Institutional Investors in Corporate Loans*

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Abstract

I examine the corporate financing implications of the emergence of non-bank institutional investors, primarily collateralized loan obligations, in the market for corporate loans. The evidence suggests that institutional loans are primarily a substitute for corporate bonds. When the supply of institutional loans increased in the years before 2008, relatively risky firms decreased their use of bonds, a pattern that was reversed in the years after 2008. There is no evidence that institutional loans are a substitute for other types of financing, including revolving credit, and only modest evidence that institutional loans are a substitute for bank funded term loans. The results suggest that non-bank lenders are willing to provide senior-secured financing and that firms view term loans and bonds as close substitutes. These results have implications for our understanding of firm capital structures choices and the structure of financial intermediaries.

Since the early 1990s, few innovations have changed the practice of corporate finance more than the development of large corporate loans financed by non-bank institutional investors. According to Reuters Loan Pricing Corporation (LPC), of the $1.6 trillion of large, corporate loans issued in the United States in 2007, over $400 billion was intended for institutional investors, including mutual funds, hedge funds, and collateralized loan obligations (CLOs). Moreover, in the space of loans to riskier borrowers, so-called "leveraged loans," institutional term loans (ITLs) comprised over 60 percent of the total volume of loans. Given that such investors were nearly non-existent in the late 1990s, there has been a dramatic shift in the nature of investors providing financing to many large corporations.

Existing research strongly suggests that the development of the institutional loan market resulted in an increase in the supply of credit. Ivashina and Sun (2011) show that corporate loan spreads tend to fall during times when institutional loans are syndicated more quickly and that syndication speed depends on flows of capital to large institutional investors such as CLOs and mutual funds that invest in loans. Nadauld and Weisbach (2011) and Shivdasani and Wang (2011) focus specifically on the role of securitization, since CLOs accounted for the majority of the growth in institutional investors during the boom years. Nadauld and Weisbach (2011) show that loans which were more likely to be securitized between 2002 and 2007 carried lower interest rates spread, which is direct evidence that capital costs were reduced by the growth in securitization. Shivdasani and Wang (2011) examine the role of CLOs in fueling the boom in leveraged buyouts (LBOs) between 2004 and 2007 and provide compelling evidence that the supply of funds from CLOs led to more LBOs, larger individual LBOs, and more loan debt in the capital structure of LBO firms. In concert, these three papers provide convincing evidence that the growth in institutional investors led to an increase in the supply of loans to corporate borrowers.

The purpose of this paper is to examine the consequences of changes in institutional loan supply on the balance sheets of corporate borrowers. Specifically, I estimate the sign and magnitude of the (cross-) elasticity of demand for various types of debt with respect to changes in the price of institutional loans. These estimates inform us on the degree to which the supply shock resulted in an expansion in leverage or

simply a substitution between different types of debt. I examine corporate bonds, term loans provided by banks, revolving credit, and in some cases, some additional forms of debt.

In order to properly identify the demand elasticities, I employ two empirical strategies. First, I examine time series patterns of corporate bond and syndicated loan issuance and estimate the elasticity of issuance with respect to quarterly variation in the price of ITLs, constructed as the spread to LIBOR based on loans trading in the secondary market. I instrument for the price of ITLs using time-series variation in net flows to collateralized loan obligations and mutual funds (MFs) investing in corporate loans, two large non-bank investors in the loan market. Conditional on several controls for the macroeconomy and observable firm-level controls for the demand for credit, the instruments are strongly correlated with the time series of institutional loan spreads. Ultimately, however, my identifying assumption is that flows to CLOs and MFs are conditionally uncorrelated with the underlying demand for various types of debt, other than through the effect on the price of ITLs. I provide support for this assumption in two ways. First, I show that the instruments are conditionally uncorrelated with corporate bond spreads, despite bond spreads being strongly unconditionally correlated with loan spreads. This result suggests that the control variables account for other factors that affect the price of other types of debt. Second, the estimated elasticities are not statistically different from zero for firms that I would expect ex-ante to be insensitive to changes in the supply of ITLs.

The second empirical strategy relies on cross-sectional variation in net changes in the level of debt on firms' balance sheets. By decomposing balance sheet debt into bonds, revolving credit, term loans funded by banks, ITLs, and other debt, I can examine how net issuance of debt varies with net issuance of ITLs. First, I show that net issuance of bonds and bank term loans are negatively correlated with net issuance of ITLs, but revolving credit and other debt are uncorrelated. Second, in order to account for the endogeneity of ITL issuance, I instrument for net ITL issuance using the pre-existing credit rating of the firm, relying on the fact that the change in supply happened exclusively for riskier borrowers. During the years 2002 through 2007, speculative-grade significantly increased their net issuance of ITLs, and then reversed the pattern from 2008 through 2011. Similar firms without a speculative-grade credit rating did not

experience such changes in ITL issuance and provide a natural control group. Compared with these other firms, firms with a speculative-grade credit rating decreased net issuance of corporate bonds and bank loans from 2002 through 2007, but increased net issuance thereafter. The instrumental variables estimates suggest that more than one-half of net ITL issuance resulted in decreased usage of bonds and other term loans, with the remainder adding to leverage. There is no evidence that revolving credit or other debt (e.g. commercial paper and mortgages) are responsive to changes in the price of ITLs.

The combined evidence strongly suggests that firms respond to decreases in the price of ITLs by issuing more syndicated loan deals that include an ITL tranche, decreasing the size of the bank term loan tranche, issuing fewer corporate bonds, and using the proceeds to partially repay existing bonds and bank term loans. Other forms of debt, including revolving credit, are unresponsive to changes in the price of ITLs.

These results contribute to our knowledge in three areas. First, the results extend the spate of recent research on the impact of institutional investors in corporate loan markets, particularly highlighting that securitization can have real economic benefits for the recipients of financing. This conclusion is particularly strong when viewed in conjunction with the results from Benmelech, Dlugosz, and Ivashina (2011), who show that borrowers whose loans were securitized did not experience adverse outcomes as compared with borrowers whose loans were not securitized. These results contrast sharply with existing evidence on securitization of consumer finance-related assets, particularly mortgages. For example, Keys, Mukherjee, Seru, and Vig (2010) find that securitization of subprime mortgages was associated with a notable increase in defaults, particularly for loans where intermediaries can add the most value through their underwriting efforts. I confirm that institutional investors, including CLOs, did increase the supply of credit and show that a primary consequence of the expansion was to replace bonds and other term loans previously funded by banks.

Second, the results extend some recent literature on the debt structure of corporate borrowing. Rauh and Sufi (2010) show that firms with credit ratings often use multiple types of

debt and frequently make changes in the types of debt used without significantly changing total debt. Moreover, high credit quality firms tend to rely primarily on senior, unsecured bond debt, whereas lower credit quality firms often use on senior, secured debt plus subordinated debt. Lower credit quality firms have more variation in the seniority of debt within their capital structures. My results suggest that, in addition to seniority, whether a loan is revolving debt or an installment loan is an important dimension along which loans vary. I find that institutional term loans are a substitute for corporate bonds but not for revolving loans, suggesting that revolving loans have a uniquely important role in firms' capital structures that cannot be replicated by a term loan. More research is warranted to identify the relevant distinguishing features.

Finally, the results help sharpen our understanding of where banks have a comparative advantage in providing corporate finance. The surge of non-bank investors into the market for loans to relatively risky borrowers challenges the traditional wisdom that banks have a comparative advantage in providing senior, secured debt financing that requires diligent monitoring (as in Diamond and Rajan, 2005). For example, Boot and Thakor (2009) write "The theory of financial intermediation has placed special emphasis on the role of banks in monitoring and screening borrowers in the process of lending." Although the results suggest that banks continue to be the sole provider of revolving debt, non-bank investors appear willing and able to provide senior, secured loans to riskier borrowers. This result intimates the findings of Carey, Post, and Sharpe (1998), who report that finance companies tend to specialize in loans to relatively risky borrowers, leaving less risky borrowers almost exclusively to banks. However, the preference of institutional investors for fully funded term loans, as opposed to revolving lines of credit, suggests that commercial banks maintain an advantage in funding revolving loans, as suggested by Gatev and Strahan (2006). Since banks persist as the near exclusive supplier of corporate credit lines, we are beginning to get a clear picture that banks advantage in financing corporations rests in their unique ability to provide revolving lines of credit.

The remainder of the paper is organized as follows. Section I provides background on the institutional loan market and summary statistics on changes in corporate balance sheets over the last 12 years. Section II discusses the research design and data collection, much of which is relegated to the Appendix. Section III presents results on the first empirical strategy examining time series variation in gross issuance. Section IV presents results on the second strategy examining firm level evidence on net issuance. Section V concludes.

I. Background

A. Institutional Loan Market

Although finance companies historically have provided the bulk of non-bank funding for corporate loans, CLOs became the primary institutional investor during the mid- to late-2000s. By 2007, nearly two-thirds of leveraged loans included a CLO investor, according to Standard & Poor's Leveraged Lending Review, as reported in Ivashina and Sun (2011). By the mid-2000s, the typical leveraged loan deal included an "institutional term loan" (ITL) tranche, which is a fully funded term loan, intended to be purchased by non-bank institutional investors. In addition to a revolving line of credit that is common in most loan deals, a deal may include a term loan intended for banks and a term loan intended for non-bank investors.

As an example of a typical loan deal, consider the 2006 loan package that funded Constellation Brands' takeover of Vincor International. The $3.5 billion deal included a $500 million line of credit with a 60 month tenor, a $1.2 billion term loan A with a 60 month tenor, and a $1.8 billion term loan B with an 84 month tenor. All tranches in the deal had identical seniority and were secured by identical collateral. The line of credit and term loan A priced at a spread of 150 basis points over LIBOR, and the term loan B priced at 175 bps over LIBOR. In addition to the longer tenor, the term loan B had a slower amortization scheduled compared with the term loan A. According to Constellation Brands' 2006 10-K filing with the SEC, the term loan A required annual principal payments ranging from $150 million to $270 million, but the term loan B required annual payments of only $18 million along with a large final

payment of $1.7 billion. Based on the lenders listed in the credit agreement filed with Constellation Brands' June 5, 2006 8-K filing, the term loan A was funded primarily by commercial banks, who also agreed to fund the line of credit.[1] Although many of the same lenders also funded the term loan B, there were more than 50 additional lenders who funded only the term loan B. A casual scanning of the names of the lenders suggests that no commercial banks funded the term loan B, with the five largest lenders being Eaton Vance Management Inc., Fidelity Investments, Babson Capital Management LLC, General Electric Capital Corporation, and Franklin Advisors Inc.

The experience of Constellation Brands is not unique. Institutional tranches typically carry a longer maturity and a slower amortization than bank term loans. Otherwise, institutional term loan tranches share the same contractual features as other corporate loans: senior in the capital structure, usually secured with substantial collateral, strict maintenance covenants, floating rate interest payments, and pre-payable at the discretion of the borrower.[2] The development of the institutional term loan has been a true innovation, as non-banks are now funding corporations via instruments historically funded almost exclusively by banks.

Coincident with the development of ITLs were several technological advances that facilitated the expansion of non-bank investors in the corporate loan market. Standardized contracts, lower assignments minimums, and more transparent pricing vastly increased the liquidity of the secondary market for corporate loans.[3] Combined with improved securitization technology and growing investor comfort with structured debt products, CLOs found a niche in securitizing corporate loans through special-purpose entities largely funded with highly-rated debt. Since CLOs raise capital that is committed for a several year horizon, CLOs prefer to invest in funded term loans rather than revolving credit lines that can be drawn at the borrower's discretion. As shown in Rauh and Sufi (2009), bank term loans typically are

[1] Together, the line of credit and bank term loan are often referred to as the "pro-rata" tranches, as lenders will fund the same share of each tranche.
[2] Institutional term loans can be thought of as having the payment features of bonds (e.g. periodic interest payments and a bullet repayment of principle at maturity) but the contractual features of loans (e.g. maintenance financial covenants).
[3] See Coffee, Milam, Torrado, and Piorkowski (2007) for a summary of changes in the corporate loan market.

issued by firms with a speculative-grade credit rating, as investment-grade firms tend to get their term financing exclusively through the bond market.[4] Moreover, as shown in Benmelech and Dlugosz (2009), CLOs often use credit rating-based rules to limit the discretion of portfolio managers. As a result, CLOs set their sights squarely on the market for term loans issued by firms with speculative-grade ratings.

B. Non-bank lenders and Collateralized Loan Obligations

Non-bank intermediaries, particularly finance companies, have long participated in providing funding to corporate loans. In a sample of corporate loans from 1987 to 1993, Carey, Post, and Sharpe (1998) report that finance companies participated as a sole lender or member of a lending syndicate in about 10 percent of loans. Mutual funds also began investing in corporate loans in the early 1990s, through vehicles marketed as "prime funds." Throughout much of the 1990s, prime funds were the major institutional investor but provided relatively little of the total funding to corporate loans.

The growth of collateralized loan obligations in the 2000s helped the non-bank market explode. CLOs are organized as special purpose entities that issue asset-backed securities in order to finance the purchase of commercial and industrial (C&I) loans. Because C&I loans typically are senior and secured, losses due to default tend to be quite low and returns on loan assets quite stable, permitting CLOs to be funded predominately with highly-rated debt. Benmelech and Dlugosz (2009) report that the average CLO had in excess of 70 percent AAA-rated debt and over 85 percent investment-grade rated debt. The remaining funding is lower rated debt and equity, which offer higher yields in return for facing higher default risk. Asset managers set up CLOs to exploit differences between the cost of funding the CLO and the yields on the underlying assets, earning a positive spread but facing the risk of loss due to default.

The assets of CLOs are typically managed by an asset manager who has discretion over the loans that comprise the portfolio. In order to limit any incentive problems that may influence the manager's choice, CLOs are often structured with rules to limit the manager's discretion. Benmelech and Dlugosz (2009)

[4] Throughout the paper, I use the term speculative-grade to denote S&P ratings below BBB-. Investment-grade refers to ratings of BBB- or above.

describe many of the common rules, which include constraints on the collateral and seniority of the underlying loans, restrictions on the nature of the cash-flows (e.g. payment frequency) of the underlying loans, and diversification requirements. In addition, a common rule will constrain the distribution of credit ratings on the firms in the portfolio. In order to protect the senior tranches of the CLO, the portfolio may not be too heavily weighted on very low rated credits, typically CCC+. In order to protect the lower rated tranches, the portfolio may not invest too heavily in highly rated credits, usually BBB and above. In the subsequent analysis, I show that the expansion in the supply of credit nearly exclusively impacted firms with a speculative-grade credit rating.

C. Aggregate Changes in Balance Sheet Composition

Figure 1 displays the time series of the composition of debt for the nonfinancial corporate sector in the U.S. The data is from the U.S. Flow of Funds accounts, and the figure reports the share of total assets funded by corporate bonds, bank loans, other loans, and other credit. Other loans include loans funded by nonbank investors, including CLOs, insurance companies, and finance companies. Other credit includes mainly mortgages but also some other forms of credit.

For much of the sample period, corporate bonds comprised about one-half of total credit, and the remainder was about evenly split between the other three groups. During the last few years, however, bonds grew faster than other forms of debt and reached nearly 60% of total credit. As I show subsequently, part of the increase in bonds can be attributed to firms switching away ITLs in the face of sharply reduced supply of institutional investors. During the 12 year sample period, bank loans fell from about 7% of total assets to roughly 3%. Conversely, other loans began the period at about 4% of total assets, and peaked at about 5% before retreating to 4%. As shown in panel B, much of the movement in other loans can be attributed to changes in the quantity of loans held by ABS issuers, which includes CLOs. Whereas CLOs funded almost very few corporate loans prior to 2000, their holdings expanded throughout the early 2000s and peaked towards the end of 2008 before retreating sharply through the end of 2011. The primary goal of this paper is to examine the consequences of the expansion of credit

supplied by nonbank investors and ask specifically if changes in other forms debt, particularly bank debt and corporate bonds, can be attributed to substitution by firms in response to the change in supply of institutional loans.

D. Existing Evidence on Supply Shock

There is compelling existing evidence that the expansion of securitization into corporate loans did increase the supply of corporate debt. Most relevant for my purpose is the work of Nadauld, and Weisbach (2012), who show that loans most likely to be securitized carried significantly lower spreads, on the order of 15 to 20 bps. Moreover, Nadauld, and Weisbach (2012) confirm that term loan B facilities are securitized much more frequently than term loan A facilities or revolvers. The evidence strongly suggests that securitization did reduce the cost of term loans.

Second, Ivashina and Sun (2011) provide evidence that the supply of credit by institutional investors, including CLOs and mutual funds, resulted in shorted syndication periods and lower loan spreads. During periods with large inflows of funds to mutual funds and CLOs, loans are syndicated faster and carry lower spreads; in the cross-section, loans that are syndicated faster carry lower spreads. Ivashina and Sun (2011) use time series variation in fund flows to instrument for syndication length and confirm the relationship. I use a similar identification strategy by instrumenting for the price of institutional term facilities with time series variation in fund flows, using net flows into prime-rate mutual funds and CLOs.

Finally, Shivdasani and Wang (2011) show that the growth in securitization of corporate loans resulted in a notable increase in the number and value of leveraged buyouts (LBO). Institutional term loans were used extensively to finance the LBO boom of the mid-2000s, and there was a strong correlation between underwriters of CLOs and lenders to finance LBOs. Shivdasani and Wang (2011) use issuance of CDOs backed by other ABS (e.g. credit card ABS) as an instrument for CLO issuance, and my identification strategy is similar in spirit to theirs.

II. Research Design and Data

A. Research Design

My goal is to measure firms' elasticity of demand for different types of debt with respect to changes in the spread on institutional term loans. This is a difficult task for the standard reason that data on quantities and spreads conflate both demand and supply effects. Moreover, changes in spreads on institutional loans are likely correlated with changes in spreads on other types of debt, due to common credit risk and discount rate factors, which makes is difficult to properly identify a cross-elasticity of demand that holds other prices constant.

I attack the problem using two strategies. First, I examine time series variation in debt issuance choices of firms, focusing on corporate bonds and syndicated loans (term loans and revolving credit). In this analysis, I construct a panel of firm-quarters and examine how gross issuance of corporate bonds, revolving credit, bank term loans, and ITLs varies with time series variation in the spread on ITLs, using an instrument for the spread on ITLs inspired by Shivdasani and Wang (2011). I use time series variation in growth of collateralized loan obligations loan-backed mutual funds as instruments for institutional loan spreads to identify the elasticity between spreads and debt issuance of several types. The underlying assumption is that the instrument solely captures variation in the supply of ITLs. I include a host of controls variables to account for time series variation in macroeconomic conditions to remove common factors that might explain both spreads and debt issuance. I also show that the instruments are conditionally correlated with loan spreads but not bond spreads, which provides supportive evidence that the instruments are not picking up changes in factors related to the price of other debt.

My second strategy is to examine cross-sectional differences in changes in the debt structure of firms. Using a panel of firm-year balance-sheet data on the composition of debt, I examine how various categories of debt change when firms increase or decrease their use of ITLs. In addition to examining conditional correlations, I also instrument for changes in ITL usage to identify the causal effect. Since the supply of ITLs is relevant only for firms that have a speculative-grade credit rating, I examine differences

in firms across different rating categories. My identifying assumption is that changes in debt composition would have been similar across firms with different ratings absent the growth, and subsequent decline, in the supply of ITLs.

B. Data

I collect data from a variety of sources and detail the collection process further in the Appendix. The result is two primary datasets: (1) a panel of firm-quarters along with gross debt issuance choices and a variety of quarterly time series, and (2) a panel of firm-years along with detailed balance sheet data including a decomposition of debt into various categories. For both datasets, the sample begins with non-financial firms in the merged Compustat-CRSP database. I convert all money amounts to real values using the GDP implicit price deflator, and I seasonally adjust most time series to account for regular seasonal patterns.

Loan Spreads. To measure the spread of institutional term loans, I use prices on loans that trade in the secondary market and convert the price into an equivalent loan spread over LIBOR. I use secondary market prices rather than spreads on newly issued loans to avoid any bias created by firms that select to issue in the primary market. I use data from Loan Pricing Corporation that is based on an index of 30 names that are actively traded in secondary market. The data is available on a weekly frequency, and I collect monthly data by capturing the last week in every month. I then compute equally weighted averages of the monthly data to form a quarterly series. This variable serves as my primary dependent variable.

LPC also provides secondary market prices on corporate bonds for the same set of firms for which it provides loan prices. Based on quoted prices for a bond with maturity closest to the quoted loan, LPC computes the yield on the bond using the quoted price and the contractual coupon. The yield is then swapped to a floating rate basis to provide a spread over LIBOR that

is comparable to the loan spread. I use these data as a check on the validity of my instrument. As shown in the Appendix, loan spreads and bond spreads are highly correlated. My instrument, however, should be conditionally correlated with loan spreads only.

Aggregate Data on Debt. From the U.S. Flow of Funds accounts, I collect data on debt outstanding for the nonfinancial corporate business sector. I collect outstanding quantities of corporate bonds, total mortgages, bank loans not elsewhere classified, other loans and advances, and total credit market instruments. I refer to "bank loans not elsewhere classified" as bank loans because the series includes C&I loans held on commercial banks' balance sheets. Other loans and advances includes loans made by finance companies, savings institutions, and credit unions but also other entities. The primary dependent variable I examine is net growth in debt outstanding, which I calculate as the first difference in the logged amount of debt outstanding.

CDOs Outstanding. I collect gross issuance and aggregate outstanding amounts of asset-backed securities and collateralized debt obligations (CDOs). The data comes from the Securities Industry and Financial Markets Association (SIFMA), which compiles the data from a variety of primary sources. My primary instrument is percentage changes the amount of global CLOs outstanding.

Mutual Funds Outstanding. Using the CRSP mutual fund database, I collect net asset values mutual funds with an objective suggesting that the fund invests in corporate loans.

Gross Issuance Data. I collect firm-level issuance data on syndicated loans and corporate bonds. Syndicated loan issuance comes from the Reuter DealScan database, and bond issuance comes

from the Fixed Income Securities Database (FISD).[5] I exclude all convertible corporate debt, but include both public and private issues into the U.S. market.

For all analysis examining gross issuance, I examine only firms that ever appear in the DealScan and FISD data. I do this so that I am confident that the sample firms *could* choose to issue a loan or bond that would end up in the sample.

Balance Sheet Data.

In addition to standard firm-level data from *Compustat*, I complement the balance-sheet data using data from Captial IQ and hand-collected data based on an analysis of the debt type in Capital IQ. Capital IQ decomposes total debt into seven mutually exclusive debt types: evolving credit, term loans, commercial paper, senior bonds and notes, subordinated bonds and notes, commercial paper, capital leases, and other debt. I aggregate senior and subordinated bonds and notes to create a category of corporate bonds, and I aggregate commercial paper, capital leases, and other debt into a category I call other debt. Finally, I decompose term loans into ITLs and bank-funded term loans by manually examining the description of the debt item provided by Capital IQ. In addition to reading the description, I use DealScan to assist with the classification.

For this sample, I require that the firm have some data in the DealScan database, which I use to assist in the classification. I also require that I can merge the firm to the debt structure data from Capital IQ, which provides only a small constraint on the sample.

[5] I merge the loan data using GVKEY and the bond data using CUSIP.

III. Gross Issuance

This section reports the result of the first empirical strategy, which examines time series variation in gross debt issuance.

A. First-Stage Regression

I begin by examining the validity of the instrument. Figure 2 plots loan spreads along with CLOs and mutual funds (MFs) outstanding from 2001:Q1 through 2011:Q4. There is a strong univariate correlation between loan spreads and changes of both CLOs and MFs. Importantly, the correlation is apparent throughout the entire time period: the growth in CLOs during the mid-2000s corresponds with a gradual decrease in loan spreads; the sharp contraction in growth corresponds with a sharp rise in loan spreads during the financial crisis; and the return of issuance corresponds with a stabilizing of loan spreads.

Table I presents the first-stage regression from the instrumental variable regressions presented subsequently. In addition to the two instruments, I include GDP growth as a contemporaneous measure of macroeconomic activity to account for time series variation in investment opportunities that might be correlated with loan spreads. I also included the return on the S&P500 stock index in the last month of the quarter. Column (1) shows the results from the actual first-stage regression with the dependent variable being loan spreads, and column (2) reports the results from using bond spreads as the dependent variable.

There is a strong relationship between net issuance of CLOs and MFs and loan spreads, conditional on the other controls. The individual coefficient on CLOs is statistically significant with a large t-stat, and the coefficient on MFs is negative and nearly significant at the 10-percent level.[6] Importantly, the partial r-squared of the instruments is 0.516, and the first-stage F-statistic of 61.95 is highly significant, provides strong evidence against the null that the instruments are not correlated with loan spreads.

[6] MFs is very significant if entered in the regression without CLOs.

Importantly, the results are different when using bond spreads instead of loan spreads. The individual coefficient estimates are statistically insignificant, and the partial r-squared is only 0.123. Moreover, the F-statistic provides no evidence that the instruments are conditionally correlated with the instruments. Notably, bond spreads are unconditionally correlated with the instruments, suggesting that the control variables are providing important controls for factors correlated with credit spreads. Indeed, the coefficient estimates on the control variables are similar in magnitude for loan spreads and bond spreads. I interpret the results in column (2) as suggesting that the instruments satisfy the exclusion restriction. Although not reported, tests of over-identifying restrictions also support this conclusion. In all regressions, Hansen J statistics fail to reject the null hypothesis that the instruments are conditionally uncorrelated with the error term. Similarly, the estimated elasticities are very similar if I use either one of the instruments independently.

B. Estimated Gross Issuance Elasticities

Tables II, III, and IV report the instrumental variables estimates of gross debt issuance with respect to changes in spreads on institutional term loans. For each type of debt, I examine an indicator of issuance in a given quarter and the amount of issuance conditional on some issuance. When examining the amount of issuance, I scale the gross issuance amount by the value of total assets from the prior quarter. Since the independent variable is measured in logs, the coefficients can be interpreted as semi-elasticities.

Table II examines issuance of ITLs, so the estimates represent own-price elasticities. The coefficient estimates on Ln(Loan Spread) suggest that issuance of ITLs is quite sensitive to changes in the price of ITLs, which complements prior studies on the impact of growth in the supply of institutional term loans. This result shows that the reduction in loan spreads led to a notable increase in total use of institutional term loans. Columns (3) and (4) show that this effect is particularly strong for firms with a speculative-grade credit rating.

Table III reports elasticities for corporate bonds, revolving credit, and bank term loans. There are several important results. First, issuance corporate bonds is very sensitive to changes in the price of ITLs,

and the estimated elasticities suggest that bonds are a substitute for ITLs. The strongly positive coefficients suggest that bond issuance increases when ITL spreads rise. Second, gross issuance of revolving credit and bank term loans are complements with ITLs. This likely reflects that fact that loans are usually issued in packages, so if a firm issues an ITL, it will also issue a revolving loan and a bank term loan. Conditional on issuing a loan, however, the size of the revolving credit is unrelated to the price of ITLs, but bank term loans become a substitute with ITLs.

Table IV replicates Table III for just firms with a pre-existing speculative-grade credit rating. The results are qualitatively similar but the magnitudes are larger.

IV. Net Issuance

This section presents the empirical results using the firm-level balance-sheet data.

A. First-Stage Regression

Table V reports the results from the first-stage regression. In the first-stage, the dependent variable is net changes in ITLs outstanding, divided by lagged total assets. The relevant instrument is an indicator that the firm has a speculative-grade credit rating, which I interact with a series of year dummy variables. This permits the cross-sectional differences to vary across time and accounts for the supply increase in the early part of the sample and subsequent decrease later. The estimates confirm this pattern. Importantly, the first-stage F statistic confirms that the series of dummy variables are highly significantly correlated with ITL issuance.

B. Net Debt Issuance

Table VI reports the results for net debt issuance, which is based on a sample of firms with at least $100M in total assets and a ratio of debt to assets of at least 10%. I make this restriction so that I examine a set of firms similar to those firms with a speculative-grade credit rating, which serve as the treatment sample. I examine for types of debt: corporate bonds, revolving credit, bank term loans, and all other debt. The dependent variable is the net change in debt scaled by lagged assets. Since the dependent

variable is net ITL issuance scaled by lagged assets, the coefficient estimates can be interpreted as measuring the dollar change in debt outstanding for each dollar change in ITL outstanding.

I include a several firm-level control variables that have previously been shown to affect corporate leverage. I use a measure of firm size (Ln(sales)), several measures of growth opportunities (operating earnings, market-to-book ratio, and sales growth), a measure of asset tangibility based on the book value of property, plant, and equipment, and a measure of corporate liquidity. I measure all stock variables year-end prior to the dependent variable, but the flow variables are contemporaneous. I also include dummy variables for the industry of the firm (based on Fama-French 38 industries), which I interact with year dummy variables. This should account for additional sources of investment opportunities.

The results suggest that corporate bonds and bank term loans are substitutes with ITLs. The OLS correlations are strongly negative for each, suggesting that firms increasing their use of ITLs tend to reduce their use of bonds and bank term loans. Not surprisingly, the IV estimates suggest a larger effect, since the OLS estimates are likely biased upwards because firms issuing an ITL likely have reasons to expand debt usage. Adding together the estimates on bonds and bank term loans suggest that more than one-half of changes in ITLs are offset by changes to other debt.

Similar to gross issuance, there is no evidence that changes in ITLs affect revolving credit. Not surprisingly, there is no effect on other debt.

V. Implications and Conclusion

The findings presented here present convincing evidence that the biggest implication of the expansion of loan supply created by institutional investors was to reduce speculative-grade firms' reliance on corporate bonds and term loans provided by banks. There is a strong positive elasticity between gross and net issuance of corporate bonds and net issuance of bank term loans. There is no evidence that revolving credit or any other debt are responsive with respect to the spread on institutional term loans.

In addition to highlighting interesting features about the demand for different types of debt, the results help pinpoint where exactly banks remain a unique provider of finance. First, banks remain the

predominate provider of revolving credit, and there is no evidence that other institutions can successfully compete with banks on this front. Banks will remain crucial for corporate finance as firms have significant demand for revolving credit. Second, although not emphasized in the paper, banks remain dominant as arrangers of syndicated loans. Even as more of the loan is funded by non-banks, banks still serve the primary role as agent bank to construct and lead the lending syndicate.

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Table I
Gross Debt Issuance First Stage Regression

This table reports coefficient estimates from the first stage regression of instrumental variables regressions of ITL issuance the interest rate spread of ITL tranches, Ln(Loan Spread) and the spread on a comparable set of corporate bonds, Ln(Bond Spread). The instruments are issuance of collateralized loan obligations (Ln(CLO issuance)) and net issuance of mutual funds backed by corporate loans (Ln(MF issuance)). The sample is a panel of nonfinancial firms in Compustat who have issued a syndicated loan in Dealscan and a bond in FISD, over the period 2001:Q1 through 2011:Q4. Standard errors are robust to arbitrary heteroskedasticity and clustered within quarter.

	Ln(Loan Spread) $_{t-1}$	Ln(Bond Spread) $_{t-1}$
	(1)	(2)
Growth in GDP $_t$	-19.290**	-23.329**
	(2.367)	(2.264)
Return on S&P 500 $_t$	0.950*	1.400**
	(1.780)	(2.114)
Ln(sales) $_{t-1}$	-0.006***	-0.009***
	(3.949)	(3.038)
Sales Growth $_t$	-0.056	-0.076
	(0.855)	(1.087)
OIBDP / Lagged Assets $_t$	-0.390***	-0.472***
	(3.147)	(3.912)
MtB $_{t-1}$	-0.021***	-0.021**
	(3.242)	(2.362)
PPE / Assets $_{t-1}$	0.017***	0.019***
	(3.710)	(3.639)
Cash / Assets $_{t-1}$	-0.034	-0.047
	(1.273)	(1.489)
Ln(CLO issuance) $_{t-1}$	-4.023***	-0.909
	(10.773)	(1.576)
Ln(MF issuance) $_{t-1}$	-0.289	-0.183
	(1.594)	(1.285)
Constant	6.260***	6.774***
	(78.100)	(69.301)
Observations	35752	35752
R^2	0.624	0.374
Partial R^2 of Instruments	.516	.123
F-Statistic	61.95	1.66
P-Value	(0.000)	(.202)
Hansen J Statistic	0.196	2.042
	(0.658)	(0.153)

Absolute *t* statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < .01$

Table II

This table reports estimated coefficients from instrumental variables regressions of ITL issuance on the interest rate spread of institutional term loan tranches, Ln(Loan Spread). The instruments are issuance of collateralized loan obligations (Ln(CLO issuance)) and net issuance of mutual funds backed by corporate loans (Ln(MF issuance)). The dependent variable in regressions (1) and (3) is an indicator of any issuance, and the specification is a probit. The dependent variable in regressions (2) and (3) is the total size of ITL issuance conditional on the firm issuing a syndicated loan, and the specification is a tobit. The sample is a panel of nonfinancial firms in Compustat who have issued a syndicated loan in Dealscan and a bond in FISD, over the period 2001:Q1 through 2011:Q4. Columns (1) and (2) include all firms, and columns (3) and (4) include only firms with a speculative-grade rating in the prior quarter. Standard errors are robust to arbitrary heteroskedasticity and clustered within a calendar quarter.

A. Loan Issuance, Conditional on Some Issuance

	Dependent Variable: Indicator if Firm Issues a Loan (mean=59%)			
	(1)	(2)	(3)	(4)
Ln(Loan Spread) $_t$	-0.605***	-0.526***	-0.625***	-0.636***
	(4.502)	(3.722)	(4.075)	(3.660)
Ln(sales) $_{t-1}$		-0.041***	-0.042***	-0.042***
		(2.636)	(2.674)	(2.680)
Sales Growth $_t$		0.002	0.051	0.053
		(0.014)	(0.421)	(0.437)
OIBDP / Lagged Assets $_t$		0.878	1.255	1.299
		(0.914)	(1.305)	(1.357)
Debt / Assets $_{t-1}$		-0.551***	-0.541***	-0.543***
		(5.238)	(5.211)	(5.292)
MtB $_{t-1}$		-0.026	-0.054*	-0.054*
		(0.772)	(1.692)	(1.693)
Cash / Assets $_{t-1}$		-0.720***	-0.602**	-0.591**
		(2.629)	(2.223)	(2.184)
Growth in GDP $_t$			0.522	1.360
			(0.069)	(0.198)
Return on S&P 500 $_t$			-1.271**	-1.178*
			(2.426)	(1.932)
FD in Ln(VIX) $_t$			-0.100	-0.064
			(0.418)	(0.239)
FD in Slope $_t$			-0.102*	-0.112**
			(1.948)	(2.132)
FD in 3M Rate $_t$			-0.126**	-0.114*
			(2.014)	(1.685)
Bank Tightening $_t$				0.001
				(0.389)
Constant	3.757***	3.825***	4.429***	4.484***
	(4.926)	(4.786)	(4.872)	(4.433)
Observations	9865	6932	6932	6932

B. Term Loan Issuance, Conditional on Loan Issuance

	Dependent Variable: Indicator if Firm Issues Only a Bond (mean=35%)

	(1)	(2)	(3)	(4)
Ln(Loan Spread) $_t$	-0.467***	-0.332***	-0.274**	-0.240**
	(4.253)	(3.156)	(2.516)	(2.030)
Ln(sales) $_{t-1}$		-0.087***	-0.086***	-0.087***
		(4.555)	(4.526)	(4.579)
Sales Growth $_t$		0.403*	0.445**	0.438**
		(1.944)	(2.201)	(2.177)
OIBDP / Lagged Assets $_t$		-2.661*	-2.783**	-2.912**
		(1.911)	(2.007)	(2.100)
Debt / Assets $_{t-1}$		1.904***	1.918***	1.924***
		(16.181)	(16.254)	(16.279)
MtB $_{t-1}$		-0.162***	-0.158***	-0.156***
		(4.241)	(3.979)	(3.919)
Cash / Assets $_{t-1}$		1.081***	1.019***	0.992***
		(4.112)	(3.857)	(3.778)
Growth in GDP $_t$			-13.698**	-16.289***
			(2.434)	(3.065)
Return on S&P 500 $_t$			0.717	0.394
			(1.247)	(0.623)
FD in Ln(VIX) $_t$			0.209	0.096
			(1.150)	(0.439)
FD in Slope $_t$			0.012	0.043
			(0.273)	(0.822)
FD in 3M Rate $_t$			0.134*	0.098
			(1.938)	(1.412)
Bank Tightening $_t$				-0.003
				(1.482)
Constant	2.325***	1.604***	1.338**	1.169*
	(3.695)	(2.591)	(2.142)	(1.746)
Observations	5854	4110	4110	4110

C. Bank Term Loan Issuance, Conditional on Term Loan Issuance

	Dependent Variable: Indicator if Firm Issues Only a Bond (mean=53%)			
	(1)	(2)	(3)	(4)
Ln(Loan Spread) $_t$	1.117***	1.364***	1.292***	1.278***
	(5.635)	(6.611)	(5.732)	(5.683)
Ln(sales) $_{t-1}$		0.120***	0.119***	0.120***
		(4.101)	(4.033)	(4.060)
Sales Growth $_t$		0.487*	0.467	0.481
		(1.726)	(1.557)	(1.608)
OIBDP / Lagged Assets $_t$		-2.545	-2.298	-2.242
		(1.291)	(1.127)	(1.076)
Debt / Assets $_{t-1}$		-1.322***	-1.323***	-1.325***
		(6.502)	(6.478)	(6.461)
MtB $_{t-1}$		0.319***	0.316***	0.316***
		(4.057)	(3.963)	(3.920)
Cash / Assets $_{t-1}$		-0.374	-0.361	-0.374

		(0.740)	(0.700)	(0.731)
Growth in GDP $_t$			-4.638	-3.616
			(0.383)	(0.281)
Return on S&P 500 $_t$			0.280	0.471
			(0.276)	(0.503)
FD in Ln(VIX) $_t$			0.001	0.061
			(0.002)	(0.147)
FD in Slope $_t$			-0.031	-0.043
			(0.218)	(0.308)
FD in 3M Rate $_t$			-0.100	-0.066
			(0.555)	(0.334)
Bank Tightening $_t$				0.002
				(0.426)
Constant	-6.353***	-8.207***	-7.769***	-7.704***
	(5.513)	(6.557)	(5.669)	(5.625)
Observations	2077	1370	1370	1370

Table II
Marginal Effects

Marginal Effect

	Unconditional Probability	-1 S.D. Change in Ln(Loan Spread)	+1 S.D. Change in Ln(Loan Spread)
Loan Issuance, Given Issuance	59%	67%	20%
Term Loan, Given Loan	35%	39%	37%
Bank Term Loan, Given Term	53%	36%	96%
Mutually Exclusive Groups			
Bond Only	41%	33%	80%
Loan, Rev Only	38%	41%	12%
Loan, Term, Bank Term	11%	9%	7%
Loan, Term, ITL Only	10%	17%	0%

Table V
Net Debt Issuance First Stage Regression

This table reports coefficient estimates from the first stage regression of instrumental variables regressions of net issuance of various debt types on net issuance of ITLs. The instruments are a set of dummy variables indicating the firm has a speculative-grade credit rating as of the prior year-end interacted with year indicator variables. The sample is a panel of nonfinancial firms in Compustat with data in Capital IQ that have assets larger than $100M and leverage greater than 10%, over the years 2003 through 2011. Standard errors are robust to arbitrary heteroskedasticity and clustered within year by industry.

	Net Issuance ITL / Lagged Assets
Ln(sales) $_{t-1}$	-0.000*
	(1.674)
Sales Growth $_{t}$	0.006***
	(4.374)
OIBDP / Lagged Assets $_{t}$	0.009**
	(2.574)
MtB $_{t-1}$	-0.001
	(1.156)
PPE / Assets $_{t-1}$	0.001
	(0.235)
Cash / Assets $_{t-1}$	-0.003
	(0.910)
I(Speculative-Grade 2003)	0.017***
	(4.448)
I(Speculative-Grade 2004)	0.008***
	(2.681)
I(Speculative-Grade 2005)	0.000
	(0.016)
I(Speculative-Grade 2006)	0.007**
	(2.245)
I(Speculative-Grade 2007)	0.001
	(0.327)
I(Speculative-Grade 2008)	-0.004**
	(2.025)
I(Speculative-Grade 2009)	-0.009***
	(4.810)
I(Speculative-Grade 2010)	-0.004*
	(1.773)
I(Speculative-Grade 2011)	-0.004
	(1.313)
Industry by year dummy variables	Yes
Observations	13227

Absolute *t* statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < .01$

Table VI
Net Debt Issuance and ITL Issuance

This table reports estimated coefficients from OLS and instrumental variables regressions of net issuance of various debt types on net issuance of ITLs. The instruments are a set of dummy variables indicating the firm has a speculative-grade credit rating as of the prior year-end interacted with year indicator variables. The sample is a panel of nonfinancial firms in Compustat with data in Capital IQ that have assets larger than $100M and leverage greater than 10%, over the years 2003 through 2011. Standard errors are robust to arbitrary heteroskedasticity and clustered within year by industry.

	Corporate Bonds / Lagged Assets		Revolving Credit / Lagged Assets		Bank Term Loans / Lagged Assets		Other Debt / Lagged Assets	
	OLS	IV	OLS	IV	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ln(sales) $_{t-1}$	0.003***	0.003***	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(3.306)	(3.237)	(0.665)	(0.632)	(0.244)	(0.476)	(0.584)	(0.433)
Sales Growth $_{t}$	0.066***	0.066***	0.018***	0.018***	0.016***	0.018***	0.004***	0.003***
	(6.980)	(6.948)	(5.389)	(5.223)	(5.664)	(5.840)	(3.336)	(2.679)
OIBDP / Lagged Assets $_{t}$	-0.031	-0.031	0.007	0.007	0.004	0.006	0.004	0.003
	(1.507)	(1.475)	(0.857)	(0.853)	(0.457)	(0.691)	(1.454)	(1.343)
MtB $_{t-1}$	0.008***	0.008***	0.001	0.001	0.002	0.001	-0.000	-0.000
	(3.216)	(3.181)	(0.875)	(0.910)	(1.304)	(1.158)	(0.641)	(0.480)
PPE / Assets $_{t-1}$	0.013*	0.013*	0.004	0.004	0.012***	0.012***	0.001	0.001
	(1.871)	(1.903)	(0.961)	(0.972)	(2.699)	(2.946)	(0.519)	(0.518)
Cash / Assets $_{t-1}$	-0.062***	-0.062***	0.001	0.001	0.005	0.004	0.001	0.001
	(4.728)	(4.796)	(0.263)	(0.269)	(0.685)	(0.625)	(0.323)	(0.376)
Net Issuance ITL	-0.180***	-0.239**	-0.082	-0.117	-0.120***	-0.345**	-0.000	0.060
	(3.113)	(1.763)	(1.044)	(0.715)	(3.741)	(2.190)	(0.073)	(0.755)
Constant	-0.068***		-0.023***		-0.015***		-0.011***	
	(11.044)		(6.870)		(4.456)		(8.563)	
Industry x year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13227	13227	13227	13227	13227	13227	13227	13227

Absolute *t* statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < .01$

Figure 1. Corporate Loan Investors and Leveraged Loan Issuance

The figure shows the time series of outstanding institutional investors in corporate loans and the issuance of leveraged loans. Panel A shows aggregate outstanding assets of collateralized loan obligations and mutual funds backed by corporate loans. The data is from SIFMA and CRSP. Panel B shows the quarterly issuance of loans outside of the investment-grade market, as defined by LPC. The sample is quarterly from 2001:Q1 through 2012:Q4.

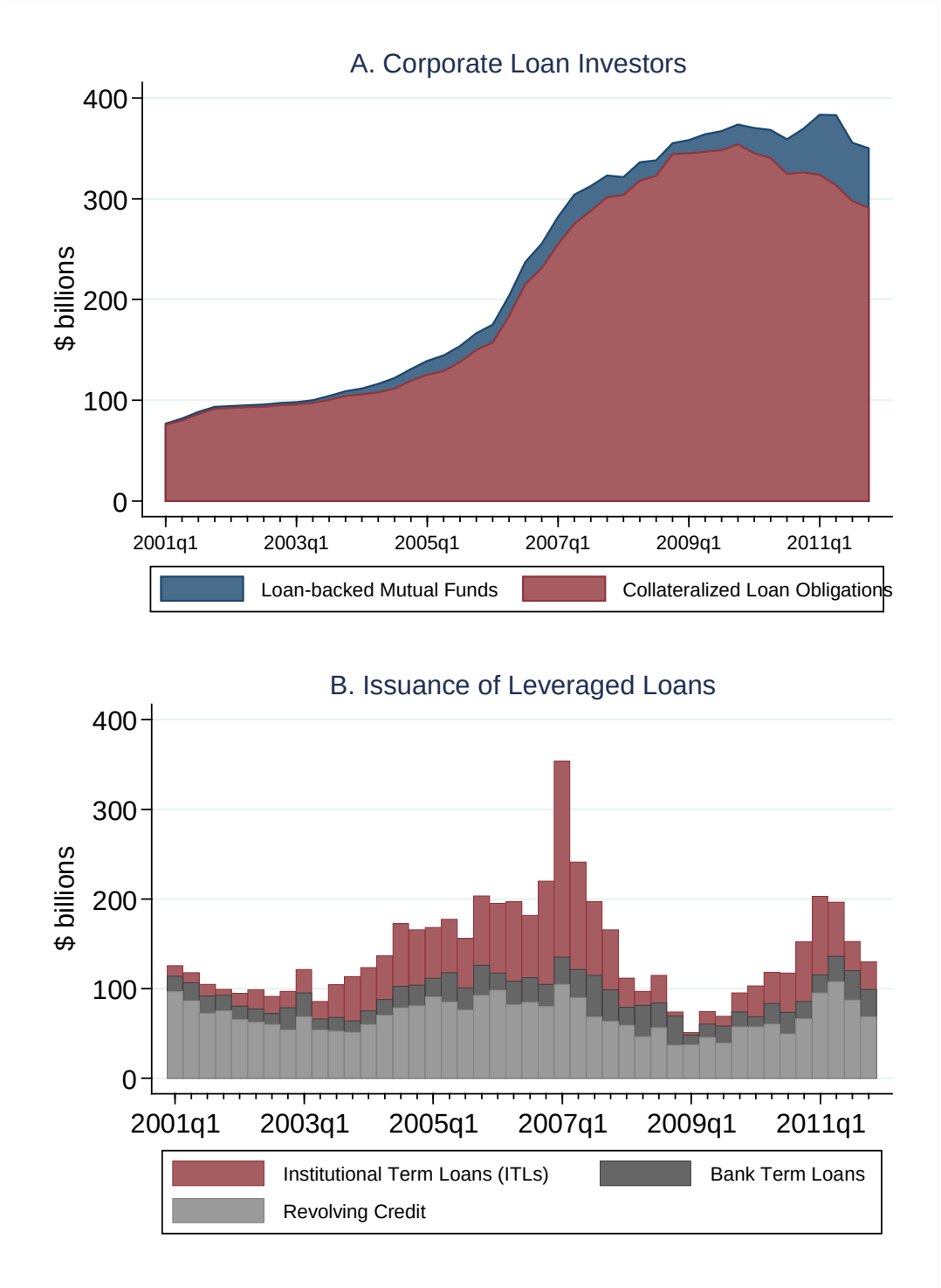
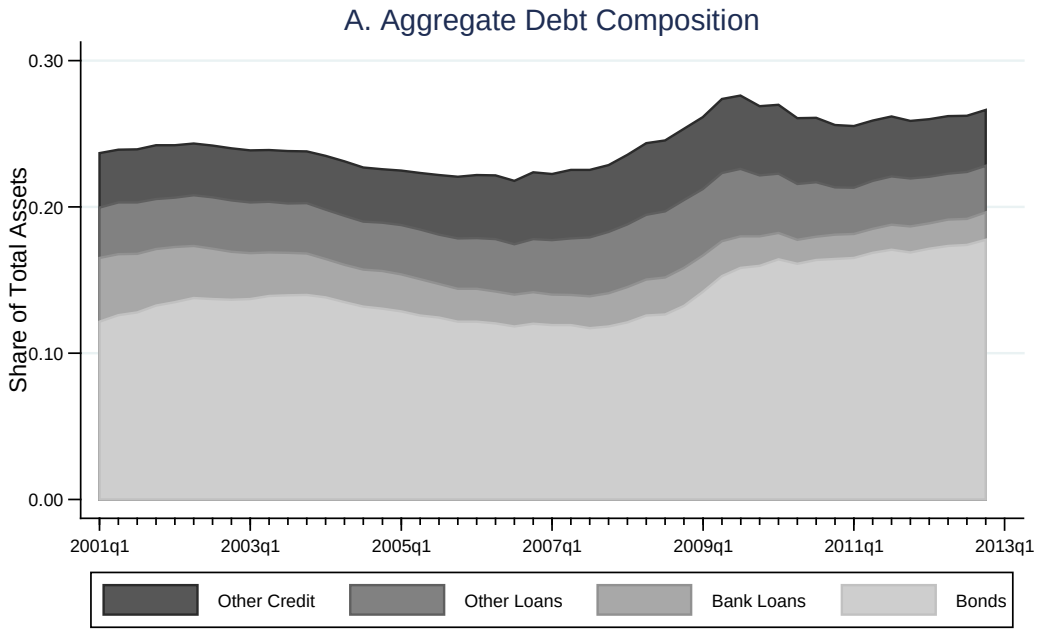


Figure 2. Debt Composition of Nonfinancial Corporate Sector

The figure shows a decomposition of total debt as a share of total assets. Panel A shows the share of total credit comprised of corporate bonds, bank loans, other loans, and other credit, and panel B decomposes other loans into the portions supplied by finance companies, syndicated loans, and other lenders, which is predominately U.S. government entities and foreign lenders. The data is from the U.S. Flow of Funds Accounts, and the sample is quarterly from 2001:Q1 through 2012:Q4.



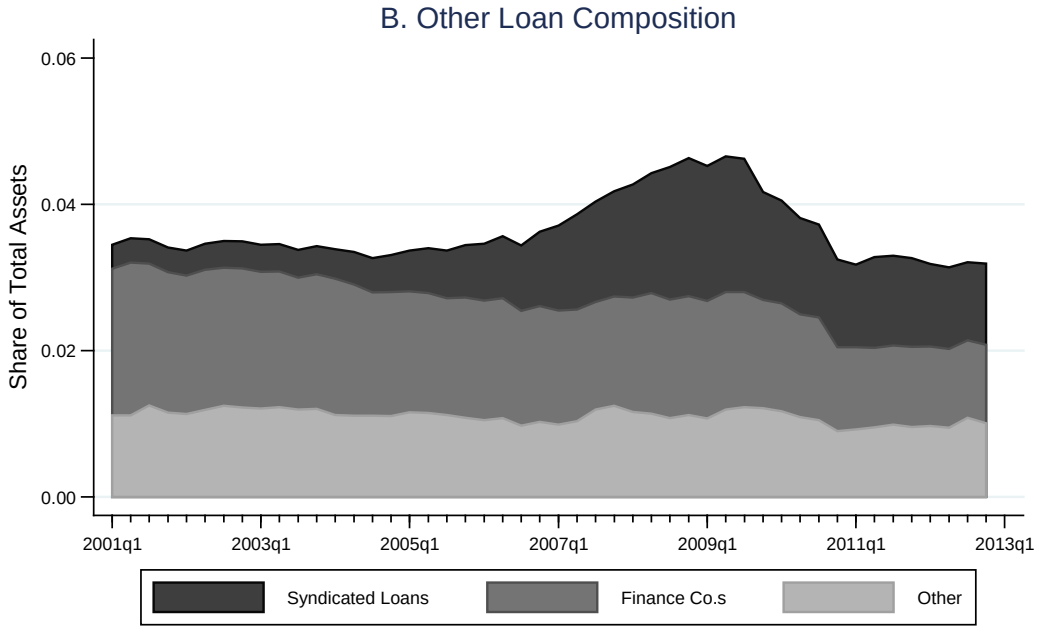
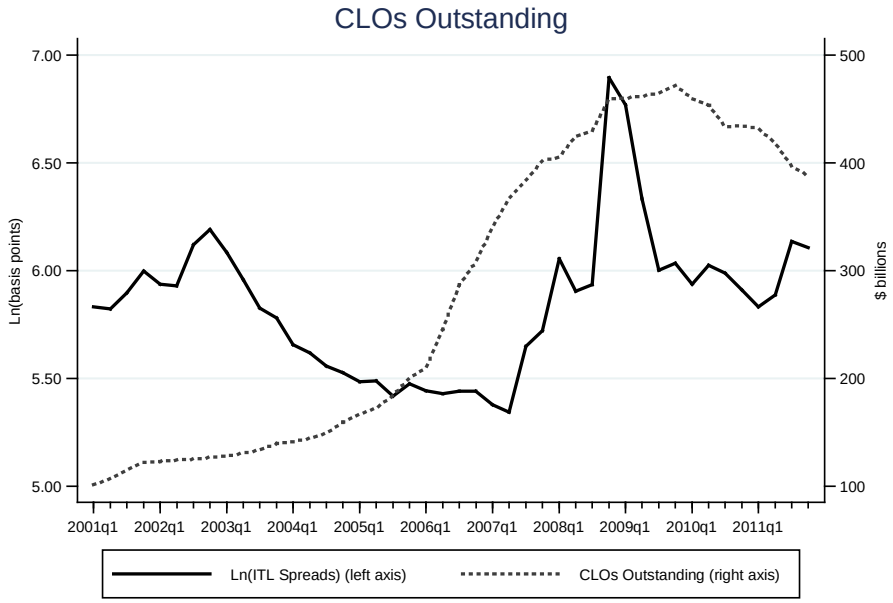


Figure 2. Loan Spreads and CLO/MF Issuance

The figure shows the quarterly average of spreads on institutional term loans along with the value (in real 2005 dollars) of CLOs outstanding and loan-backed mutual funds outstanding (in real 2005 dollars). Loan spreads are measured as the logged value of basis points and plotted against the left axis. The issuance quantities are logged values of $billions and plotted against the right axis. The sample is quarterly from 2001:Q1 through 2011:Q4.



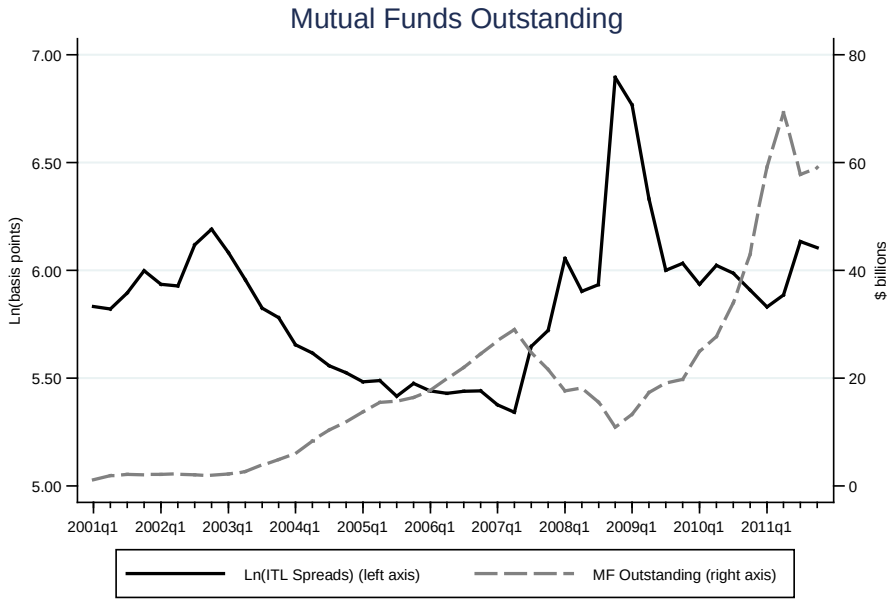
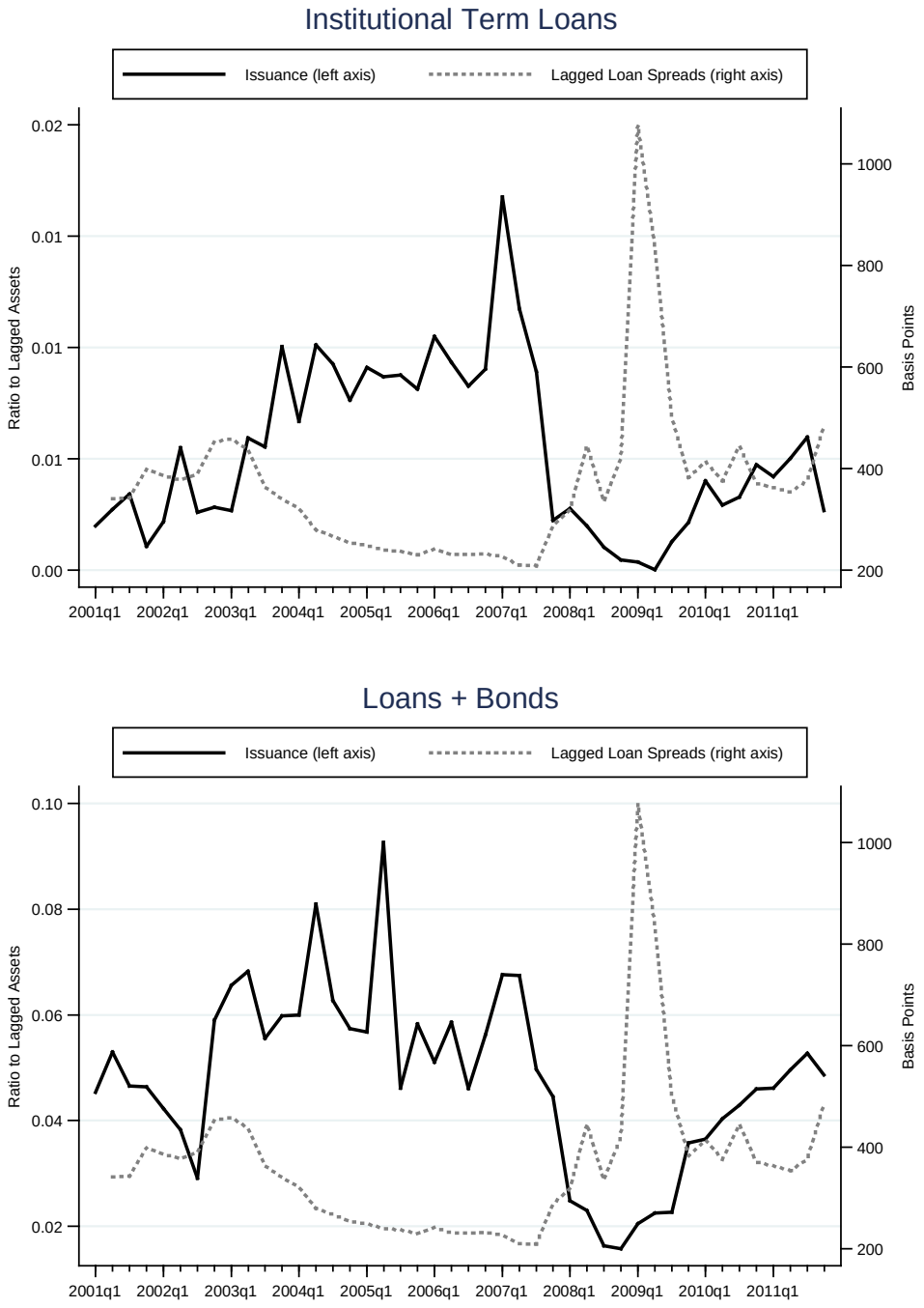
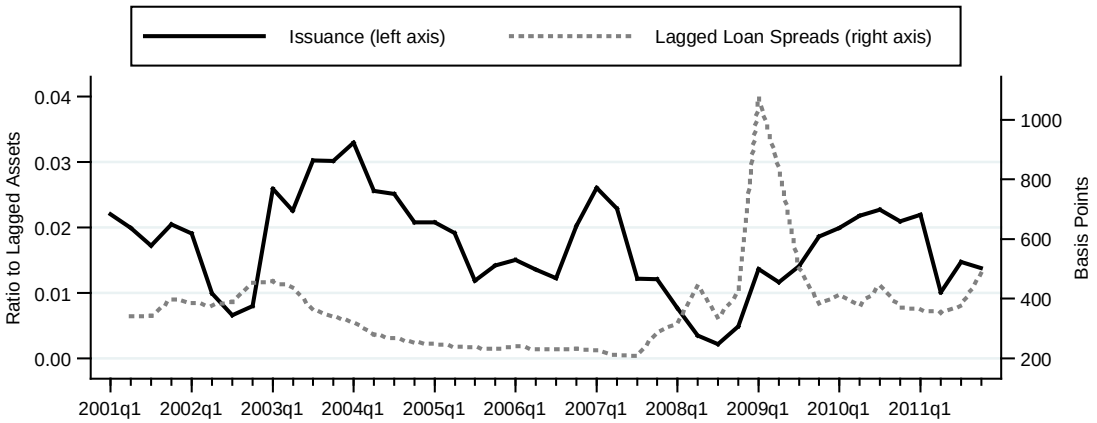


Figure 3. Corporate Debt Issuance

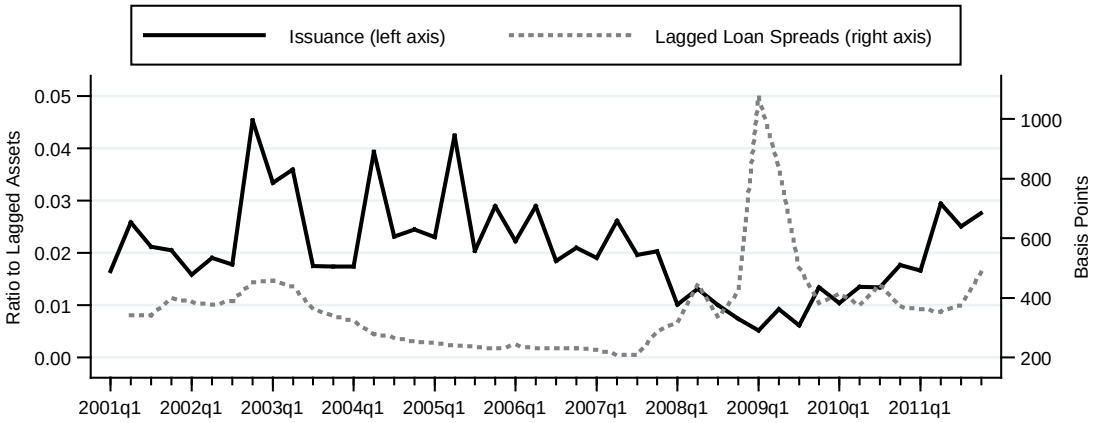
The figure shows the time series of average firm-level issuance of various types of corporate debt (as a ratio to lagged assets): institutional term loans, total syndicated loans plus corporate bonds, corporate bonds, revolving syndicated loans, and bank term loans. Each panel also plots the time series of spreads on institutional term loans.



Corporate Bonds



Revolving Credit



Term Loans by Banks

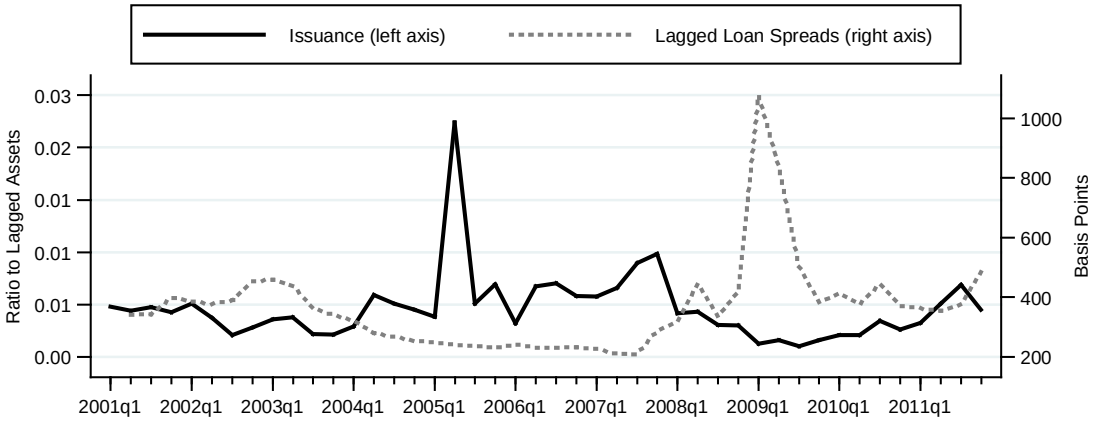
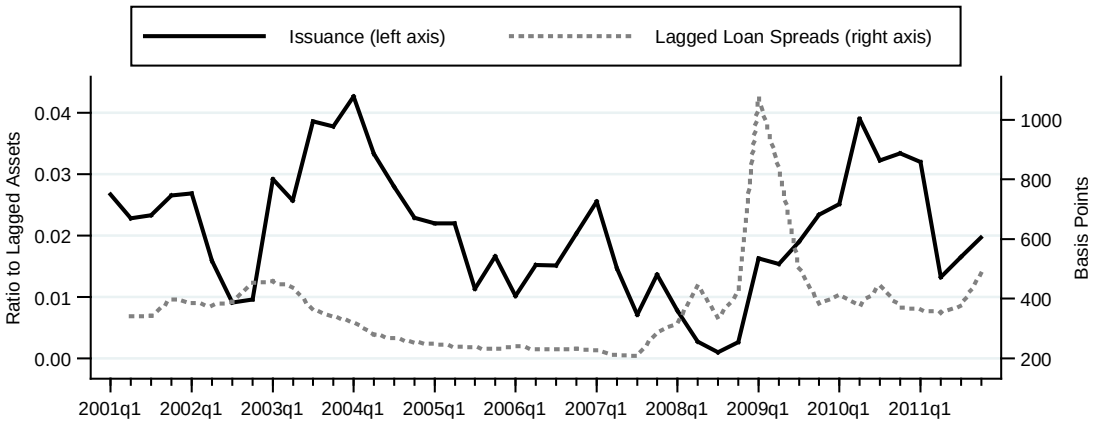


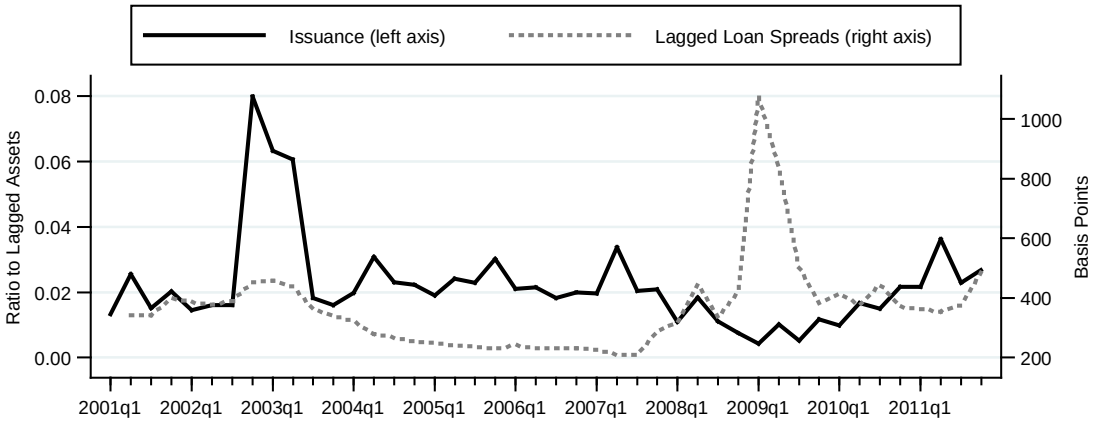
Figure 4. Corporate Debt Issuance for Speculative-Grade Firms

The figure shows the time series of average firm-level issuance of various types of corporate debt (as a ratio to lagged assets) for firms with a (lagged) speculative-grade credit rating. Each panel also plots the time series of spreads on institutional term loans.

Corporate Bonds



Revolving Credit



Term Loans by Banks

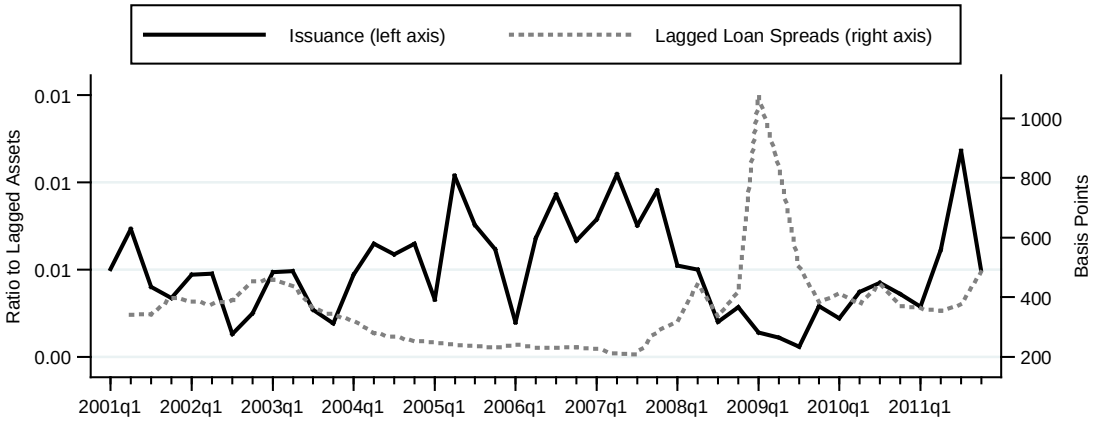


Figure 5. Corporate Debt Composition

The figure shows the time series of average firm-level debt structure for all firms, firms with a speculative-grade credit rating, firms with an investment-grade credit rating, and unrated firms. The sample is all nonfinancial firms in Compustat that can be merged to Capital IQ.

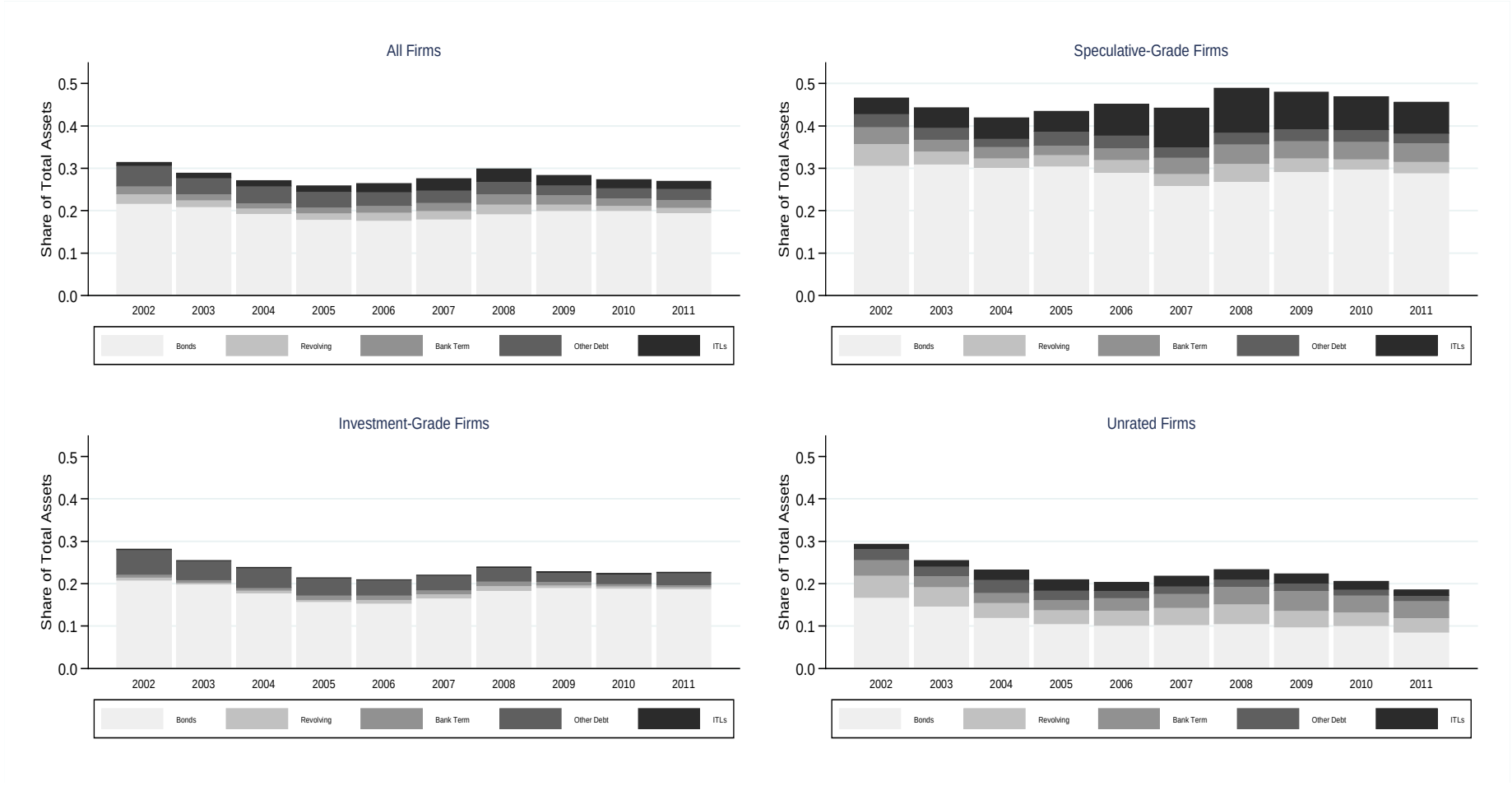
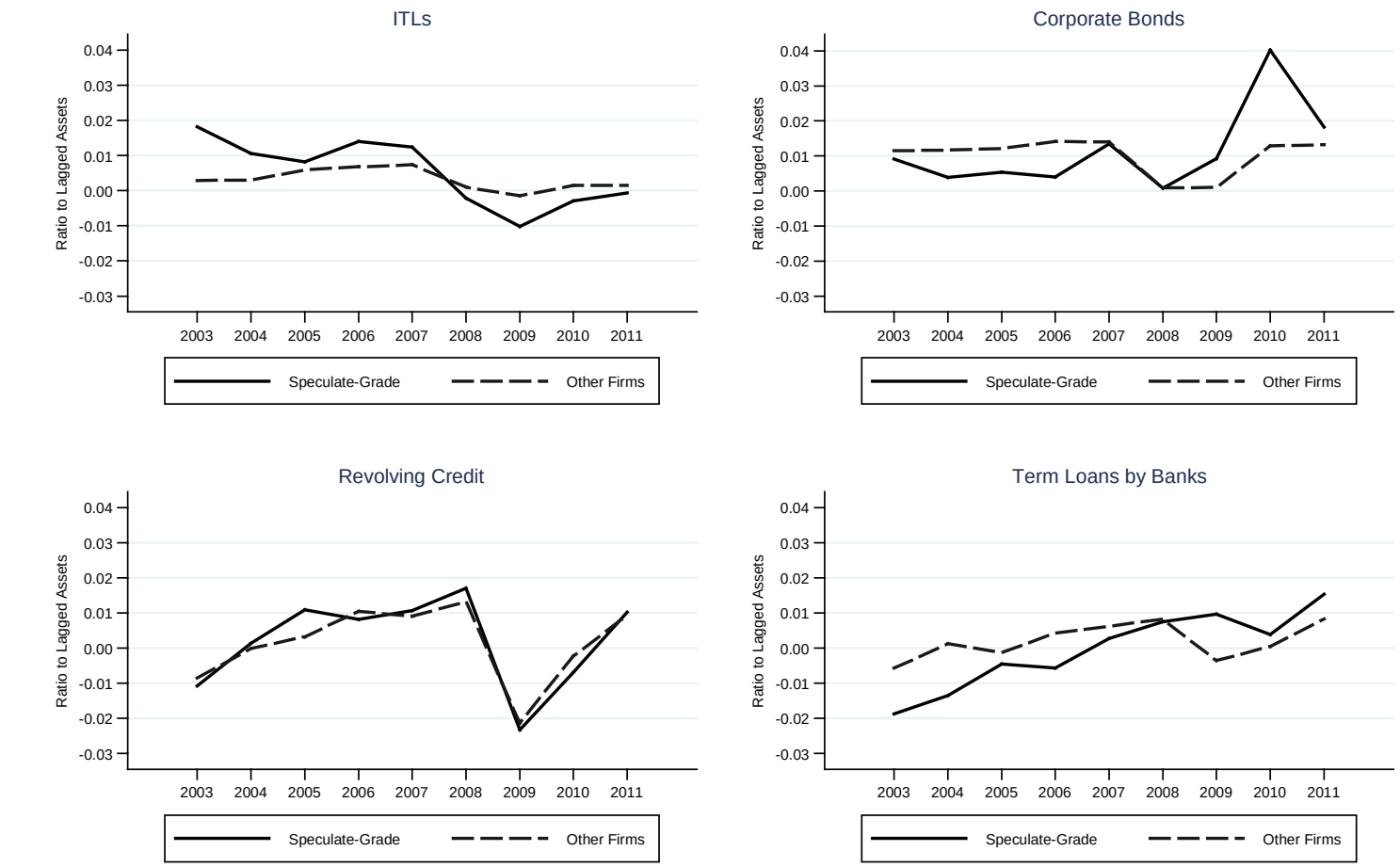


Figure 6. Net Corporate Debt Issuance by Rating

The figure shows the time series of average firm-level net debt issuance for firms with a speculative-grade rating as of the prior year-end and all other firms. The sample is all nonfinancial firms in Compustat that can be merged to Capital IQ that have assets larger than $100M and leverage greater than 10%.



Internet Appendix for

What is Special about Bank Loans

Greg Nini, October 2013

This appendix explains the process used to collect the data for "Institutional Investors in Corporate Loans." The appendix is separated into several sections that each describes a single component of the data. I collect data for various sample periods, but I primarily focus on the period from 2001:Q1 through 2012:Q4. This is because data on loan spreads is not available prior to 2001, but the time period corresponds well to the growth in non-bank corporate loan funding.

Most data series are available only on a nominal basis, and I convert all nominal amounts to real quantities using the GDP implicit price deflator available from the Federal Reserve Economic Data (FRED) website maintained by the St. Louis Fed. I use the price deflator to convert dollar quantities to real 2005 equivalents.

Since I use quarterly data, many data series also require a seasonal adjustment to remove consistent seasonal patterns. For example, issuance of asset-backed securities appears regularly stronger in the fourth quarter of each calendar year. I seasonally adjust series using SAS's X-12-ARIMA procedure provided by the U.S. Census (see U.S. Bureau of the Census, *X-12-ARIMA Seasonal Adjustment Program, Version 0.2.8*, Washington, DC.) In the firm-level regressions, I include fiscal year dummy variables to account for any regular seasonal variation in firm-level debt quantities.[1]

A. Aggregate Data

The U.S. flow of funds accounts provide quarterly snapshots of the levels and flows of many asset and liability items for various segments of the economy. I collect the levels of several debt items for the nonfinancial corporate business sector and several asset items for the asset-backed security (ABS) sector. I infer that certain assets held by ABS issuers represent liabilities of the nonfinancial corporate sector.

[1] All results are robust to allowing the fiscal year dummy variables to vary with 2-digit SIC code.

For the nonfinancial corporate business sector, I collect quarterly outstanding amounts on several different categories of liabilities, each of which is a component of total credit market instruments (Flow of funds mnemonic FL104104005.Q). For each series, I compute real, seasonally adjusted quantities outstanding and compute quarterly growth rates as the difference in the logged values of the outstanding quantities. I collect the following series: corporate bonds (FL103163003.Q), total mortgages (FL103165005.Q), bank loans not elsewhere classified (FL103168005.Q), other loans and advances (FL103169005.Q), and total credit market instruments (FL104104005.Q). I refer to "bank loans not elsewhere classified" as bank loans and assume that the series includes only C&I loans held on commercial banks' balance sheets. Other loans and advances includes loans made by finance companies, savings institutions, and credit unions but also other entities.

I also collect syndicated loans to nonfinancial corporate business (FL673069803.Q), which is an asset category for issuers of asset-backed securities. I assume that these assets represent liabilities of the U.S. nonfinancial corporate business sector, which appears to be a safe assumption. To the extent that ABS issuers hold loans to non-U.S. firms, this may overstate the liabilities of the U.S. nonfinancial sector. Anecdotal evidence suggests that such foreign holdings are likely quite small. As Figure 2 shows, the assets held by ABS issuers are far less than the total amount of other loans and advances, so there is no evidence that any overstatement is very large.

B. Loan Spreads

The primary dependent variable of interest is the price of syndicated loans that trade in the secondary market. We use prices on loans in the secondary market to avoid any bias created by firms that choose to issue in the primary market. We use data from Loan Pricing Corporation, a division of Thomson Reuters, for an index of 30 names that are actively traded in secondary market. The prices are quoted as spreads relative to LIBOR, based on indicative bid prices provided through the LSTA/Thomson Reuters mark-to-market service. Using the quoted price and the contractual interest payments, LPC calculates the implied yield on the loan, with the yield spread being the difference between the yield and LIBOR. The result is

an interest rate spread that is comparable to the spread provided in loan origination databases such as DealScan. The difference is that the spread is based on trading prices in the secondary market rather than spreads at initiation for firms that choose to borrow. By avoiding the sample selection, the resulting series should more closely match the spread that a typical firm would pay for a newly initiated loan. As a point of comparison, Shivdasani and Wang (2011) report that spreads on loans issued towards the end of 2008 reached about 600 bps, whereas spreads on loans trading in the secondary market reached over 900 bps. Given that so few firms issued loans in the fourth quarter of 2008, I suspect the difference in spreads reflects the relative quality of firms that chose to issue during that period.

LPC also provides secondary market prices on corporate bonds for the same set of firms for which it provides loan prices. Based on indicative bid prices for a bond with maturity closest to the quoted loan, LPC computes the yield on the bond using the quoted price and the contractual coupon. The yield is then swapped to a floating rate basis to provide a spread over LIBOR that is comparable to the loan spread. The result is a set of bond and loan spreads for a set of 30 names.

LPC provide these data in an effort to measure the relative value of bonds and loans, which is why they focus on the same set of firms. In nearly all cases, the underlying loans are institutional term loans, so the data provide a good measure of the price of institutional term loans. The comparable data on bond spreads provides an additional piece of data that I use to rule out alternative stories for the effects I find. In particular, I show that issuance of asset-backed securities (the instrument in the IV regressions) is conditionally correlated with loan spreads but not with bond spreads. This provides some comfort that the instrument is not picking up omitted factors that might be correlated with general debt issuance.

LPC provides the data weekly, and I collect monthly data by capturing the last week in every month. I then compute equally weighted averages of the monthly data to form a quarterly series. Figure A1 displays the time series of the loan and bond spread series, from 2001:Q1 through 2011:Q4. There is a high degree of correlation between loan spreads and bond spreads; the univariate correlation between the two series is about 0.90. There is, however, some variation in the difference between the two series, and I

confirm in unreported results that the difference is positively correlated with issuance of ABS. Most importantly, although loan spreads are conditionally correlated with ABS issuance, bond spreads are not.

C. ABS Issuance

I collect gross issuance of asset-backed securities from the Securities Industry and Financial Markets Association (SIFMA), which compiles the data from a variety of primary sources. I collect gross issuance at a quarterly frequency for ABS backed by automobile related assets (e.g. auto loans, dealer floorplan loans), credit card receivables, home equity based assets (which does not include agency mortgage-backed securities), and total non-agency ABS. All of the issuance data is seasonally-adjusted and converted to 2005 real dollars.

Figure A2 provides a time series picture of total ABS issuance along with ABS backed by home equity. I highlight home equity to stress that mortgage-related securitizations do not account for all of the level or variation in total ABS issuance. Indeed, much of the increase in issuance between 2004 and 2007 was from ABS unrelated to home equity. Similarly, the collapse in 2008 was only in part due to mortgage-related ABS. Finally, although home equity ABS all but stopped after 2008, other ABS issuance has bounced back somewhat and provides additional variation in 2010 through 2012.

I also collect gross issuance of debt related to collateralized debt obligations (CDO), also from SIFMA. SIFMA provides data on global CDO issuance, so the data is not exclusively related to the U.S. SIFMA provides issuance data based on the underlying collateral of the CDO, and I construct two series: one based on CDOs backed by high yield loans (termed collateralized loan obligations) and one for all other CDOs, primarily funded by other ABS debt. All of the issuance data has been seasonally-adjusted and converted to 2005 real dollars.

Figure A3 shows issuance of ABS along with issuance of the two types of CDOs. The series track quite closely, reflecting the growth in popularity of securitization during the 2000s and the marked collapse following 2008. Although issuance of CDOs remained low following the financial crisis, it is

worth noting that the majority of CDO debt remains outstanding today, as CDOs issue debt securities with maturities between 7 and 10 years.

D. Foreign Positions of European Countries

I collect gross foreign asset holdings of Europe and the U.K. from balance of payments (BOP) data. I collect data from the financial account on outstanding quantities of total foreign assets, which includes direct investment abroad, portfolio investment (equity and debt securities), and other investments that includes banking assets. I collect data vis-à-vis the rest of the world, so the series include all foreign assets regardless of the country of the claim. For the euro area, I use data from the European Central Bank taken from the Monthly Bulletin, Table 7.3. For the U.K., I use U.K. National Statistics (http://www.statistics.gov.uk/hub/economy/national-accounts/balance-of-payments).

As a point of comparison, I also collect data on foreign asset holdings of U.K. and euro area banks. I use data from the Bank for International Settlements (BIS) on international banking positions (Table 9D).[2] The consolidated statistics are based on the nationality of the parent bank, and I use the data on foreign claims that aggregates the local claims of foreign affiliates.

The statistics also provide separate data on international claims of foreign bank offices whose head offices are located outside the reporting countries on an unconsolidated basis.

drawing attention to the sizable inflows from European investors into U.S. private-label asset-backed securities (ABS), including mortgage-backed securities and other structured investment products. By adding to domestic demand for private-label ABS, substantial foreign acquisitions of these securities

[2] For more information, see Bank for International Settlements (2009) "Guide to the international financial statistics"
http://www.bis.org/statistics/intfinstatsguide.pdf

contributed to the decline in their spreads over Treasury yields. Through a combination of empirical estimation and model simulation, we verify that both GSG inflows into Treasuries and Agencies, as well as European acquisitions of ABS, played a role in contributing to downward pressures on U.S. interest rates.

E. Firm Level Data

I begin with all U.S. nonfinancial firms in Compustat as of fiscal year 2002 that satisfy certain data requirements. I require that each firm have non-missing data on assets, sales, and liabilities, along with reliable data on fiscal-year dates. Next I require that the firm have at least one loan in Loan Pricing Corporation's DealScan database.[3] I do this because I use information from Dealscan to create gross issuance information, and I want to minimize the chance that Dealscan is missing loans that were actually issued.

For this sample of firms, I collect quarterly accounting from Compustat for calendar quarters 2001:Q1 through 2010:Q4, the latest complete year that is available. I then merge this data with the debt structure data from Capital IQ, which provides information on the characteristics of various debt items taken from the footnotes of financial statements. I am able to merge about 70 percent of the firm-year observations between Compustat and Capital IQ. For the hand collected data (described below), I use information from Capital IQ to provide additional clues to assist classifying debt at revolving, bank term loan, or institutional term loan.

The result of this process is a sample of about 31,043 firm-quarters for 1020 firms. For this sample, I incorporate standard accounting ratios that serve as control variables in firm-level regressions. The following list provides a summary of the variables used. All dollar values are in millions of 2005 values, and ratios have been winsorized at the 1st and 99th percentiles.

[3] I use the Dealscan-Compustat linking file provided by Michael Roberts. Please see "How does Financing Impact Investment? The Role of Debt Covenants," *Journal of Finance* 2008, 63, 2085 - 2121

OIBDP / assets: operating income before depreciation and amortization divided by assets, computed as oibbp / at

MtB: market to book ratio, computed as ((prcc_f *csho) + lt – txditc) / at

Sales growth: percentage growth in sales, computed as quarterly growth in sale

Ln(sales): natural log of sales

MV leverage: market leverage, computed as book debt (dlc+dltt) divided by the market value of assets (book debt + prcc_f *csho).

Current ratio: ratio of current assets (act) to current liabilities (lct)

Cash / assets: cash (che) to assets (at)

The following table shows summary statistics for the control variables used in the firm-level regressions.

Variable	Mean	Std. Dev.	Min	Max
OIBDP / assets	0.031	0.028	-1.796	0.352
MtB	1.511	0.824	0.259	16.802
Sales Growth	0.032	0.188	-0.541	0.988
Ln(sales)	5.874	1.331	-6.215	11.117
MV leverage	0.252	0.180	0.000	0.953
Current ratio	1.935	1.127	0.282	8.097
Cash / assets	0.090	0.112	0.000	0.970

F. Loan Issuance Data

For each firm, I collect the history of loan deals provided in the Dealscan database, which covers loans initiated through the end of 2010. For each loan package, I aggregate the facility level data to identify the presence and quantity of revolving loans, bank term loans, and institutional term loans. I define a revolving loan as a loan with a type as any of the following: "Revolver/Line < 1 Yr.", "Revolver/ Line >= 1 Yr.", "Revolver/Term Loan", "364-Day Facility", "Demand Loan", or "Limited Line." I define a bank term loan as a loan type that is “Term Loan”, “Delay Draw Tem Loan”, or “Term Loan A.” And I define an institutional term loan as a term loan with a modifier of “B”, “C”, “D”, “E”, “F”, “G”, or “H”. For each package, I track the number of each type of facility and the aggregate amount of the facility.

I then aggregate the package data to the calendar quarter when the loan deal becomes active to create a firm-quarter panel of gross loan issuance amounts. For firm-quarters with no data from Dealscan, I impute a zero for gross issuance.

G. Detailed Balance Sheet Data

For a random sample of firms, I collect detailed balance sheet information on the type of debt outstanding as of each quarter-end available in Compustat. I begin by choosing a random sample of 244 firms that existed in 2002, which is 24 percent of the total number of firms. From the 10-Q and 10-K filings for each of these firms, I collect the outstanding amounts of revolving debt, bank term loan, and institutional term loans. I use the same classification as with loan issuance. In cases that are unclear from the SEC filings, I use Dealscan and Capital IQ to provide additional clues as to how to categorize the debt.

I collect quarterly data from 2002:Q1 through 2010:Q4, which is the last quarter from the last complete year available. The result of this process is a panel of 6,954 firm-quarters with a breakdown of revolving credit, bank term loans, and institutional term loans. From this, I can compute growth rates in net debt and provide summary statistics on the changes in debt composition over time.

The following table provides a few summary statistics to confirm that the randomization provided a representative sample of Compustat firms. The table provides sample means as of the end of 2002 for the firms randomly chosen to look up the debt data and the firms excluded from the look up. In none of the cases are the sample means statistically different.

	With Detailed Debt Data	No Detailed Debt Data
Number of firms	244	776
Ln (sales)	5.5	5.5
Has credit rating	0.664	0.585
Debt / assets	0.367	0.386
PPE / assets	0.329	0.357

Figure A1. Loan and Bond Spreads

The figure displays loan and bond spreads (over LIBOR) based on secondary market prices. The data is quarterly from 2001:Q1 through 2011:Q4.

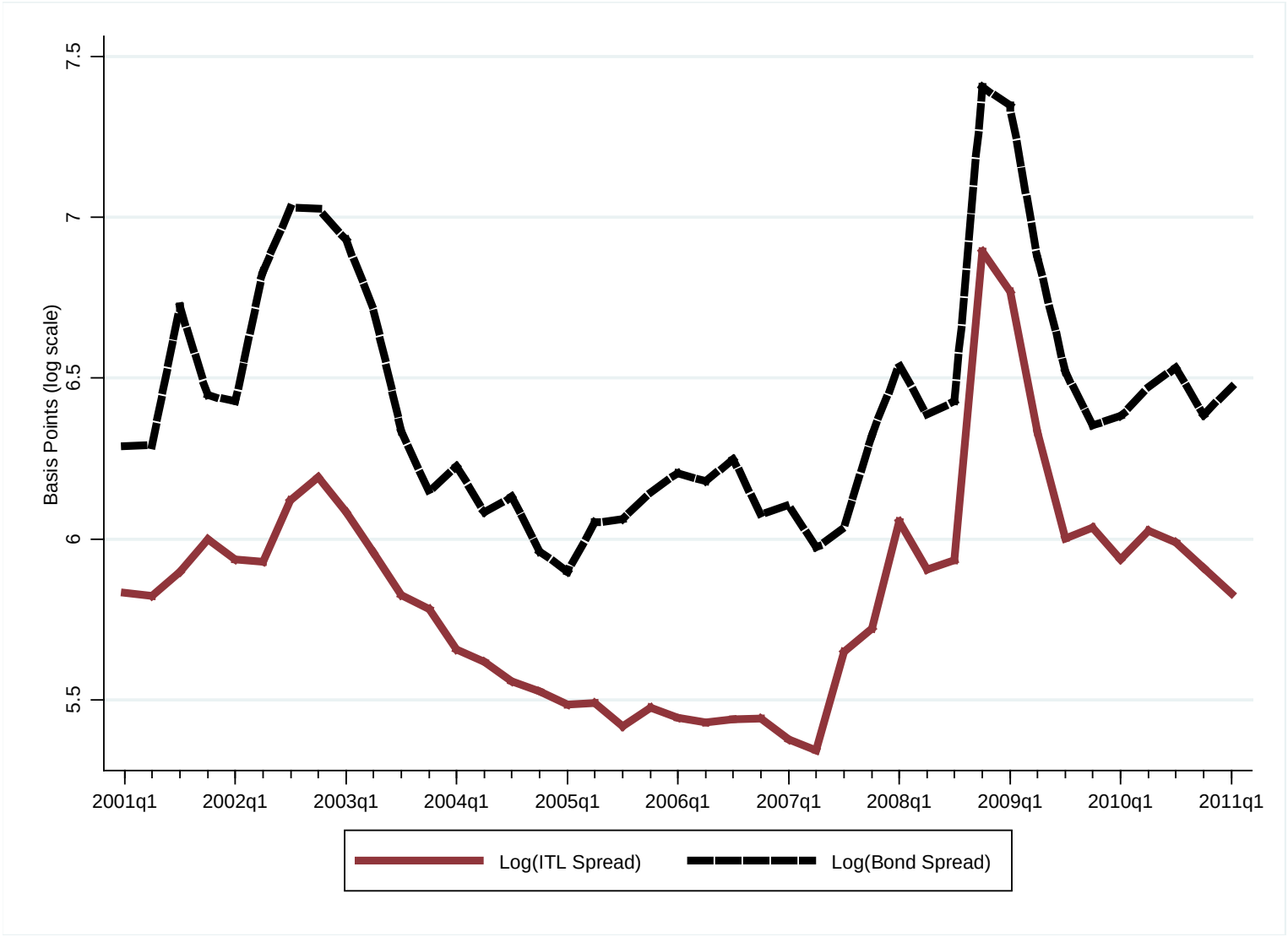


Figure A2. Issuance of Asset-backed Securities

The figure displays gross issuance of asset backed securities backed by home equity assets (red, dashed line) and other assets (blue, solid lone). The data is quarterly from 2001:Q1 through 2011:Q4 and has been seasonally adjusted. Dollar amounts are in billions of 2005 dollars.

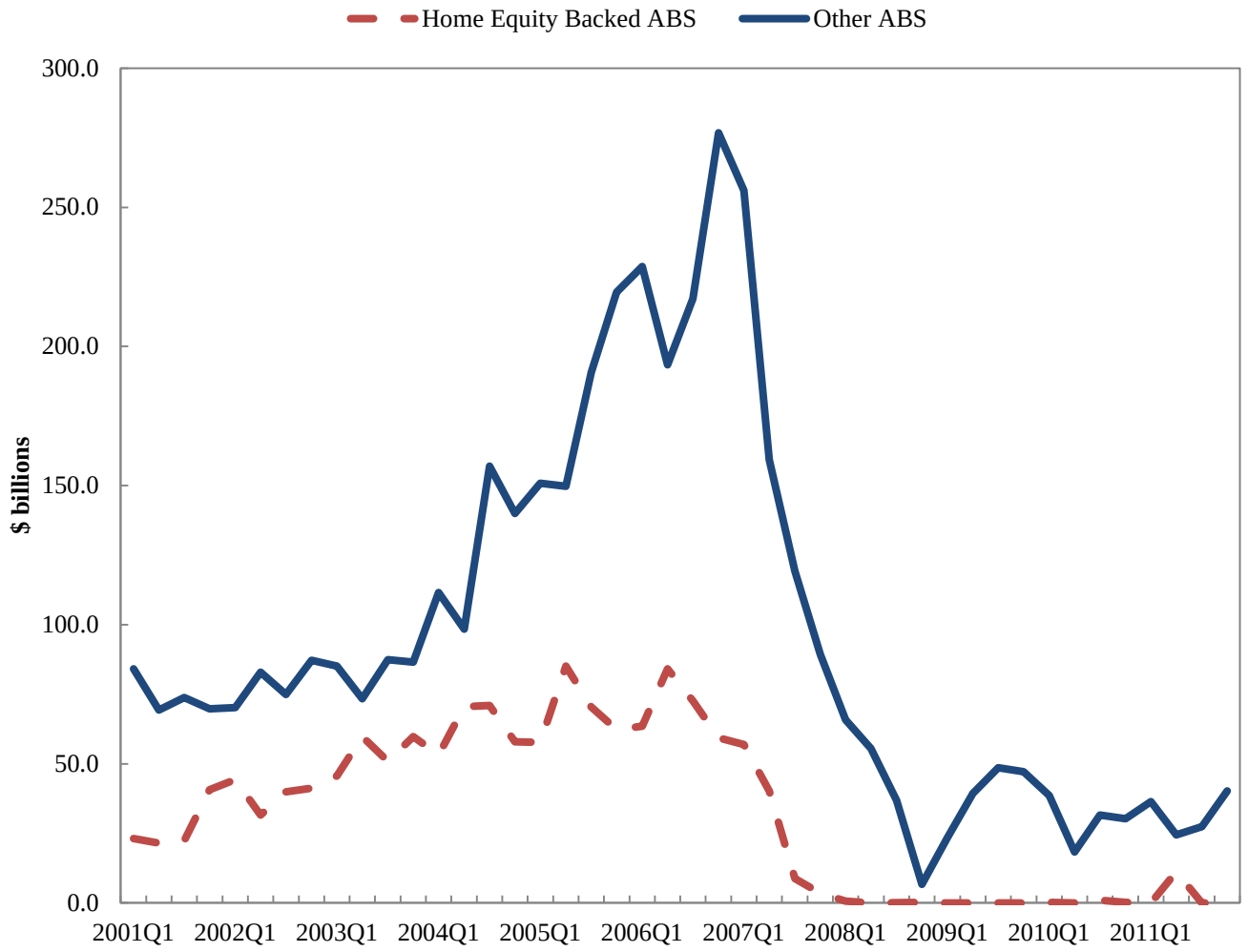


Figure A3. Issuance of Asset-backed Securities and Collateralized Debt Obligations

The figure displays gross issuance of all asset backed securities (blue, solid line), collateralized loan obligations (CLO, red, dotted line), and collateralized debt obligations not backed by corporate loans (Other CDOs, green, dashed line). The data is quarterly from 2001:Q1 through 2011:Q4 and has been seasonally adjusted. Dollar amounts are in billions of 2005 dollars.

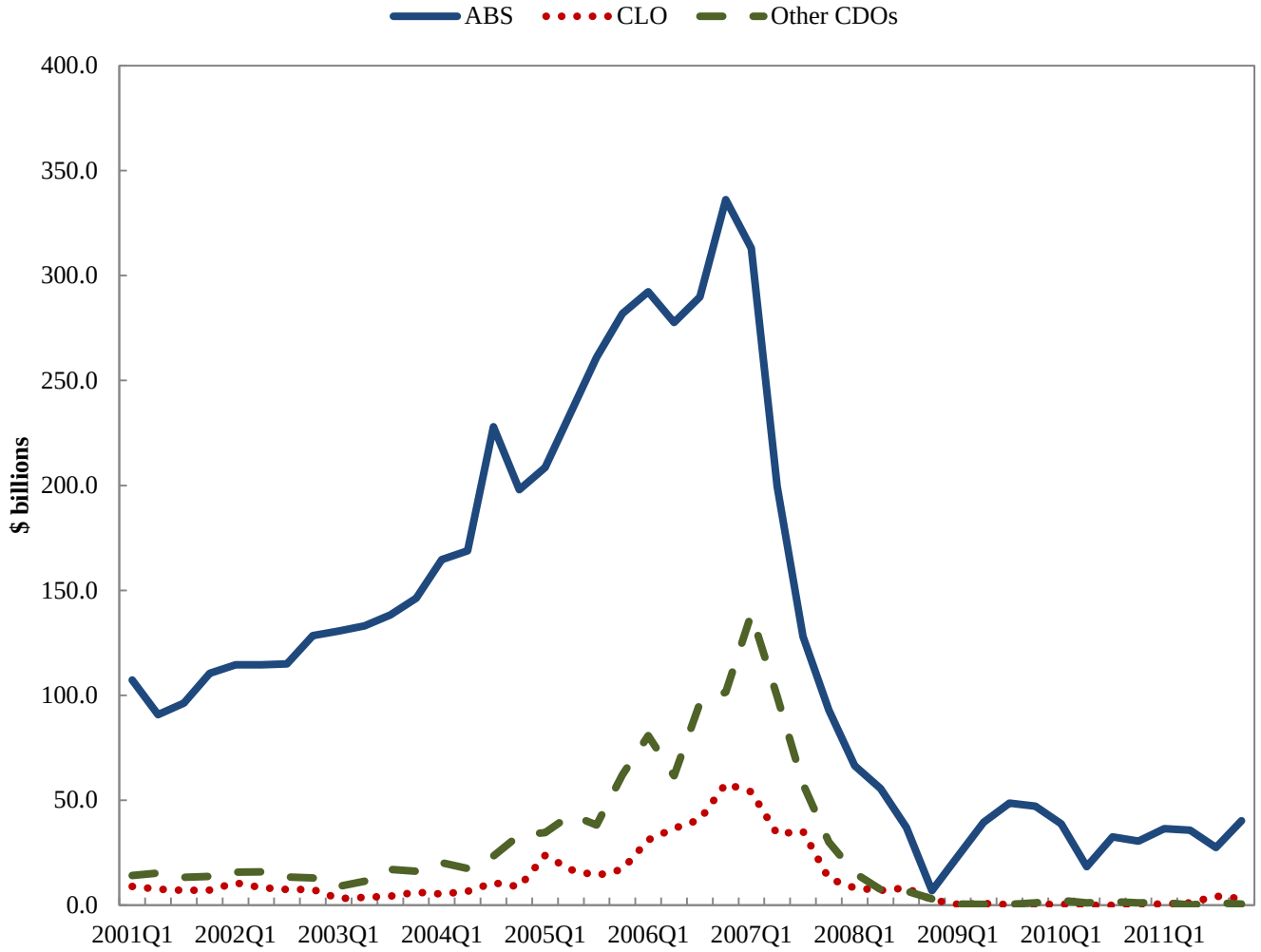


Figure XX. Debt Issuance: Total vs. Compustat Sample

The figure displays …