Information asymmetry and self-selection bias in bank loan announcement studies (Forthcoming in the *Journal of Financial Economics*)

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Abstract

We question the validity of the broad consensus in the literature that loans are unique relative to other financial contracts. Research in this area is event-study driven and implicitly assumes that relatively small samples of loan announcements adequately represent all bank loans. Our analysis begins with a sizeable loan universe and asks whether some loans are more likely to be announced than others. We find that loan announcements are relatively rare, and that factors such as information asymmetry and materiality affect borrowers' decisions to announce loans. Using Billet, Flannery, and Garfinkel's (1995) data, we show that their sample fails to represent the loan universe and that significant abnormal announcement returns are confined to the smallest firms. The abnormal return for our own sample, which better represents the loan population, is insignificantly different from zero. We conclude that if all loans were announced, the average abnormal return would likely be insignificant. Our findings, which suggest self-selection bias affects extant loan announcement research, do not support the views that loans generally are a special form of finance or that private and public debt differ in significant ways.

Keywords: Loans, announcements, information asymmetry, event studies, selection bias

JEL Classification: G14

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1. Introduction

There is consensus in the literature that bank loans differ significantly from other forms of finance. That conclusion follows from a large body of research showing that announcements of bank loan agreements result in positive abnormal equity returns for borrowers, on average. Because announcements of bond financings generate no significant abnormal returns and stock issues yield negative abnormal returns, researchers infer that loans are *unique* or *special*. Although banks originate a large number of commercial loans every year, loan announcement studies typically use relatively small samples.[1] Nonetheless, researchers commonly draw inferences from the results concerning the population of loans, because they implicitly assume that all loans are equally likely to be announced.

We focus on the prospect that loan announcements may be selective and investigate the factors that affect the decision to announce a loan. We also examine how sample selection problems can bias the outcomes of loan announcement studies. We find that only about one-fourth of bank loan acquisitions are announced and that firms with announced loans differ systematically from those with unannounced loans. The presence of information asymmetries strongly affects the prospect that a borrower will announce a loan. *Material* loans, meaning those that are large relative to the borrowing firm's asset base, or loans made to firms facing actual or prospective cash flow problems, are also more likely to be announced. Loans that remain unannounced go to large, less information-problematic firms where investors are less likely to view a new loan as material information. We conjecture that loans to these firms would not elicit

[1] The average sample size is 446, with a range from 117 to 728, in the studies by James (1987), Lummer and McConnell (1989), Slovin et al. (1992), Best and Zhang (1993), Preece and Mullineaux (1994), and Billett, Flannery, and Garfinkel (1995).

a significant market response, even if made public. Among announced loans, we find that only those to the smallest decile of borrowers elicit significant reaction. Consequently, we conclude that only a small subset of loans is special, at best.

The paper proceeds as follows. The next section offers hypotheses about the nature of bank loan announcements, addressing issues the literature has ignored to date, such as what parties will announce loans and under what circumstances. Section 3 offers several tests of the hypotheses, and provides estimates of logistic models for loan announcements. Section 4 provides an analysis of the results of a well-known study of loan announcements motivated by our findings on announcement decisions. Section 5 concludes.

2. Why Do Borrowers—or Others—Announce Loans?

The conclusion that bank loans are a special type of financial contract and/or that banks have unique capabilities relative to other financial firms follows from research based on event studies. Many researchers report that positive and significant abnormal returns attend to announcements that firms have signed a bank loan agreement. James (1987) is a widely cited example of such research and he finds a sizeable average excess return of 193 basis points. He views the result as consistent with Fama's (1985) conjecture that banks are "unique" institutions because they gain insider-like information through lending and deposit relationships. Many studies replicate the results of James's paper, although often with qualifications.[2] For instance, Lummer and McConnell (1989), Preece and Mullineaux (1994), and Billett, Flannery, and Garfinkel (1995) report significant excess returns of 0.61%, 0.79%, and 0.68%, respectively.

[2] For example, loans generate positive abnormal returns and consequently are special when they are made (1) to small firms (Slovin et al., 1992), (2) to firms facing earnings uncertainty (Best and Zhang, 1993), (3) by nonbanks (Preece and Mullineaux, 1994), (4) by reputable lenders (Billett et al., 1995), (5) by syndicates with few lenders (Preece and Mullineaux, 1996), (6) in amounts of $10 billion or more (Mosebach, 1999), (7) by lenders not using loan sales or securitization (Marsh, 2006), or (8) with larger portions retained by arrangers (Focarelli, Pozzolo, and Casolaro, 2008). Billet et al. (2006) find that bank loans are not special, however, when abnormal returns are estimated over a longer period, such as 3 years.

Generally, researchers seem to agree that loans differ somehow from other debt contracts and that institutions offering loans are likewise unique, in some sense.

The relevant population for addressing whether loans differ from other financings is the totality of loans made to business borrowers. However, unlike other forms of finance raised by public companies, the SEC does not generally require the public announcement of loan financings.[3] The exception to this rule would be a loan "that arises other than in the ordinary course of doing business" (Securities and Exchange Commission, Form 8-K, General Instructions). Nor does the SEC consider a bank loan a "security" potentially subject to registration requirements. Consequently, a firm's decision to reveal a bank loan acquisition is in most cases discretionary. The extant literature therefore necessarily relies on a sample of loans that get announced, with the implicit assumption that announced and unannounced loans are identical in all important respects. We examine this assumption's validity by considering the factors that would motivate a borrower to reveal the successful conclusion of a loan agreement. Corporate finance decisions are seldom random and managers typically self select their choices in a wide variety of situations (Chaney, Jeter, and Shivakumar, 2004; Li and Prabhala, 2007; McNichols and O'Brien, 1997). Firms may have preferences not just across different types of funding, but also about whether to publicize their financing decisions.

Announcing a loan can lower information asymmetry between a borrowing firm and its investors. Diamond (1985) demonstrates that disclosure can be an optimal policy both because it generates cost savings for investors who would otherwise attempt to acquire costly information and because it can improve risk sharing by making investor expectations more homogeneous and reducing the speculative positions of informed traders. Diamond and Verrecchia (1991) show that increased disclosure can decrease a firm's cost of capital by reducing information asymmetries.

[3] Public issues of debt or equity must be disclosed via the registration process. Private issues of equity, debt, or capital and operating leases must be disclosed in an 8-K filing.

But the sizeable disclosure literature reveals a large variation in predicted outcomes. For example, Verrecchia (2001) notes that, in some models, increased disclosure results in more information asymmetry and that the empirical evidence is sparse on the relationship between disclosure and information asymmetries. Our initial hypothesis directly links loan disclosures to information asymmetries.

Hypothesis 1: Firms that present higher levels of information asymmetry to investors will be more likely to announce their loan financings.

Although SEC rules do not mandate the reporting of bank loans, public firms are required to disclose all "material" events within 4 business days of their occurrence on Form 8-K (SEC Staff Accounting Bulletin No. 99 – Materiality). Accounting rules state an event is material if it potentially impacts the financial position of the firm or the value of its shares. We hypothesize that borrowers will view bank loans as material in certain circumstances and consequently will be more inclined to reveal such financings. For example, if a bank loan is large relative to the borrower's existing asset base, the new debt is more likely to affect the firm's financial position and thus qualify as *material*. And firms with cash flow problems may view a new bank loan as relevant to its financial position or equity value. To assess these claims we test a second hypothesis.

Hypothesis 2: A borrower will be more likely to announce a bank loan when the financing is a large component of the capital structure or when the firm faces higher prospects of cash flow problems.

Although borrowing firms have an option to announce the successful completion of a loan agreement, they are not the sole potential source of such information. Lenders and reporters with financial newspapers or information services (such as *Bloomberg* or *Reuters*) also could

reveal such financings. But we argue that these alternative sources are less likely to be motivated by efforts to reduce information asymmetries at the borrowing company. This permits the testing of a third hypothesis that allows us to assess the relevance of information asymmetries from an alternative perspective.

Hypothesis 3: Loan announcements generated by parties other than the borrower will be more weakly related to firm information asymmetries than will borrower-generated announcements.

3. Testing the Hypotheses

3.1 The sample

To examine our hypotheses empirically, we need information on unannounced as well as announced loans. Loan announcement studies typically generate a database of bank loan announcements over some chosen sample period and then estimate the equity market's response to the announcements. In particular, researchers perform keyword searches in news databases such as WSJ and Dow Jones Newswire, looking for keywords such as *credit*, *loan*, *commitment*, or *line of credit*. By design, this methodology captures only loans that are announced in the media during the study period. We employ a different methodology. Rather than begin with loan announcements, we start with a sample of randomly selected loans from the population and then search for announcements. We consider a loan to be announced if any article in the Factiva database mentions the loan. Our population is the set of loans to U.S. borrowers that appears in the Reuters Loan Pricing Corporation's Dealscan database from 1987 to 2004. The data in Dealscan primarily comes from SEC filings, large loan syndicators, and a staff of reporters. The database is widely used in studies of various aspects of the loan market.[4] We delete borrowers

[4] As one example, Gande and Saunders (2006) use the LPC database in their analysis of whether banks remain special following the advent of the secondary loan market. The authors do not employ the usual method of searching for loan announcements. Instead, they note the database contains several dates for most loans, including the signing date, active date, and closing date. They take the earliest of these dates as

that are government entities, financial companies, or utilities and observations for firms lacking a ticker symbol, leaving 20,140 loans. We then randomly pick 200 loans without replacement from this population. We analyze the characteristics of this sample relative to those of the population and find it representative. The characteristics include loan amount and maturity, lender identity, the number of facilities in the loan, borrower rating, and the year the loan is originated. We next search for announcements of these loans in the Factiva database, which collects its information from 10,000 authoritative sources, including the *Wall Street Journal*, *Financial Times*, and the news services of Dow Jones, Reuters, and the Associated Press. Rather than use a computer program to search for announcements, we read the text of news stories and search for each announcement manually to minimize measurement error. Our search window is six months prior to and two months after the loan closing date.

We find some mention in the media for 57 of the 200 loans in our initial sample. Of these instances, five media reports show a borrower is either seeking the loan or expecting to receive the loan or that a lead bank is inviting syndicate members to participate in a loan. The remaining 52 announcements confirm that the loan is made. Of these, the company generates 37, and the lending bank only one. We treat a loan as company-announced when the media states "in a press release the company said," or "the company announced today." We also treat an announcement as company-generated when top management contributes a quote to the news story. Either reporters or SEC filings are the source of information in ten announcements. We cannot identify the information source in four announcements. Of the 52 closed deals, one announcement takes place 17 days before closing. The others are within 15 days of closing, with seven on the day the loan closed and twelve on the next trading day. Eleven loan announcements are made prior to the loan closing date. We treat loans announced after 4:00 PM EST as announced on the next trading day.

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the *likely* announcement date. In effect, they assume that all loans in the database are announced and predict the likely announcement date. As our results will show, this assumption appears to be untenable.

With one exception the announcements in our first sample take place within 15 days of the loan closing date, so we next randomly draw 600 additional loans from our population and search for announcements in a narrower window of +/- 15 days from the loan closing date. Again, we must confirm that our sample of loans is representative of the population. In Table 1, we show the average loan and borrower characteristics of our sample loans are not statistically or economically different from those of the loans in the Dealscan population.

Insert Table 1 here

Once more, a little more than a quarter of the 600 loans are announced. Most loans continue to go unannounced. Figure 1 shows the histogram for the 168 of the 232 announcements that are generated by the borrowing firm. These announcements typically occur within one to seven days of the loan closing date. The most popular announcement date is the day after the loan closes, but 18 of these loans are announced prior to closing. The histogram for all 232 announcements (not shown) is similar to that of Figure 1. One difference is that borrowers are less likely than others to announce loans before the closing date.

Insert Figure 1 here

3.2 The relevance of information asymmetry

We now analyze the likelihood of loan announcement, with a view toward testing our first hypothesis—that information asymmetries will be a systematic driver of borrowers' loan announcement decisions. We get data on borrowing firms from CRSP, Compustat, I/B/E/S, and the SEC's Ownership Reporting System (ORS) datasets. The literature employs several measures of information asymmetry, including market microstructure-based variables (bid-ask spread, turnover), analysts' EPS forecasts (analyst following, forecast error, dispersion of analyst opinion), the volatility of stock returns (volatility of abnormal returns around earnings announcements, residual volatility), and the intensity of insider trading. For example, Gomes and Phillips (2010) use a variety of measures to study how information asymmetry affects a firm's decision to issue private versus public securities, including analysts' forecast errors, the

dispersion of analyst opinion, the volatility of abnormal returns around earnings announcements, insider trading, and a composite index based on stock returns and turnover. Bharath, Pasquariello, and Wu (2009) analyze the impact of information asymmetry on capital structure decisions, employing a composite measure based on market microstructure variables. Leary and Roberts (2010) likewise study the information asymmetry-capital structure relationship, using analyst dispersion, analyst following, firm size, and firm age as proxies for information asymmetry.

The literature lacks a firm consensus on the optimal measure(s) of information asymmetry, so we create a composite index based on six common information asymmetry benchmarks – analyst forecast errors, dispersion of analyst opinions, volatility of residual returns, volatility of abnormal returns around earnings announcements, firm age, and bid-ask spreads.[5] Forecast error is the absolute difference between analysts' predicted earnings and actual earnings per share in the month prior to annual earnings announcement. Dispersion of analyst opinions is the standard deviation of analysts' forecasts of annual EPS in the last month prior to earnings announcement. Both the forecast error and volatility variables are standardized by share price. The volatility of abnormal returns around earnings announcements is the standard deviation of 3-day abnormal returns around earnings reports in the 5-year period preceding loan announcements. We use the CRSP value-weighted index to compute market-adjusted abnormal returns and require at least 10 observations in the 5-year period. Residual volatility in daily stock returns is the standard deviation of market-adjusted daily stock returns in the year of the loan announcement. Following Chung and Zhang (2009), we measure the bid-ask spread variable as the average ratio of the difference between the daily bid and ask closing prices to the midpoint of the bid and ask closing prices.[6] We require at least 100 observations per year to calculate spread and residual

[5] We define and measure our information asymmetry variables following Dierkins (1991), Krishnaswami, Spindt, and Subramaniam (1999), Krishnaswami and Subramaniam (1999), Bharath et al. (2009), Gomes and Phillips (2010), and Leary and Roberts (2010).

[6] We also estimate the bid-ask spread using daily high and low prices and the relatively complex methodology of Corwin and Schultz (2010) and find our results to be marginally stronger (results unreported). We also use TAQ-based microstructure measure, PIN, of Easley, Hvidkjaer, and O'Hara

volatility. Firm age is measured as the number of years since the first firm observation in Compustat and serves as an inverse proxy for information asymmetry. We create the information asymmetry index by calculating the six measures of information asymmetry for our sample firms for each year in our sample period. To avoid the effect of secular trends in the measures over time, we group firms into quintiles based on each measure for all the firms in the year a loan is announced.[7] As Gomes and Phillips (2010) do, we compute the information asymmetry index as the average of the quintile ranking of a firm based on the six information asymmetry measures.

Other candidate measures of information asymmetry exist. For example, several studies use turnover as an inverse proxy of information asymmetry. Dierkins (1991) notes that the literature fails to clarify the direction of turnover's influence on information asymmetry, however.[8] Another inverse proxy for information asymmetry is the number of analysts following a firm, because analysts have a fundamental role in reducing information asymmetry. But Chung, McInish, Wood, and Wyhowski (1995) claim that analysts are attracted to firms with more severe information problems because private information's value increases with information asymmetry. If so, analyst following could be positively related to information asymmetry. Our results are robust to including analyst following as inverse proxy of information asymmetry in our index. Some studies use measures of a firm's growth opportunities, like the market-to-book and price-to-

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(2010) and again find our results to be marginally stronger. This measure is available at http://sites.google.com/site/hvidkjaer/data for all NYSE / Amex common stocks from 1983-2001. PIN, the perceived probability of the arrival of an informed trade, is one of the components of the information asymmetry index created by Bharath et al. (2010). They report that PIN has the highest correlation of all the components with their information asymmetry index. We also find significant positive correlation between PIN and our information asymmetry index measure (Table 2).

[7] For example, the minimum tick size was one-eighth prior to 1997 and a penny after 2001. If we were to categorize firms into quintiles based on bid-ask spreads for the sample firms in the year of the loan announcement, firms that announced loans after 2001 would tend to fall in the lowest quintile regardless of the level of information asymmetry. To avoid this effect, we categorize firms into quintiles based on the appropriate measure for all sample firms in the same year.

[8] Dierkens (1991) finds that information asymmetry and turnover are positively correlated. We find that the turnover measure in our study is negatively correlated with bid-ask spread and positively correlated with volatility measures and unrelated to analysts' forecasts measures (Table 2). Our results remain the same if we include turnover as an inverse proxy for information asymmetry in our index. Turnover is the average number of shares traded daily divided by the number of shares outstanding in the year of the loan announcement.

earnings ratios, as proxies for information asymmetry. Clarke and Shastri (2001) empirically examine the quality of information asymmetry measures and state that proxies based on firm investment and growth opportunities are indirect measures of information asymmetry, at best. Bharath et al. (2009) construct an alternative information asymmetry measure based on the intensity of insider trading activity, but note that the data in the SEC's ORS is available only between 1978 and 2000. Our results again hold if we include this measure in our index. We present the correlation matrix of the different information asymmetry measures in Table 2. Our information asymmetry index is significantly correlated with all the proxies employed in the literature except for turnover. We find a correlation coefficient of -0.69 between our index and firm size. Although analyst following and PIN are not components of our information asymmetry index, we observe high correlations between these measures and our index.

Insert Table 2

In Panel A of Table 3 we analyze how announcements generated by borrowers and other sources vary as the amount of information asymmetry changes. The results in Column 2 show that as information asymmetry increases, borrowers announce a higher percentage of loans. The proportion of loans announced for firms with information asymmetry index > 4 is more than twice as large as that for borrowers with an index value between 2 and 3, for example, and more than 3 times as large relative to firms with information asymmetry index ≤ 2.[9] These results are consistent with our first hypothesis. The figures in Column 3 of Panel A reveal no increase in the proportion of loans announced by parties other than the borrower as information asymmetry increases, which supports our third hypothesis.

[9] Data constraints prevent us from computing all six of the information asymmetry measures for every firm. For an average firm in our sample, the index contains five of the six information asymmetry measures. Our results do not change if we exclude observations where the information asymmetry index value contains only one or two components.

We next examine how loan announcements vary with analyst following, which we treat as an inverse information asymmetry proxy. Panel B shows that the proportion of loans announced is 6 times larger for firms with 4 or fewer analysts as compared with borrowers with 16 or more. And the percentage of loans announced declines monotonically with the scale of analyst coverage. Borrowers that announce loans have 4.32 analysts, on average, while those who fail to announce have twice as many analysts at the mean. The results likewise support our first hypothesis. No discernable pattern appears between the proportion of loans announced by others and the extent of analyst following, which is consistent with the results for the information asymmetry index and again supports the third hypothesis.

Insert Table 3 here

3.3 The relevance of other factors

We next analyze announcement decisions with a focus on measures of the extent to which a loan acquisition might be judged material information. We use the state of the borrower's cash flow position and loan size relative to the size of the firm to gauge materiality. We use EBITDA/Assets as a measure of the borrower's cash flow prospects and suggest that investors are more likely to view a loan as material if the borrower has negative EBITDA. We use the loan's size as a percentage of assets as a gauge of its significance in the borrower's capital structure and posit that a loan becomes more material to investors as this ratio increases. The results in Table 3, Panel C, show that firms with EBITDA ≤ 0 in the year prior to the loan announce a substantially higher percentage of their loans than firms with EBITDA in excess of 20% of assets. But little variation appears in the percentage of borrower-announced loans for firms with positive cash flows. Because firms with negative EBITDA have higher prospects of financial distress, obtaining a loan in the face of such conditions is likely to be material news. The percentage of loans announced by others does not vary in any systematic way with the borrower's cash flow status, however. Panel D of Table 3 shows that when the size of a new loan exceeds half a borrower's existing asset base, borrowers announce 35% of their loans, but when a new loan is

less than 5% of assets, companies announce only 5% of the time. Larger loans appear to be more material and more likely to generate a borrower announcement. In this case, the portion of loans announced by others also increases with the significance of the loan relative to the size of the firm. The results in Panels C and D support our second hypothesis, that borrowers are more likely to announce loans that represent potential material information to shareholders.

Insert Table 4 here

In Table 4, we disaggregate our sample into loans announced by the borrowing firms, those announced by others, and unannounced loans. We compute mean values for borrower and loan characteristics, including the information asymmetry index, market capitalization, the new-loan-to-assets ratio, a dummy equal to one for negative EBITDA, and the loan amount. We also perform *t*-tests to determine whether the observed differences are statistically significant. Firms with borrower-announced loans have higher information asymmetry index values, are smaller, and are more likely to have negative EBITDA than firms with unannounced loans, and each difference is significant. Although borrower-announced loans are smaller, on average, than unannounced loans, they form a significantly larger portion of the company's asset base. The results again are consistent with our first two hypotheses: information asymmetry is a differentiating factor for borrower-announced and unannounced loans, and loans announced by borrowers are more material—compose more of the firm's capital structure or go to firms with higher prospects of cash flow problems—than loans that go unannounced.

3.4 A logistic model for loan announcements

We next analyze our data in a multivariate setting. We estimate coefficients of a logit model to predict the probability a borrower will announce its loan in the media. The dependent variable initially takes a value of 1 if the borrower announces its loan and zero otherwise. The explanatory variables in the model are the information asymmetry index, a dummy equal to 1 for

firms with negative EBITDA and zero otherwise, and the log (1 + loan-size / borrower-assets). Our hypotheses suggest positive coefficient signs for the three variables.

Insert Table 5 here

Column (1) of Table 5 presents the results of this estimation, and we find confirming evidence for our hypotheses. Borrowers are more likely to announce loan agreements in the presence of more information asymmetry, higher prospects of cash flow problems (negative EBITDA), and as the loan in question becomes a larger percentage of the borrower's existing asset base. The probability is 8% that a firm with information asymmetry index value of 1, positive EBITDA, and a loan-to-assets ratio of .30 will announce its loan, but the probability increases more than fourfold —to 34%—if the information asymmetry index value increases to 5. Likewise, if the loan-to-assets ratio for this firm increases from .30 to 1, other things equal, the announcement probability increases from 8% to 20%. The announcement probability also increases from 8% to 20% if the firm in question switches from positive to negative EBITDA.

In Column (2), we include the log of the borrower's market capitalization as an inverse proxy for information asymmetry.[10] We find a highly significant, negative coefficient estimate for the firm size variable, while the sign and significance of the remaining two variables are similar to those in Column (1). Smaller firms, which presumably present investors with more serious information asymmetry problems, are significantly more likely to announce their loans. A borrower with $300 million in market value, positive EBITDA, and an average loan-to-assets ratio is almost twice as likely to announce its loan as an otherwise similar firm with $10 billion in market value.

To test Hypotheses 3, which posits different outcomes depending on the source of the announcement, we estimate a multinomial logit model. The dependent variable takes a value of 1 for loans announced by borrowers and a value of 2 for those announced by others, zero otherwise.

[10] Gomes and Phillips (2010) use firm size as a measure of information asymmetry, and the correlation matrix in Table 2 shows that market capitalization correlates best with the information asymmetry index across the variables we employ.

The results appear in Columns (3) and (4) of Table 5. We posit that business reporters and lending institutions are less likely to announce loans based on perceptions of information asymmetry problems between firms and investors. This implies that no (or at best a weak) relationship should exist between the information asymmetry index and the probability of loan announcements by non-borrowers.[11] We likewise argue that the borrower's cash flow position is unlikely to drive a reporting decision by non-borrowers, suggesting another insignificant coefficient estimate for the negative EBITDA dummy variable. But reporters and lending institutions do seem likely to report loans that are relatively large and consequently material. We therefore predict a positive coefficient estimate for log (1 + loan-size / borrower-assets). Columns (3) and (4) present the coefficient estimates of our multinomial logit model for announcements by borrower and others, respectively. The sign and significance of the estimates in column (3) are similar to those in Column (1). But the coefficient estimates for the information asymmetry index and negative EBITDA dummy in Column (4) are insignificantly different from zero, supporting our prediction that these factors would fail to motivate non-borrowers to announce loans. We do find a significantly positive coefficient for the loan-to-assets ratio, suggesting that non-borrowers are more likely to announce loans that are material in this sense. These findings confirm our third hypothesis.

Our findings have implications for the samples typically drawn in loan announcement studies. These samples do not appear representative of the market as a whole. Rather, they will be over-weighted toward smaller, cash-constrained firms posing serious information asymmetries *because* these borrowers are most likely to announce their loans. This prompts the following

[11] Our data suggest, however, that reporters and other entities tend to disclose loans before the closing date, while borrowers typically report on or after the close. In our sample 50% of announcements by non-borrowers occurred before the loan closed, but only about 10% of the borrowers generated announcement prior to closing. Announcements by others could preempt borrowers from announcing their loans. Because the reference group in our multinomial model is unannounced loans, the information asymmetry index could have a positive coefficient estimate.

question: In the absence of systematic differences between borrowers with announced and unannounced loans, would loan announcements generate positive equity market response?

4. Event study results with a representative sample

We have shown that firms making bank loan announcements have well-defined characteristics that differentiate them from borrowing firms in general. If announcing firms fail to represent the universe of borrowers, what are the implications for the existing body of event-study research on loan announcements? We try to answer by examining whether the positive equity returns found in prior studies of bank loan announcements would survive if the samples had represented the borrower universe. We do so by computing a weighted average abnormal return on a sample of loan announcements gathered by Billett et al. (1995) (hereafter BFG), where the weights reflect the borrower universe more accurately. We thank these authors for providing their data.

In Table 6, we array all the firms in the BFG sample into deciles by market capitalization, using the size breakpoints from Kenneth French's data library. We also show in Table 6 that the information asymmetry index for the firms in our randomly selected sample of 800 loans decreases monotonically when arrayed by size in the same fashion. We calculate the mean abnormal returns for BFG's loan announcements for each decile. Like BFG (1995), we calculate one-day market adjusted abnormal returns, but the results do not change if we calculate two-day returns or use other specifications for predicted returns. We find that 35% of the loan borrowers in the sample are from the smallest decile, while only 2% fall in the largest decile. Thus, BFG's sample is not representative of the population of loan borrowers as a whole. The abnormal return for the smallest firms is 148 basis points. For the remainder of the sample, the announcement return is an insignificant 26 basis points, and abnormal returns fail the significance test in every decile. The statistically significant return of about 68 basis points observed by BFG (1995) clearly is driven by the firms in the smallest decile, and their sample is heavily weighted toward

such firms. But what would we observe if borrowers were drawn from a sample that small firms do not dominate? To estimate such an outcome, we calculate the mean abnormal return weighted equally across each decile in the BFG sample. The result is 35 basis points, which is statistically insignificant.

Insert Table 6 here

Perhaps small firms are not only more likely to announce loans but are also more likely to rely on them, as some studies imply (Maskara and Mullineaux, 2010). If so, over-weighting small firms in loan announcement studies could be justified. Our own random sample of 800 loans is also skewed toward smaller firms (Table 6, Column 7), but less so than BFG's. And the results in Table 1 confirm that our sample conforms to the Dealscan loan universe. So we compute the average abnormal return from BFG's data using decile weights from our random sample of 800 loans and the result is a statistically insignificant 54 basis points.[12] We also calculate the announcement return for our sample and get an abnormal return of a statistically insignificant 5 basis points. We conclude that significant loan announcement returns are unlikely outcomes when samples more accurately represent the distribution of borrowers. We also infer that if all loans were to be announced, an event study on this universe would yield insignificant results.

Our findings suggest that bank loans, in general, are not special. Accordingly, the literature's critical distinctions between private and public debt may be unjustified. Although we find that loan announcements by the smallest BFG firms result in significantly positive abnormal returns, we refrain from drawing inferences about whether bank loans to very small borrowers are special. While we show that small borrowers are more likely to announce their loans, the majority of such borrowers (60% of such in our sample) apparently do not announce. In addition, the

[12] We use bootstrapped standard errors to calculate the *t*-statistics. We draw appropriate number of observations from each decile to reflect the weight of our sample firms in each decile and calculate the mean. We perform 1,000 iterations of this process to calculate the standard deviation of the mean abnormal return.

estimated return for borrowers in the smallest decile in our own sample is a statistically insignificant 17 basis points.

An alternative explanation, as the referee points out, for the results generated from the BFG sample could be that positive effects of loan announcements on equity returns for large firms are too small to be detected. Though possible, it seems unlikely that we would detect responses for only the smallest category of firms. If our observed results reflect non-detection, we should observe monotonically decreasing abnormal returns across firm size deciles. But the data in Table 6 show that the abnormal returns in the BFG sample drop sharply for firms in the second decile, and thereafter the abnormal returns follow no meaningful pattern.

5. Conclusion

Our results suggest that loan announcements are relatively rare events that emanate from specific types of firms. Borrowers are more likely to announce loans when they present sizeable information asymmetries to investors or when the loans in question appear material. We treat loans as material when they are a large component of the borrower's capital structure or when the borrower faces higher prospects of cash flow problems.

Firms that announce loans do not represent the population of borrowers, and this raises questions about whether the loan announcement results reported in the literature apply broadly. We find that the significant abnormal returns in BFG's loan sample are limited to the smallest 10% of the borrower universe. If we apply weights to the BFG results that are more representative of borrowing firms, in general, then the overall estimated abnormal return is insignificantly different from zero. The estimated abnormal return for the firms in our own sample of announcements is likewise insignificantly different from zero. Given these results, we infer that if all loans were to be announced, an event study on such a sample would fail to produce significant positive returns.

Do these results influence the literature's consensus that loans represent "special" types of financings and that public and private debt differ in critical ways? We contend that they do. Although loan announcements might elicit positive abnormal returns in special cases, the conclusion that loans are unique does not generalize to the population of loans. Public and private debt consequently could be cut from the same rather than a different cloth.

Our research focuses on the prospect of self-selection in disclosure decisions in a specific context. Yet firms can choose to announce any of a broad array of outcomes not subject to regulatory disclosures. For example, disclosure of operational events like obtaining a large sales contract or forming strategic, marketing, or technological partnerships is discretionary, but small firms facing higher information asymmetries may be more likely to make such announcements. The issue we raise consequently could be relevant to event study research more broadly.

REFERENCES

Best, R., Zhang, H., 1993. Alternative information sources and the information content of bank loans. *The Journal of Finance* 48, 1507-1522.

Bharath, S. T., Pasquariello, P., Wu, G., 2009. Does information asymmetry drive capital structure decisions? *Review of Financial Studies* 22, 3211-3243.

Billett, M. T., Flannery, M. J., Garfinkel, J. A., 1995. The effect of lender identity on a borrowing firm's equity return. *The Journal of Finance* 50, 699-718.

Billett, M. T., Flannery, M. J., Garfinkel, J. A., 2006. Are bank loans special? Evidence on the post-announcement performance of bank borrowers. *Journal of Financial and Quantitative Analysis* 41, 733-751.

Chaney, P. K., Jeter, D. C., Shivakumar, L., 2004. Self-selection of auditors and audit pricing in private firms. *The Accounting Review* 79 (1), 51-72.

Chung, K., McInish, T., Wood, R., Wyhowski , D., 1995. Production of information, information asymmetry, and the bid –ask spread. *Journal of Banking and Finance* 19, 1025-1046.

Chung, K., Zhang, H., 2009. A simple approximation of intraday spreads using daily data. Unpublished working paper, State University of New York, Buffalo.

Clarke, J., Shastri, K., 2001. On information asymmetry metrics. Unpublished working paper. University of Pittsburgh, Pittsburgh.

Corwin, S., Schultz, P., 2010. A simple way to estimate bid-ask spreads from daily high and low prices. Unpublished working paper, University of Notre Dame, South Bend.

Diamond, D., 1985. Optimal release of information by firms, *Journal of Finance* 40, 1071-1094.

Diamond, D., Verrecchia, 1991. Disclosure, liquidity, and the cost of capital, *Journal of Finance* 46, 1325-1359.

Dierkins, N., 1991. Information asymmetry and equity issues. *Journal of Financial and Quantitative Analysis* 26, 181-199.

Easely, D., Hvidkjaer, S., O'Hara, M., 2010. Factoring information into returns, *Journal of Financial and Quantitative Analysis*, 45, 293-309.

Fama, E., 1985, What's different about banks? *Journal of Monetary Economics* 15, 29-39.

Focarelli, D., Pozzolo, A. F., Casolaro, L., 2008. The pricing effect of certification on syndicated loans. *Journal of Monetary Economics* 55, 335-349.

Gande, A., and Saunders, A., 2006. Are banks still special when there is a secondary market for loans? SSRN working paper series.

Gomes, A., Phillips, G., 2010. Private and public security issuance by public firms: The role of asymmetric information. Working paper. Washington University

James, C., 1987. Some evidence on the uniqueness of bank loans. *Journal of Financial Economics* 19, 217-236.

Krishnaswami, S., Spindt, P., Subramaniam, V., 1999. Information asymmetry, monitoring, and the placement structure of corporate debt. *Journal of Financial Economics* 51, 407-434.

Krishnaswami, S., Subramaniam, V., 1999. Information asymmetry, valuation, and the corporate spin-off decision. *Journal of Financial Economics* 53, 73-112.

Leary, M. T., Roberts, M. R., 2010. Pecking order, debt capacity, and information asymmetry. *Journal of Financial Economics*, forthcoming.

Li, K., Prabhala, N., 2007. Self-selection models in corporate finance, Handbook of Corporate Finance: Empirical Corporate Finance, Handbook in Finance Series, Elsevier/North Holland, 39-85.

Lummer, S., McConnell, J., 1989. Further evidence on the bank lending process and the capital market response to bank loan agreements. *Journal of Financial Economics* 25, 99-122.

Maskara, P., Mullineaux, D. J., 2010. Small firm capital structure and the syndicated loan market, *Journal of Financial Services Research*, forthcoming.

Marsh, I. W. 2006. The effect of lender's credit risk transfer activities on borrowing firms' equity returns. SSRN Working Paper Series.

McNichols, M., O'Brien, P., 1997. Self-selection and analyst coverage. *Journal of Accounting Research* 35, 167-199.

Mosebach, M., 1999. Market responses to banks granting lines of credit. *Journal of Banking and Finance* 23, 1707-1723.

Preece, D., Mullineaux, D. J., 1994. Monitoring by financial intermediaries: Banks vs. nonbanks. *Journal of Financial Services Research* 4, 191-200.

Preece, D., Mullineaux, D. J., 1996. Monitoring, loan renegotiability, and firm value: The role of lending syndicates. *Journal of Banking and Finance* 20, 577-593.

Slovin, M. B., Johnson, S. A., Glascock, J. L., 1992. Firm size and the information content of bank loan announcements. *Journal of Banking and Finance* 16, 1057-1071.

Verrecchia, R., 2001. Essays on disclosure. *Journal of Accounting and Economics* 32, 97-180.

Figure I

The Timing of Loan Announcements by Borrowing Firms

A histogram of the number of loans announced in the media by the borrowing firm on the loan closing date (Day 0) and certain days before and after. Our randomly selected sample of 800 loans from the Dealscan database yielded 232 announced loans. We consider a loan to be announced if any news story in the Factiva database mentioned it explicitly. Of the 232 announcements, the borrowing firm made 168. We treat the borrower as the source if the news story stated that the company announced the financing or if a company representative contributed a quote to the story. The sample period is 1987-2004.

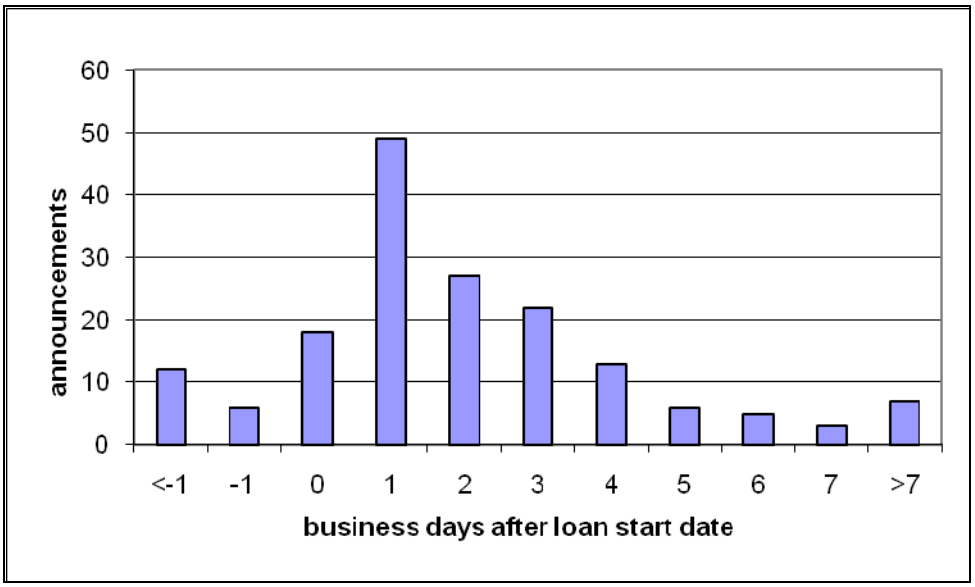

Table 1

Descriptive statistics for the loan population in the Dealscan database and for our randomly selected sample of loans

Panel A shows Dealscan database descriptive statistics for all loan deals between 1987 and 2004 involving U.S. borrowers that are not government entities, financial companies, or utilities. Debt rating is the S&P credit rating for the borrower's senior debt at the time of the loan acquisition. It takes a value of 1 for C-rated borrowers, 2 for those rated CC, 3 for CCC-rated and so on. Number of lenders represents the number of lenders participating in the loan deal. Tenor measures loan maturity in months. Deal amount is the loan amount in millions of dollars. Interest rate is the credit spread on the loan (measured as the loan rate minus LIBOR) in basis points. Syndicated is a dummy variable that takes a unit value for loan deals that had two or more lenders participating and 0 otherwise. Panel B shows similar descriptive statistics for the randomly selected 800 loans in our sample.

Panel A: Population

Variable	N	Mean	Std Dev	Minimum	Maximum
Debt rating	6,949	5.51	1.3	1	9
Number of lenders	20,127	5.46	7.7	1	110
Tenor	18,011	44.78	34	1	366
Deal amount	20,140	273	708	0.05	25,000
Interest rate	16,234	199.68	137	-14	1,490
Syndicated	20,127	0.59	0.49	0	1

Panel B: Sample

Variable	N	Mean	Std. Dev.	Minimum	Maximum
Debt rating	342	5.69	1.18	3	9
Number of lenders	800	6.15	8.83	1	108
Tenor	715	41.46	32.72	0	361
Deal amount	800	309.6	719.85	0.2	12,000
Interest rate	676	182	129.38	6.32	980
Syndicated	800	0.63	0.48	0	1

Table 2

The Pearson correlation coefficients across different measures of information asymmetry for our sample firms

Firm size is the log of the market capitalization of the borrowing firm. Bid-Ask spread is the average ratio of the difference between daily closing bid and ask prices to the midpoint of closing bid and ask prices. Forecast error is the ratio of the average absolute difference between analysts' EPS forecasts and actual EPS to the share price of the firms. Forecast dispersion is the standard deviation of the analyst annual EPS forecasts divided by firm's share price. Analysts' forecasts are observed at the last month prior to annual earnings announcements by firms and share price as of the beginning of the month prior to earnings announcements. Volatility around earnings announcements is the standard deviation of 3-day market adjusted abnormal returns for the last 5-year period. Residual volatility is the standard deviation of the daily market adjusted abnormal return of the firm's stock. Insider trading intensity is the ratio of total yearly purchases and sales of a firm's stock by officers, management, and directors to annual trading volume. Informed trade is the perceived probability of arrival of informed trades (PIN) as calculated by Easley et al. (2010). Firm age is the number of years since first observation for the firm in Compustat. Number of analysts is measured as number of analyst EPS estimates in the last month prior to earnings reports. Turnover is the average ratio of the number of shares traded daily divided by the number of shares outstanding. The information asymmetry index is the average quintile ranking of a sample firm in the year of the loan based on six measures of information asymmetry – forecast error, forecast dispersion, residual volatility, volatility around earnings announcements, firm age, and the bid-ask spread. The numbers in **bold** reflect significance at the 1% level. The italicized numbers reflect significance at the 5% level.

	IA	Firm size	Bid-ask	Forecast error	Forecast dispersion	Volatility around earnings	Residual volatility	Insider trading	Informed trades	Firm age	Number of analysts
Firm size	**(0.69)**										
Bid-ask	**0.30**	**(0.33)**									
Forecast error	**0.26**	**(0.16)**	**0.18**								
Forecast dispersion	**0.19**	**(0.12)**	**0.22**	**0.92**							
Volatility around earnings	**0.66**	**(0.44)**	**0.20**	**0.24**	*0.10*						
Residual volatility	**0.69**	**(0.56)**	**0.51**	**0.28**	**0.19**	**0.63**					
Insider trading	*0.11*	**(0.12)**	**0.14**	0.01	(0.00)	**0.18**	**0.17**				
Informed trades	**0.53**	**(0.77)**	**0.31**	*0.13*	**0.16**	**0.33**	**0.41**	**0.17**			
Firm age	**(0.54)**	**0.51**	**(0.10)**	(0.08)	(0.08)	**(0.21)**	**(0.27)**	(0.05)	**(0.40)**		
Number of analysts	**(0.51)**	**0.78**	**(0.24)**	**(0.11)**	(0.08)	**(0.28)**	**(0.35)**	*(0.11)*	**(0.52)**	**0.38**	
Turnover	0.03	**0.19**	**(0.12)**	(0.01)	(0.02)	**0.18**	*0.07*	(0.06)	**(0.21)**	(0.01)	**0.18**

Table 3

Distributions of sample firms and announcements for various borrower and loan characteristics

The sample consists of 800 loans randomly selected from a population of 20,140 loans in the Dealscan database over the period 1987-2004. Column (1) of Panels A-D shows the total number of loans in the sample for which the borrowing firm met the designated criterion. Column (2) of Panels A-D shows the number of loans announced by the borrowing firm as a percent of total loans in each category. Column (3) of Panels A-D shows the number of loans announced by someone other than the borrowing firm as a percent of all loans that met the criteria. Panel A tabulates the loans based on the information asymmetry index value calculated as the average quintile value of the borrowing firm based on six measures – analysts' forecast error, dispersion of analysts' forecasts, residual volatility of stock returns, standard deviation of abnormal returns around earnings announcement, firm age, and bid-ask spread. No data in Panel A indicates that insufficient data were available in CRSP, Compustat, and I/B/E/S to calculate any of the measures needed to compute the information asymmetry index value. Panel B tabulates the loans based on the number of analysts following the borrowing firm. No data in Panel B indicates that no data were available for the analyst forecasts of earnings for the borrowing firms in the I/B/E/S database. Panel C tabulates the loans based on the EBITDA-to-total assets ratio of the firm. Panel D tabulates the loans based on loan size-to-asset size of the borrowing firm. Missing data in Panel C and D indicate that the Compustat database had no data for the borrowing firm.

	(1)	(2)	(3)
	N	Company	Others
Panel A: Information Asymmetry Index			
IA <=2	126	11%	6%
2<IA<=3	258	16%	9%
3<IA<=4	227	26%	8%
IA>4	132	35%	8%
No data	57	14%	5%
Total	800	21%	8%
Panel B: Analyst Following			
1 to 4	226	30%	8%
5 to 8	143	27%	12%
9 to 15	133	12%	5%
16 to 41	134	5%	10%
No data	164	23%	4%
Total	800	21%	8%

	(1)	(2)	(3)
	N	Company	Others
Panel C: EBITDA/Total Assets			
<=0	107	37%	4%
0<x<0.10	161	18%	11%
0.10<=x<0.15	186	22%	9%
0.15<=x<0.20	162	19%	7%
x>=0.20	119	13%	8%
No Data	65	20%	6%
Total	800	21%	8%
Panel D: Loan-to-Assets ratio			
X<=0.05	111	5%	4%
0.05<x<=0.1	100	11%	8%
0.1<x<=0.25	232	19%	8%
0.25<x<=0.5	158	30%	8%
x>0.5	134	35%	13%
No data	65	20%	6%
Total	800	21%	8%

Table 4

Difference of means test for loan and borrower characteristics of announced and unannounced loans

Columns (1), (2), and (3) show the mean values for loans announced by the borrowing firm, announced by any entity other than the borrowing firm, and unannounced loans, respectively. Column (4) shows the *t*-statistics for difference of mean values for loans announced by the company and those unannounced. Information asymmetry index is calculated as the average quintile value of the borrowing firm based on six measures – analysts' forecast error, dispersion of analysts' forecasts, residual volatility of stock returns, standard deviation of abnormal returns around earnings announcement, firm age, and bid-ask spread. Firm size is the market capitalization of the borrowing firm. Firm size and loan amount are measured in million dollars. Negative EBITDA is a dummy variable that takes unit value when the borrowing firm has zero or negative EBITDA, zero otherwise. Loan-to-assets is the ratio of the loan amount to the size of the existing asset base of the borrowing firm.

	(1)	(2)	(3)	(4)
	Announced by company	Announced by others	Unannounced	t-stat (1) - (3)
Information asymmetry index	3.49	3.08	2.98	6.13
Firm size	718.91	2,112.60	5,606.58	(6.35)
Loan-to-assets	0.44	0.53	0.26	4.77
Negative EBITDA	0.26	0.07	0.12	3.60
Loan amount	191.04	343.91	340.90	(3.61)
N	168	64	568	

Table 5

Logit model estimates of the probability a loan will be announced by the borrowing firm and/or other entities

In columns (1) and (2) the dependent variable takes a value of 1 if the loan was announced by the borrowing firm and 0 otherwise. The information asymmetry index is the average quintile ranking of the borrowing firm based on six information asymmetry measures—forecast error, forecast dispersion, bid ask spread, firm age, volatility of abnormal returns around earnings announcement, and residual volatility of sock returns. The dummy variable Negative EBITDA takes a value of 1 for borrowers with zero or negative EBITDA and 0 otherwise. Loan-to-assets ratio is the log of one plus the loan-to-assets ratio. Market Cap is the log of market capitalization. Columns (3) and (4) show the estimates of a multinomial logit model. The dependent variable takes unit value for loans announced by the company and a value of two for loans announced by other entities. The reference group is unannounced loans. Column (3) shows estimates for announcements by the company and column (4) for announcements by others. The numbers in parentheses are standard errors.
** Significant at 1% level; * 5% level.

	(1)	(2)	(3)	(4)
Dependent variable: Announced by	Company	Company	Company	Others
Intercept	-3.3214 **	2.274	-3.293 **	-2.640 **
	(0.368)	(1.029)	(0.373)	(0.500)
Info. Asym. Index	0.443 **		0.432 **	-0.051
	(0.107)		(0.109)	(0.164)
Negative EBITDA	1.022 **	0.920 **	0.963 **	-0.856
	(0.239)	(0.240)	(0.243)	(0.614)
Loan to Asset ratio	1.515 **	1.372 **	2.059 **	2.650 **
	(0.382)	(0.385)	(0.416)	(0.523)
Market Cap		-0.210 **		
		(0.051)		
LR Chi-sq	63.9 **	64.1 **	1018.9 **	
N	714	714	714	

Table 6

Abnormal returns to loan announcement across firm size deciles and weighted abnormal returns

We calculate firm size deciles based on the Fama-French size breakpoints for all borrowing firms in the month of loan closing. Column (1) shows the mean information asymmetry index value for firms in the appropriate size decile estimated based on randomly selected 800 loans in our sample. Column (2) shows the number of loans in the BFG (1995) sample in each size decile. Column (3) shows the mean one-day market-adjusted abnormal return on the loan announcement day for the BFG firms. Column (4) shows standard deviations of the abnormal returns. Column (5) shows the percent of BFG firms in each size decile experiencing positive announcement return. Column (6) shows the percent weight allotted to firms from each size decile in the BFG sample. Column (7) shows percent of borrowing firms in each decile in the random sample of 800 loans. ** Significant at 1% level.

(1)		(2)	(3)		(4)	(5)	(6)	(7)
Mean Info. Asym. Index	Firm Decile	N	Abnormal Return		Std Dev	Percent Positive	Weight in BFG sample	Weight in our sample
4.03	Smallest	219	0.0148	**	0.0597	53%	35%	24%
3.48	2	108	0.0045		0.0375	53%	17%	12%
3.12	3	71	0.0012		0.0347	51%	11%	10%
3.07	4	47	0.0022		0.0219	53%	8%	9%
2.81	5	32	0.0030		0.0213	59%	5%	8%
2.71	6	43	0.0006		0.0250	53%	7%	5%
2.71	7	40	0.0034		0.0219	55%	6%	6%
2.33	8	25	0.0015		0.0259	56%	4%	8%
2.38	9	26	0.0014		0.0163	62%	4%	7%
2.12	Biggest	15	0.0023		0.0240	47%	2%	10%
	All firms	626	0.0068	**	0.0428	53%		