; $r = 3\%$; $\tau = 1/2$; $L = 60$						
			σ_V			
	0	0.1	0.2	0.3	0.4	0.5
$\partial E(V_t)/\partial L$	0.11489	0.11489	0.11494	0.11823	0.13218	0.15563
$\partial D(V_t)/\partial L$	0.98511	0.98511	0.98506	0.98177	0.96782	0.94437

Table 3: **Loan-Bond Match Statistics**

	Total	Period	Source
Bond Issuers	19,626	1970:2004	SDC
Loan Borrowers	39,397	1987:2003	LPC
Matched Firms	2,437	1987:2003	SDC and LPC

Table 4: **Final Sample**

	Total	Seniority (fraction)	Period	Source
Bonds Issued	3,589	-	1997:2004	Datastream
Loans Granted	894	99%	1997:2003	LPC
Total Firms	364		1997:2003	Datastream and LPC

Table 5: **Description of Variables**

The table presents a description of the variables employed in this study as well as details about the sources of the data.

Variables	**Definition**	**Source**
Panel A: Cross Sectional Variables		
Cumulative Average Abnormal Returns	= Estimated Cumulative Average Abnormal Return	Equation (2)
Δ *Credit Spread*	= Change in Credit Spread after Loan Announcement; event window (-1;+1)	Equation (3)
Credit Spread	= Level of Credit Spread 10 days prior to Loan Announcement	Datastream
Firm Size	= logarithm of firm's total assets	CRSP
Loan Amount	= logarithm of loan amount	LPC
Debt Amount Outstanding	= logarithm of amount outstanding	Datastream
Book to Market	= Total Equity/(Common Shares Outstanding x Share Price)	CRSP
Leverage	= Long Term Debt/Total Assets	CRSP
Stock Volatility	= Stock Return Volatility	CRSP
Bond Time to Maturity	= $\sqrt{}$ of Bond Redemption Date minus Loan Announcement Date	Datastream
Loan Time to Maturity	= $\sqrt{}$ of Loan Maturity - Loan Announcement Date	LPC
Risk free Rate	= 10-year Benchmark Treasury Rate	FRB St. Louis
Panel B: Timer Series Variables		
Credit Spread	= Daily Credit Spread Levels	Datastream
Equity Returns	= Daily Equity Returns	CRSP
S&P500	= Daily Return on S&P500 Index	CRSP
VIX	= Implied Volatility of S&P500 Index	CBOE
Slope	= 10-year minus 2-year Treasury Bond Yield	FRB St. Louis
Risk free Rate	= 10-year Benchmark Treasury Rate	FRB St. Lous
Market Return	= Return on Equally Weighted Market Index	CRSP

Table 6: **Descriptive Statistics**

The table presents the descriptive statistics for the variables employed in the regression analysis. Panel A presents the variables used in the cross section, while Panel B summarizes the characteristics of the variables used in the time series regressions.

Variables	**Nr.Obs.**	**Mean**	**Median**	**Min**	**Max**	**SD**
Panel A: Cross Sectional Variables						
Cummulative Average Abnormal Returns	797	0.32	0.07	-27.54	39.42	4.52
Δ *Credit Spread*	3,589	-3.04	-5.96	-482.54	516.95	78.75
Credit Spread	3,589	218.73	160.3	12.1	960.3	170.18
Firm Size	3,360	23.65	23.56	19.71	27.05	1.45
Loan Amount	3,589	20.41	20.25	15.57	23.52	1.38
Debt Amount Outstanding	3,575	19.27	19.34	11.51	25.33	1.13
$Book-to-Market$	3,182	0.61	0.5	0.01	3.43	0.46
Leverage	3,385	0.31	0.29	0.01	0.91	0.12
Stock Volatility	2,919	0.02	0.02	0.01	0.13	0.01
Bond Time to Maturity	3,329	54.12	47.28	8.31	190.83	28.54
Loan Time to Maturity	3,281	27.03	19.10	4.89	61.02	12.08
Risk free Rate	3,589	226.63	168	81	622	160.48
Panel B: Timer Series Variables						
Credit Spread	829,290	220.95	16.8	0.2	999.9	167.64
Equity Returns	745,144	.06	0.00	-92.77	344.44	2.66
$S\&P500$	829,290	1,080.51	1,069.92	776.76	1,527.46	185.23
VIX	829,290	25.59	24.26	14.34	45.74	5.88
Slope	829,290	155.12	192	-52	275	89.01
Riskfree Rate	829,290	472.81	478	313	679	77.27

Table 7: **Correlations for Cross Sectional Variables**

The table provides the correlations between the variables employed in the cross sectional analysis

	CAAR	Δ*Credit Spread*	*Credit Spread*	*Firm Size*	*Loan Amount*	*Debt Amount Outstand.*	*Book to Market*	*Leverage*	*Stock Volatility*	*Bond Time to Mat.*	*Loan Time to Mat.*	*Risk free rate*
CAAR	1.00											
Δ*Credit Spread*	0.05	1.00										
Credit Spread	0.02	0.22	1.00									
Firm Size	0.14	0.02	-0.36	1.00								
Loan Amount	0.07	0.00	-0.21	0.29	1.00							
Debt Amount Outst.	0.12	0.02	-0.18	0.17	0.16	1.00						
Book to Market	0.00	0.03	0.27	0.01	-0.14	-0.11	1.00					
Leverage	0.05	0.03	0.24	-0.19	-0.13	-0.04	-0.09	1.00				
Stock Volatility	0.01	0.04	0.33	0.05	-0.06	-0.06	0.15	-0.01	1.00			
Bond Time to Mat.	0.12	-0.01	0.01	0.05	0.03	-0.05	0.02	-0.04	0.01	1.00		
Loan Time to Mat.	-0.14	-0.04	-0.02	-0.08	-0.06	-0.09	0.00	0.02	-0.02	-0.04	1.00	
Risk free rate	0.02	0.15	-0.12	0.13	-0.02	-0.02	-0.08	-0.01	0.07	0.04	-0.09	1.00

Table 8: **Daily Average Abnormal Return**
The table provides the estimates of the γ_k coefficients in regression (3) and τ_k coefficients in regression (4). *a*, *b*, *c* indicate significance at 1%, 5% and 10% respectively. Standard errors are in parenthesis.

	τ_{-5}	τ_{-4}	τ_{-3}	τ_{-2}	τ_{-1}	τ_0	τ_{+1}	τ_{+2}	τ_{+3}	τ_{+4}	τ_{+5}
γ_k	-10.2^c	-10.4^b	-12.3	5.23	-3.32^b	24.13^a	12.37	8.44	-8.25	-2.23	7.38
	(3.98)	(1.78)	(10.11)	(4.12)	(0.88)	(2.26)	(14.42)	(10.16)	(12.39)	(3.16)	(9.41)
τ_k	-4.73^a	-5.23^a	-5.51^a	-5.52^a	-5.48^a	-5.71^a	-5.67^a	-5.36^a	-5.44^a	-4.78^a	-4.63^a
	(1.34)	(1.31)	(1.32)	(1.35)	(1.37)	(1.37)	(1.38)	(1.40)	(1.42)	(1.45)	(1.47)

Table 9: **Cumulative Average Abnormal Reaction**
The table presents the cumulative abnormal reactions estimated in regressions (3) and (4). The values were obtained by aggregating the corresponding coefficients presented in Table 8. *a*, *b*, *c* indicate significance at 1%, 5% and 10% respectively.

Event window	*Equity CAAR* (bps)	Δ*Credit Spreads* (bps)
(-5;+5)	16.49	-58.06^a
(-1;0)	26.45^c	-11.19^a
(-1;+1)	38.82^b	-16.86^a
(-2;+2)	52.49^c	-27.74^a
(-3;+3)	31.94^b	-38.69^a

Table 10: **Regression Models for Loan Announcements**

The table shows cluster regression results for loan announcements 3-day abnormal return. Model 1 is given in (5) and in (6) for stocks and bonds respectively, while Model 2 and Model 3 are extensions used to test for the sign of the main risk variable. $I(A;B)$ stands for interaction between A and B, where both, A and B where demeaned, i.e. $I(A;B) = (A-\bar{A})(B-\bar{B})$. a, b, c indicate significance at 1%, 5% and 10% respectively. Standard errors are in parenthesis.

	Dep. Var.: $CAAR_i$			**Dep. Var.:** $\Delta CreditSpread_i$		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
$Credit\ Spread$	$.002^a$	-	-	$.12^a$	-	-
	(.0007)			(.01)		
$Leverage$	-	4.81^a	-	-	25.37^c	-
		(.96)			(13.65)	
$Volatility$	-	-	15.63	-	-	573.21^a
			(10.88)			(146.77)
ln($Firm\ Size$)	$.38^a$	$.41^a$	$.41^a$	2.86^a	-1.95^c	-.83
	(.08)	(.08)	(.09)	(1.05)	(1.06)	(1.22)
ln($Loan\ Amount$)	$.23^a$	$.17^b$	.13	.58	.11	-.90
	(.08)	(.07)	(.10)	(1.07)	(1.06)	(1.35)
ln($Amount\ Outstanding$)	$.29^a$	$.23^a$	$.32^a$	2.81^b	.85	1.11
	(.08)	(.08)	(.09)	(1.17)	(1.20)	(1.29)
r_f	$.01^a$	$.01^a$	$.01^a$	$.45^a$	$.46^a$	$.48^a$
	(.003)	(.003)	(.004)	(.05)	(.05)	(.05)
$(r_f)^2$	$-.000^b$	$-.000^a$	$-.000^a$	$-.001^a$	$-.001^a$	$-.001^a$
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
$Bond\ Maturity$	$-.012^b$	$-.009^c$	$-.006$	-.01	.08	.07
	(.005)	(.005)	(.005)	(.07)	(.07)	(.07)
$Loan\ Maturity$	.004	.003	.01	$-.60^a$	$-.52^a$	$-.39^b$
	(.014)	(.01)	(.015)	(.18)	(.19)	(.18)
$I(Spread_i; Firm\ Size_i)$	-.0004	-		$.01^c$	-	-
	(.0004)			(.01)		
$I(Spread_i; Loan\ Amount_i)$	.0005	-		-.01	-	-
	(.0005)			(.01)		
$I(Lvrg_i; Firm\ Size_i)$	-	.74		-	1.77	-
		(.60)			(8.56)	
$I(Lvrg_i; Loan\ Amount_i)$	-	-2.06^a		-	-12.07	-
		(.68)			(9.72)	
$I(Volatility_i; Firm\ Size_i)$	-	-	-10.5	-	-	180.65
			(8.84)			(119.71)
$I(Volatility_i; Loan\ Amount_i)$	-	-	12.15	-	-	-234.21^b
			(10.18)			(133.9)
Constant	-21.32^a	-20.51^a	-20.87^a	-219.6^a	-42.43	-59.09
	(2.63)	(2.56)	(2.77)	(36.06)	(36.32)	(36.93)
R^2	0.03	0.03	0.03	0.10	0.05	0.06
Nr. Obs.	2697	2697	2291	3011	3010	2546
Nr. Clusters	296	296	281	337	332	287

Table 11: **Net Effect of a Loan Announcement on Firm Value**
The Table presents the net effect of a loan announcement on the value of a firm with average, median, maximum and minimum characteristics.

	Mean	**Median**	**Max**	**Min**	**Low. Q**	**Upp. Q.**
Total Assets	21852.3	9863	289357	352	3652.19	20739.79
Market Value of Equity (MM$)	23154.15	6550.47	308090.1	58	2294.78	2294.78
Liabilities - Total (MM$)	13521.04	6532	283767	214	2238.12	14728
Total Effect on Firm Value (MM$)	39.91	7.23	375.38	-0.16	2.61	-16.12
Total Effect on Firm Value (%)	0.18%	0.07%	0.13%	-0.05%	0.07%	-0.08%

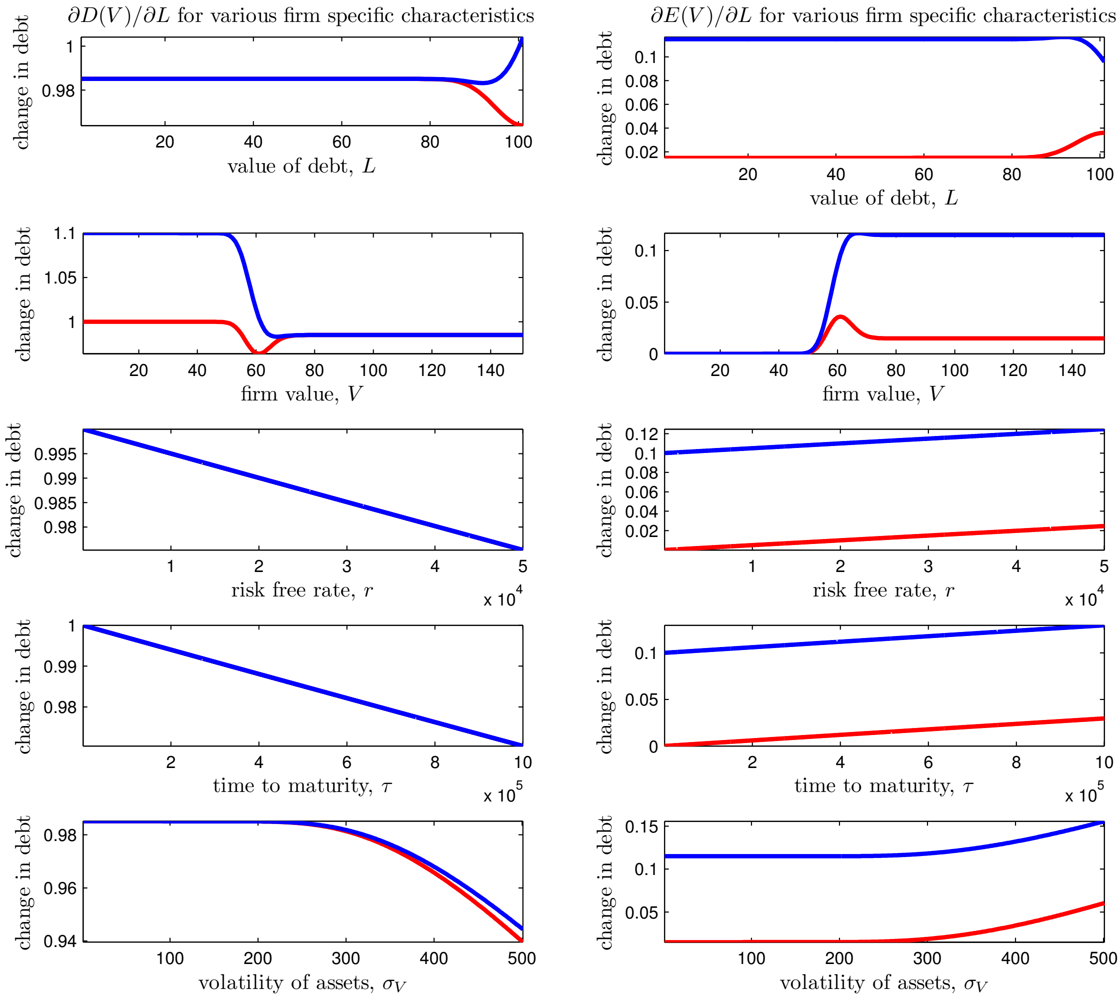

Figure 1: **Changes in Debt (left) and Equity (right) with New Debt (with and without bank certification)**

The figure plots the simulation results for equation (7) and (8) for a wide range of parameter values. Debt reaction to new loan is on the left, while the equity reaction is on the right. The red line corresponds to $\alpha = 1$, while the blue line corresponds to $\alpha = 1.1$.

31

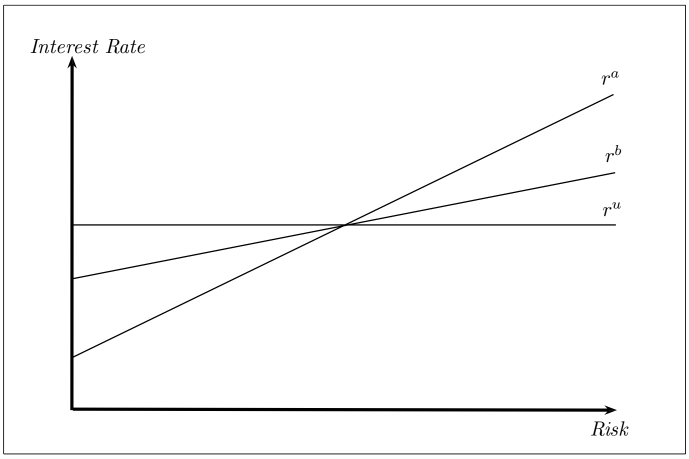

Figure 2: **Rate of return for uninformed (r^u) and informed (r^a and r^b) lenders**

The figure plots the rates of return charged by lenders with different information about firm's risk. The pricing functions of more informed lenders will be more sensitive to firm's risk, whilst, the less informed lenders this function is less steep. In the extreme case, the uninformed lender will charge all borrowers the same rate since her pricing function is insensitive to firm's risk.

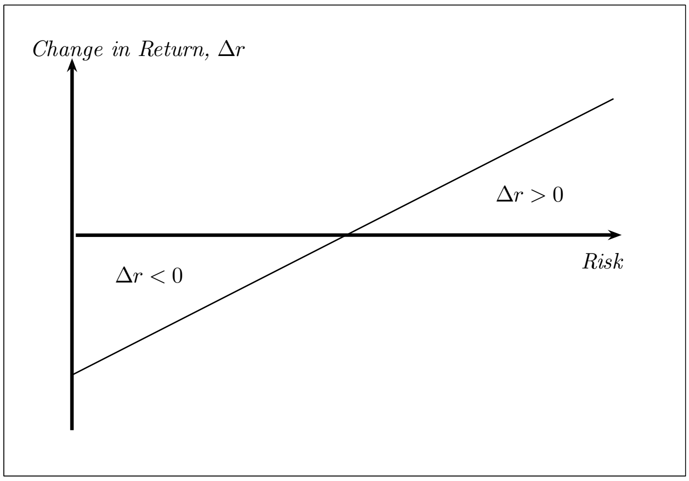

Figure 3: **Changes in rates of return when new information is revealed ($\Delta r = r^a - r^b$)**

The figure plots theoretical predictions of changes in rates of return (on the vertical axis) against market's perception of firm's risk (horizontal axis) when new information is revealed. The market will require greater return on investments in riskier firms, and lower returns on investments in safer firms.

32

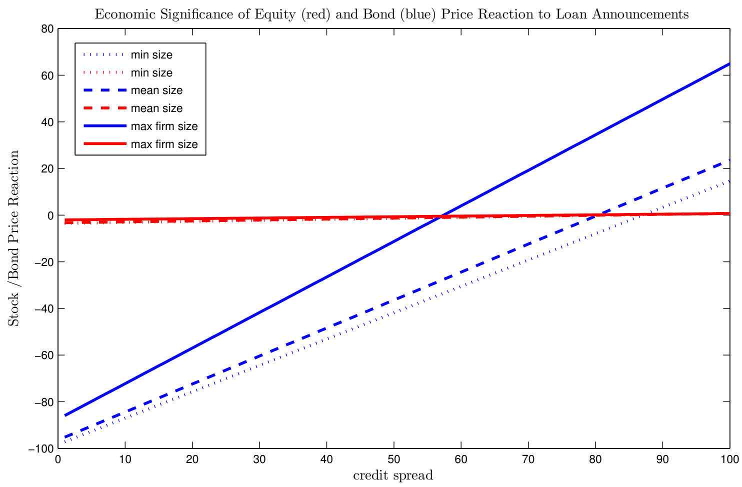

Figure 4: **Partial Effects**

The figure presents the partial economic effects of estimates from Table 10. The red line is the stock market reaction (vertical axis), while the blue line is the bond price reaction (vertical axis) as a function of firm's risk (horizontal axis). The dotted lines plot the effects for firms size set to sample minimum, the dashed lines - for sample averages, and the continuous lines - for sample maxima values of firm size.