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Essays in Leveraged Capital Markets

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by

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ABSTRACT

The debt capital markets for leveraged borrowers are ripe with information asymmetry, lender specialization, and borrower segmentation. In this dissertation, I explore how these factors manifest themselves and the economic consequences thereof. Essay 1 shows that adverse selection and moral hazard concerns are inherent in underwriting syndicates that differ in size and number of lead underwriters. Using a nested double selection probit model of syndicate choice, I examine the matching of issuers and underwriters and find that matches of issuer quality and underwriter reputation are positive assortative. Further, switching regressions show that yield spreads reflect uncertainty about the intrinsic values of debt issued. Yield spreads are 150 basis points higher when poor issuer and issue quality require multiple lead underwriters, but weak lead underwriter reputation constrains the size of the syndicate needed for information production and distribution. Essay 2 shows that borrowers care who are their lenders. The matches between borrowers and lenders are endogenously determined and negative assortative. Creditworthy but opaque firms will choose to borrow from specialized lenders (QIBs), who are more adept at assessing issuer quality, maintaining confidentiality of private disclosures, and monitoring. In Essay 3, I investigate the default and bankruptcy hazards of covenant-lite and fully covenanted leveraged loans over the period 1999 to Q3:2016. I show how lender specialization and borrower segmentation in the leveraged loan market is impounded in the pricing of loans characterized by low probability but high loss events. Non-bank lenders rely on screening of speculative grade rated borrowers and secondary market trading of loans to control potential agency conflicts with borrowers. Traditional monitoring is more important for bank lenders. The default rates of covenant-lite loans are lower than on fully covenanted loans, but recovery rates implied by higher yield spreads are substantially lower. In loan pricing, lenders give considerably more weight to losses when default occurs.

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Essay 2 shows that borrowers care who are their lenders. The matches between borrowers and lenders are endogenously determined and negative assortative. Creditworthy but opaque firms will choose to borrow from specialized lenders (QIBs), who are more adept at assessing issuer quality, maintaining confidentiality of private disclosures, and monitoring.

In Essay 3, I investigate the default and bankruptcy hazards of covenant-lite and fully covenanted leveraged loans over the period 1999 to Q3:2016. I show how lender specialization and borrower segmentation in the leveraged loan market is impounded in the pricing of loans characterized by low probability but high loss events. Non-bank lenders rely on screening of speculative grade rated borrowers and secondary market trading of loans to control potential agency conflicts with borrowers. Traditional monitoring is more important for bank lenders. The default rates of covenant-lite loans are lower than on fully covenanted loans, but recovery rates implied by higher yield spreads are

substantially lower. In loan pricing, lenders give considerably more weight to losses when default occurs.

I. Essay 1 – Assortative Matches in Debt Syndicates

I. Introduction

Underwriting syndicates are critical to the success of corporate debt issuances. Because the ability and effort of syndicate members are latent and unobservable, adverse selection and moral hazard concerns are ever-present in underwriting syndicates. In forming a syndicate, the left lead underwriter seeks to: spread effort and diversify risk among members of the lead underwriting group; induce coordination and effort by providing incentives in shared fees; and deter shirking by monitoring.[1] The rents to collective reputation, moral hazard, and threat of exclusion will constrain the number and reputations of lead banks in a syndicate (Tirole, 1996).

Securities are information sensitive when the opacity of issuers impedes the ability of investors to discriminate between more and less creditworthy issuers. The resulting price uncertainty, together with issue volume, will affect not only the size but also the composition of the syndicate; that is, the number of lead as well as non-lead underwriters who come together to market the issue. The scale and scope of activities related to information collection and dissemination, as well as those related to the distribution and secondary market support of securities, create high barriers to entry for underwriting services that are beyond the capacities of individual underwriters. Issuers, in an effort to maximize bond offer prices, will motivate syndicate underwriting effort by sharing their gains with the syndicate. In syndicates, "form follows function" (Pichler and Wilhelm, 2001).

In contrast to existing literature, this study views syndicate formation to be endogenously determined. Specifically, the many-to-many matches of disparate issuers and underwriters map into a limited set of mutually exclusive syndicates defined by total size and number of lead underwriters. In this context, syndicate form are composite (summary) statistics that encapsulate the matches of issuers and underwriters but do not directly involve the individual specific attributes of issuers and underwriters.[2]

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[1]Left lead refers to the lead bank in a joint-led underwriting syndicate. The term stems from the position of bank names in deal documentation – such as a prospectus – with the most important bank listed first in the upper left-hand corner of the prospectus cover. Throughout the paper, "left lead" and "lead" are used interchangeably.

[2]Syndicate forms are the value functions in the Fox (2007) semi-parametric "scoring" approach to modeling many-to-many matches. Value functions represent the structural preferences of agents for matches that involve the observable characteristics of matched pairs and interactions of agent attributes. In a maximum scoring model, inequalities are used to

It is well-established that issuers and underwriters have reasons to self-select. When investors are uninformed about issuers, certification by underwriters who are willing to put their reputations at risk, avoids the cross-subsidization of less creditworthy borrowers by more creditworthy borrowers. Less creditworthy borrowers have reduced incentives to incur higher costs to engage more reputable underwriters to divulge lower probabilities of debt repayment.

Furthermore, investors may not be symmetrically informed about the issuer. The costs of acquiring information give institutional investors, e.g. pension funds, insurance companies, asset managers, and other qualified institutional buyers who are frequent repeat purchasers, an informational advantage over retail investors. Soliciting indications of interest through a price and share allotment auction addresses the "winners curse" problem that deters participation by unsophisticated and relatively uninformed retail investors. Lender specialization in debt markets may also play an important role in how syndicates are formed.

Yet, little is known about the determinants and economic impact of syndicate form. What factors influence the match between issuers and underwriters in alternative syndicate structures? Are the associations between issuers and underwriters in syndicates endogenously determined? Can differences in syndicate structure explain at-issue yield spreads? How are yield spreads affected when matches differ from observed? Do syndicates affect potential transfers of wealth between new bondholders and existing shareholders?

This paper uses a sample of 4,547 high yield bonds issued in the United States from January 2005 through December 2015 to examine these questions. Compared to investment grade corporate bonds, the relative illiquidity of speculative grade bonds heightens the agency problems inherent in syndicates. Issuers of high yield bonds, which include financially-sponsored, first-time, and unlisted firms, will self-select into syndicates with varying degrees of information disclosure and participation by diverse investor clienteles.

This study is the first to use a nested bivariate (double selection) probit model of syndicate

describe how agents choose to match.

choice to describe how multiple lead arrangers with differing characteristics match with distinct issuers and issue features. Syndicate structure is defined by first establishing whether or not the underwriting syndicate has a single lead bank (sole led) or multiple lead banks (joint led). The total size of the syndicate then allows us to ascribe a "lead percentage" to each deal, which is the ratio of the number of lead banks to total syndicate size.[3] Lastly, sorting observations into "above" and "below" median lead percentage groups captures the impact of syndicate size and number of lead underwriters on the collective underwriting effort required for a successful offering.[4]

I document that matches of issuers and lead underwriters are positive assortative. In sole led syndicates, issuers are highest in quality and lead underwriters are most reputable. Issuers are lowest in quality, and lead underwriters are least reputable, in joint above median led syndicates. In sole led syndicates, issuers are better rated and more established older firms. In joint above median syndicates, issuers are more likely to be unlisted, first-time, and worse rated.

Lead underwriters in sole led syndicates are more likely to be investment banks, but more likely to be commercial banks in joint led syndicates. Further, in sole led syndicates, lead underwriters underwrite fewer high yield debt deals, but fee income from underwriting high yield debt represents a higher percentage of total fee income for lead arrangers. Findings substantiate that less reputable underwriters, who are less sensitive to issuer quality, will have a higher probability of matching with an issuer in active markets. When reputation acquisition is costly, growth in issuance volume prompts less reputable underwriters to reduce price. Reputable underwriters, who do not compete on price, will underwrite fewer high yield debt issues but charge a premium for their services.

Issues are highest in quality in joint below median led syndicates. In sole led syndicates, issue ratings are lower, maturities are shorter, secondary market liquidity is impaired because issue sizes are too small for inclusion in the Lehman Brothers/Barclay High Yield Bond Index, and senior

[3]For example, a sole led syndicate of size eight will have a 12.5% lead percentage; a joint led syndicate of size eight with three lead banks will have a 37.5% lead percentage. In the sample, the median lead percentage is 54% and the minimum syndicate size is two.

[4]Given the median lead percentage of the sample and minimum syndicate size, all sole led syndicates are below median lead percentage. But joint led syndicates can either be above or below median lead percentage.

securitization is necessitated. In joint above median led syndicates, issues are less likely to be investment/speculative split-rated, and issues are smaller in size.

Using switching regressions to control for self-selection, and taking market conditions, issuer and issue characteristics as well as use of proceeds into account, I find that syndicate structure affects yield spreads. Information asymmetry between issuers and investors is highest in joint above median led syndicates. Latent information on syndicate choices captured in Inverse Mills Ratios represent 5% to 7% of average yield spreads.

Debt issued through joint above median led syndicates have the highest yield spreads, averaging 501 bps. In contrast, debt issued through sole and joint below median led syndicates have much lower yield spreads, averaging 332 bps and 351 bps, respectively. In concentrated syndicates, more intense and specialized due diligence is required when issuers are opaque and information spillovers are limited.[5] Compared to joint above median led syndicates, marginal yield spreads in sole and joint below median led syndicates are higher by an average 66 bps for first-time issuers, and marginally higher by an average 78 bps for unlisted issuers. Further, indicated yield guidance from the solicitation of institutional investors result in significantly higher marginal yield spreads of 54 bps and 38 bps respectively, only in sole and joint below median led syndicates. In joint above median led syndicates, it appears institutional investors find it more advantageous to withhold disclosures of private information.

My results also show that seasoning and listing result in significant reductions in yield spreads. Seasoning lowers marginal yield spreads by an average 45 bps in joint above median led syndicates. In addition, when issuers are also unlisted, seasoning lowers marginal yield spreads by 72 bps in joint above median led syndicates, and by an average 44 bps in sole and joint below median led syndicates. Listing lowers marginal yield spreads by 49 bps in joint above median led syndicates, and by an average 108 bps in sole and joint below median led syndicates. Moreover, when issuers are also listed,

[5]Because of the potential adverse consequences on investment decisions, issue pricing accuracy is important. Information produced to ascertain valuation is not useful in pricing issuances by similar firms in the same industry. Concentrated syndicates are typical in syndicated bank loans.

seasoning lowers marginal yield spreads by 68 bps in sole led syndicates.

The decision to retain or switch the lead underwriter affects yield spreads only when issues by joint led syndicates are traded. Contrasted against sole led syndicates, joint led syndicates have less reputable underwriters. Moreover, the reductions in marginal yield spreads from retain or switch are greater for unlisted firms. Findings are consistent with two views on the issuer-underwriter relationship. Firm specific information obtained by lead arrangers in the certification process has private value which degrades over time (James, 1992). When matching is positive assortative, the joint returns to issuer quality and underwriter ability are complementary. Issuers whose quality improves (declines) will "up" ("down") switch to higher (lower) underwriter quality in subsequent issuances (Fernando, Gatchev, and Spindt, 2005).

Offer yield spreads appear unrelated to post-offer market trading. Weighted average yield spreads on traded and non-traded debt issuances are not significantly different. Higher offer yield spreads do not foster post-offer market trading but rather compensate investors for illiquidity. Average yield spreads on debt issuances by joint below median led syndicates are nearly 307 bps lower when the issues are traded. Finding is consistent with higher liquidity associated with larger issue sizes in joint below median led syndicates.

In syndicate falsification tests, I use switching regressions to estimate hypothetical yield spreads when issuers counterfactually elect into syndicates that differ from observed syndicates which are the result of self-selection by issuers acting in their best interests. Estimated (fitted) yield spreads take co-variates as well as actual and hypothetical *IMR*s into account. Issuers in joint above median led syndicates who are the least creditworthy will incur lower average yield spreads when they can elect either into sole or joint below median led syndicates with more reputable lead underwriters. But this option may be not be a realistic possibility. For issuers in sole led syndicates who are the most creditworthy, average yield spreads will be lower when they elect into joint below median led syndicates with lower but still reputable lead underwriters, but higher yield spreads when they elect into joint above median led syndicates with the least reputable lead underwriters. Finally, for issuers in joint below median syndicates, average yield spreads will be higher when they elect either into sole

led syndicates with the most reputable lead underwriters or into joint above median led syndicates with the least reputable underwriters.

Lastly, this paper relates to the literature on the role of syndicates in securities offerings. In this literature, several studies find widespread evidence that suggests elements of syndicate form may influence the security offering process. In their analysis of over 1,600 equity IPOs issued from 1997 to 2002, Corwin and Schultz (2005) find strong evidence of information production by syndicate members, and conclude that issuers may benefit from larger syndicates. Underpricing is inversely related to syndicate size. Additionally, larger underwriting syndicates result in increased analyst coverage and number of market makers.

The entry of commercial banks into debt underwriting following the repeal of the Glass-Steagall Act stimulated the growth of joint-led underwriting syndicates. The dual roles of commercial banks as lenders and underwriters can enhance information efficiency, but create potential conflicts of interest, particularly when debt proceeds are used to refinance existing bank debt.[6] Shivdasani and Song (2011) find that the entry of commercial banks lowered the incentives to screen and certify issuer quality, particularly in industries where commercial banks have significant market shares.

In Fang (2005), switching regressions are used to address the endogeneity of the match between issuers and high/low reputation underwriters. She finds lower yields and higher gross fees on issues underwritten by high reputation lead managers. Yasuda (2005) employs a nested multinomial logit model, where issuers first decide between commercial or investment banks as lead arrangers, and second, choose a specific commercial or investment bank. She finds that past service as lead manager has the strongest impact on underwriter choices by issuers. Further, gross fees are significantly lower for issues underwritten by commercial banks with relationships to issuers particularly for speculative issues and first-time issuers.

[6]Puri (1996) finds that investors were willing to pay a higher price for securities underwritten by commercial banks, particularly for junior securities that are more information sensitive prior to the repeal of the Glass-Steagall Act. Similarly, Grande, Puri, Saunders and Walter (1997) find that commercial banks tend to underwrite smaller issues by riskier firms and earn lower spreads on high yield debt issues when there was a prior lending relationship. Spreads for bonds issued to refinance existing debt and underwritten by commercial banks and investment banks are not statistically different.

Fernando, Gatchev, and Spindt (2005) show that issuer-underwriter matches will be positive assortative – "birds of the same feather, flock together". When reputable underwriters market bonds with lower yields but charge higher fees to do so, the positive assortative matching of higher quality issuers with more reputable underwriters may not be exclusive to equity underwriting. Although debt and equity are fundamentally different securities, the roles that underwriters play in the offering processes for each security type are similar. In each case, underwriters are engaged to help maximize proceeds received by the issuing firms. But secondary market liquidity for bonds is relatively poor. In contrast to equities, bonds are traded in over-the-counter dealer markets rather than organized exchanges, and some issues may not trade at all. This secondary market liquidity risk may help explain the underpricing of corporate debt found in Datta, Iskandar-Datta and Patel (1997), Helwege and Kleinman (1998), and Cai, Helwege and Warga (2007).

II. Data

A. Data and Sample Construction

Data is collected from *Capital IQ*, *S&P* Global Market Intelligence, Federal Reserve Bank of St. Louis, and the Electronic Data Gather, Analysis, and Retrieval (EDGAR) system of the U.S. Securities and Exchange Commission (SEC). From *Capital IQ* I include high yield bond issues marketed in the U.S. between 2005 and 2015. I exclude all offers of pay-in-kind (PIK) and floating rate notes. The total number of issues is a sample of 4,547, of which 1,050 are not traded. I compile bond transaction data from *Capital IQ*, which maintains primary market information on high yield bonds dating back to 2005. Issuer and underwriter financial information are also acquired from *Capital IQ*. In cases where information is incomplete, I hand-collect the missing details used in this study from *S&P* Global Market Intelligence, which publishes Leveraged Commentary & Data (*LCD*) News.[7] Other criteria used to identify my sample of high yield bonds include: (*i*) bond is issued domestically; (*ii*) offering is

[7] *LCD* News is a newswire service that reports news related to high yield debt transactions. Transaction details, such as syndicate members, issue pricing and ratings, and use of proceeds are often reported in the press releases. Several prior studies obtain transaction data from *SDC* Platinum. I cannot, however, reliably reconcile information for bonds drawn from *SDC* Platinum to hand-collected information from SEC filings, *Capital IQ,* or *LCD* News. Moreover, several of the variables on which I rely in this study are not available in the *SDC* Platinum database. Accordingly, I limit the sample to high yield bonds issued between 2005 and 2015.

cash-pay (excludes pay-in-kind (*PIK*) notes); and (*iii*) coupon is fixed.

[Insert Figures 1 and 2 here.]

Figures 1 and 2 graph issues underwritten annually across syndicates by number of issues and by dollar volume, respectively. The share of sole led deals, which averaged 18.8% over the sample period, declined from 43.7% to 7.7%. The increased share of joint led deals is almost evenly split between joint above and below median led percentage syndicates. Joint led share was 54% at the beginning of the sample period, of which 27.1% were joint above median led deals. By the end of the sample period, joint led deals represented just over 92% of the market, and joint above median led deals comprised 46.5% of joint led deals. The incidence of commercial bank as lead arrangers also rose from 43.7% to 55.1% over the sample period.

<Insert Table 1 here.>

The list of lead arrangers and number of deals underwritten by each lead arranger are reported in Table 1. Note that the top 10 and 17 lead arrangers respectively, represent 95% and 99% of all high yield debt issues underwritten. Moreover, only 4 of the top 10 lead arrangers are U.S. commercial bank holding companies – Bank of America, JP Morgan, Citi, and Wells Fargo; the remaining 6, are investment banks. Further, the percentage of deals by the top 10 lead arrangers that are sole led syndicates range from 11% to 25%, with an exception for Jeffries LLC. Only 8 (7) of the 37 lead arrangers are in 100% sole (joint) led syndicates. But the number of deals involved in these cases, 11 for sole and 23 for joint led, represent less than 1% of the total number of deals in the sample.

B. Yield Spread and Underpricing

Offer yield spreads are computed as offer yield minus the yield on a Treasury bond of the same maturity. Underpricing is the gain on break (*GOB*) measured when the bond first trades, and is computed as the percentage change between offer price $p_{i,t}$ and first trade price $p_{i,t+n}$ that occurs n days post offer expressed in basis points (bps). Cai, Helwege, and Warga (2007) compute issue underpricing as the gain on break adjusted for the return on a high yield bond index over the same period:

$$Adjusted\ GOB_i = \left(\frac{p_{i,t+n} - p_t}{p_{i,t}} \right) - \left(\frac{INDX_{t+n} - INDX_t}{INDX_t} \right)$$

In this study, the *Bank of America Merrill Lynch US High Yield Master II Index* is used as the high yield bond index. For coupon bonds, there are a number of combinations of coupon and price consistent with a given yield to maturity and term. To correct for cross-sectional differences in issue coupons, I use issue coupon and maturity to compute the prices of pure discount bonds, $p^*_{i,t}$ and $p^*_{i,t+n}$, which correspond to an issue's yield to maturity at offer and trade dates. Pure discount bond prices depend only on yield to maturity and term. I compute the coupon adjusted gain on break as:

$$Coupon\ Adjusted\ GOB_i = \left(\frac{p^*_{i,t+n} - p^*_{i,t}}{p^*_{i,t}} \right) - \left(\frac{INDX_{t+n} - INDX_t}{INDX_t} \right) \quad (1)$$

C. Syndicate and Deal Structure Variables

Syndicate choices by issuers convey information to investors about the issuing firm and lead arrangers in the syndicate. Syndicates create moral hazard and collective reputation limits the incentives of its members. Although multiple underwriters were unknown prior to 1995, by 2000, one-third of all bond issues were by underwritten by joint led syndicates. Over this period, Shivdasani and Song (2011) find that issuers were more likely to engage in financial misconduct in industries with higher levels of commercial bank underwriting. Further, the frequency of fraudulent lawsuits and earnings restatements for issuers in joint led syndicates were more likely; but yields were not significantly higher for joint than sole led syndicates.

In the high yield debt market, informational asymmetries play a major role. The quality of issuers and lead underwriters is uncertain, particularly for unlisted and first-time issuers. Identifying exclusionary variables which proxy for underwriting risk and effort that influence an issuer's syndicate choice is critical in understanding the impact of syndicate form on offer yields and underpricing.

Underwriter Quality: I use the quality of the lead arranger on sole and joint led syndicates to proxy for underwriting risk and effort that influences the decision of issuers to self-select into sole or joint led syndicates. Lending relationships with potential issuers may impart an informational advantage to

commercial banks over investment banks but the use of proceeds or tie-in services create potential conflicts of interests with investors.[8] Puri (1996) and Gande, Puri, and Saunders (1999) find that yields are no worse on issues underwritten by commercial than investment banks; Yasuda (2005), that commercial banks charged lower underwriting fees to firms with whom they had relationships. I use the indicator variable, *Commercial Bank,* to capture potential informational advantages of underwriter types.

Certification by prestigious left lead arrangers can assure primary market investors about the quality of the issue. When reputation acquisition is costly, Chemmanur and Fulgheiri (1994) show that in equilibrium, reputable investment banks will underwrite fewer risky issues, obtain higher issue prices, and receive greater compensation. *No. of HY Bonds Underwritten* is the number of issues underwritten by the lead arranger in the calendar year of the issue. More (less) reputable investment banks with higher percentages of fee income from underwriting have more (less) to lose from eroding their reputations for short-term gains (DeLong, 1991). The percentage of total fee income contributed by underwriting high yield debt in the calendar year of the issue, *HY Underwritten ($)/Total Underwritten ($)*, reflects the importance of the high yield market to the lead arranger. The brand equity of the lead arranger can be inferred from its *Age* – the total number of years the underwriter has been in business at date of issue. Lastly, limitations on the distribution capacities of underwriters will require joint syndicates when issues are substantial in size. Joint syndicates will involve a higher *No. of Lead Underwriters* when rents to collective reputation are high (Tirole, 1996).

Issuer Quality: *Parent Rating*, *Unlisted*, *1st Time Issuer*, and *Age* are used to proxy for issuer quality. *Parent Rating* is the *S&P* or *Moody's* long-term issuer credit rating expressed on a numerical scale where *AAA/Aaa* = 1. *Unlisted* and *1st Time Issuer* are indicator variables. *Age* is computed based on the year the issuing firm was founded as reported in the *Capital IQ* database.

[8]Drucker and Puri (2005) point out that Section 106 of the Bank Holding Company Act Amendments of 1970 prohibits a bank from explicitly extending credit or varying the terms of credit on the condition that a customer purchase another product or service from the bank or its affiliates. The Federal Reserve states, however, this law does "not prohibit a bank from granting credit or providing any other product to a customer based solely on a desire or a hope (but not a requirement) that the customer will obtain additional products from the bank or its affiliates in the future." Clients are free to use "their own bargaining power" to seek a bundle of banking services.

Issue Characteristics: *Bond Rating* is the *S&P* or *Moody's* issue credit rating expressed on a numerical scale where *AAA*/*Aaa* = 1 and averaged when the issue is dual rated. For dual rated bond issues, *IG/HY Split-Rated* is an indicator variable. *Meets Index Liquidity Constraint* is an indicator variable that takes on a value of 1 when bond issue at issue date is large enough for inclusion in Lehman Brothers/Barclays High Yield Bond Index, and 0 otherwise. *Term* is the maturity of the bond in years. *Senior Secured* is an indicator variable that takes on a value of 1 when the bond issue is collateralized, and 0 otherwise.

D. Univariate Analysis

As shown in Figure 3, issue sizes are significantly smaller in sole than joint led syndicates. In Figure 4, syndicate size is largest for joint below median led syndicates. Over the sample period, sole and joint led syndicates average 2.6 and 8.7 underwriters, respectively. Joint below median led syndicates average 10.7 underwriters compared to 7.2 underwriters for joint above median led syndicates. Further, crisis year 2008 excepted, average issue size is positively correlated with syndicate size.

[Insert Figures 3 and 4 here.]

Note in Figure 5, the number of lead underwriters is significantly smaller in joint above than joint below median led syndicates. Moreover, from Figure 6, sole led syndicates are the most concentrated syndicates with the smallest size and lowest median lead percentage. Joint above syndicates, which have the largest median lead percentage, have the smallest number of members and lead underwriters. Over the sample period, the average number of lead underwriters is higher in joint below than joint above median led syndicates; 5.4 and 4.6 respectively. The median lead percentage for sole led syndicates is 50%, compared to 53.8% and 57.1% for joint below and joint above median led syndicates, respectively.

[Insert Figures 5 and 6 here.]

Finally, Figure 7 shows underwriter reputation is highest for sole led syndicates. In Figure 8, lowest for joint above median led syndicates. Compared to joint led syndicates, lead arrangers in sole

led syndicates underwrite far fewer bonds per year and are also less likely to be commercial banks. Over the sample period, lead arrangers in sole led syndicates underwrite an average 146 high yield bonds per year and are commercial banks 37.1% of the time. In contrast, lead arrangers in joint above and joint below median syndicates underwrite an average 224 and 211 high yield bonds annually, and are commercial banks 59.9% and 54.3% of the time, respectively.

[Insert Figures 7 and 8 here.]

Yield spreads average 535 bps, and coupon adjusted gains on break indicate some underpricing. The unconditional yield spreads and post offer gains reported in the table, however, take neither the differences in underwriter, issuer, and issue characteristics nor endogeneity of syndicate choice into account. Further, as will become evident in subsequent discussion, the effect of price guidance on offer yield spreads is significant in sole and joint below median led syndicate issuances but insignificant in joint above median led syndicate issuances. Moreover, the effect of price guidance is largest in sole led syndicate issuances when the issue is not traded.

Weighted least squares regressions are used to examine differences in lead underwriter, issuer and issue characteristics across syndicates. In two separately estimated regressions, *Sole Led* and *Joint Above Median Lead* are dummy variables that proxy for syndicate form. Using Fama and French (1997) 17 industries, industry demeaned proceeds are used to account for considerable cross-sectional heterogeneity in issue size. Weights are computed based on the entire sample of issuances and subsample of joint led syndicate issuances respectively. Results on dummy variable coefficients for the regressions are reported in the last two columns of Table 2.

[Insert Table 2 here.]

Commercial banks, are 17.9% more likely to be left lead underwriters on joint led syndicates; and investment banks, as lead underwriters on sole led syndicates. Contrasted against joint led syndicates, lead arrangers on sole led syndicates underwrite 49.6 fewer high yield bonds annually, the percentage of high yield debt to total underwriting revenue is 2.7% higher, and are in the business longer. There are no significant differences, however, in the likelihood of commercial banks as lead

underwriters, and percentage of total fee income from underwriting high yield debt between joint below and joint above median led syndicates. In subsequent probit regressions, I will show the number of high debt issues underwritten and number of years in business do not predict the choice between joint below and above median led syndicates.

Issuer quality is best for sole led syndicates and worst for joint above median led syndicates. Assessed against joint led syndicates, issuers in: (*i*) sole led syndicates are higher rated and older; and (*ii*) joint above median led syndicates are lower rated and more likely to be unlisted and first-time issuers. Better quality issuers tend to self-select with lead underwriters in sole led syndicates; and worse quality issuers, self-select with lead underwriters in joint above median led syndicates.

Issue quality is worst in sole led syndicates, and relatively poor in joint above median led syndicates. In comparison to joint led syndicates, issues in: (*i*) sole led syndicates are lower rated, shorter in term, more likely to be senior secured, smaller in size and illiquid; and (*ii*) joint above median led syndicates are less likely to be investment/speculative split-rated, smaller in size and illiquid. Issue quality is highest for joint below median syndicates.

Overall, univariate results show that bonds issued by sole led, joint above and below median led syndicates, differ across underwriter, issuer, and issue dimensions. Judgments about how underwriter, issuer, and issue attributes can affect syndicate choice are better addressed in a nested (double selection) bivariate probit model.[9]

III. Syndicate Form

A. Model Setup

As shown in Figure 9, I describe the self-selection of issuers and underwriters into syndicates as a nested bivariate (double selection) model.

[Insert Figure 9 here.]

[9]To avoid an erroneous elimination of covariates, we avoid a purely exploratory approach to the specification of the double selection model. Tabachnick, Fidell and Osterlind (2001) show that doing so can lead to a flawed interpretation of the results. Instead, we follow the model-building approach recommended by Hosmer and Lemeshow (2000) that uses correlation and other measures of association to decide on the choices for covariates in the double selection model.

Because two is the minimum number of underwriters in a syndicate, 50% is the maximum percentage of lead banks in sole led syndicate deals. When the median lead percentage exceeds 50%, above median lead percentage is possible only when the syndicate is joint led. In this sample, the median lead percentage is 54.5%.

The participation equations that characterize self-selection are nested probit functions.

$$\begin{aligned} I_1^* &= \mathbf{x}_1'\boldsymbol{\gamma}_1 + \varepsilon_1 \qquad I_1 = 1 \text{ when } I_1^* > 0 \text{ and } I_1 = 0 \text{ when } I_1^* < 0 \\ I_2^* &= \mathbf{x}_2'\boldsymbol{\gamma}_2 + \varepsilon_2 \qquad I_2 = 1 \text{ when } I_2^* > 0 \text{ and } I_2 = 0 \text{ when } I_2^* < 0 \\ &\qquad\qquad \text{only possible when } I_1 = 0 \end{aligned} \tag{2}$$

and

$$\begin{pmatrix} \varepsilon_1 | \mathbf{x}_1 \\ \varepsilon_2 | \mathbf{x}_1, \mathbf{x}_2 \end{pmatrix} \sim N\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 & \rho_{12} \\ \rho_{12} & 1 \end{pmatrix} \tag{3}$$

In (2), $I_1^* > 0$ ($I_1^* < 0$) is the index function that embodies the issuer's decision to self-select into sole or joint led syndicate, and when self-selection is into a joint led syndicate, $I_2^* > 0$ ($I_2 < 0$), reflects syndicate size, whether the joint led syndicate is above or below median lead percentage. In (3), the observable and latent factors that influence syndicate choices are reflected in $(\mathbf{x}_1, \mathbf{x}_2)$ and $(\varepsilon_1, \varepsilon_2)$ respectively. Observable factors are variables that affect the choice of issuers to self-select into sole or joint led, and if joint, into joint above or below median lead percentage syndicates. Latent factors are unknown motives that influence the syndicate choices of issuers, which can be correlated with each other as well as with outcomes. For identification, an important subset of observable factors should be exclusionary variables that affect the syndicate choices by issuers but do not affect the outcomes from their syndicate choices (Greene, 2003).

The log likelihood function for the bivariate probit is:

$$\log L = \sum_i \begin{bmatrix} I_{1i} \cdot \ln \Phi\left(\mathbf{x}_{1i}'\boldsymbol{\gamma}_1\right) + \left(1 - I_{1i}\right) \cdot \ln \Phi\left(-\mathbf{x}_{1i}'\boldsymbol{\gamma}_1\right) \\ + \left(1 - I_{1i}\right) I_{2i} \cdot \ln \Phi\left(-\mathbf{x}_{1i}'\boldsymbol{\gamma}_1, \mathbf{x}_{2i}'\boldsymbol{\gamma}_2\right) + \left(1 - I_{1i}\right)\left(1 - I_{2i}\right) \cdot \ln \Phi\left(-\mathbf{x}_{1i}'\boldsymbol{\gamma}_1, -\mathbf{x}_{2i}'\boldsymbol{\gamma}_2\right) \end{bmatrix} \tag{4}$$

where $i = 1, 2, \ldots, N$ denote issue observations. Defining $q_{1i} = 2I_{1i} - 1$ and $q_{2i} = 2I_{2i} - 1$, the general form of the bivariate log likelihood function is:

$$\log L = \sum_i \ln \Phi\left(q_{1i}\mathbf{x}'_{1i}\boldsymbol{\gamma}_1, q_{2i}\mathbf{x}'_{2i}\boldsymbol{\gamma}_2; \rho_i^*\right) \quad (5)$$

where $\rho_i^* = q_{1i}q_{2i}\rho_{12}$. When $\rho_{12} = 0$, the bivariate probit functions can be estimated independently as univariate probit functions. In (4), $\Phi\left(\mathbf{x}'_{1i}\boldsymbol{\gamma}_1\right)$ and $\Phi\left(-\mathbf{x}'_{1i}\boldsymbol{\gamma}_1\right)$ are the likelihoods of sole and joint led syndicates, respectively. Given the syndicate is joint led, $\Phi\left(\mathbf{x}'_{2i}\boldsymbol{\gamma}_2 \mid -\mathbf{x}'_{1i}\boldsymbol{\gamma}_1\right) = \Phi\left(-\mathbf{x}'_{1i}\boldsymbol{\gamma}_1, \mathbf{x}'_{2i}\boldsymbol{\gamma}_2\right) / \Phi\left(-\mathbf{x}'_{1i}\boldsymbol{\gamma}_1\right)$ is the likelihood that the syndicate is joint above median lead percentage; and $\Phi\left(-\mathbf{x}'_{2i}\boldsymbol{\gamma}_2 \mid -\mathbf{x}'_{1i}\boldsymbol{\gamma}_1\right) = \Phi\left(-\mathbf{x}'_{1i}\boldsymbol{\gamma}_1, -\mathbf{x}'_{2i}\boldsymbol{\gamma}_2\right) / \Phi\left(-\mathbf{x}'_{1i}\boldsymbol{\gamma}_1\right)$, that the syndicate is joint below median lead percentage.

B. Bivariate Probit Estimation

Bivariate probit regression results are presented in Table 3 for four alternative model specifications.[10] In the first probit regression, the dependent variable *Sole Led* is 1 when the issuance is through a sole led syndicate, and 0, if joint led. In the second probit regression, the issuance is through a joint led syndicate and the dependent variable *Joint Above Median Lead %* is 1 when the ratio of lead arrangers to number of underwriters in the syndicate is greater than the sample median.[11] The initial assignment of variables to bivariate probit regressions of sole vs. joint led syndicates, and joint above vs. below median led syndicates, are based on the univariate analyses in Table 2. Standard errors are clustered on (Fama and French 17) industries in all model specifications.

[Insert Table 3 here.]

Results are consistent across all models and Model 4 appears to be the best specification. Lead arrangers in sole led syndicates are the most reputable. Compared to joint led syndicates, lead arrangers in sole led syndicates are more established financial institutions who specialize in high yield bond underwriting, but underwrite fewer deals, and are less likely to be commercial banks. Contrasted against joint led syndicates, lead arrangers in joint above led syndicates are fewer in number, and least reputable.

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[10]Special attention should be given to sample sizes. Aldrich and Nelson (1984) recommend minimum sample sizes of at least 50 observations for probit regressions. Hosmer and Lemeshow (2000) suggest that the sample size of the smallest response group be at least as large as 10(p+1), where p is the number of predictors in the model. Either way, the sole led sample size of 856 more than meets the minimum recommendations.

[11]In estimating this probit regression, the sample is restricted to issuances which involve joint led syndicates.

The likelihood of sole led syndicates is higher for issuing firms that are older and have better issuer credit ratings. Further, issues in sole led syndicates are lower rated, shorter term, more likely to be senior secured, smaller in size and more illiquid. Sole led syndicates have the best quality issuers but worst quality issues. Lowest quality issuances underwritten by the most reputable lead arrangers in sole led syndicates substantiates the important certification role that lead arrangers play in the issuance process. A more concentrated syndicate is necessary when higher underwriting risk requires more intense and specialized due diligence as well as when pricing accuracy is critical.

Joint led syndicates are generally associated with larger issue sizes. Joint above median led syndicates are more likely when: (*i*) issuing firms are of poorer quality – lower rated, unlisted and first-time issuers; and (*ii*) issues are of lower quality – lower rated, unlikely to be investment/speculative split-rated, smaller in size, and more illiquid. Joint above median led syndicates not only have the worst quality issuing firms and issues, but also the least reputable lead underwriters. For uninformed investors, the "winners curse" risk is considerable in joint above median led syndicate issuances. Institutional investors may find it more advantageous to withhold participation in price discovery associated with disclosures of private information to lead underwriters.

As expected, the correlations between sole vs. joint led, as well as joint above vs. joint below median led percentages, are always negative and significant. Tjur (2009) R^2 indicates excellent model fit; similarly with McFadden (1973) R^2, which does not have an upper bound of 1.[12] Following Herron (1999), reported percent correctly predicted (*PCP*) and expected percent correctly predicted (*ePCP*) statistics for the bivariate (double selection) probit model confirm the likelihood of misclassification is low.[13]

Following Menard (2002), I compute standardized regression coefficients for Model 4 to assess economic significance. When **x** is continuous, variables are standardized to be mean 0 and variance 1. Results are reported in the last two columns of Table 3.

[12]For a discussion on the interpretation of McFadden's pseudo-R^2 measure, see McFadden (1977).
[13]See Herron (1999) for theory behind the *ePCP* measure.

Standardized coefficients confirm the earlier conclusions. There is a positive assortative match of high (low) quality issuing firms with more (less) reputable lead underwriters. A sole led syndicate is more likely when the lead underwriter is more reputable, and a joint above median syndicate is more likely when the underwriter is less reputable. The likelihood the syndicate is sole led is: (*i*) lower by 17.9% when the lead underwriter is a commercial bank; and (*ii*) higher by 11.9% and 124.1%, respectively, when the lead arranger underwrites fewer issues and the contribution of high yield debt to total fee income is higher. The likelihood that the syndicate is joint above median is higher by 138% when the number of lead underwriters are fewer.

Relative to joint led syndicates, the likelihood of a sole led syndicate is higher by 44.8% and 4.2% respectively, when the issuing firm is higher rated and older. In contrast, the likelihood of joint above median led syndicate is higher by 86% when the issuing firm is lower rated, and 20.1% and 29% respectively, when the issuing firm is unlisted or first-time issuer.

Lastly, issue quality is worse for sole and joint above median led syndicates. Contrasted with joint led syndicates, the likelihood that issuances are undertaken through sole led syndicates are higher: (*i*) by 5%, 19%, and 15.5% respectively, when the issue is lower rated, senior secured, and shorter in term; and (*ii*) 88.3% when the issue is smaller in size and illiquid. Similarly, the likelihood that issuances are undertaken through joint above median led syndicates are higher: (*i*) by 9.7% and 64.8% respectively, when the issue is lower rated and not investment/speculative split-rated; and (*ii*) 20%, when the issue is smaller in size and illiquid.

IV. Pricing Impact of Syndicate Form

A. At-Issue Yield Spreads

Lead arranger, issuer, and issue characteristics influence syndicate choices, but do these choices explain at-issue yield spreads? Fundamentally, does the endogeneity of syndicate choice affect yield spreads when lead arrangers certify issue quality, and the match of issuers and lead arrangers is positive assortative.

To examine the possibility that syndicate choice can impact at-issue yield spreads, I estimate

ordinary least squares (*OLS*) switching regressions of issuer yield spreads y on a vector $\boldsymbol{Z}$ of issuer and issue characteristics.

$$y = \boldsymbol{Z}'\boldsymbol{\beta} + \lambda_j IMR_j + \eta \tag{6}$$

In (6), η are i.i.d. random noise terms, and IMR_j are issuer-specific Heckit correction terms (Inverse Mills Ratios) that account for the endogeneity of syndicate choices. The Inverse Mills Ratios associated with sole led, joint above median led, and joint below median led syndicates are:[14]

$$\begin{aligned} IMR_1 &= E\left(\varepsilon_1 \mid \varepsilon_1 > -\mathbf{x}_{1i}'\boldsymbol{\gamma}_1\right) \\ &= \frac{\phi\left(\mathbf{x}_{1i}'\boldsymbol{\gamma}_1\right)}{\Phi\left(\mathbf{x}_{1i}'\boldsymbol{\gamma}_1\right)} \end{aligned} \tag{7}$$

$$\begin{aligned} IMR_2 &= E\left(\varepsilon_2 \mid \varepsilon_1 < -\mathbf{x}_{1i}'\boldsymbol{\gamma}_1, \varepsilon_2 > -\mathbf{x}_{2i}'\boldsymbol{\gamma}_2\right) \\ &= \frac{-\rho_{12}\Phi\left(\frac{\rho_{12}\mathbf{x}_{1i}'\boldsymbol{\gamma}_1 - \mathbf{x}_{2i}'\boldsymbol{\gamma}_2}{\sqrt{1-\rho_{12}^2}}\right)\phi\left(\mathbf{x}_{1i}'\boldsymbol{\gamma}_1\right) - \Phi\left(\frac{-\mathbf{x}_{1i}'\boldsymbol{\gamma}_1 + \rho_{12}\mathbf{x}_{2i}'\boldsymbol{\gamma}_2}{\sqrt{1-\rho_{12}^2}}\right)\phi\left(\mathbf{x}_{2i}'\boldsymbol{\gamma}_2\right)}{\Phi\left(-\mathbf{x}_{1i}'\boldsymbol{\gamma}_1, -\mathbf{x}_{2i}'\boldsymbol{\gamma}_2\right)} \end{aligned} \tag{8}$$

$$\begin{aligned} IMR_3 &= E\left(\varepsilon_2 \mid \varepsilon_1 < -\mathbf{x}_{1i}'\boldsymbol{\gamma}_1, \varepsilon_2 < -\mathbf{x}_{2i}'\boldsymbol{\gamma}_2\right) \\ &= \frac{-\rho_{12}\Phi\left(\frac{\rho_{12}\mathbf{x}_{1i}'\boldsymbol{\gamma}_1 - \mathbf{x}_{2i}'\boldsymbol{\gamma}_2}{\sqrt{1-\rho_{12}^2}}\right)\phi\left(\mathbf{x}_{1i}'\boldsymbol{\gamma}_1\right) + \Phi\left(\frac{-\mathbf{x}_{1i}'\boldsymbol{\gamma}_1 + \rho_{12}\mathbf{x}_{2i}'\boldsymbol{\gamma}_2}{\sqrt{1-\rho_{12}^2}}\right)\phi\left(\mathbf{x}_{2i}'\boldsymbol{\gamma}_2\right)}{\Phi\left(-\mathbf{x}_{1i}'\boldsymbol{\gamma}_1, \mathbf{x}_{2i}'\boldsymbol{\gamma}_2\right)} \end{aligned} \tag{9}$$

Table 4 presents the baseline offer yield spread regression results.[15] Model 1 has an *Unlisted* issuer indicator variable. Model 2 replaces *Unlisted* with a *Listed* issuer indicator variable. The intercepts, which reflect average yield spreads associated with syndicate type, are all positive and statistically significant in both models. Latent information on syndicate choice reflected in Inverse Mills Ratios are statistically significant in sole and joint above median led syndicates. Offer yield spreads are influenced by the self-selection of issuers and lead underwriters into syndicates.

[Insert Table 4 here.]

[14]Derivations can be obtained from the authors upon request.

[15]In untabulated results, the introduction of a *Crisis* dummy variable defined as the last quarter period between 9/15/2008 and 12/31/2008 was considered but discarded because there were only 8 observations in total; of which 4 were in sole led, 1 in joint above median, and 3 in joint below median syndicates.

In Model 1 (2), the average yield spread on joint above median led syndicates of 508 (551) bps is significantly higher by 177 (107) and 156 (134) bps compared to sole and joint below median led syndicates, respectively. *Indicated Yield* has no significant impact on yield spreads in joint above led syndicates, but results in significantly higher yield spreads of 54 (51) and 38 (39) bps in sole and joint below median led syndicates. Findings are consistent with "winner's curse". Joint above median led syndicates involve the worst quality issuers and issues as well as least reputable lead underwriters. When lead underwriter certification is weak, it is in the interests of institutional investors to withhold disclosure of private information.

In Model 1 (2), marginal yield spreads are higher for first-time issuers across syndicates. 104 (98) bps, 110 (117) bps, and 41 (49) bps in sole, joint below median, and joint above median led syndicates respectively. Moreover, observe from Model 1 that marginal yield spreads for unlisted issuers in sole and joint below median led syndicates are also higher by 98 bps and 58 bps; and by 42 bps (=83-41) in joint above median lead syndicates when unlisted issuers are also first-time issuers. Symmetrically, in Model 2, marginal yield spreads are lower, by -119 bps, -62 bps, and -53 bps respectively, for listed issuers in sole, joint below median, and joint above median led syndicates. The diminished marginal effect of first-time and unlisted issuers on yield spreads in joint above median led syndicates in both models are consistent with lower costs of certification when lead underwriters are least reputable.

Scale economies associated with distribution are significant in sole and joint above median led syndicates that entail smaller issue sizes, but insignificant in joint below median led syndicates that involve larger issue sizes. The marginal effect of issue size on yield spreads are, however, small in magnitude. A 10% increase in issue size reduces yield spreads by an average 6 bps in sole and joint above median led syndicates.

Finally, the marginal impact on yield spreads from the use of proceeds reflect potential conflicts of interest. Yield spreads are generally higher when proceeds from debt issues are used to finance acquisitions or reduce equity, and lower when proceeds are used to refinance existing debt. On the margin, agency conflicts are insignificant in joint above median lead syndicates where lead underwriter certification is weakest.

B. Economic Significance of Syndicate Choice

In the preceding analysis observed syndicates are the result of self-selection by issuers acting in their best interests. In a falsification test, I use the switching regressions in Table 4 to estimate hypothetical yield spreads when issuers counterfactually elect into syndicates different from those observed. Estimated (fitted) yield spreads take co-variates as well as actual and hypothetical *IMR*s into account. Results are reported in Table 5.

[Insert Table 5 here.]

Issuers in joint above median led syndicates will incur lower yield spreads when they elect instead either into sole or joint below median led syndicates. This finding substantiates that less creditworthy issuers will be better off engaging more reputable lead underwriters. Bear in mind, however, that the option to match with more reputable lead underwriters may not be realistic for low creditworthy issuers.

In contrast, issuers in sole led syndicates are the most creditworthy. In this case, yield spreads will be lower when issuers in sole led syndicates elect into joint below median led syndicates with lower but still reputable lead underwriters. But higher average yield spreads, when they elect into joint above median led syndicates with the least reputable lead underwriters.

Finally, issuers in joint below median syndicates will incur higher average yield spreads when they elect either into sole led syndicates with the most reputable lead underwriters or into joint above median led syndicates with the least reputable underwriters.

C. Seasoning

The influence of seasoning on yield spreads are reported in Table 6. Model 1 has an *Unlisted* issuer indicator variable. Model 2 replaces *Unlisted* with a *Listed* issuer indicator variable.

[Insert Table 6 here.]

I substantiate the findings of Drucker and Puri (2005) and Yasuda (2005) on seasoned issues. When lead underwriter certification is weaker, seasoning plays a more important role. In joint above median led syndicates, issuers are worst quality and lead underwriters are least reputable. Seasoning

lowers marginal yield spreads by an average 45 bps in joint above median led syndicates. In addition, when issuers are also unlisted, seasoning lowers marginal yield spreads by 72 bps in joint above median led syndicates, and by an average 44 bps in sole and joint below median led syndicates. Listing lowers marginal yield spreads by 49 bps in joint above median led syndicates, and by an average 108 bps in sole and joint below median led syndicates. Moreover, when issuers are also listed, seasoning lowers marginal yield spreads by 68 bps in sole led syndicates.

As expected, marginal yield spreads are 87 bps to 135 bps higher for *Unlisted* issuers, and marginal yield spread is highest in sole led syndicates with the highest quality issuers and most reputable lead underwriters. The average yield spread of 625 bps (=87+538) is highest for *Unlisted* issuers in joint above median led syndicates. Symmetrically, marginal yield spreads are 46 bps to 72 bps lower for *Listed* issuers, and marginal yield spread is lowest in sole lead syndicates. The average yield spread of 545 bps (=591-46) is highest for *Listed* issuers in joint above median led syndicates.

Again, as in Table 4, *Indicated Yield* has no impact on yield spreads in joint above led syndicates, but a 66 bps and 41 bps increase in sole and joint below median led syndicates, respectively. Through "price talk", lead arrangers are successful in extracting the reservation prices of informed investors that mitigates the "winners curse" faced by uninformed investors in sole and joint below median led syndicates.

Likewise, as in Table 4, scale economies associated with distribution are significant in sole and joint above median led syndicates that entail smaller issue sizes, but insignificant in joint below median led syndicates that involve larger issue sizes. The marginal effect of issue size on yield spreads are small in magnitude. Yield spreads are generally higher when proceeds from debt issues are used to finance acquisitions or reduce equity; and lower, to refinance existing debt. Agency conflicts appear to be more acute in sole and joint above median led syndicates where lead underwriter certification is strongest and weakest.

D. Post-Offer Trading

Analyses thus far assumes yield spreads on non-traded and traded debt issuances are similar. But offer price may be materially affected by an investor's expectation that the security will be traded. It is

unclear from prior studies to what extent issue pricing represents a compensation for illiquidity or an incentive to motivate post-offer trading.

Note from Table 1 that nearly 77% of the bonds in the sample are traded. Debt issued through sole led syndicates trade 62% of the time, and 80% of the time, for debt issued through joint led syndicates. In untabulated results, I show the composition of lead arrangers, issuers, and issues differ between non-traded and traded debt issuances. Syndicate size is smaller and lead arrangers are fewer in number in non-traded debt issuances by joint led syndicates. On non-traded debt issuances: (*i*) price guidance is less likely; (*ii*) lead arrangers underwrite fewer high yield debt issues and newer in the business; (*iii*) issuing firms are higher rated, and more likely to be unlisted; (*iv*) issue sizes are smaller and more illiquid.

Yield spread switching regressions for non-traded and traded debt issues are reported in Table 7. *Switched Lead UW* and *Repeat Lead UW* indicate whether the lead underwriter in the current issue was different from or the same as in the prior issue. Latent information on syndicate choice reflected in Inverse Mills Ratios are statistically significant in both models.

[Insert Table 7 here.]

The decision to switch or retain the lead underwriter affects marginal yield spreads only when issues by joint led syndicates are traded.[16] Contrasted against sole led syndicates, joint led syndicates have less reputable underwriters. Moreover, the marginal reductions in yield spreads from retain or switch are greater for unlisted firms. Findings are consistent with two views on the issuer-underwriter relationship. Firm specific information obtained by lead arrangers in the certification process has private value which degrades over time (James, 1992). When matching is positive assortative, the joint returns to issuer quality and underwriter ability are complementary. Issuers whose quality improves (declines) will "up" ("down") switch to higher (lower) underwriter quality in subsequent issuances (Fernando, Gatchev, and Spindt, 2005).

[16]Overall, 75% of switches are changes either in investment or commercial bank lead underwriter; only 25% are changes from commercial to investment bank or vice-versa. Similarly, for switches by first-time and seasoned issuers, 82% and 74% are changes either in investment or commercial bank lead underwriter respectively.

Offer yield spreads appear unrelated to post-offer market trading. Weighted average yield spreads on traded and non-traded debt issuances are not significantly different. Higher offer yield spreads do not foster post-offer market trading but rather compensate investors for illiquidity. Average yield spreads on debt issuances by joint below median led syndicates are nearly 307 bps lower when the issues are traded. Finding is consistent with higher liquidity associated with larger issue sizes in joint below median led syndicates.

Additionally, coefficients on *Ln of Proceeds-SIC demeaned* are negative and statistically significant with the exception of joint below median led syndicates. Recall however that 80% of debt issuances by joint led syndicates are traded. The insignificant coefficient on non-traded bond issuances by joint below median led syndicates stems from reduced sample size. Further, the reduction in marginal yield spreads from larger issue size, which is lower for traded than non-traded issues, suggests underpricing. The underpricing is too small, however, to stimulate post-issue trading.

As in prior results, yield spreads are generally higher when proceeds from debt issues are used to finance acquisitions or reduce equity; and lower, to refinance existing debt. Agency conflicts appear more acute when issues are not traded. Compared to traded issues, marginal yield spreads for non-traded issues in sole and joint above median led syndicates are 58 bps and 64 bps higher when proceeds are used in acquisitions. Marginal yield spreads for non-traded issues in sole led syndicates are also 62 bps lower when proceeds are used to refinance.

[Insert Table 8 here.]

Results of syndicate falsification tests for traded and not-traded issues reported in Table 8 should be interpreted with caution. For sole led syndicates, the decision to retain or switch underwriters has no significant impact on yield spreads but result in notably lower yield spreads in joint led syndicates particularly when the issuer is unlisted. As a result, regardless of whether or not issues are traded, yield spreads will appear lower for issuers in sole led syndicates that elect instead into joint below or above median led syndicates. But for issuers in joint below and above median led syndicates, electing into alternative syndicate structures will more likely increase than reduce average yield spreads.

E. Underpricing

Table 9 reports regressions of underpricing on syndicate type. Overall, I find the high yield debt market to be largely information efficient. On average, underpricing is statistically insignificant across syndicates. For first-time issuers, underpricing is marginally higher by 33 bps in sole led syndicates, and 10 bps in joint below median led syndicates. For unlisted firms, underpricing is marginally higher by 12 bps in joint below median led syndicates, and by 23 bps for unlisted and first-time issuers in joint above median led syndicates.

[Insert Table 9 here.]

F. Wealth Transfer Effects

In the sample of 4,547 high yield debt issues, 3,346 are by publicly traded firms, and the remaining by private firms. Moreover, 1,119 unique firms are issuers of the 3,346 high yield debt issues by publicly traded firms. 570 of the 1,119 firms had the requisite *CRSP* data for estimating cumulative abnormal returns. 92 of which were by sole led syndicates, while 282 and 196 were by joint above and below median syndicates, respectively.

To examine potential wealth transfers, I employ the Fama and French (1993) three factor model plus a Carhart (1997) momentum factor to describe returns on publicly traded equity shares of high yield debt issuers in the sample. Using daily returns,

$$R_{it} = \alpha_i + \beta_{i1} R_{mt} + \beta_{i2} SMB_t + \beta_{i3} HML_t + \beta_{i4} UMD_t + \varepsilon_{it} \tag{10}$$

is estimated over the year -244 to -3 days prior to debt issue date, where R_{it} is the return on equity shares of firm i, R_{mt} is the return on the value-weighted *CRSP* index, SMB_t is the return on portfolios of small minus big capitalization stocks, HML_t is the return on portfolios of high minus low book-to-market stocks, and UMD_t is the return on portfolios of stocks with highest and lowest one year prior returns. Daily abnormal returns AR_{it} are computed over different windows $(-n, +n)$ days centered on the debt issue date t^* as:

$$AR_{it^*+\tau} = R_{it^*+\tau} - \left(\alpha_i + \beta_{i1} R_{mt^*+\tau} + \beta_{i2} SMB_{t^*+\tau} + \beta_{i3} HML_{t^*+\tau} + \beta_{i4} UMD_{t^*+\tau}\right)$$

and cumulative daily abnormal returns, CAR_{it^*+n}, as:

$$CAR_{it^*+n} = \sum_{\tau=-n}^{\tau=+n} AR_{it^*+\tau} \tag{11}$$

Table 10 reports the results for 5- and 7-day event windows surrounding debt issuances by syndicate type for subsamples of firms with and without publicly traded shares. Overall, I find little evidence of significant changes in shareholder wealth around high yield debt issuances, regardless of syndicate form. Results are consistent with the findings of Eckbo (1986) and Mikkelson and Partch (1986).

[Insert Table 10 here.]

V. Conclusion

Using a sample of 4,547 high yield debt issues over the period 2005 to 2015, this study examines the impact that syndicate form has on the pricing of initial and seasoned public offerings of high yield debt as well as its concomitant effect on shareholder wealth. Utilizing a nested bivariate (double selection) probit model that characterizes syndicate form, I document a positive assortative matching of high (low) quality issuers with more (less) reputable lead underwriters. The matches between issuers and lead arrangers in underwriting syndicates involve self-selection.

In sole led syndicates, issuers are older established firms and higher credit rated, but issue ratings are lower, maturities are shorter, secondary market liquidity is impaired, and senior securitization is needed. When higher underwriting risk requires intensive and specialized due diligence and pricing accuracy is important, a more concentrated syndicate is necessary, and certification by reputable lead underwriters is essential. I find that in contrast to joint led syndicates, lead underwriters in sole led syndicates are more likely to be investment banks, underwrite fewer high yield debt issues, and a higher percentage of total fee income stems from underwriting high yield debt.

Further, when moral hazard is more severe and rents from collective reputation are low, syndicate size is smaller and the number of lead underwriters are fewer. Joint above median syndicates have the least reputable lead underwriters. In joint above median led syndicates, issuing firms are lower rated, and more likely to be unlisted and first-time issuers. Additionally, issues are lower rated, less

likely to be investment/speculative split-rated, and smaller in size with poorer secondary market liquidity. Issue quality is highest for joint below median led syndicates.

Second, I find that syndicates have a significant impact on at-issue yield spreads of high yield debt. Debt issuances in joint above median led syndicates have the highest average yield spreads. As expected, marginal yield spreads are higher for first-time and unlisted issuers across all syndicates. For uninformed investors, the risk of "winners curse" is considerable in joint above median led syndicate issuances. The solicitation of reservation prices from informed investors has a significant effect on marginal yield spreads of debt issued by sole led and joint below median led syndicates, but an insignificant effect on the marginal yield spreads of debt issued by joint above median led syndicates. Institutional investors seem to find it more advantageous to withhold participation in price discovery associated with disclosures of private information when the quality of the issuer and reputation of lead underwriter are poor.

Third, I find that seasoned issues have significantly lower average yields. The reduction in yields is highest in debt issuances by joint above median led syndicates where lead underwriters are least reputable, issuers are worst quality, and the resulting certification process is less robust. The retention or change in lead underwriters reduces marginal yield spreads only when debt issues by joint led syndicates are traded. Weighted average yield spreads on traded and non-traded debt issuances are not significantly different. It appears higher offer yield spreads are meant to compensate investors for illiquidity rather than to stimulate post-offer market trading. Informed investors are better rewarded when debt issues offered are expected to be illiquid.

Lastly, I find little evidence of underpricing. Debt issuances in sole led syndicates by first-time issuers are weakly underpriced, as are debt issuances by first-time and unlisted issuers in joint above median led syndicates. There are, however, no significant cross-sectional differences in underpricing across syndicates. Further, I find no significant changes in shareholder wealth from high yield debt issuances.

FIGURES

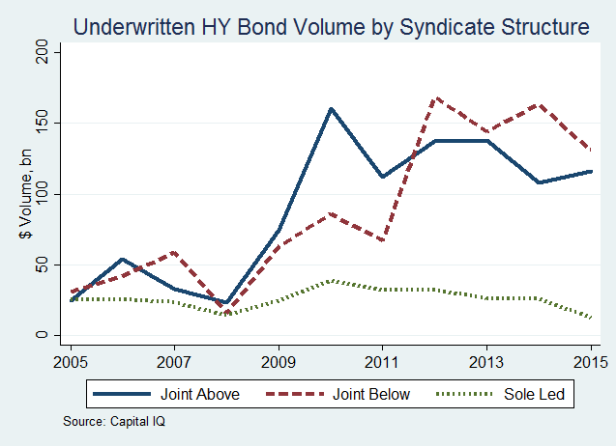

Figure 1

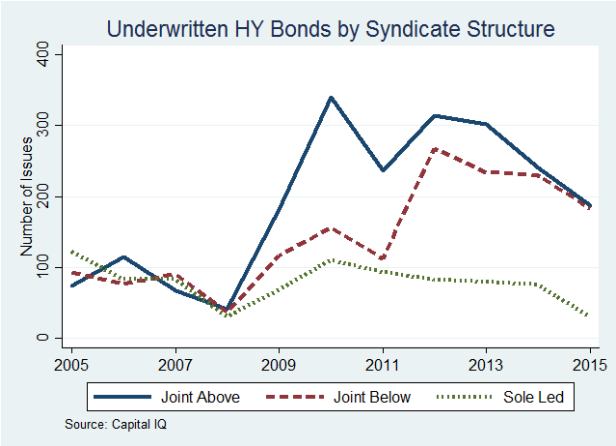

Figure 2

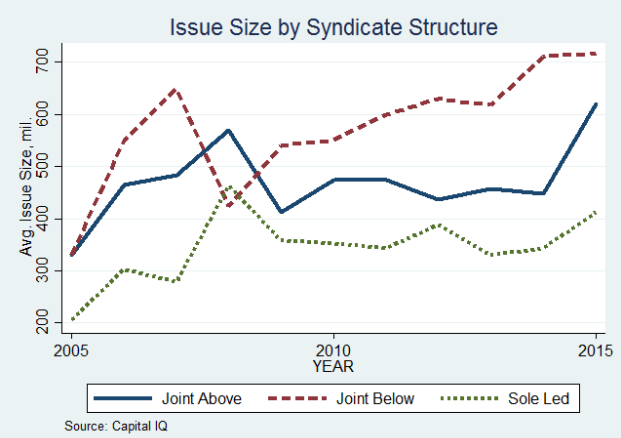

Figure 3

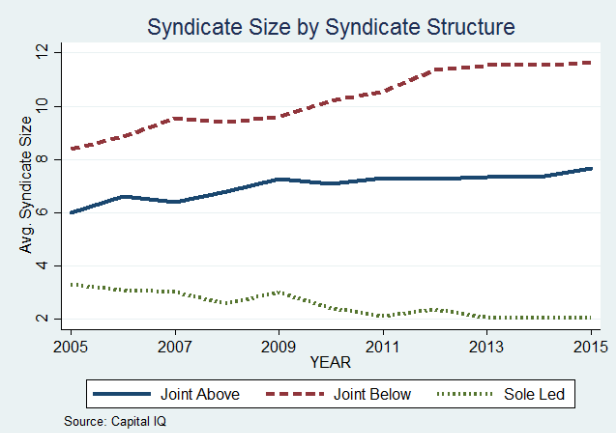

Figure 4

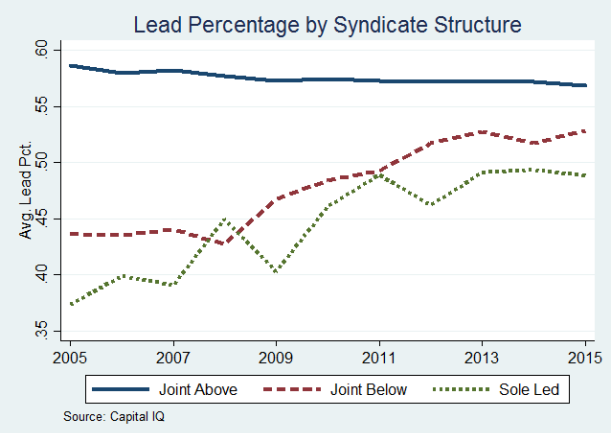

Figure 5

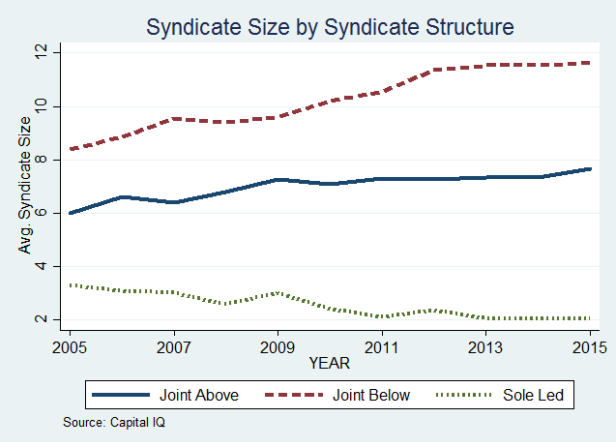

Figure 6

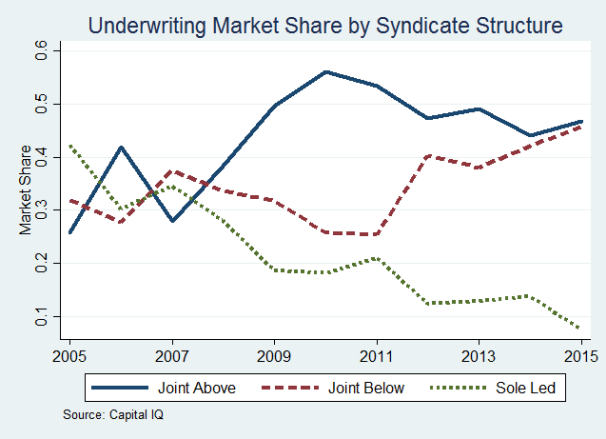

Figure 7

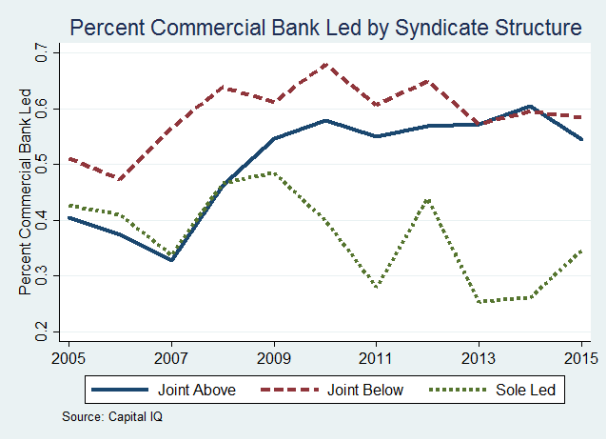

Figure 8

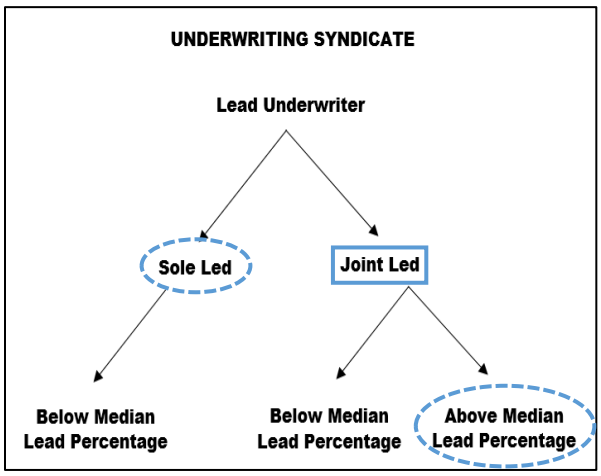

Figure 9

Table 1 – Lead Underwriters. Sample consists of 4,547 cash-pay, fixed rate, high yield debt issued domestically between 2005 and 2015. Table reports all of the left lead underwriters and their rates of participation. *IB* is an indicator variable that equals 1 if the lead underwriter is an investment bank, and 0, otherwise. † Bank of America acquired Merrill Lynch on September 14, 2008; JP Morgan acquired Bear Stearns on March 16, 2009. As such, *IB* represents the percent of Bank of America and JP Morgan syndicate deals underwritten by Merrill Lynch and Bear Stearns, respectively, prior to acquisition.

	Lead Underwriter	Frequency	% of Total	Cumulative Frequency	% Sole Led	IB
1	Bank of America Merrill Lynch †	947	20.83	20.83	12.14	5.81%
2	JP Morgan †	829	18.23	39.06	13.87	3.02%
3	Credit Suisse	488	10.73	49.79	20.90	1
4	Citi	413	9.08	58.87	17.43	0
5	Deutsche Bank	345	7.59	66.46	16.23	1
6	Goldman Sachs & Company	321	7.06	73.52	24.61	1
7	Barclays	298	6.55	80.07	11.07	1
8	Morgan Stanley	251	5.52	85.59	17.13	1
9	Jefferies LLC	214	4.71	90.30	68.69	1
10	Wells Fargo & Company	182	4.00	94.30	12.09	0
11	UBS	77	1.69	96.00	28.57	1
12	RBC Capital Markets	67	1.47	97.47	14.93	0
13	RBS	24	0.53	98.00	25.00	0
14	SunTrust Banks	15	0.33	98.33	13.33	0
15	BNP Paribas SA	14	0.31	98.64	0.00	1
16	Imperial Credit Industries Incorporated	11	0.24	98.88	63.64	1
17	BMO Capital Markets	9	0.20	99.08	11.11	0
18	Global Hunter Securities	5	0.11	99.19	20.00	1
19	Societe Generale	5	0.11	99.30	80.00	1
20	Gleacher & Company	4	0.09	99.38	75.00	1
21	Stifel/KBW	3	0.07	99.45	33.33	1
22	CIBC World Markets Incorporated	3	0.07	99.52	66.67	0
23	Imperial Bank	3	0.07	99.58	100.00	1
24	Credit Agricole CIB	2	0.04	99.63	0.00	1
25	HSBC Holdings PLC	2	0.04	99.67	0.00	1
26	Key Banc Capital Markets Incorporated	2	0.04	99.71	0.00	0
27	Pareto Investments	2	0.04	99.76	50.00	1
28	Macquarie Group	2	0.04	99.80	100.00	1
29	Bank of New York	1	0.02	99.82	0.00	0
30	Nomura Bank	1	0.02	99.85	0.00	1
31	Portigon AG	1	0.02	99.87	0.00	1
32	Calyon	1	0.02	99.89	100.00	1
33	Citadel Investment Group LLC	1	0.02	99.91	100.00	1
34	Cyan Capital Management	1	0.02	99.93	100.00	1
35	GMP Capital Corporation	1	0.02	99.96	100.00	1
36	Lazard	1	0.02	99.98	100.00	1
37	TD Securities Incorporated	1	0.02	100.00	100.00	1
	Total	**4,547**				

Table 2 – Summary Statistics. Sample consists of 4,547 cash-pay, fixed rate, high yield debt issued domestically between 2005 and 2015. *No. of HY Bonds Underwritten* is the number of issues underwritten by lead arranger in the calendar year of the issue. *HY Underwritten ($)/Total Underwritten ($)* is the percentage of total fee income contributed by underwriting high yield debt. *Underwriter Age* is total number of years lead underwriter has been in business at issue date. *Parent Rating* is *S&P* or *Moody's* long-term issuer rating in numerical scale where *AAA/Aaa* = 1. *Unlisted* and *First-time* issuers are indicator variables. *Age* is computed from the year issuing firm was founded as reported in the *Capital IQ* database. *Bond Rating* is *S&P* or *Moody's* issue rating in numerical scale where *AAA/Aaa* = 1 and averaged when issue is dual rated. *IG/HY Split-Rated* indicates issue is split-rated. *Meets Liquidity Constraint* is 1 when debt issue is large enough for inclusion in Lehman Brothers/Barclays High Yield Bond Index, and 0 otherwise. *Term* is the maturity of the issue in years. *Senior Secured* is 1 when the issue is collateralized, and 0 otherwise. *Yield Spread* is offer yield minus yield on a Treasury bond of the same maturity. *Coupon-Adjusted Gain on Break* converts yields at issue and first trade into discount bond price equivalents, computes the discount price difference between issue and first trade, and adjusts for the change in *BAML HY* Index over the days between issue and first trade. To examine differences in underwriter, issuer, issue characteristics as well as yield spreads and underpricing, weighted least squares regressions are estimated over the entire a sample of issuances and subsample of joint led syndicate issuances, respectively, where *Sole Led* and *Joint Above Median Lead* are dummy variables that proxy for syndicate form. Using Fama and French (1997) 17 industries, weights in the regressions employ industry demeaned proceeds to control for issue size. Coefficients are reported in the last two columns. † indicates not meaningful; issue liquidity is correlated with proceeds.

	Overall	Sole Led	Joint Led	Joint Above Median	Joint Below Median	Sole Minus Overall	Joint Above Median Minus Joint Led
Number of Observations	4,547	856	3,691	2,099	1,592		
SYNDICATE FORM							
Total No. of Underwriters	7.643	2.605	8.704	7.185	10.708		
Number of Lead Arrangers	3.958	1.000	4.644	4.092	5.371		
ISSUE PRICING							
Yield Spread	535.263	614.825	516.811	559.386	460.677		
Coupon-Adjusted Gain on Break (bps)	66.919	77.482	65.029	70.346	57.947		
Indicated Yield	0.796	0.646	0.831	0.830	0.832		
Traded	0.769	0.620	0.804	0.806	0.800		
LEAD UNDERWRITER							
Underwriter is Commercial Bank	0.530	0.369	0.567	0.543	0.599	-0.179***	-0.032
No. of HY Bonds Underwritten	203.510	146.026	216.527	211.022	223.750	-49.611***	-13.286***
HY Underwritten($)/Total Underwritten($)	0.257	0.326	0.241	0.252	0.227	0.027***	0.003
Ln(Underwriter Age)	4.796	4.329	4.905	4.872	4.949	-0.166***	-0.043*
ISSUER							
Parent Rating	12.458	11.127	12.767	13.188	12.213	-1.314***	0.362***
Unlisted	0.264	0.356	0.243	0.292	0.178	0.089***	0.053***
1st Time	0.156	0.151	0.157	0.195	0.107	0.008	0.033**
Ln(Age)	2.892	2.832	2.906	2.872	2.952	-0.102*	0.095
ISSUE							
Bond Rating	14.372	14.771	14.283	14.579	13.893	0.038	0.292***
IG/HY Split-Rated	0.040	0.036	0.041	0.020	0.069	0.014	-0.038***
Meets Index Liquidity Constraint	0.917	0.748	0.956	0.941	0.977	†	†
Ln(Term)	2.019	1.922	2.042	2.015	2.077	-0.056***	-0.011
Senior Secured	0.107	0.152	0.097	0.113	0.076	0.037***	0.003

Table 3 – Bivariate Probit Regressions. Sample consists of 4,547 cash-pay, fixed rate, high yield debt issued domestically between 2005 and 2015. The participation equations for sole and joint above median led syndicates are respectively: (*i*) $I_1^* = \mathbf{x}_1'\boldsymbol{\gamma}_1 + \varepsilon_1$ and $I_2^* = \mathbf{x}_2'\boldsymbol{\gamma}_2 + \varepsilon_2$ only possible when $I_1^* < 0$; (*ii*) ε_1 and ε_2 are standard normal variates with correlation ρ_{12}. The log likelihood function is: $\log L = \Sigma_i \ln \Phi\left(q_{1i}\mathbf{x}_{1i}'\boldsymbol{\gamma}_1, q_{2i}\mathbf{x}_{2i}'\boldsymbol{\gamma}_2; \rho_i^*\right)$ where $\rho_i^* = q_{1i}q_{2i}\rho_{12}$ · $(\mathbf{x}_1, \mathbf{x}_2)$ and $(\varepsilon_1, \varepsilon_2)$ are observable and latent factors that affect syndicate choice. To make the impact on likelihood comparable to indicator variables, continuous variables in Model 4 are standardized to mean 0 and variance 1. Standardized coefficients are reported in last two columns of the table. *p*-values are in parentheses. **p*<0.10, ***p*<0.05, and ****p*<0.01.

	(1)		(2)		(3)		(4)		Standardized	
Limited Dependent Variable	**Sole**	**Joint Above Median**	**Sole**	**Joint Above Median**	**Sole**	**Joint Above Median**	**Sole**	**Joint Above Median**	**Sole**	**Joint Above Median**
LEAD UNDERWRITER										
Underwriter is Commercial Bank	-0.166**		-0.178**		-0.179**		-0.179**		-0.179**	
	(0.036)		(0.018)		(0.016)		(0.016)		(0.016)	
No. of HY Bonds Underwritten	-0.002***		-0.001***	-0.001	-0.001***		-0.001***		-0.119***	
	(0.001)		(0.005)	(0.151)	(0.007)		(0.009)		(0.009)	
HY Underwritten($)/Total Underwritten($)	1.230***		1.242***		1.239***		1.241***		1.241***	
	(0.000)		(0.000)		(0.000)		(0.000)		(0.000)	
Ln(Underwriter Age)	0.050		0.028		0.030	0.015	0.031		0.028	
	(0.139)		(0.459)		(0.432)	(0.749)	(0.419)		(0.419)	
Number of Lead Arrangers				-0.764***		-0.765***		-0.758***		-1.380***
				(0.000)		(0.000)		(0.000)		(0.000)
ISSUER										
Parent Rating	-0.024***	0.031**	-0.022***	0.042**	-0.023***	0.043**	-0.023***	0.044**	-0.448***	0.860**
	(0.000)	(0.026)	(0.000)	(0.016)	(0.000)	(0.016)	(0.000)	(0.020)	(0.000)	(0.020)
Unlisted	0.099	0.202***	0.108	0.199***	0.107	0.196***	0.107	0.201***	0.107	0.201***
	(0.243)	(0.002)	(0.187)	(0.000)	(0.190)	(0.000)	(0.188)	(0.000)	(0.188)	(0.000)
1st Time		0.287***		0.288***		0.285***		0.290***		0.290***
		(0.000)		(0.000)		(0.001)		(0.001)		(0.001)
Ln(Age)	0.026*		0.030*		0.029**		0.029**		0.042**	
	(0.050)		(0.050)		(0.050)		(0.041)		(0.041)	
ISSUE										
Bond Rating	0.028**	0.028	0.026**	0.051	0.026**	0.052	0.026**	0.050	0.050**	0.097
	(0.015)	(0.163)	(0.042)	(0.170)	(0.038)	(0.153)	(0.037)	(0.148)	(0.037)	(0.148)
IG/HY Split-Rated		-0.522***		-0.644***		-0.653***		-0.648***		-0.648***
		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)

Table 3 – Bivariate Probit Regressions (cont.).

	(1)		(2)		(3)		(4)		Standardized	
Limited Dependent Variable	**Sole**	**Joint Above Median**	**Sole**	**Joint Above Median**	**Sole**	**Joint Above Median**	**Sole**	**Joint Above Median**	**Sole**	**Joint Above Median**
Meets Index Liquidity Constraint	-0.861***	-0.156*	-0.882***	-0.262**	-0.882***	-0.220**	-0.883***	-0.200**	-0.883***	-0.200**
	(0.000)	(0.095)	(0.000)	(0.025)	(0.000)	(0.035)	(0.000)	(0.042)	(0.000)	(0.042)
Ln(Term)	-0.536***	-0.089	-0.546***	0.063	-0.544***	0.066	-0.540***		-0.155***	
	(0.000)	(0.361)	(0.000)	(0.660)	(0.000)	(0.633)	(0.000)		(0.000)	
Senior Secured	0.197**	0.066	0.182**	0.153	0.182**	0.152	0.190**		0.190**	
Constant	1.034***	-0.872*	1.130***	1.761**	1.127***	1.447**	1.113***	1.642***	0.422***	-0.091
	(0.001)	(0.090)	(0.001)	(0.028)	(0.000)	(0.032)	(0.001)	(0.000)	(0.004)	(0.640)
ρ_{12}	-0.751***		-0.077		-0.174***		-0.184			
	(0.000)		(0.104)		(0.000)		(0.109)			
Model Adjusted Standard Error	0.179	0.568	0.179	0.568	0.179	0.562	0.179	0.562		
Wald χ^2	2,129.882		6,250.514		14,417.050		1.013e+12			
Log Pseudo-Likelihood	-3,975.073		-3,419.288		-3,425.068		-3,430.718			
Tjur R^2 (2009)	0.300		0.566		0.566		0.564			
McFadden R^2 (1974)	0.211		0.478		0.678		1.000			
Percent Correctly Predicted (PCP)	84.13%	64.28%	84.13%	79.98%	84.13%	79.77%	84.13%	80.06%		
expected Percent Correctly Predicted (ePCP)	76.49%	55.79%	76.49%	68.77%	76.49%	68.77%	76.49%	68.68%		

Table 4 – Offer Yield Spread Regressions. This table reports how syndicate form impacts yield spreads on a sample of 4,547 cash-pay, fixed rate, high yield bonds issued domestically from 2005 and 2015 when the endogeneity of syndicate choice is considered. The dependent variable is the at-issue yield spread to maturity (*STM*). Controls for market conditions as well as issuer and issue characteristics are included. 5-1 *Term Premium* is the difference in term premiums on the 5-year Treasury and 1-Year Treasury. *SLOOS* is the net % of domestic banks tightening standards for *C&I* Loans to large and middle-market firms at issue date. *CFSI* Liquidity is the *Cleveland Financial Stress Index Liquidity Factor* which quantifies changes in the differences in bid- ask prices on the 3-month *T*-Bills at issue date. *1st Time* issuer is an indicator variable, which equals 1 if the observation represents the first bond offering from the issuer since January 1, 1991, and 0 otherwise. ‡ indicates coefficient multiplied by 10^2. All variables are computed at issue date. Standard errors are clustered on industry (Fama-French 17 industries). *p*-values are in parentheses. **p*<0.10, ***p*<0.05, and ****p*<0.01.

	(1)			(2)		
Dependent Variable: Spread to Maturity	**Sole**	**Joint Below Median**	**Joint Above Median**	**Sole**	**Joint Below Median**	**Joint Above Median**
Issuer and Issue Characteristics						
Indicated Yield	53.705***	38.285***	8.180	51.423***	39.238***	11.576
	(0.005)	(0.002)	(0.634)	(0.009)	(0.002)	(0.513)
1st Time	104.360***	110.204**	41.124***	98.240***	117.439***	49.485***
	(0.000)	(0.000)	(0.004)	(0.001)	(0.000)	(0.001)
Unlisted	97.911***	58.365***	12.037			
	(0.000)	(0.005)	(0.276)			
Unlisted and 1st Time	16.720	19.256	83.329***			
	(0.261)	(0.362)	(0.000)			
Listed				-118.878***	-61.978***	-53.589***
				(0.000)	(0.002)	(0.000)
Listed and 1st Time				35.791*	-10.976	22.895***
				(0.073)	(0.291)	(0.004)
Ln of Proceeds-SIC demeaned ‡	-71.538***	-11.212	-51.609***	-71.498***	-12.091	-52.722***
	(0.000)	(0.248)	(0.000)	(0.000)	(0.215)	(0.000)
Use of Proceeds						
Acquisition – General Corp Purpose	-7.235	0.067	24.015	-8.756	0.008	22.069
	(0.788)	(0.996)	(0.142)	(0.746)	(1.000)	(0.152)
Recapitalization – General Corp Purpose	108.712*	34.365*	14.561	109.611*	35.707*	20.576
	(0.075)	(0.093)	(0.581)	(0.074)	(0.083)	(0.471)
Refinancing – General Corp Purpose	-41.734**	-3.113	-12.937	-42.157**	-3.853	-12.725
	(0.026)	(0.785)	(0.282)	(0.024)	(0.740)	(0.300)
Market Conditions						
Term Premium 30 day pct change - bps	0.004	0.001	0.002	0.004	0.001	0.001
	(0.133)	(0.161)	(0.385)	(0.145)	(0.149)	(0.407)
SLOOS-economic outlook	17.655***	12.873***	13.002***	17.543***	12.928***	13.067***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
VIX 30 day pct change - bps	0.018	0.005	-0.001	0.018	0.004	-0.001
	(0.248)	(0.748)	(0.871)	(0.275)	(0.772)	(0.887)
CFSI Liquidity 30 day pct change - bps	0.004	0.015	0.170	0.005	0.016	0.172
	(0.869)	(0.660)	(0.192)	(0.820)	(0.630)	(0.187)
IMR-Sole Led	1.897**			2.026**		
	(0.042)			(0.032)		
IMR-Joint Below		-2.289			-2.328	
		(0.125)			(0.122)	
IMR-Joint Above			-30.034***			-30.024***
			(0.000)			(0.000)
Constant	331.147***	352.030**	508.013***	444.183***	417.032***	551.106**
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Model Diagnostics						
Observations	856	1,592	2,099	856	1,592	2,099
McFadden R^2 (1974)	0.247	0.232	0.278	0.249	0.232	0.270
Mean Variance Inflation Factor	1.250	1.170	1.160	1.220	1.150	1.130
Model Adjusted Standard Error	28.615	19.364	21.764	29.203	19.178	21.687
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Table 5 – Falsification Test. Using the switching regressions in Table 4, this table reports summary statistics on average yield spreads from observed (actual) and hypothetical (counterfactual) syndicate choices by issuers. Actual and hypothetical yield spreads take co-variates as well as actual and hypothetical *IMR*s into account.

	Model 1			Model 2		
	Actual	**Hypothetical**		**Actual**	**Hypothetical**	
	Sole	Joint Below	Joint Above	***Sole***	Joint Below	Joint Above
Average Yield Spread	597.59	515.69	609.00	597.59	514.76	607.41
Standard Deviation	144.16	99.63	116.77	144.60	98.89	114.43
No. of Observations	856	856	856	856	856	856
Standard Error	4.93	3.41	3.99	4.94	3.38	3.91
Difference in Yield Spread		-81.90	11.41		-82.83	9.81
t-statistic		-13.67	1.80		-13.83	1.56
	Joint Below	Sole	Joint Above	***Joint Below***	Sole	Joint Above
Average Yield Spread	460.45	495.61	595.34	460.45	490.71	594.59
Standard Deviation	95.82	139.89	170.71	95.70	141.58	170.72
No. of Observations	1,592	1,592	1,592	1,592	1,592	1,592
Standard Error	2.40	3.51	4.28	2.40	3.55	4.28
Difference in Yield Spread		35.15	134.88		30.26	134.14
t-statistic		8.27	27.49		7.06	27.35
	Joint Above	Sole	Joint Below	***Joint Above***	Sole	Joint Below
Average Yield Spread	557.35	551.10	480.86	557.35	547.89	480.57
Standard Deviation	118.71	140.36	92.43	117.31	141.91	91.71
No. of Observations	2,099	2,099	2,099	2,099	2,099	2,099
Standard Error	2.59	3.06	2.02	2.56	3.10	2.00
Difference in Yield Spread		-6.24	-76.49		-9.46	-76.78
t-statistic		-1.56	-23.29		-2.35	-23.62

Table 6 – Seasoned Offer Yield Spread Regressions. This table examines how seasoning impacts yield spreads on a sample of 4,547 cash-pay, fixed rate, high yield debt issued domestically from 2005 and 2015 taking the endogeneity of syndicate choice into account. The dependent variable is at-issue yield spread to maturity (STM). Controls for market conditions as well as issuer and issue characteristics are included. Term Premium is the difference in term premiums on the 5-year Treasury and 1-Year Treasury. SLOOS is the net % of domestic banks tightening standards for C&I Loans to large and middle-market firms at issue date. CFSI Liquidity is the Cleveland Financial Stress Index Liquidity Factor which quantifies changes in the differences in bid- ask prices on the 3-month T-Bills at issue date. ‡ indicates coefficient multiplied by 10^2. All variables are computed at issue date. Standard errors are clustered on industry (Fama-French 17 industries). *p*-values are in parentheses. *p<0.10, **p<0.05, and ***p<0.01.

	(1)			(2)		
Dependent Variable: Spread to Maturity	**Sole**	**Joint Below Median**	**Joint Above Median**	**Sole**	**Joint Below Median**	**Joint Above Median**
Issuer and Issue Characteristics						
Indicated Yield	66.206***	41.333***	4.903	66.633***	41.648***	6.654
	(0.001)	(0.002)	(0.769)	(0.002)	(0.002)	(0.692)
Seasoned	-0.008	-15.239*	-35.919***	18.749	-18.949	-55.241***
	(1.000)	(0.062)	(0.001)	(0.222)	(0.152)	(0.001)
Unlisted	135.810***	106.813***	86.719***			
	(0.000)	(0.000)	(0.000)			
Unlisted and Seasoned	-41.138*	-47.070**	-71.551***			
	(0.055)	(0.049)	(0.000)			
Listed				-71.512***	-69.814***	-45.805***
				(0.005)	(0.004)	(0.000)
Listed and Seasoned				-67.969***	-6.908	3.757
				(0.002)	(0.670)	(0.721)
Ln of Proceeds-SIC demeaned ‡	-70.809***	-10.196	-50.009***	-71.377***	-10.389	-50.620***
	(0.000)	(0.243)	(0.000)	(0.000)	(0.235)	(0.000)
Use of Proceeds						
Acquisition – General Corp Purpose	6.949	13.663	27.509*	5.314	14.695	25.602*
	(0.780)	(0.392)	(0.073)	(0.842)	(0.361)	(0.078)
Recapitalization – General Corp Purpose	105.752*	25.376	10.623	107.818*	25.513	14.351
	(0.086)	(0.204)	(0.691)	(0.086)	(0.202)	(0.616)
Refinancing – General Corp Purpose	-49.153**	-7.381	-14.318	-48.638**	-8.419	-14.013
	(0.014)	(0.525)	(0.241)	(0.018)	(0.474)	(0.262)
Market Conditions						
Term Premium 30 day pct change - bps	0.004	0.001	0.001	0.004	0.001	0.001
	(0.140)	(0.161)	(0.415)	(0.138)	(0.163)	(0.438)
SLOOS-economic outlook	17.366***	12.520***	12.666***	17.295***	12.519***	12.568***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
VIX 30 day pct change - bps	0.015	0.003	-0.001	0.012	0.004	-0.000
	(0.410)	(0.823)	(0.933)	(0.499)	(0.793)	(0.978)
CFSI Liquidity 30 day pct change - bps	0.001	0.004	0.171	0.005	0.010	0.172
	(0.982)	(0.885)	(0.189)	(0.800)	(0.748)	(0.186)
IMR-Sole Led	1.746*			1.754*		
	(0.066)			(0.057)		
IMR-Joint Below		-2.458			-2.472	
		(0.108)			(0.103)	
IMR-Joint Above			-30.734***			-30.871***
			(0.000)			(0.000)
Constant	356.194***	375.702***	538.445***	474.482***	451.928***	591.197***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Model Diagnostics						
Observations	856	1,592	2,099	856	1,592	2,099
McFadden R^2 (1974)	0.233	0.208	0.278	0.237	0.206	0.272
Mean Variance Inflation Factor	1.290	1.280	1.210	1.310	1.280	1.250
Model Adjusted Standard Error	28.470	19.718	21.544	29.453	19.697	21.657
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Table 7 – Trading and Switch/Retain Underwriter Offer Yield Spread Regressions. This table examines how the endogeneity of syndicate choice impacts yield spreads of a sample of 4,547 cash-pay, fixed rate, high yield debt issued domestically from 2005 and 2015. The dependent variable is the at-issue yield spread to maturity (*STM*). Controls for market conditions as well as issuer and issue characteristics are included. *Term Premium* is the difference in term premiums on the 5-year Treasury and 1-Year Treasury. *SLOOS* is the net % of domestic banks tightening standards for *C&I* Loans to large and middle-market firms at issue date. *CFSI Liquidity* is the *Cleveland Financial Stress Index Liquidity Factor* quantifies changes in the differences in bid- ask prices on the 3-month *T*-Bills at issue date. ‡ indicates coefficient multiplied by 10^2. All models include *Switched Lead UW* and *Retained Lead UW* dummy variables, where *Switched/Retained* equal 1 if the observation represents a bond where the issuer used a different/same lead underwriter for the offering, and 0 otherwise. All variables are computed at issue date. Standard errors are clustered on industry (Fama-French 17 industries). *p*-values are in parentheses.*p<0.10, **p<0.05, and ***p<0.01.

	Overall Sample			Traded Sample			Non-Traded Sample		
Dependent Variable: Spread to Maturity	**Sole**	**Joint Below Median**	**Joint Above Median**	**Sole**	**Joint Below Median**	**Joint Above Median**	**Sole**	**Joint Below Median**	**Joint Above Median**
Issuer and Issue Characteristics									
Indicated Yield	66.365***	42.194***	5.945	45.726	32.554**	11.219	98.991***	26.700*	-33.619*
	(0.001)	(0.001)	(0.717)	(0.125)	(0.030)	(0.676)	(0.001)	(0.051)	(0.087)
Unlisted	133.435***	111.069***	76.336***	129.358***	116.835***	57.968***	137.565***	89.777	151.256***
	(0.000)	(0.002)	(0.000)	(0.001)	(0.000)	(0.000)	(0.002)	(0.178)	(0.000)
Switched Lead UW	27.745	-16.555**	-27.372***	0.423	-23.785**	-29.721**	65.125	3.206	-20.683
	(0.604)	(0.026)	(0.002)	(0.995)	(0.014)	(0.017)	(0.135)	(0.876)	(0.499)
Retained Lead UW	-8.435	-6.111	-31.510***	-35.963	-12.089*	-35.166***	34.772	-15.279	-28.511
	(0.638)	(0.406)	(0.000)	(0.112)	(0.074)	(0.005)	(0.161)	(0.620)	(0.267)
Unlisted and Switched Lead UW	-21.188	-51.191*	-58.820***	-26.681	-60.175***	-69.574***	-46.768	-25.300	-16.302
Unlisted and Retained Lead UW	-51.250**	-53.940	-61.196**	-57.654*	-55.711*	-54.211**	-45.802	-5.881	-90.450*
	(0.047)	(0.112)	(0.019)	(0.091)	(0.090)	(0.039)	(0.394)	(0.919)	(0.083)
Ln of Proceeds-SIC demeaned ‡	-70.541***	-9.743	-49.594***	-54.000***	-16.742**	-45.972***	-101.738***	1.481	-65.283***
	(0.000)	(0.259)	(0.000)	(0.000)	(0.034)	(0.000)	(0.000)	(0.897)	(0.000)
Use of Proceeds									
Acquisition – General Corp Purpose	6.426	12.107	25.602*	-25.393	9.743	19.694	57.989*	33.077	63.599***
	(0.789)	(0.439)	(0.086)	(0.275)	(0.546)	(0.218)	(0.071)	(0.325)	(0.000)
Recapitalization – General Corp Purpose	107.697*	26.181	11.403	141.570**	33.579	14.174	44.810	18.713	10.940
	(0.070)	(0.186)	(0.685)	(0.021)	(0.177)	(0.587)	(0.481)	(0.685)	(0.821)
Refinancing – General Corp Purpose	-52.671**	-6.603	-13.902	-40.585	-6.931	-15.925	-62.124***	-16.343	-4.538
	(0.015)	(0.562)	(0.266)	(0.177)	(0.569)	(0.310)	(0.002)	(0.422)	(0.681)
Market Conditions									
Term Premium 30 day pct change - bps	0.004	0.001	0.001	0.003	0.001	0.002*	0.009*	0.001	-0.004
	(0.106)	(0.154)	(0.434)	(0.406)	(0.196)	(0.081)	(0.060)	(0.823)	(0.268)
SLOOS-economic outlook	17.181***	12.519***	12.653***	17.363***	12.507***	13.194***	15.944***	5.631*	10.532***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.095)	(0.000)

Table 7 – Trading and Switch/Retain Underwriter Offer Yield Spread Regressions (cont.).

	Overall Sample			Traded Sample			Non-Traded Sample		
Dependent Variable: Spread to Maturity	**Sole**	**Joint Below Median**	**Joint Above Median**	**Sole**	**Joint Below Median**	**Joint Above Median**	**Sole**	**Joint Below Median**	**Joint Above Median**
VIX 30 day pct change - bps	0.015	0.003	-0.001	0.019	0.016	-0.001	-0.012	-0.055**	-0.004
	(0.410)	(0.831)	(0.920)	(0.310)	(0.358)	(0.905)	(0.607)	(0.021)	(0.796)
CFSI Liquidity 30 day pct change - bps	0.001	0.006	0.171	-0.113	0.028	0.172	0.012	-0.277***	0.091
	(0.976)	(0.853)	(0.189)	(0.684)	(0.355)	(0.191)	(0.434)	(0.000)	(0.245)
IMR-Sole Led	1.685*			-0.067			2.532		
	(0.075)			(0.923)			(0.364)		
IMR-Joint Below		-2.403			-1.812			-3.678*	
		(0.117)			(0.241)			(0.075)	
IMR-Joint Above			-30.926***			-36.115***			-19.907***
			(0.000)			(0.000)			(0.002)
Constant	354.748***	374.414***	537.630***	402.168***	339.244***	554.145***	407.015***	646.131***	497.469***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.004)	(0.000)	(0.000)
Model Diagnostics									
Observations	856	1,592	2,099	531	1,274	1,692	325	318	407
McFadden R^2 (1974)	0.234	0.210	0.276	0.246	0.226	0.278	0.215	0.159	0.351
Mean Variance Inflation Factor	1.310	1.250	1.210	1.350	1.290	1.210	1.360	1.280	1.290
Model Adjusted Standard Error	34.897	20.418	22.115	47.491	20.481	24.020	49.548	44.714	36.193
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 8 – Falsification Test on Traded and Non-Traded Samples. Using the switching regressions in Table 4, this table reports summary statistics on average yield spreads from observed (actual) and hypothetical (counterfactual) syndicate choices by issuers. Actual and hypothetical yield spreads take co-variates as well as actual and hypothetical *IMR*s into account.

	Traded Sample			**Non-Traded Sample**		
	Actual	**Hypothetical**		**Actual**	**Hypothetical**	
	Sole	**Joint Below**	**Joint Above**	***Sole***	**Joint Below**	**Joint Above**
Average Yield Spread	606.89	543.65	588.35	581.25	455.49	511.18
Standard Deviation	146.77	143.82	141.55	151.43	134.11	139.25
No. of Observations	531	531	531	325	325	325
Standard Error	6.37	6.24	6.14	8.40	7.44	7.72
Difference in Yield Spread		-63.24	-18.53		-125.77	-70.07
t-statistic		-7.09	-2.09		-11.21	-6.14
	Joint Below	**Sole**	**Joint Above**	***Joint Below***	**Sole**	**Joint Above**
Average Yield Spread	470.64	529.33	491.04	419.42	482.14	435.07
Standard Deviation	97.51	101.86	91.54	95.22	155.42	98.86
No. of Observations	1,274	1,274	1,274	318	318	318
Standard Error	4.28	3.91	2.00	5.34	8.72	5.54
Difference in Yield Spread		58.69	20.40		62.72	15.65
t-statistic		10.12	4.32		6.14	2.03
	Joint Above	**Sole**	**Joint Below**	***Joint Above***	**Sole**	**Joint Below**
Average Yield Spread	561.04	609.97	622.52	541.72	627.84	535.93
Standard Deviation	119.01	108.91	201.11	137.69	144.50	143.22
No. of Observations	1,692	1,692	1,692	407	407	407
Standard Error	3.10	3.38	3.55	6.82	7.16	7.10
Difference in Yield Spread		48.92	61.48		86.12	-5.79
t-statistic		10.67	13.05		8.70	-0.59

Table 9 – Underpricing Regressions. This table examines the impact of syndicate choice endogeneity on underpricing of a sample of 4,547 traded cash-pay, fixed rate, high yield debt issued domestically from 2005 and 2015. The dependent variable is the at-issue yield spread to maturity (*STM*). Controls for market conditions as well as issuer and issue characteristics are included. *Term Premium* is the difference in term premiums on the 5-year Treasury and 1-Year Treasury. *SLOOS* is the net % of domestic banks tightening standards for *C&I* Loans to large and middle-market firms at issue date. *CFSI Liquidity* is the *Cleveland Financial Stress Index Liquidity Factor* quantifies changes in the differences in bid- ask prices on the 3-month *T*-Bills at issue date. ‡ indicates coefficient multiplied by 10^2. All variables are computed at issue date. Standard errors are clustered on industry (Fama-French 17 industries). *p*-values are in parentheses.*p<0.10, **p<0.05, and ***p<0.01.

	(1)			(2)		
Dependent Variable: Coupon-Adjusted Gain on Break	**Sole Led**	**Joint Below Median**	**Joint Above Median**	**Sole Led**	**Joint Below Median**	**Joint Above Median**
Issuer and Issue Characteristics						
Indicated Yield	10.152	8.638	16.939	10.640	8.196	15.807
	(0.353)	(0.103)	(0.175)	(0.350)	(0.113)	(0.201)
1st Time	34.121**	9.502**	1.139	32.792***	3.420	-2.530
	(0.021)	(0.050)	(0.744)	(0.008)	(0.589)	(0.496)
Unlisted	-7.159	12.199**	-8.905***			
	(0.722)	(0.024)	(0.003)			
Unlisted and 1st Time	20.250	11.645	22.763***			
	(0.283)	(0.482)	(0.000)			
Listed				-6.788	-19.961***	-7.120***
				(0.549)	(0.000)	(0.004)
Listed and 1st Time				17.105	19.225**	23.062***
				(0.244)	(0.032)	(0.000)
Ln of Proceeds-SIC demeaned ‡	4.821	5.936*	1.019	4.633	6.203*	1.195
	(0.427)	(0.069)	(0.641)	(0.456)	(0.061)	(0.598)
Use of Proceeds						
Acquisition – General Corp Purpose	-1.005	3.370	5.776**	-1.357	3.702	5.548**
	(0.883)	(0.426)	(0.030)	(0.852)	(0.318)	(0.028)
Recapitalization – General Corp Purpose	26.268*	-3.686	-0.903	26.930*	-4.229	0.380
	(0.059)	(0.639)	(0.893)	(0.062)	(0.571)	(0.956)
Refinancing – General Corp Purpose	6.892	-5.679**	7.238**	7.053	-5.774**	7.133**
	(0.500)	(0.021)	(0.034)	(0.521)	(0.017)	(0.032)
Market Conditions						
Term Premium 30 day pct change - bps	0.001			0.001	0.001***	0.001***
	(0.302)			(0.245)	(0.001)	(0.000)
SLOOS-economic outlook	6.805***			6.738***	6.741***	7.868***
	(0.000)			(0.000)	(0.000)	(0.000)
VIX 30 day pct change - bps	0.011			0.010	0.004	0.004
	(0.262)			(0.295)	(0.326)	(0.129)
CFSI Liquidity 30 day pct change - bps	0.053			0.054	0.017*	0.014**
	(0.676)			(0.680)	(0.073)	(0.038)
IMR-Sole Led	-0.277			-0.274		
	(0.480)			(0.519)		
IMR-Joint Below		-1.912***			-1.815***	
		(0.000)			(0.000)	
IMR-Joint Above			-3.715***			-3.657***
			(0.007)			(0.003)
Constant	-15.482	7.015	8.493	-7.107	19.100	11.822
	(0.755)	(0.789)	(0.497)	(0.899)	(0.464)	(0.381)
Model Diagnostics						
Observations	531	1,274	1,692	531	1,274	1,692
McFadden R^2 (1974)	0.221	0.340	0.311	0.222	0.345	0.315
Mean Variance Inflation Factor	1.280	1.190	1.160	1.240	1.170	1.130
Model Adjusted Standard Error	15.841	6.606	6.630	16.082	6.023	6.532
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Table 10 - Cumulative Abnormal Returns. On a sample of 4,547 cash-pay, fixed rate, high yield bonds issued domestically between 2005 and 2015m 3,346 were issued by publicly listed firms. Listed firms could be identified on 1,119 issues and only 570 had the requisite *CRSP* data for estimating cumulative abnormal returns. This table reports cumulative abnormal returns on equity of these firms. Value-weighted returns are tabulated; results are qualitatively similar when equal-weighted returns are used. *p*-values are in parentheses. **p*<0.10, ***p*<0.05, and ****p*<0.01.

	(1) All Publicly Traded Equity on Debt Issues		
	Sole Led	**Joint Below**	**Joint Above**
CAR (-2, 2)	0.0065	0.0036	-0.0032
	(0.3216)	(0.2902)	(0.3836)
CAR (-3, 3)	0.0093	0.0047	-0.0035
	(0.2235)	(0.2380)	(0.3835)

	(2) Publicly Traded Equity on Non-Traded Debt Issues			(3) Publicly Traded Equity on Traded Debt Issues		
	Sole Led	**Joint Below**	**Joint Above**	**Sole Led**	**Joint Below**	**Joint Above**
CAR (-2, 2)	0.0175	0.0039	-0.0121	0.0042	0.0035	-0.0021
	(0.1922)	(0.5923)	(0.1626)	(0.5743)	(0.3348)	(0.5942)
CAR (-3, 3)	0.0318*	0.0101	-0.0202*	0.0045	0.0041	-0.0016
	(0.0574)	(0.3490)	(0.0773)	(0.5956)	(0.3342)	(0.7187)

	(4) Publicly Traded Equity Non-Traded – Traded Debt Issues		
	Sole Led	**Joint Below**	**Joint Above**
CAR (-2, 2)	0.0133	0.0004	-0.0100
	(0.3775)	(0.9609)	(0.2883)
CAR (-3, 3)	0.0273	0.0060	-0.0186
	(0.1346)	(0.6031)	(0.1242)

II. Essay 2 – Do Firms Care Who Their Lenders Are? The Role of QIBs in Private Debt Placements

I.Introduction

Debt securities are information sensitive when opacity impedes the ability of investors to discriminate between more and less creditworthy issuers. Certification by underwriters who are willing to put their reputations at risk moderates the cross-subsidization of less creditworthy borrowers by more creditworthy borrowers. Less creditworthy borrowers have reduced incentives to incur higher costs to engage more reputable underwriters to divulge lower probabilities of debt repayment.

But qualified institutional buyers are habitual repeat institutional purchasers of debt securities with considerable accumulated experience in judging the creditworthiness of potential borrowers. Moreover, because they hold and manage relatively large portfolios of similar investments, qualified institutional buyers (QIBs) are also likely to be well-informed about the pricing of risky debt. The correlations in payoffs on debt securities issued by a diverse set of firms contains valuable latent information about common risk factors, and exposure to correlated risks, is a strong motive to monitor (Phelan, 2017). For retail investors, there is less to learn from infrequent security purchases, and incentives to monitor are adversely affected by free-riding. Furthermore, in negotiating the terms of the debt contract, issuing firms are less likely to share non-public confidential information with a disparate group of retail investors, but more likely to do so with a small and select group of QIBs who sign nondisclosure agreements. Sophisticated and well-informed QIBs can substitute for information production by underwriters and mitigate the informational monopoly and bargaining power of underwriters who are also the firms' current lenders.

Finally, firms may also attach value to borrowing from QIBs who have an established reputation for minimizing inefficient liquidation when default occurs (Chemmanur and Fulgheiri, 1994). In the event of default, private and court-administered negotiations can be prolonged. Avoiding delays in bankruptcy resolution necessitate costly state verification and creditor coordination (Cantillo and Wright, 2000), both of which are challenging for retail investors. QIBs who are more likely to derive a higher value from making the "right" decision to either reorganize or liquidate the defaulted firm will devote a larger amount of resources toward such evaluations.

In short, lender specialization in debt markets can play an important role in how firms choose

their lenders. Opaque but otherwise creditworthy firms may prefer to borrow from QIBs through 144A private placements of debt rather than borrow from retail investors through public placements of debt. If firms care about their lenders, what are the issuer, underwriter, and issue characteristics that affect their choice of lenders? Do issuing firms and lenders self-select? What is the impact of self-selection on at-issue yield spreads? Is the choice of lenders influenced by equity revaluations?

To address these questions, I use a sample of 4,547 high yield bond placements in the United States by domestic and foreign firms over the period 2005 to 2015. High yield bond issues provide a constructive setting for several reasons. First, informational asymmetry will be relatively high for firms that issue speculative grade debt compared to firms that issue investment grade debt. Second, issues can be publicly placed or offered privately through Rule 144A. In public placements, lenders are more diverse and larger in number, which intensifies free-riding in information production and monitoring. In contrast, private placements rely on QIBs, who as specialized lenders tend to be more focused and better-informed. Moreover, private security sales to QIBs that do not require pre-registration are expeditious, but absent registration can only be traded post-issue among QIBs. Finally, high yield bond covenants are markedly different from those in leveraged loans. High yield bond covenants are typically "incurrence-based", which necessitate a negotiation between QIBs and issuers over the crafting of proscribed issuer actions. But loan covenants are typically "maintenance-based", which require ongoing compliance by issuers to specific terms.

Using a nested double selection probit model, I find that the matches between borrowers and lenders are negative assortative. Firms that are non-SEC reporting, first-time issuers, and have poorer issuer credit ratings, are more likely to borrow from specialized lenders. Foreign firms, who are less familiar and more opaque than domestic firms, are also more likely to borrow from specialized lenders. Further, issuing firms, especially foreign firms, seem more willing to share non-public confidential information with specialized lenders who sign nondisclosure agreements with the firm.

Average yield spreads in public placements by foreign firms are 281 bps higher than public placements by domestic firms. But average yield spreads on 144A Non-Life debt placements by foreign firms are 75 bps lower than 144A Non-Life debt placements by domestic firms. These findings

suggest that in high information asymmetry settings, QIBs are better than retail investors at discerning the creditworthiness of less familiar and more opaque foreign firms.

There are, however, significantly higher costs to foreign firms from non-public disclosure and restricted trading to QIBs. 144A Life debt placements of securities have no registration rights and are precluded over the life of the security from registration post-issue. Yield spreads on 144A Life debt placements by foreign firms are 127 bps higher than 144A Life debt placements by domestic firms. The higher yield compensates specialized lenders for the higher costs of certifying foreign firms and higher illiquidity associated with the restricted trading of unregistered securities associated with foreign issuers.

The bargaining power of lead underwriters who are also the firm's current lenders is more significant when issuing firms are foreign.[17] For foreign firms, yield spreads are 21 bps higher in public debt placements by relationship underwriters. QIBs moderate the bargaining power of relationship underwriters considerably in private debt placements by foreign firms. For these issues, average yield spreads are lower by 32 bps and 38 bps in 144A Non-Life and 144A Life debt placements, respectively.

Lastly, I find that yield spreads are lower (higher) when an issuing firm that is publicly traded experiences a positive (negative) stock return in the year prior to bond issuance. Compared to QIBs, retail investors tend to overreact (underreact) to "bad" ("good") news on foreign firms, and conversely, on domestic firms.

This study advances our understanding of private and public placements of debt issues. The results suggest firms do care from whom they borrow when issuers and investors are asymmetrically informed. Creditworthy but opaque firms will look to specialized lenders who are more adept at assessing creditworthiness, can maintain the confidentiality of private disclosures, monitor, and minimize inefficient liquidation in the event of default.

[17]Throughout this study, we use "underwriter" and "arranger" interchangeably. Both terms represent a financial institution involved in the marketing and distribution of the high yield bond financing.

II. High Yield Debt

A. SEC Rule 144A

Like other securities, high-yield bonds are sold to investors either through public or private offerings. If placed privately, the bonds are typically issued via Rule 144A which are exempted from registration requirements under the 1933 Securities Act. The exemption from registration comes from the combination of Section 4(2) and Rule 144A of the 1933 Securities Act. Section 4(2) exempts the initial sale of securities by issuers to broker-dealers acting as initial purchasers. Rule 144A allows the resale of securities by initial purchasers to QIBs.

Rule 144A was designed to attract foreign issuers to deeper and more liquid U.S. security markets (Fenn, 2000; Chaplinsky and Ramchand, 2004). Securities sold under Rule 144A are, however, restricted securities and cannot be resold freely. Resales are limited to other QIBs, and trades are transacted in over-the-counter (OTC) markets. Rule 144A is attractive because the sale of securities without SEC registration speeds issuance but at the potential cost of inadequate disclosure. The decision whether to issue registered or restricted securities will depend on the requirements of the issuer, as well as the judgment of underwriters about the likelihood of achieving a successful placement.[18]

Rule 144A issues come in two forms. The first, herein referred to as *144A Non-Life*, has registration rights attached. Registration rights allow security holders to force the issuer to register the securities with the SEC post-issue. Penalties for failure to deliver registered securities within a year following the exercise of registration rights are typically 25 basis points (bps) for each quarter of delay and capped at 100 bps. When exercised, registration rights enhance the post-issue liquidity of the bonds since registered securities are freely tradable with non-QIBs. Absent registration, 144A Non-Life issues can only be traded among QIBs after a six-month minimum holding period when the issuing firm is a *Reporting Issuer* as defined by the SEC. In cases where 144A Non-Life bonds are issued

[18]Over the 2005-2015 period, 82% of high yield bonds were issued privately (through Rule 144A), and the balance, as SEC registered (public) securities.

by non-SEC reporting firms, the mandatory minimum holding period is one year.

The second form of Rule 144A issuance, herein referred to as *144A Life*, do not have registration rights attached. In this form, issuing firms are precluded, for the life of the bond, from exchanging restricted securities sold at-issue for SEC-registered securities post-issue. 144A Life issues have the same mandatory holding period restrictions as 144A Non-Life issues. As a result of a February 15, 2008 amendment, all securities owned by non-affiliates of the issuing firm and issued under Rule 144 can be freely traded by QIBs after a year without any regard to whether or not the issuing firm is a *Reporting Issuer*. Further, the requirement for issuing firms to remain current in their SEC filings falls away after one year, which raises investor concerns about the potential loss of publicly available information and absence of regulatory scrutiny by the SEC.[19]

In their approach to high yield debt investments, not all QIBs are equal. Certain QIBs, e.g. mutual funds, place self-imposed constraints on investments in restricted securities, and limit total dollar amounts at 10% of portfolio values. Other QIBs, e.g. hedge funds and private equity funds, do not have limitations on investments in restricted securities. In this respect, QIBs that purchase Life and Non-Life issues differ in their willingness to screen and monitor issuing firms, and to accept constraints on liquidity from secondary market restrictions on trading with non-QIBs.

In contrast to unsophisticated retail investors in publicly placed debt, sophisticated QIB investors in privately place debt have greater ability to evaluate issuer quality, and potentially better informed when security laws allow non-public information to be shared with private investors who sign nondisclosure agreements with the firm. Further, the incentives for information production by private investors are higher when the securities being issued are more information-sensitive (Fulghieri and Lukin, 2001). The decision to use public or private (144A) placements to issue debt provides insight into issuers' lender preferences.

[19]As of December 2015, restricted securities can be sold or transferred under exemptions provided in Section 4(a)(1½) and Section 4(a)(7) of the Securities Act. Although Section 4(a)(1½) is not fully detailed in the Securities Act, it has nonetheless been recognized by the SEC as a hybrid exemption on registration and the private resale of restricted securities. Section 4(a)(7) became effective immediately after the Fixing America's Surface Transportation Act (FAST Act) was signed into law on December 4, 2015.

B. Related Literature

Tirole (2006) suggests that when sophisticated investors assume a significant financial stake in a firm, favorable information about a firm's creditworthiness is conveyed, which has spillover effects on other market participants. In the context of interbank loans, Rochet and Tirole (1996a), detail that lending by informed investors sends a positive signal regarding the quality of the issuer and the probability of repayment, which ultimately garners the attention of uninformed investors. Creditworthy borrowers have an incentive to separate themselves from less creditworthy through costly dissipative signals. These signals have the greatest value when information asymmetry is high and succeed when the cost of signaling discourages non-creditworthy borrowers from mimicking creditworthy ones (Tirole, 2006).

Certification by underwriters, who are willing to place their reputations at risk, moderates the cross-subsidization of less creditworthy borrowers by more creditworthy borrowers. Less creditworthy borrowers have reduced incentives to incur higher costs to engage more reputable underwriters to divulge lower probabilities of debt repayment; and conversely, for more creditworthy borrowers. In the literature, other signals of high-quality borrowing include the pledging of assets (Bester, 1985; Chan and Kanatas, 1985; Besanko and Thakor, 1987; Bester, 1987), and the issuance of short-term debt (Diamond, 1991; Diamond, 1993).

I argue that in the high yield debt market, firms can reduce informational asymmetry by borrowing from QIBs. As specialized lenders, information production and monitoring by QIBs can substitute for underwriter certification of issuer and issue quality.

For certification by QIBs to be credible, however, three conditions should be satisfied. First, reputational capital must be at stake. Second, incentive compatibility is met. The gains to reputational capital from truthful certification exceed wealth transfers from false certification. Third, it is costly for issuing firms to lease the reputational capital of specialized investors.

There are compelling reasons to believe QIBs meet these requirements. First, QIBs represent an important group of investors that include the majority of investment funds with more than $100 million under management. In the sample, 82% of the high yield debt issues involve QIBs, and

collectively, QIBs make substantial investments in the high yield bond primary market with ongoing yearly investments more than a hundred billion dollars. Second, QIBs compete against each another for investable funds, and their investment performance is continually monitored by fund investors. Corporate debt underwriters rely greatly on institutional investors to build order books. In a repeated game it is unlikely these investors will choose one-time gains from false certification and forgo the expected future gains that accrue from participation in an active high yield primary market. Moreover, mandatory holding periods and restrictions on secondary market trading also discourage false certification. Lastly, QIBs are intimately involved in credit risk assessment as well as the negotiation and structuring of covenants and deal terms. As specialized lenders, QIBs expect to be compensated for their expertise and cost of information production (Fenn, 2000; Huang and Ramírez, 2010).

C. Testable Hypotheses

First, I envisage issuer/investor matches are endogenously determined, and I expect matches to be negative assortative. Opaque borrowers will match with specialized lenders to issue debt more cost efficiently.

Second, yield spreads on public placements will be higher when unsophisticated retail investors are unable to discriminate more from less creditworthy borrowers. As specialized lenders, QIBs in private placements will play an important role in resolving informational asymmetry. Moreover, QIBs will be especially important when the bargaining power of the underwriter is significant; that is, when the left lead underwriter is the issuing firm's current lender on a syndicated loan.

Third, creditworthy foreign firms will have lower yield spreads by borrowing from QIBs than retail investors. The initial impetus for Rule 144A was to attract foreign issuers to deeper and more liquid U.S. securities markets. Private debt markets function differently from public debt markets because private lenders are better informed and have a greater ability to evaluate issuer quality (Gomes and Phillips, 2012). I conjecture certification by QIBs facilitates the access of foreign firms to the U.S. high yield debt market as intended by the enactment of Rule 144A.

III. Data, Variables, and Summary Statistics

A. Data Sources

The sample dataset is assembled using *Capital IQ*, *S&P* Global Market Intelligence, *FRED* (Federal Reserve Bank of St. Louis), as well as the *EDGAR* (Electronic Data Gather, Analysis, and Retrieval) system of the U.S. Securities and Exchange Commission (SEC). From *Capital IQ* I compile all high yield bonds issued in the U.S. between 2005 and 2015. I exclude all offers of pay-in-kind (PIK) and floating rate notes, which yields a final sample of 4,547 bonds, of which 3,724 are issued privately. *Capital IQ* allows us to collect primary market transaction data dating back to 2005 and includes important issuer and underwriter financial information. In cases where information is incomplete, I hand-collect the missing details required from *S&P* Global Market Intelligence, which publishes Leveraged Commentary & Data (*LCD*) News.

<Insert Figure 1 here.>

Figure 1 graphs the market composition of annual high yield debt issued by placement method, which proxies for investor (lender) types. The share of public debt placements, which increased modestly over the sample period, is considerably smaller than the combined market shares of private debt placements, 144A Non-Life and 144A Life, throughout the sample period. Placements of 144A Non-Life debt with delayed registration rights represent 94.1% of high yield debt issues at the beginning of the sample period, but only 32.5% by the end of the sample period. The increasing share of 144A Life debt placements, which had the largest overall market share by 2014, shows the expanding role of QIBs as specialized lenders. Figure 2 and Figure 3 graph high yield debt placements by public (listed) and private (unlisted) firms respectively. The active participation of QIBs in 144A Life placements is remarkable, especially for unlisted firms.

<Insert Figures 2 and 3 here.>

B. Summary Statistics

Table 1 provides summary underwriter, issuer, and bond issue statistics for the sample and

highlights the important differences between private and public placements of high yield debt.

<Insert Table 1 here.>

Two variables proxy for market timing in debt issuance decisions. *Post Amendment* is an indicator variable that equals 1 when debt is issued after the 2008 Rule 144A amendment that allowed all restricted securities to be freely traded by QIBs after a year without any regard to whether the issuing firm is SEC reporting; and 0 otherwise. Post amendment, firms seem more likely to issue 144A Life and less likely to issue 144A Non-Life debt placements regardless of domicile.

Prior Stock Return is the percentage change in stock price over the 52-week period ending with the bond issue date. For publicly traded issuers, prior year stock returns average 27% overall. Regardless of domicile, public and 144A Non-Life debt placements seem more likely when issuing firms experience significant positive prior year stock returns; but 144A Life debt placements are more likely when prior year stock returns are lower. Debt placement choice by foreign (domestic) firms also seems less (more) sensitive to prior year stock return.

I use five variables to address underwriter characteristics. *Underwriter is Commercial Bank*, that equals 1 when the lead underwriter is a commercial bank and 0 otherwise, is an indicator variable that proxies for the reputational quality of commercial banks relative to investment banks. Puri (1996) and Gande, Puri and Saunders (1999) find that yields are no worse on issues underwritten by commercial than investment banks; Yasuda (2005), that commercial banks charge lower underwriting fees to firms with whom they had relationships. Overall, commercial banks are lead underwriters in 53% of high yield debt placements. Private debt placements underwritten by commercial banks appear less (more) likely for foreign (domestic) firms.

Lead Underwriter is Current Lender, that equals 1 when the lead arranger on the debt placement is also a current lender to the issuing firm and 0 otherwise, is an indicator variable that proxies for the bargaining power of the lead arranger and potential for agency conflicts of interest between borrowers and lenders (Rajan, 1992). In the sample, the current lender is the lead arranger on 16% of high yield debt issues. Current lenders as lead underwriters seem most likely in 144A Life debt placements and

least likely in 144A Non-Life debt placements.

Underwriter Age, *No. of HY Bonds Underwritten*, and *HY Underwritten /Total Underwritten* proxy for the experience, as well as market participation in and importance of the high yield debt underwriting business to the lead arranger. *Underwriter Age* is the number of years the lead arranger has been in the business at the debt issue date. *No. of HY Bonds Underwritten* is the number of high yield debt issues underwritten by the lead arranger in the same calendar year as the current debt issue. *HY Underwritten /Total Underwritten* is the percentage of total fee income contributed by underwriting high yield debt in the calendar year of the debt issue. DeLong (1991) finds that more (less) reputable investment banks with higher percentages of fee income from underwriting have more (less) to lose from eroding their reputations for short-term gains. Lead arrangers in private debt placements, and 144A Non-Life debt issues in particular, are relatively younger and underwrite fewer number of issues, but generate a higher percentage of underwriting income from high yield debt.

Five variables account for differing dimensions of issuer quality. *SEC-Reporting* and *1st Time* are indicator variables that proxy for public disclosure and opacity. Overall, 82% of firms that issue high yield debt are SEC reporting; the remaining 18% are foreign firms. Further, the incidence of foreign first-time issuers is notably higher than that of domestic issuers across all three placement types. Private debt placements also seem more likely for foreign firms that are non-SEC reporting and first-time issuers.

Parent Rating is the *S&P* or *Moody's* long-term issuer credit rating expressed in a numerical scale where *AAA*/*Aaa* = 1. On average, foreign firms are better rated than domestic firms regardless of debt placement choice. Issuers in public debt placements tend to be better rated, but they are poorer rated in 144A Life debt placements.

Firm Age is measured in years and computed based on the year the issuing firm was founded as reported in *Capital IQ*. On average, foreign firms are younger than domestic firms. In the sample, the youngest (oldest) firms are foreign (domestic) issuers of public debt. Foreign firms are older in private than public debt placements. Domestic firms are older in public than private debt placements

Total Assets, measured in millions of dollars, is the book value of assets at the issue date. In public

debt placements, foreign and domestic firms are similar in size. In private debt placements, however, foreign firms tend to be several times larger than domestic firms, particularly in 144A Non-Life debt issues.

Five variables characterize issue quality. *IG/HY Split-Rated* is an indicator variable that equals 1 when the issue is dual rated and credit rating agencies disagree on whether the issue is investment or speculative grade, and 0 otherwise. Although only 4% of all high yield debt issues are split-rated, 15.3% of public debt placements by foreign firms are split-rated; 11.9%, for domestic firms. Split-rated debt in private debt placements are notably less likely, particularly, on 144A Life debt issues.

Issue Rating is the *S&P* or *Moody's* issue credit rating expressed in a numerical scale where *AAA/Aaa* = 1, and averaged, when the issue is dual rated. On average, issues in public debt placements are at least one notch better rated than on private debt placements. *Issue Size*, measured in millions of dollars, is the offer amount of the bond. On average, public debt placements are about $90 million larger than private debt placements. *Issue Maturity*, measured in years, is the term life of the debt issuance. Debt maturity in public debt placements tends to be longer, but shorter in private debt placements, particularly on 144A Life issues. *Senior Secured* is an indicator variable that takes on a value of 1 when the debt issue is collateralized, and 0 otherwise. Although 11% of high yield debt issues are senior secured, only 1% and 2% of public debt placements are senior secured by foreign and domestic firms, respectively. Senior secured seem most likely in private debt placements, particularly, 144A Life debt issues.

Yield Spread, measured in basis points, is computed as offer yield minus the yield on a Treasury bond of the same maturity. The overall average yield spread is 535.2 basis points, with spreads being higher on debt issues by foreign firms relative to domestic ones. Regardless of issuer domicile, yield spreads are also higher in private than public debt placements. The temporal pattern in yield spreads by debt placement over the sample period is shown in Figure 4.

<Insert Figure 4 here.>

IV. Results and Discussion

A. Double Selection Model Setup

To understand the factors that influence a firm's lender choice, I model the match of issuers and investors as a (nested) double selection probit model. In this framework, I take the decision to issue high yield bonds as exogenous and assess whether firms care from whom they borrow. In the model, the issuing firm first decides whether to elect a private placement of permanently restricted 144A Life debt securities. If not, the decision comes down to a private placement of 144A Non-Life debt with registration rights, or a public placement of SEC-registered debt securities. Bear in mind the difference between 144A Non-Life and public placement reflects the speed of issuance from a delay in SEC registration. All the 144A Non-Life debt issues in the sample are eventually registered post-issue.

The participation equations that characterize issuer and investor matches are nested probit functions.

$$\begin{aligned} I_1^* &= \mathbf{x}_1'\boldsymbol{\gamma}_1 + \varepsilon_1 \qquad I_1 = 1 \text{ when } I_1^* > 0 \text{ and } I_1 = 0 \text{ when } I_1^* < 0 \\ I_2^* &= \mathbf{x}_2'\boldsymbol{\gamma}_2 + \varepsilon_2 \qquad I_2 = 1 \text{ when } I_2^* > 0 \text{ and } I_2 = 0 \text{ when } I_2^* < 0 \\ &\qquad\qquad \text{only possible when } I_1 = 0 \end{aligned} \tag{1}$$

and

$$\begin{pmatrix} \varepsilon_1 | \mathbf{x}_1 \\ \varepsilon_2 | \mathbf{x}_1, \mathbf{x}_2 \end{pmatrix} \sim N\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 & \rho_{12} \\ \rho_{12} & 1 \end{pmatrix} \tag{2}$$

In (1), $I_1^* > 0$ ($I_1^* < 0$) is the index function that embodies the firm's decision whether or not to issue permanently restricted securities (144A Life). $I_2^* > 0$ ($I_2 < 0$) reflects whether 144A Non-Life securities with delayed post-issue SEC registration or at-issue SEC registered securities is used. In (2), the observable and latent factors that influence bond placement choices are reflected in $(\mathbf{x}_1, \mathbf{x}_2)$ and $(\varepsilon_1, \varepsilon_2)$, respectively. Observable factors are variables that affect the choice of issuers to self-select into restricted or registered debt offers, and if registered offers, with delayed or at-issue registration. Latent factors are unknown motives that influence the bond placement choices of issuers, which can be

correlated with each other as well as with outcomes. Following Greene (2003), I identify a subset of exclusionary observable factors that affect the bond placement choices by issuers but do not affect the outcomes y from their placement for identification purposes.

The log likelihood function for the bivariate probit is:

$$\log L = \sum_i \begin{bmatrix} I_{1i} \cdot \ln \Phi\left(\mathbf{x}_{1i}'\boldsymbol{\gamma}_1\right) + \left(1 - I_{1i}\right) \cdot \ln \Phi\left(-\mathbf{x}_{1i}'\boldsymbol{\gamma}_1\right) \\ + \left(1 - I_{1i}\right) I_{2i} \cdot \ln \Phi\left(-\mathbf{x}_{1i}'\boldsymbol{\gamma}_1, \mathbf{x}_{2i}'\boldsymbol{\gamma}_2\right) + \left(1 - I_{1i}\right)\left(1 - I_{2i}\right) \cdot \ln \Phi\left(-\mathbf{x}_{1i}'\boldsymbol{\gamma}_1, -\mathbf{x}_{2i}'\boldsymbol{\gamma}_2\right) \end{bmatrix} \quad (3)$$

where $i = 1, 2, \ldots, N$ denote issue observations. Defining $q_{1i} = 2I_{1i} - 1$ and $q_{2i} = 2I_{2i} - 1$, the general form of the bivariate log likelihood function is:

$$\log L = \sum_i \ln \Phi\left(q_{1i}\mathbf{x}_{1i}'\boldsymbol{\gamma}_1, q_{2i}\mathbf{x}_{2i}'\boldsymbol{\gamma}_2; \rho_i^*\right) \quad (4)$$

where $\rho_i^* = q_{1i}q_{2i}\rho_{12}$. When $\rho_{12} = 0$, the bivariate probit functions can be estimated independently as univariate probit functions. In (3), $\Phi\left(\mathbf{x}_{1i}'\boldsymbol{\gamma}_1\right)$ and $\Phi\left(-\mathbf{x}_{1i}'\boldsymbol{\gamma}_1\right)$ are the likelihoods of offering restricted and registered securities, respectively. Given the bond is offered with registration rights, $\Phi\left(\mathbf{x}_{2i}'\boldsymbol{\gamma}_2 \mid -\mathbf{x}_{1i}'\boldsymbol{\gamma}_1\right) = \Phi\left(-\mathbf{x}_{1i}'\boldsymbol{\gamma}_1, \mathbf{x}_{2i}'\boldsymbol{\gamma}_2\right) / \Phi\left(-\mathbf{x}_{1i}'\boldsymbol{\gamma}_1\right)$ reflects the likelihood that the bond is privately placed but with delayed registration (Nonlife); and $\Phi\left(-\mathbf{x}_{2i}'\boldsymbol{\gamma}_2 \mid -\mathbf{x}_{1i}'\boldsymbol{\gamma}_1\right) = \Phi\left(-\mathbf{x}_{1i}'\boldsymbol{\gamma}_1, -\mathbf{x}_{2i}'\boldsymbol{\gamma}_2\right) / \Phi\left(-\mathbf{x}_{1i}'\boldsymbol{\gamma}_1\right)$ reflects the likelihood that the bond is publicly placed with immediate registration.

B. Double Selection Model Estimation

The double selection probit regression results are presented in Table 2. In the first probit regression, the limited dependent variable is *Life*, which equals 1 when the bond is issued as a permanently restricted security, and 0, when it is issued with registration rights. In the second probit regression, the limited dependent variable is *Non-Life*, that equals 1 when the bond is issued with delayed post-issue registration through Rule 144A (private placement), and 0, when it is registered at-issue (public placement). Model 2 is the best and most parsimonious specification. Additionally, to assess economic significance, I follow Menard (2002) and estimate standardized regression

coefficients. I focus on the standardized coefficients version of Model 2 in subsequent discussion.[20]

<Insert Table 2 here.>

The double selection model supports the hypothesis that issuer/investor matches are negative assortative. Creditworthy but opaque borrowers are more likely to match with specialized lenders (QIBs) through private debt placements when the issuing firm is: (*i*) non-SEC reporting; (*ii*) poorer credit rated; (*iii*) foreign or first-time issuer; and (*iv*) smaller in asset size.

Additionally, private debt placements with specialized lenders (QIBs) are more likely when issue quality is poor. Issues are also less likely to be split investment-speculative grade rated and more likely to be senior secured. Collateral pledging is a costly dissipative signal used by high yield debt issuers. Its use corroborates findings in prior studies that asset securitization is associated with high quality borrowers (e.g. Bester 1985; Chan and Kanatas, 1985; Besanko and Thakor, 1987; Bester, 1987). Though statistically insignificant, private debt placements are also more likely to be shorter maturity debt.

Further, I find that market timing influences debt placement choice. Private placements of restricted 144A Life debt are more likely after the February 2008 amendment to Rule 144, which allows trading of restricted securities by QIBs without regard to whether the issuing firm is SEC reporting. Private placements of 144A Non-Life debt are also more likely when the issuing firm experiences a positive 52-week prior stock return. A one standard deviation increase in prior stock return leads to a 10.2% increase in the predicted probability of issuing 144A Non-Life debt, all else equal.

Lastly, probit regression results show the participation of specialized lenders (QIBs) in private placements is more likely when lead arrangers are not commercial banks, but rather, more established (older) investment banks with extensive experience underwriting large numbers of high yield debt issues. In the sample, commercial banks as lead arrangers underwrite 63.3% of public placements, but

[20]Model 2 is re-estimated with standardized unit variance on all continuous explanatory variables. Results are reported in the last two columns of Table 2.

only 43.6% and 54.9% of private placements by foreign and domestic firms, respectively. Moreover, when the lead arranger is a commercial bank, the odds are one-in-four that the lead arranger is also the issuing firm's current lender. Private placements with specialized lenders (QIBs) can restrain the significant bargaining power of relationship underwriters over issuing firms.

C. Outcome Equations

To examine the pricing impact of placement choice, I estimate seemingly unrelated switching regressions (SURs) of yield spreads taking the endogeneity of borrowing firms and lenders into account, and controlling for market conditions, issue size, and use of proceeds. Issuer specific Heckit correction terms (Inverse Mills Ratios) are used in switching regressions to account for the endogeneity of bond placement choice associated with 144A Life, 144A Non-Life, and public debt issues.[21]

$$\begin{aligned} IMR_1 &= E\left(\varepsilon_1 \mid \varepsilon_1 > -\mathbf{x}_{1i}'\boldsymbol{\gamma}_1\right) \\ &= \frac{\phi\left(\mathbf{x}_{1i}'\boldsymbol{\gamma}_1\right)}{\Phi\left(\mathbf{x}_{1i}'\boldsymbol{\gamma}_1\right)} \end{aligned} \tag{5}$$

$$\begin{aligned} IMR_2 &= E\left(\varepsilon_2 \mid \varepsilon_1 < -\mathbf{x}_{1i}'\boldsymbol{\gamma}_1, \varepsilon_2 > -\mathbf{x}_{2i}'\boldsymbol{\gamma}_2\right) \\ &= \frac{-\rho_{12}\Phi\left(\frac{\rho_{12}\mathbf{x}_{1i}'\boldsymbol{\gamma}_1 - \mathbf{x}_{2i}'\boldsymbol{\gamma}_2}{\sqrt{1-\rho_{12}^2}}\right)\phi\left(\mathbf{x}_{1i}'\boldsymbol{\gamma}_1\right) - \Phi\left(\frac{-\mathbf{x}_{1i}'\boldsymbol{\gamma}_1 + \rho_{12}\mathbf{x}_{2i}'\boldsymbol{\gamma}_2}{\sqrt{1-\rho_{12}^2}}\right)\phi\left(\mathbf{x}_{2i}'\boldsymbol{\gamma}_2\right)}{\Phi\left(-\mathbf{x}_{1i}'\boldsymbol{\gamma}_1, -\mathbf{x}_{2i}'\boldsymbol{\gamma}_2\right)} \end{aligned} \tag{6}$$

$$\begin{aligned} IMR_3 &= E\left(\varepsilon_2 \mid \varepsilon_1 < -\mathbf{x}_{1i}'\boldsymbol{\gamma}_1, \varepsilon_2 < -\mathbf{x}_{2i}'\boldsymbol{\gamma}_2\right) \\ &= \frac{-\rho_{12}\Phi\left(\frac{\rho_{12}\mathbf{x}_{1i}'\boldsymbol{\gamma}_1 - \mathbf{x}_{2i}'\boldsymbol{\gamma}_2}{\sqrt{1-\rho_{12}^2}}\right)\phi\left(\mathbf{x}_{1i}'\boldsymbol{\gamma}_1\right) + \Phi\left(\frac{-\mathbf{x}_{1i}'\boldsymbol{\gamma}_1 + \rho_{12}\mathbf{x}_{2i}'\boldsymbol{\gamma}_2}{\sqrt{1-\rho_{12}^2}}\right)\phi\left(\mathbf{x}_{2i}'\boldsymbol{\gamma}_2\right)}{\Phi\left(-\mathbf{x}_{1i}'\boldsymbol{\gamma}_1, \mathbf{x}_{2i}'\boldsymbol{\gamma}_2\right)} \end{aligned} \tag{7}$$

[21]Derivations can be obtained from the authors upon request.

Estimated switching regressions for the entire sample are reported in Table 3.

Entire Sample

All else equal, average yield spreads on public and 144A Non-Life placements of 259 bps and 260 bps respectively, are not different. This finding corroborates a similar observation by Fenn (2000). The incremental information provided by securities registration do not seem to be important, particularly for sophisticated investors (QIBs). 144A Non-Life placements of high yield debt, which are subsequently registered within a year of issue, are used to facilitate speed of issuance. Regardless of debt placement choice, yield spreads are lower for SEC reporting firms and larger size issues; and higher, for first-time and poorer credit rated issuers.

<Insert Table 3 here.>

Importantly, I show that as specialized lenders, QIBs who conduct extensive due diligence, structure the terms and covenants of the debt indenture, as well as renegotiate terms and covenants as conditions warrant, carry out a vital certification role for high yield debt issuers. The difference in average yield spreads between 144A Life and public placements of 63.7 bps (=323.7-260) compensates QIBs not only for the cost of information production and monitoring, which takes the place of public disclosures associated with SEC registration, but also for secondary market illiquidity from restrictions on trading unregistered securities to QIBs. Relative to public placements, yield spreads in 144A Non-Life and 144A Life placements, respectively, are 33.1 bps (=33.5+0.4) and 33.2 bps (=33.6+0.4) lower for SEC reporting firms; and 12.7 bps (=27.7-15.1) and 9.9 bps (=25-15.1) higher, for first-time issuers.

The impact on yield spreads from the use of proceeds proxy for potential agency conflicts of interest between borrowing firms and their lenders. Compared to public debt placements, yield spreads are lowest in private debt placements for the purpose of refinancing that do not involve changes in leverage. But highest for recapitalization, consistent with increased default risk when debt proceeds are used either to finance share repurchases or to pay cash dividends. Yield spreads are also lower in public than private debt placements to finance acquisitions that involve target firms and

inherently difficult to evaluate.

Further, regardless of placement choice, yield spreads are 12 bps to 17 bps higher when credit conditions tighten. Lastly, lower yield spreads associated with larger size issues is a multiple of 2.7 (=22.5/8.2) and 2.7 (=21.9/8.2) greater in 144A Non-Life and 144A Life than public placements.

Domestic vs. Foreign Firms

Switching regression results for domestic and foreign firms reported in Table 4 address two hypotheses. First, if the initial impetus for Rule 144A was to attract foreign issuers to deeper and more liquid U.S. securities markets, then certification by QIBs should facilitate the access of foreign firms to the U.S. high yield debt market. Creditworthy but opaque foreign firms should have lower yield spreads borrowing from specialized lenders (QIBs) than retail investors. Second, if QIBs in 144A Life placements substitute specialized lenders for underwriter certification, then QIBs should be especially important when the bargaining power of the underwriter is significant; that is, when lead underwriters are the issuing firm's current lenders.

<Insert Table 4 here.>

All else equal, average yield spreads are 280.6 bps (=510.6-230) higher on public placements of high yield debt by foreign firms compared to domestic firms. The percentage of high yield debt issues by foreign and domestic firms through public placements are similar at 17.5% and 18.2%, respectively. Foreign firms are, however, considerably better off with private placements of high yield debt. Relative to public debt placements, yield spreads on 144A Non-Life and 144A Life debt placements by foreign firms are 344.2 bps (=510.6-176.4) and 161.8 bps (=510.6-348.8) lower, respectively. But for similar placements by domestic firms are not meaningfully higher by 21.2 bps (251.1-229.9) and lower by 8.2 bps (=221.7-229.9).

These results are consistent with the "home bias" literature, (French and Poterba, 1991; Tesar and Werner, 1995). The lack of familiarity with foreign firms can be a major hurdle for unsophisticated retail investors in public debt placements to overcome. Further, private placements of high yield debt by foreign firms are priced more favorably by specialized lenders for reasons unrelated to public

disclosure (Chaplinsky and Ramchand, 2004). Foreign firms may be more willing than domestic firms to reveal proprietary information to sophisticated QIB investors when the release of confidential information has adverse consequences in contestable product markets (Bhattacharya and Chiesa, 1995; and Yosha, 1995).

Extant literature suggests that underwriters who are inside lenders will exploit their information advantage. In Rajan (1992), the information advantage, which allows inside lenders to exercise control over project continuation in the future, is more severe when informational asymmetry is high. On debt placements by relationship underwriters who are current lenders to issuing firms, yield spreads are 21.3 bps and 6.5 bps higher in public placements by foreign and domestic firms, respectively. Compared to domestic firms, foreign firms are only 1% less likely to use public placements by relationship lenders, but 5.3% and 10.2% less likely to use private placements of 144A Non-Life and 144A Life debt issues by relationship lenders.

In private placements, QIBs take the place of underwriter certification. Whether the issuer is a domestic or foreign firm, QIBs moderate the bargaining power of relationship underwriters, and more markedly when the issuer is a foreign firm. Relative to public placements, yield spreads on private placements of 144A Non-Life and 144A Life debt issues with relationship underwriters are always lower for foreign firms by 31.9 bps (=10.6+21.3) and 38 bps (=16.7+21.3), respectively. For domestic firms, yield spreads in private relative to public placements by relationship underwriters are not meaningfully different; lower by 9.2 bps (=2.7+6.5) on 144A Non-Life debt issues, and higher by 1 bps (=7.5-6.5) on 144A Life debt issues.

In public and private debt placements, a 100% of domestic firms are SEC reporting. In contrast, 98.6% of foreign firms in public debt placements are SEC reporting, but only 47.4% and 30.9% of foreign firms in private 144A Non-Life and 144A Life debt placements respectively, are SEC reporting. Foreign firms, who are also first-time issuers, are 2.5% more likely to use public placements; but 6.5% and 12.8% more likely, to use 144A Non-Life and 144A Life placements, respectively.

The incidence and cost of cross-subsidization is pronounced in public debt placements when a lack of familiarity makes it difficult for unsophisticated retail investors to discriminate more from less

creditworthy foreign borrowers (Tirole, 2006). Opaque, but creditworthy, borrowers are always hurt by the presence of less-creditworthy borrowers when certification by underwriters is imperfect.

Compared to domestic firms, yield spreads are 84.6 bps and 72.7 bps (=85.5-12.8) bps higher on public debt placements by foreign firms who are SEC reporting and first-time issuers respectively. For the same credit rating, yield spreads in public debt placements are 63% (=5.8/3.6-1) higher for foreign firms than domestic firms. The reduction in yield spreads from larger size issues is 29% (=5.9/8.4-1) less on public debt placements by foreign firms than domestic firms.

Relative to those on public debt placements, the yield spreads of 144A Non-Life and 144A Life debt placements are 114.5 bps (=84.7+29.8) and 108.6 bps (84.7+23.9) lower for SEC reporting foreign firms, respectively; 52.9 bps (=85.5-32.5) and 60.9 bps (=85.5-24.6) lower, for foreign first-time issuers. For the same credit rating, yield spreads are 44% (=5.8/3.3-1) and 20% (=5.8/4.6-1) lower on 144A Non-Life and 144A Life than public debt placements by foreign firms. The reduction in yield spreads from larger size issues is 6.2 times (=37.1/6-1) and 4.5 times (=26.8/6-1) more on 144A Non-Life and 144A Life than public debt placements by foreign firms.

In contrast, domestic firms do not generally benefit from private debt placements because all domestic firms that issue high yield debt are SEC reporting. Relative to public debt placements, 144A Non-Life and 144A Life debt placements are 11 bps (=23.8+12.8) higher for first-time domestic issuing firms. For the same credit rating, yield spreads are 12% (=4/3.6-1) and 35% (=4.8/3.6-1) higher on 144A Non-Life and 144A Life than public debt placements by domestic firms. Relative to public debt placements, the reduction in yield spreads from larger size issues is 2.2 times (=18.3/8.4-1) more on 144A Non-Life but not meaningfully different on 144A Life debt placements by domestic firms.

For foreign firms, private placements with QIBs curb adverse selection and moral hazard concomitant with informational asymmetry. As Boyd and Prescott (1986) and Diamond (1991) argue, private lenders have a cost advantage in producing information because a public offering to dispersed investors leads to either duplication of effort or a free-riding. And as Gomes and Phillips (2012) show, the likelihood of private placement increases with higher information asymmetry.

Additionally, yield spreads on private and public placements by foreign and domestic firms are affected by the use of proceeds. Unsophisticated retail investors tend to view proceeds used to finance acquisitions positively; and negatively when proceeds are used to refinance debt. Moreover, to unsophisticated retail investors, foreign firms will appear less familiar and more opaque than domestic firms.

Acquisitions are more challenging to evaluate. Yield spreads are lower in public than private debt placements to finance acquisitions; -80.3 bps for foreign firms, and -14.4 bps for domestic firms. Yield spreads are generally lower in refinancing and higher in recapitalization that involve increased leverage. Reduced yield spreads on private debt placements for refinancing are larger for domestic than foreign firms. But increased yield spreads on private debt placements for recapitalization are larger for foreign than domestic firms.

<Insert Table 5 here.>

Market Timing

Switching regressions, which take the impact of prior year stock return on placement choice by domestic and foreign firms, are reported in Table 5. Regardless of placement choice, yield spreads are lower (higher) when the issuing foreign or domestic firm experiences a positive (negative) stock return in the year prior. In public debt placements, the decreases in yield spreads associated with a positive prior year stock return for foreign and domestic firms are 45.6 bps and 52.1 bps, respectively; the increases in yield spreads associated with a prior year negative stock return are 104.1 bps and 18.9 bps for foreign and domestic firms, respectively. In 144A Non-Life and 144A Life debt placements by foreign firms, the magnitude of the decrease in yield spreads associated with a positive prior year stock return are not meaningfully different; but the relative increases in yield spreads for privately placed bonds of issuers associated with a negative prior year stock return are lower by 33.6 bps (=104.1-70.5) and 80.5 bps (=104.1-23.6).

In contrast, the increase in yield spreads associated with a negative prior year stock return are not meaningfully different between 144A Non-Life and 144A Life debt placements by domestic firms.

However, yield spreads associated with a positive prior year stock return are notably lower by 34.3 bps (=52.1-17.8) in 144A Non-Life debt placements. By and large, foreign firms are more opaque than domestic firms. Compared to sophisticated QIB investors, unsophisticated retail investors tend to overreact (underreact) to "bad" news associated with negative revaluations of equity on foreign (domestic) firms; but underreact (overreact) to "good" news associated with positive revaluations of equity on foreign (domestic) firms.

V. Conclusion

Using a sample of 4,547 high yield debt issues over the period 2005 to 2015, I find the matches between lenders and borrowers are negative assortative on transparency and sophistication, whereby less transparent borrowers will match with more sophisticated informed lenders. I find that creditworthy borrowers are always hurt by the presence of non-creditworthy borrowers when lenders are uninformed. Importantly, by leveraging investor restrictions associated with Rule 144A private placements, I show that QIBs as specialized lenders play an important role in certifying creditworthiness.

FIGURES

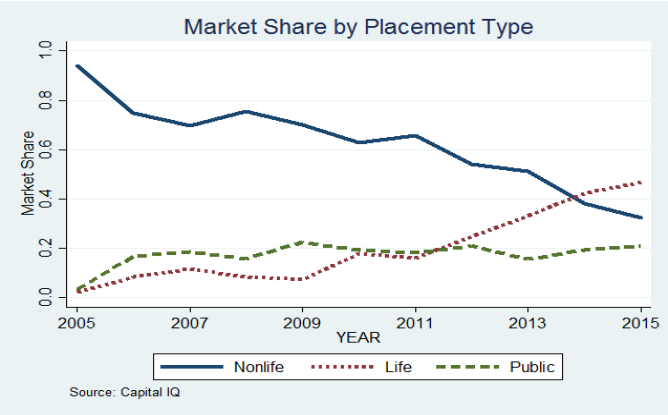

Figure 1

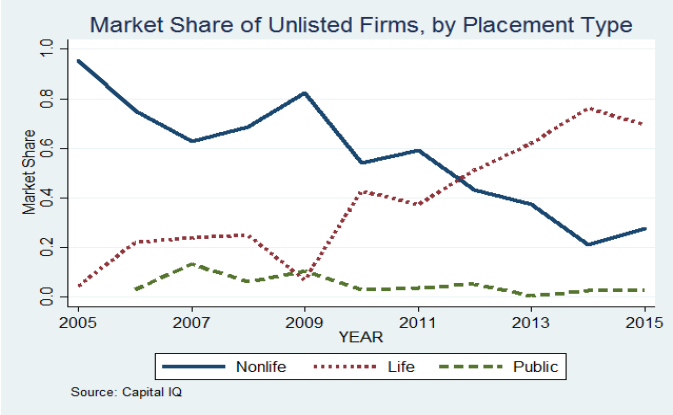

Figure 2

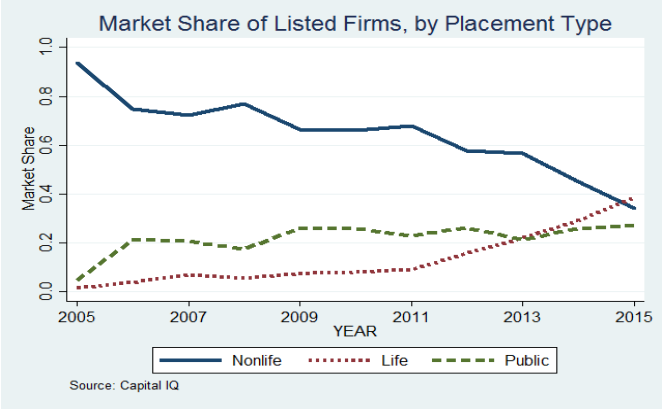

Figure 3

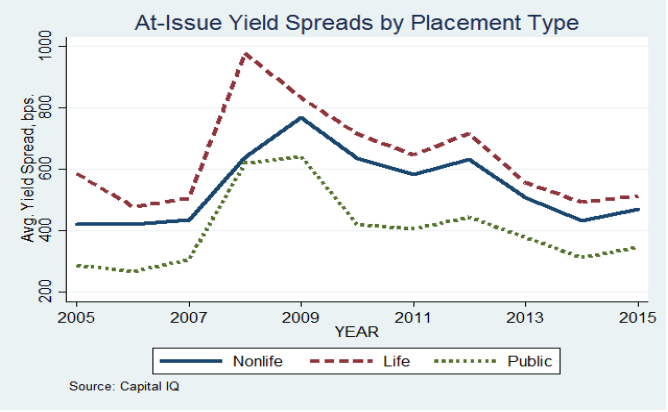

Figure 4

Table 1 – Summary Statistics. Sample consists of 4,547 cash-pay, fixed rate, high yield debt issued domestically over the period 2005 to 2015. Underwriter is Commercial Bank and Lead Underwriter is Current Lender are indicator variables. No. of HY Bonds Underwritten is the number of issues underwritten by the lead arranger in the calendar year of the issue. Underwriter Age is total number of years lead underwriter has been in business at issue date. HY Underwritten ($)/Total Underwritten ($) is the percentage of total fee income contributed by underwriting high yield debt. SEC reporting and 1st Time are indicator variables. Parent Rating is *S&P* or *Moody's* long-term issuer rating in numerical scale where AAA/Aaa = 1. Prior Year Stock Return is the change in stock price over the 52-week period preceding the bond issuance. Firm Age is computed from the year issuing firm was founded as reported in the *Capital IQ* database. Total Assets is the book value of the issuer's assets at time of bond issuance. IG/HY Split-Rated indicates issue is split-rated. Issue Rating is *S&P* or *Moody's* issue rating in numerical scale where AAA/Aaa = 1 and averaged when the issue is dual rated. Issue Size is the dollar amount of the debt offering. Issue Maturity reflects the maturity of the bond. Senior Secured is 1 when the issue is collateralized, and 0 otherwise. Yield Spread is offer yield minus yield on a Treasury bond of the same maturity.

		144A Life		144A Non-Life		Public	
	Overall	Domestic	Int'l	Domestic	Int'l	Domestic	Int'l
No. of Observations	4,547	882	178	2,231	433	693	130
Market Conditions							
Post Amendment	0.82	0.95	0.94	0.77	0.74	0.88	0.82
Prior Year Stock Return	0.27	0.08	0.11	0.36	0.13	0.44	0.22
Underwriting Characteristics							
UW is Commercial Bank	0.53	0.48	0.45	0.56	0.42	0.63	0.64
Lead UW is Current Lender	0.16	0.95	0.94	0.77	0.74	0.88	0.82
No. of HY Bonds UW'd	203.5	237.1	219.8	192.7	179.5	221.4	203.7
Underwriter Age (years)	145.9	149.7	137.5	146.4	138.9	154.2	164.1
HY UW ($)/Total UW ($)	0.26	0.23	0.13	0.18	0.12	0.16	0.15
Issuer Characteristics							
SEC Reporting	0.82	1.00	0.31	1.00	0.47	1.00	0.99
1st Time	0.13	0.14	0.27	0.11	0.17	0.02	0.04
Parent Rating	12.5	14.1	13.6	12.2	11.8	11.9	10.8
Age (years)	37.8	40.7	31.8	38.4	29.9	48.4	26.9
Total Assets ($Million)	21,884	5,644	16,125	6,159	80,230	20,095	22,462
Issue Characteristics							
IG/HY Split Rated	0.040	0.007	0.005	0.031	0.022	0.119	0.153
Issue Rating	14.4	14.8	14.9	14.6	14.7	13.0	12.7
Issue Size ($Million)	489.9	500.4	460.7	475.4	468.3	560.3	559.2
Issue Maturity (years)	7.8	7.4	7.0	8.0	7.6	8.6	8.2
Senior Secured	0.11	0.19	0.20	0.09	0.13	0.02	0.01
Yield Spread	535.2	564.3	608.7	536.8	595.1	405.6	424.4

Table 2 - Double Selection Probit Regressions. Sample consists of 4,547 cash-pay, fixed rate, high yield debt issued domestically over the period 2005 to 2015. Underwriter is Commercial Bank and Lead Underwriter is Current Lender are indicator variables. No. of HY Bonds Underwritten is the number of issues underwritten by the lead arranger in the calendar year of the issue. Underwriter Age is total number of years lead underwriter has been in business at issue date. HY Underwritten ($)/Total Underwritten ($) is the percentage of total fee income contributed by underwriting high yield debt. SEC reporting and 1st Time are indicator variables. Parent Rating is *S&P* or *Moody's* long-term issuer rating in numerical scale where AAA/Aaa = 1. Prior Year Stock Return is the change in stock price over the 52-week period preceding the bond issuance. Firm Age is computed from the year issuing firm was founded as reported in the *Capital IQ* database. Total Assets is the book value of the issuer's assets at time of bond issuance. IG/HY Split-Rated indicates issue is split-rated. Issue Rating is *S&P* or *Moody's* issue rating in numerical scale where AAA/Aaa = 1 and averaged when the issue is dual rated. Issue Size is the dollar amount of the debt offering. Issue Maturity reflects the maturity of the bond. Senior Secured is 1 when the issue is collateralized, and 0 otherwise. The limited dependent variables on jointly estimated bivariate participation equations are 144A Life and 144A Non-Life. Standard errors are clustered on Fama-French 17 industry classification in all models. *p*-values are in parentheses. **p*<0.10, ***p*<0.05, and ****p*<0.01.

	Model 1		**Model 2**		**Standardized**	
	144A Life	**144A Non-Life**	**144A Life**	**144A Non-Life**	**144A Life**	**144A Non-Life**
Market Timing						
Post Amendment	2.177***		2.112***		2.112***	
	(0.000)		(0.000)		(0.000)	
Prior Year Stock Return	-0.033	-0.003		9.656***		10.159***
	(0.315)	(0.199)		(0.000)		(0.000)
Underwriting Characteristics						
Underwriter is Commercial Bank	-0.302***	0.022	-0.309***	0.081	-0.309***	0.081
	(0.002)	(0.135)	(0.001)	(0.164)	(0.001)	(0.164)
Lead Underwriter is Current Lender	0.073	0.014	0.077	0.041	0.077	0.041
	(0.269)	(0.793)	(0.238)	(0.124)	(0.238)	(0.124)
No. of HY Bonds Underwritten	-0.010***	-0.007***	-0.010***	-0.002***	0.076	-0.048
	(0.000)	(0.000)	(0.000)	(0.000)	(0.175)	(0.118)
Ln(Underwriter Age)	-0.251***	-0.168***	-0.254***	0.019	0.176***	0.021***
	(0.000)	(0.000)	(0.000)	(0.254)	(0.002)	(0.000)
No. HY Bonds Underwritten*Ln(UW Age)	0.002***	0.001***	0.002***	0.000**	0.201***	0.029***
	(0.000)	(0.000)	(0.000)	(0.030)	(0.000)	(0.000)
HY Underwritten ($)/Total Underwritten ($)	-0.267	-0.661***	-0.293	0.004	-0.055	-0.004
	(0.403)	(0.000)	(0.373)	(0.878)	(0.380)	(0.389)
Issuer Characteristics						
Foreign	0.594***	0.031	0.586***	0.518***	0.586***	0.518***
	(0.000)	(0.580)	(0.000)	(0.000)	(0.000)	(0.000)
SEC Reporting	-0.426***	0.553***	-0.424***	-0.062***	-0.424***	-0.062***
	(0.000)	(0.000)	(0.000)	(0.005)	(0.000)	(0.005)
1st Time	0.207***	-0.387***	0.224***	0.055***	0.224***	0.055***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Parent Rating	0.041*	-0.037***	0.052***	0.010***	0.052***	0.010***
	(0.077)	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)
Ln(Age)	0.024	-0.061***				
	(0.580)	(0.000)				
Ln(Total Assets)	-0.044***	-0.041***	-0.045***	-0.001	-0.046***	-0.005***
	(0.000)	(0.000)	(0.000)	(0.697)	(0.000)	(0.002)

Table 2 – Double Selection Probit Regressions (cont.).

	Model 1		Model 2		Standardized	
	144A Life	**144A Non-Life**	**144A Life**	**144A Non-Life**	**144A Life**	**144A Non-Life**
Issue Characteristics						
IG/HY Split Rated	-0.756***	0.132***	-0.831***	-0.023	-0.831***	-0.023
	(0.000)	(0.002)	(0.000)	(0.698)	(0.000)	(0.698)
Issue Rating	0.029	0.020**				
	(0.209)	(0.035)				
Issue Size Meets Index Liquidity Constraint	0.083	0.057*				
	(0.137)	(0.075)				
Ln(Term)	-0.174	-0.020	-0.178		-0.052	
	(0.186)	(0.745)	(0.151)		(0.146)	
Senior Secured	0.393***	-0.483***	0.379***	0.069***	0.379***	0.069***
	(0.001)	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)
Constant	-1.399**	-3.895***	-0.865*	-3.984***	-1.982***	-4.738***
	(0.022)	(0.000)	(0.092)	(0.000)	(0.000)	(0.000)
Model Diagnostics						
ρ	-0.98***		-0.99***		-0.98***	
	(0.000)		(0.000)		(0.000)	
Standard Error of Residual	0.174	0.225	0.154	0.651	0.154	0.472
Wald Chi-square	4,943.7		15,395.9		12,270.8	
Log Pseudolikelihood	-1,680.4		-1,684.5		-1,684.5	
McKelvey and Zavoina R^2 (1975)	0.543		0.550		0.551	
Tjur R^2 (2009)	0.511		0.556		0.556	
Percent Correctly Predicted (PCP)	*82.4%*	*78.5%*	*82.4%*	*80.1%*	*82.3%*	*80.1%*
expected Percent Correctly Predicted (ePCP)	*75.3%*	*71.3%*	*75.3%*	*73.0%*	*75.4%*	*72.9%*
Industry Fixed Effects	Yes		Yes		Yes	

Table 3 – Offer Yield Spread Regressions. Sample consists of 4,547 cash-pay, fixed rate, high yield debt issued domestically over the period 2005 to 2015. Dependent variable is at-issue yield spread to maturity (STM). Inverse Mills Ratios (IMR) in switching regressions account for endogeneity. 5-1 Term Premium is the difference in term premium on the 5-year and 1-Year Treasury. SLOOS is the percent of domestic banks that report tightened standards on C&I loans to large and middle-market firms at issue date. VIX is the implied volatility on *S&P* 500 index options reported by the Chicago Board Options Exchange (CBOE). CFSI Liquidity is the Cleveland Financial Stress Index Liquidity Factor, which computes changes in bid-ask prices on 3-month T-Bills at issue date. Relationship-Arm's Length Underwriter is a contrast variable equal to 1 when the lead underwriter is also a lender on an existing syndicated loan, and -1 otherwise. 1st Time-Seasoned is a contrast variable that equals 1 when issuing firm is first-time, and -1 otherwise. SEC-Non-SEC Reporting is a contrast variable that equals 1 when the issuing firm is SEC-reporting, and -1 otherwise. Issuer Rating is *S&P* or *Moody's* long-term issuer rating in numerical scale where AAA/Aaa = 1. Issue Size is the dollar amount of the debt offering. All variables are computed at issue date. Standard errors are clustered on placement type. *p*-values are reported in parentheses. **p*<0.10, ***p*<0.05, and ****p*<0.01.

Dependent Variable		**All Firms**	
YIELD SPREAD (bps)	**144A Life**	**144A Non-Life**	**Public**
Market Conditions			
30 day % Change 5-1 Term Premium	0.002***	0.003***	0.000***
	(0.000)	(0.000)	(0.000)
30 day % Change in SLOOS Outlook	17.359***	11.564***	14.267***
	(0.000)	(0.000)	(0.000)
30 day % Change in VIX	-0.004***	0.025***	-0.004***
	(0.000)	(0.000)	(0.000)
30 day % Change in CFSI Liquidity	-0.011***	0.162***	-0.034***
	(0.000)	(0.000)	(0.000)
Underwriter, Issuer, and Issue Characteristics			
Relationship – Arm's Length Underwriter	-7.174***	-5.104***	7.222***
	(0.000)	(0.000)	(0.000)
SEC – Non-SEC Reporting Issuer	-33.569***	-33.518***	-0.356***
	(0.000)	(0.000)	(0.000)
1st Time – Seasoned Issuer	25.020***	27.734***	15.078***
	(0.000)	(0.000)	(0.000)
Issuer Credit Rating, percentile	4.666***	3.799***	3.722***
	(0.000)	(0.000)	(0.000)
Standardized Issue Proceeds	-21.954***	-22.490***	-8.201***
	(0.000)	(0.000)	(0.000)
Use of Proceeds			
Acquisition - GCP	12.880***	1.829***	-15.478***
	(0.000)	(0.000)	(0.000)
Recapitalization - GCP	32.937***	45.013***	10.104***
	(0.000)	(0.000)	(0.000)
Refinancing - GCP	-32.714***	-29.946***	4.357***
	(0.000)	(0.000)	(0.000)
IMR_144A Life	2.799***		
	(0.000)		
IMR_144A Non-Life		1.182***	
		(0.000)	
IMR_Public			1.858***
			(0.000)
Constant	323.662***	258.998***	259.977***
	(0.000)	(0.000)	(0.000)

Table 3 – Offer Yield Spread Regressions (cont.).

Dependent Variable		**All Firms**	
YIELD SPREAD (bps)	**144A Life**	**144A Non-Life**	**Public**
Observations	1,060	2,664	823
Adjusted R^2	0.482	0.421	0.528
Average Variance Inflation Factor	1.14	1.09	1.35
Standard Error of Residual	25.00	17.84	20.18
Industry Fixed Effects	Yes	Yes	Yes

Table 4 – Domestic vs. Foreign Firms. Sample consists of 4,547 cash-pay, fixed rate, high yield debt issued domestically over the period 2005 to 2015. Dependent variable is at-issue yield spread to maturity (STM). Inverse Mills Ratios (IMR) in switching regressions account for endogeneity. 5-1 Term Premium is the difference in term premium on the 5-year and 1-Year Treasury. SLOOS is the percent of domestic banks that report tightened standards on C&I loans to large and middle-market firms at issue date. VIX is the implied volatility on *S&P* 500 index options reported by the Chicago Board Options Exchange (CBOE). CFSI Liquidity is the Cleveland Financial Stress Index Liquidity Factor, which computes changes in bid-ask prices on 3-month T-Bills at issue date. Relationship-Arm's Length Underwriter is a contrast variable equal to 1 when the lead underwriter is also a lender on an existing syndicated loan, and -1 otherwise. 1st Time-Seasoned is a contrast variable that equals 1 when issuing firm is first-time, and -1 otherwise. SEC-Non-SEC Reporting is a contrast variable that equals 1 when the issuing firm is SEC-reporting, and -1 otherwise. †All domestic issuers are SEC-reporting firms. Issuer Rating is *S&P* or *Moody's* long-term issuer rating in numerical scale where AAA/Aaa = 1. Issue Size is the dollar amount of the debt offering. All variables are computed at issue date. All variables are computed at issue date. Standard errors are clustered on placement type. *p*-values are reported in parentheses. **p*<0.10, ***p*<0.05, and ****p*<0.01.

Dependent Variable	**Domestic Firms**			**Foreign Firms**		
YIELD SPREAD (bps)	**144A Life**	**144A Non-Life**	**Public**	**144A Life**	**144A Non-Life**	**Public**
Market Conditions						
30 day % Change 5-1 Term Premium	0.001***	0.003***	-0.000***	0.002***	0.003***	0.009***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
30 day % Change in SLOOS Outlook	15.679***	11.769***	14.325***	19.675***	11.636***	14.211***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
30 day % Change in VIX	0.004***	0.018***	0.002***	-0.009***	0.044***	-0.054***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
30 day % Change in CFSI Liquidity	-0.142***	0.162***	-0.049***	-0.008***	0.037***	0.451***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Underwriter, Issuer, and Issue Characteristics						
Relationship – Arm's Length Lender	7.532***	-2.748***	6.460***	-16.681***	-10.618***	21.299***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
SEC – Non-SEC Reporting Issuer	†	†	†	-23.926***	-29.849***	84.695***
				(0.000)	(0.000)	(0.000)
1st Time – Seasoned Issuer	23.788***	23.778***	12.768***	24.626***	32.549***	85.486***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Issuer Credit Rating, percentile	4.846***	4.020***	3.578***	4.647***	3.284***	5.819***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Standardized Issue Proceeds	-8.430***	-18.296***	-8.388***	-26.770***	-37.079***	-5.972***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Use of Proceeds						
Acquisition - GCP	35.874***	5.538***	-14.392***	5.880***	-4.099***	-80.307***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Recapitalization - GCP	25.061***	46.664***	9.371***	31.791***	33.581***	50.485***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Refinancing - GCP	-62.809***	-32.787***	6.096***	-10.758***	-20.603***	5.702***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
IMR_144A Life	6.111***			1.357***		
	(0.000)			(0.000)		
IMR_144A Non-Life		1.090***			1.765***	
		(0.000)			(0.000)	
IMR_Public			1.729***			-2.814***
			(0.000)			(0.000)

Table 4 – Domestic vs. Foreign Firms (cont.).

Dependent Variable YIELD SPREAD (bps)	Domestic Firms			Foreign Firms		
	144A Life	144A Non-Life	Public	144A Life	144A Non-Life	Public
Constant	221.725***	251.111***	229.941***	348.838***	176.374***	510.592***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	882	2,231	693	178	433	130
Adjusted R^2	0.523	0.428	0.525	0.456	0.382	0.522
Average Variance Inflation Factor	1.16	1.10	1.37	1.14	1.13	2.01
Standard Error of Residual	37.92	20.46	20.70	32.19	33.86	77.32
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Table 5 – Market Timing. Sample consists of 4,547 cash-pay, fixed rate, high yield debt issued domestically over the period 2005 to 2015. Dependent variable is at-issue yield spread to maturity (STM). Inverse Mills Ratios (IMR) in switching regressions account for endogeneity. 5-1 Term Premium is the difference in term premium on the 5-year and 1-Year Treasury. SLOOS is the percent of domestic banks that report tightened standards on C&I loans to large and middle-market firms at issue date. VIX is the implied volatility on *S&P* 500 index options reported by the Chicago Board Options Exchange (CBOE). CFSI Liquidity is the Cleveland Financial Stress Index Liquidity Factor, which computes changes in bid-ask prices on 3-month T-Bills at issue date. Prior Year Stock Return is the change in stock price over the 52-week period preceding the bond issuance. Positive (Negative) Prior Yr Stock Return-Not Traded are contrast variables that equal 1 if issuing firm is publicly traded and prior year stock return is positive (negative) and 0 otherwise; -1, if issuing firm is private. Relationship-Arm's Length Underwriter is a contrast variable equal to 1 when the lead underwriter is also a lender on an existing syndicated loan, and -1 otherwise. 1st Time-Seasoned is a contrast variable that equals 1 when issuing firm is first-time, and -1 otherwise. SEC-Non-SEC Reporting is a contrast variable that equals 1 when the issuing firm is SEC-reporting, and -1 otherwise. †All domestic issuers are SEC-reporting firms. Issuer Rating is *S&P* or *Moody's* long-term issuer rating in numerical scale where AAA/Aaa = 1. Issue Size is the dollar amount of the debt offering. All variables are computed at issue date. All variables are computed at issue date. Standard errors are clustered on placement type. *p*-values are reported in parentheses. **p*<0.10, ***p*<0.05, and ****p*<0.01.

Dependent Variable	**Domestic Firms**			**Foreign Firms**		
YIELD SPREAD (bps)	**144A Life**	**144A Non-Life**	**Public**	**144A Life**	**144A Non-Life**	**Public**
Market Conditions						
30 day % Change 5-1 Term Premium	0.002***	0.003***	0.000***	0.002***	0.003***	0.009***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
30 day % Change in SLOOS Outlook	14.902***	11.249***	13.075***	18.937***	11.655***	14.373***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
30 day % Change in VIX	-0.001***	0.019***	0.003***	-0.009***	0.044***	-0.072***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
30 day % Change in CFSI Liquidity	-0.162***	0.164***	-0.044***	-0.007***	0.042***	0.357***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Market Timing						
Positive Prior Yr Stock Return – Not Traded	-59.309***	-17.834***	-52.115***	-37.358***	-48.528***	-45.579***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Negative Prior Yr Stock Return – Not Traded	24.568***	25.061***	18.954***	23.654***	70.506***	104.141**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Underwriter, Issuer, and Issue Characteristics						
Relationship – Arm's Length Lender	2.718***	-3.664***	4.288***	-16.940***	-11.541***	18.854***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
SEC – Non-SEC Reporting Issuer	†	†	†	-11.950***	-27.729***	113.318**
				(0.000)	(0.000)	(0.000)
1st Time – Seasoned Issuer	25.772***	24.273***	17.138***	24.215***	33.337***	56.556***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Issuer Credit Rating, percentile	4.964***	4.055***	3.681***	4.617***	3.327***	5.895***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Standardized Issue Proceeds	-5.990***	-17.687***	-7.756***	-24.624***	-35.691***	-1.166***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Use of Proceeds						
Acquisition - GCP	30.274***	6.361***	-6.666***	6.298***	-4.098***	-71.122***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Recapitalization - GCP	26.048***	48.387***	-3.541***	29.919***	38.679***	100.012**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Refinancing - GCP	-64.100***	-34.506***	6.191***	-7.932***	-24.370***	1.586***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Table 5 – Market Timing (cont.).

Dependent Variable	Domestic Firms			Foreign Firms		
YIELD SPREAD (bps)	**144A Life**	**144A Non-Life**	**Public**	**144A Life**	**144A Non-Life**	**Public**
IMR_144A Life	5.779***			1.461***		
	(0.000)			(0.000)		
IMR_144A Non-Life		0.992***			2.012***	
		(0.000)			(0.000)	
IMR_Public			0.890***			-3.939***
			(0.000)			(0.000)
Constant	291.176**	258.980**	273.345**	351.113**	203.538**	597.571**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	882	2,231	693	178	433	130
Adjusted R^2	0.541	0.431	0.552	0.458	0.389	0.567
Average Variance Inflation Factor	1.19	1.11	1.72	1.49	1.36	2.27
Adjusted Standard Error of Residual	38.66	21.30	20.85	33.32	35.15	77.38
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

III. Essay 3 – Financial Disintermediation, Covenant-lite Loans and "Peso" Pricing

I.Introduction

Syndicated loans are commercial credits provided by a group of lenders that are structured, arranged, and administered by one or several commercial or investment banks, known as arrangers. When lenders are banks, syndicated loan facilities involve a revolving line of credit and amortizing term loan issued at LIBOR. Debt covenants imposed on borrowers protect lenders against credit default. Covenant breaches stipulate loan amendment fees, "make-whole" compensation, or transfer of control rights to lenders[22] In syndicated loans, maintenance covenants are tested at regular intervals and require ongoing compliance. In contrast, incurrence covenants in bonds are tested only when borrowers undertake specific actions, e.g. incur additional debt or repay junior debt, pay dividends, make an acquisition, or divest.[23] Maintenance covenants provide lenders an early warning signal that borrowers are not performing as expected and actions can be taken to improve performance and/or adjust loan terms. But for exchange listed borrowers, the reputational damage from a public disclosure of covenant violations can prompt financial distress that make corrective actions to address underperformance difficult. Moreover, when borrowers are riskier and more leveraged, maintenance covenants in syndicated loans rather than incurrence covenants in high yield bonds can be overly restrictive. Default is costly when uncertainty about and timing surrounding a liquidation or restructuring decision is high. An unexpected adverse change in macroeconomic conditions that results in a transitory decline in a borrower's financial performance gives lenders significant discretion on whether to trigger default.

The search for yield by non-bank lenders, institutional and private equity investors as well as retail investors in specialized debt funds, fueled an evolution in leveraged loans. Leveraged loans are

[22]Covenants specifying maximum leverage, minimum interest coverage ratio, and maximum fixed charge coverage ratio are common.

[23]For example, a financial covenant can require a minimum interest coverage ratio of 2.5 times prior 12-month EBITDA. When maintenance based, interest coverage is tested quarterly and compliance by the borrower is ongoing. When incurrence based, the borrower cannot take an action, e.g. issue new debt, which results in a violation of the interest coverage ratio.

defined by *S&P* as loan facilities that are either speculative grade rated or unrated/investment grade rated with facility spreads of LIBOR plus 125 bps or higher and secured by a first or second lien.[24] In term loans, the liens are on fixed assets, and on inventories and receivables in asset-backed loans.

The heightened interest of non-bank lenders in leveraged finance overwhelmed the demand for leveraged loans. Borrowers, particularly firms with financial sponsors, sought and received more borrower-friendly incurrence covenants akin to those in high yield speculative grade corporate bonds as non-bank institutional lenders assumed a more prominent corporate lending role.[25] At the end of February 2018, U.S. leveraged loans outstanding amounted to $984 billion.[26] 75.8% are covenant-lite loan debt held by institutional investors. Only 17.8% are rated BB or higher, 40.7% are rated B, and the remaining 42.6% are either unrated or rated CCC or lower.

There is little agreement, however, whether reductions in lender protection, adverse incentives to leak assets through tunneling, as well as prolonged life and optionality for shareholders in covenant-lite leveraged loans comes at the expense of lower recovery rates for lenders and increased systemic risk when macroeconomic conditions weaken. For bank lenders, covenant-lite loans allow borrowers in syndicated leveraged loans with financial sponsors to negotiate principal-reducing bond exchange offers that improve recovery rates. Non-bank lenders, who are not reliant on deposits and short-term debt, and funded by a sophisticated and stable base of institutional and private equity investors, may contribute to financial stability. In the 2008 financial crisis, the absence of fully-covenanted protection on existing debt allowed many companies, particularly those in energy and basic industry sectors, to avoid default by pledging assets to secure liquidity that kept them from default. Additionally, the reputation and financing capacity of non-bank lenders as well as cuts in the Fed Funds rate and injection of liquidity into the banking system enabled rated firms with access to capital to borrow.

I find that covenant-lite loans are not associated with greater risks of default and bankruptcy.

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[24]**See http://www.leveragedloan.com/primer/#!whatisaleveragedloan.**

[25]Using a sample of leveraged loans spanning the 1997-2007 period, Lim et. Al (2014) also document the increasing role of non-bank lenders.

[26]Source: *S&P* Global Market Intelligence, March 2018. Also see Figures 1 and 2.

In Billett et. al (2016), covenant choice is a tradeoff that lenders face between the value of monitoring that mitigates agency conflicts with borrowers, and the potential loss in future revenue from enforcing covenants and triggering default. Taking the self-selection of borrowers and lenders into covenant-lite and fully covenanted loans, I show the episodic nature of default and bankruptcy makes the valuation of low probability but high loss events by lenders difficult to forecast with accuracy. The resulting higher yields on covenant-lite leverage loans are catastrophic insurance premiums that borrowers pay lenders for unexpected losses from default and bankruptcy. Unexpected losses embed the likelihoods of default and bankruptcy and recovery rates when default and bankruptcy occur.

In covenant-lite loans, financial covenants are tested only when specific events occur, but are tested quarterly in non-covenant lite loans. Maintenance based covenant testing is valuable when there are strong incentives to monitor. Namely, when in the event of default, state verification – whether the borrowing firm should be liquidated or restructured, is costly and strategic intervention to resolve default outside bankruptcy through loan workouts avoids potential holdup costs from the option to delay by other creditors and shareholders.

Because institutions represent a heterogeneous group of lenders, the problems of free-riding and lender coordination in the event of default dilute the value of monitoring. Institutions are unlikely to offer covenant-lite loans to borrowers who have relatively high likelihoods of default. Moreover, the ability of banks to lend against excess risk-capital based reserves on deposits that are insured at subsidized premiums confers a cost of capital advantage to banks over institutions. Consistent with the inverse relationship between creditor rights and spreads documented by Bae and Goyal (2009), I find that all else equal, covenant-lite loans by institutional lenders will have higher yield spreads.

Borrowers who receive covenant-lite loans will be more creditworthy, and yield spreads on covenant-lite loans to creditworthy borrowers will be lower for banks than institutions. Less creditworthy borrowers will only receive non-covenant lite loans from banks.

II. Sample Construction

A. Data Sources

I obtain the sample of leverage loan facilities from the *S&P* Leveraged Commentary and Data (*LCD*) database over the period 1999 to Q3:2016. Leveraged loans are defined by *S&P* as loans either to speculative grade rated borrowers or unrated/investment grade rated borrowers at LIBOR rate plus 125 bps and secured either by a first or second lien. Leveraged loan facilities are single or multiple tranche. In a single tranche loan facility, the loan is either an amortizing loan with a shorter than six-year term and the lender is a bank, or a bullet term loan and the lenders are institutional investors in debt funds that specialize in collateralized loan obligations (*CLO*). A multiple tranche loan facility typically involves an unfunded revolver with amortizing term loan as well as bullet term loan. Amortizing term loans where the lenders are banks are fully covenanted (maintenance based), and covenant-lite (incurrence based) on bullet term loans where the lenders are institutional investors. In term loans, the liens are on fixed assets, and on inventories and receivables in asset-backed loans.

Because the focus is on credit risk associated with covenant-lite and fully covenanted loans, I require loan origination dates to manually reconcile borrowers with default and bankruptcy events. Borrowers in the sample of leverage loan facilities are private as well as publicly listed firms. Additionally, I compile the use of proceeds on all leverage loan facilities. The screening process produces a final sample of 14,795 leverage loan facilities involving 5,187 unique borrowers. 2,366 of the leverage loan facilities were covenant-lite. A total of 380 borrowers defaulted and filed for bankruptcy, of which 253 were covenant-lite leverage loan facilities.

Data on leverage loan facility characteristics – identity of the borrower, whether the facility is covenant-lite, tranche details (e.g. pricing, term, size, rating, and lender type), use of proceeds, and underwriter details, are provided in the *S&P* LCD database. Additional data on private borrowers is supplemented by *S&P* Capital IQ. Leverage loan facilities that are traded are flagged and related details on dates of first trade and prices are assembled. To classify lead arrangers as commercial or investment bank at loan origination dates, I use the primary Standard Industrial Classification (*SIC*)

codes from *S&P* Capital IQ. A lead arranger is a relationship bank when the bank served as a lead arranger on a borrower's prior loans. Loan pricing is the weighted average all-in-drawn spread over LIBOR.

B. Sample Description

Table 1 reports the total number and aggregate supply (billions of dollars) of leverage loans by year over the 18-year sample period 1999 to Q3:2016. The rising dominance of non-bank lenders is very apparent. The participation of bank lenders in leverage loans declined in the years preceding the financial crisis of 2008 – from 43.5% in 1999 to 12% in 2007. The annualized 6% growth in the number and 15% increase in aggregate supply of leverage loans prior to 2008 was clearly the result of a 15-fold increase in the number of non-bank lenders from 34 in 1999 to 521 in 2007. By 2007, the participation of non-bank lenders in leverage loans of 31.7% was almost three times the 12% participation of bank lenders. In 2008, the participation of non-bank lenders in leverage loans fell to 22.7% and rose to 31.4% for bank lenders. Following 2008, the percentage of leverage loans by non-bank lenders grew but shrunk for bank and mixed lenders. By the end of the sample period in Q3:2016, non-bank lenders provided 62.7% of leverage loans. Bank and mixed lenders provided 29.6% and 7.7% respectively.

< Insert Table 1 here.>

Prior to 2005, less than 1% of leverage loans were covenant-lite and the amounts never exceeded $0.5 billion. The supply increased markedly in the years following. In 2007, 19.8% of leverage loans were covenant-lite, presaging the financial crisis of 2008. Following a decline to 3.2% in 2008, the percentage of leverage loans rose contemporaneously with the rise in participation of non-bank lenders in leverage loans. In 2012, 22.9% of leverage loans were covenant-lite eclipsing the previous high established in 2007. By the end of the sample period in Q3:2016, of the $334.5 billion in leverage loans, $209.7 billion (62.7%) were from non-bank lenders and $174.2 billion (52.1%) were covenant-lite.

C. Covenant-Lite vs. Fully Covenanted Leverage Loans

Table 2 reports on the attributes of borrowers and lenders in covenant-lite and fully covenanted leverage loans. Lender specialization, where non-bank lenders serve speculative-grade rated while bank lenders serve unrated or investment-grade rated borrowers, is clear. Non-bank (institutional) lenders are predominant in covenant-lite leverage loans. 92.7% of covenant-lite leverage loans are extended by non-bank lenders. Bank lenders are principally active in fully covenanted leverage loans – 35.2% compared to 1.1% in covenant-lite leverage loans. In fully covenanted leverage loans with bank lenders, a bank is most likely to be a lead underwriter but less likely when the bank is also a borrower's current lender.

< Insert Table 2 here.>

Non-bank lenders in covenant-lite and fully covenanted leverage loans are essentially single tranche. Bank lenders are involved in multi-tranche leverage loans only in fully covenanted loans. 38.4% of multi-tranche leverage loans in covenant-lite and 93.4 % in fully covenanted leverage loans involve mixed lenders.

Average loan amounts are larger in covenant-lite than fully covenanted leverage loans – $607.4 billion by non-bank lenders compared to $366.8 billion by bank lenders. Average loan amounts are largest in leverage loans by mixed lenders. Terms are 2, 4, and 7 quarters longer in covenant-lite than fully covenanted leverage loans by bank, non-bank, and mixed lenders respectively. Loan facilities are always more likely to be rated in leverage loans by non-bank and mixed lenders than by bank lenders. 95.9% and 93.2% vs 38.5% in covenant-lite leverage loans and 70.7% and 61.5% vs. 31% in fully covenanted leverage loans. This ratings trend is consistent with Faulkender and Petersen (2006) in that rated borrowers have better access to debt capital. When leverage loan facilities are rated, covenant-lite leverage loans by non-bank and mixed lenders are speculative grade rated but investment grade rated by bank lenders. In fully covenanted leverage loans, loan facilities by non-bank, bank, and mixed lenders are investment grade rated. This suggests that access to capital in the leveraged loan

market is not necessarily tied to ratings themselves, but rather associated with having a rating in general. Asset-back leverage loans, which are collateralized by inventories and receivables, are prevalent only for bank lenders particularly in covenant-lite leverage loans. Borrower liquidity is more important for bank lenders. Deal proceeds are primarily used for refinancing and secondarily to finance acquisitions and leverage buyouts.

Fully covenanted leverage loans by bank lenders are essentially never traded. In contrast, 88.2% of covenant-lite and 49.9% of fully covenanted leverage loans by non-bank lenders are traded. Similarly, on leverage loans by mixed lenders. It appears trading may provide incentives for a diverse group of non-bank lenders to produce private information that avoids the free rider problem associated with monitoring.

Borrowers in covenant-lite leverage loans are more likely to have financial sponsors – 76.5% vs. 52.6% and be international firms – 11.8% vs. 5.5%, but less likely to be listed – 23.2% vs. 26.0% or first-time borrowers – 36.1% vs. 49.4%.

Leverage of borrowers are slightly higher in covenant-lite and fully covenanted leverage loans. Borrowers are most likely to be rated in covenant-lite than fully covenanted leverage loans particularly when lenders are non-banks. When borrowers are rated, the average rating of borrowers in covenant-lite leverage loans is speculative grade but investment grade in fully covenanted leverage loans.

A higher average all-in facility spread of 446.1 bps on covenant-lite leverage loans compared to 322.4 bps on fully covenanted leverage loans reflects the specialization of non-bank lenders in covenant-lite leverage loans and bank lenders in fully covenanted leverage loans. Facility spreads on leverage loans are market risk premiums associated with expected losses to lenders that embed not only the likelihoods of default and bankruptcy but also recovery rates when default and bankruptcy occur. The average rates of default and bankruptcy on covenant-lite are lower than on fully covenanted loans – 1.9% and 2.7% respectively. I will show, however, that implied average recovery rates are notably higher on fully covenanted than covenant-lite loans. The match of lenders and borrowers

affect facility spreads.

The average rates of default and bankruptcy in covenant-lite and fully covenanted leverage loans point to the relative value of screening rated borrowers by non-bank lenders and monitoring unrated borrowers by bank lenders. In covenant-lite leverage loans, 95.5% of borrowers with non-bank lenders are rated, but only 76.9% of borrowers with bank lenders are rated. The likelihoods of default and bankruptcy are significantly lower (higher) for rated than unrated borrowers in covenant-lite leverage loans with non-bank (bank) lenders. In fully covenanted leverage loans with bank lenders, lower default and bankruptcy rates suggest monitoring associated with maintenance-based covenant testing is more important. Unrated borrowers have lower (higher) rates of default and bankruptcy than rated borrowers in fully covenanted leverage loans with bank (non-bank) lenders. Moreover, when lenders are heterogeneous, lender coordination is more severe. Rates of default and bankruptcy in fully covenanted leverage loans by mixed lenders are significantly higher.

III. Borrower and Lender Matches

Covenant-lite and fully covenanted leverage loans reflect the endogenous match of borrowers and lenders. In a probit model, I use the insights from the prior section to ascertain how borrowers and lenders self-select into covenant-lite and fully covenanted leverage loans taking lead arranger and facility characteristics into account. The limited dependent variable equals 1 when the leverage loan is covenant-lite, and 0, when fully covenanted. Maximum likelihood is used to estimate the probit regression. The results are presented in Table 3.

< Insert Table 3 here.>

The unconditional predicted probability that a leverage loan is covenant-lite is 15.8%. A leverage loan with a non-bank lender is 4.4% more likely to be covenant-lite and 10.1% more likely to fully covenanted when the lender is a bank. When borrowers are rated or have financial sponsors, the likelihood of a covenant-lite leverage loan increases by 3.1% and 5.2% respectively. An increase in quarterly CLO volume of one standard deviation, roughly $13.7 million, raises the probability of a

covenant-lite leverage loan by 1.4%. These findings are consistent with the dominant role of non-banks in leverage loans and the desire of financial sponsors for flexibility.

Borrower-lender matches have the largest impact on the likelihood that a leverage loan is covenant-lite. When a rated borrower is matched with a non-bank lender, the likelihood of a covenant-lite leverage loan increases by 7.5%; but decreases by 7.0% when matched with a bank lender. Pairing rated borrowers with mixed non-bank and bank lenders also reduces the likelihood of a covenant-lite leverage loan by 2.6%. These results are aligned with my expectation that the value of monitoring in fully covenanted leverage loans is highest for banks (Fama, 1985; James, 1987; Gande and Saunders, 2012) than non-banks (institutions) who view leverage loans simply as an alternative asset class (Ivashina and Sun, 2011). Similarly, a borrower with a financial sponsor paired with a non-bank lender increases the likelihood the leverage loan is covenant-lite by 9.6% but decreases the likelihood by 4.9% when paired with a bank lender.

Because multi-tranche leverage loan facilities involve bank lenders, a multi-tranche leverage loan is 12.2% less likely to be covenant-lite. Facility characteristics play an important role. The likelihood of a covenant-lite leverage loan increases with facility size and term, and when the leverage loan facility is rated either by *Moody's* or *S&P*, asset backed, traded, and priced at LIBOR plus spread.

A. Estimating Default and Bankruptcy

Understanding that borrower-lender matches in covenant-lite and fully covenanted leverage loans are endogenous, I examine how covenant structure affects the likelihoods of default and bankruptcy given default using a Cox proportional hazard model (Cox, 1972). The hazard rates, namely the probabilities of default or bankruptcy conditional that default has not yet occurred, are estimated parametrically. The survival times, measured in quarters, is the minimum of the time between loan origination and either the incidence of default or bankruptcy prior to the maturity of the loan or loan maturity. Survival times are right censored when loans have neither matured nor experienced default or bankruptcy prior to the end of the sample period. Because of the way default

is recorded in LCD, I use the Efron (1977) method to calculate the Cox partial likelihood when there are tied events.

Hazard models are estimated over the pooled sample using two approaches. The first approach uses a covenant-lite dummy variable corrected for endogeneity using a Heckman Inverse Mills Ratio (*IMR*). The second is an instrumental variable approach that uses the estimated probability the leverage loan is covenant-lite. The estimated hazard models for default and bankruptcy are presented in Table 4.

< Insert Table 4 here.>

The hazard ratios show the likelihood of default is 52.8% to 61.2% lower for covenant-lite than fully covenanted leverage loans. Similarly, the likelihood of bankruptcy given default is 34.3% to 27.9% lower for covenant-lite than fully covenanted leverage loans. Further, note that the probabilities of default and bankruptcy given default increase with time. Fewer than 2.35% of covenant-lite leverage loan borrowers default and default will occur by the end of 30 quarters. Given default, less than 1.02% of covenant-lite leverage loan borrowers file for bankruptcy and bankruptcy will occur by the end of 40 quarters following default. For fully covenanted leverage loan borrowers, fewer than 5.66% default and default will occur by the end of 40 quarters. Given default, less than 2.29% of fully covenanted leverage loan borrowers file for bankruptcy. Not only are the likelihoods of default and bankruptcy clearly lower for covenant-lite leverage loan borrowers, the times to default and bankruptcy are shorter. Uncertainty about credit default risk is resolved sooner for covenant-lite leverage loan borrowers.

B. Recovery Rates in Facility Spreads

Table 5 shows how lender specialization in covenant-lite and fully covenanted leverage loans affects default and bankruptcy rates. Differences in facility spreads imply differences in rates of default and recovery. The estimated probabilities of default and bankruptcy given default are lower in covenant-lite leverage loans for non-bank lenders, but lower in fully covenanted leverage loans for

bank lenders. For mixed lenders, the estimated probabilities of default and bankruptcy given default are similar for mixed lenders in covenant-lite and fully covenanted leverage loans. Further, the estimated probabilities of default for non-bank lenders in covenant-lite and bank lenders in fully covenanted leverage loans are not meaningfully different.

< Insert Table 5 here.>

To determine the recovery rates implied in facility spreads, I take default in any quarter to be an independent binomial process. The probability of default, p, is estimated from Cox proportional hazard models. Loss rate, x, and recovery rate, r, are defined as percentages of the loan at origination. Taking the recovery rate as the minimum bound on loan value post origination, the loss rate is $(1-r) \geq x \geq 0$ when default occurs. I assume $x^* = ln(x)$ is a normal distributed random variable with mean $\alpha = ln(1-r/2)$ where $r/2$ is the average recovery rate, and a variance $\sigma^2 T = p(1-p)T$ in loan recovery rates directly proportional to the uncertainty of default $p(1-p)$ where T is the maturity of the loan in quarters.[27] Recovery rates are correlated with the likelihoods of default (Altman, Resti, and Sironi 2003); i.e. are higher for firms with medium and high EBITDA and lower risks of default than firms with low EBITDA and higher risks of default. The facility spread compensates lenders for the expected loss, $E(x^*|ln(1-r) \geq x^* \geq -\infty)$, when default occurs.

$$E(x^*|ln(1-r) \geq x^* \geq -\infty) = \left(\sigma\sqrt{T} \cdot \sqrt{2\pi}\right)^{-1} \int_{-\infty}^{ln(1-r)} exp(x^*) \cdot exp\left\{\frac{(x^*-\alpha)^2}{\sigma^2 T}\right\} dx^*$$
$$= exp\left(\alpha + \tfrac{1}{2}\sigma^2 T\right) N(d) \quad (1)$$

where $d = \left(\sigma\sqrt{T}\right)^{-1}[ln(1-r) - (\alpha + \sigma^2 T)]$. To compute implied recovery rates, I assume $T = 40$ quarters.

Higher average all-in facility spread of 434.7 bps on covenant-lite leverage loans compared to 322.4 bps on fully covenanted leverage loans reflects lower rates of default on covenant-lite than fully covenanted leverage loans of 2.2% and 4.7% respectively, but higher recovery rates on fully

[27]The implied recovery rate is a monotone decreasing function of the variance in loan recovery rates.

covenanted than covenant-lite leverage loans of 81.3% and 71.6% respectively.

Facility spread is lowest for non-bank lenders in covenant-lite leverage loans, and for bank lenders in fully covenanted leverage loans. For non-bank lenders, a lower facility spread of 446.1 bps on covenant-lite and 489.1 bps on fully covenanted suggests that screening for the propensity to default is more important. Default probability is markedly lower on covenant-lite than fully covenanted leverage loans of 2% and 8.3% respectively. Recovery rates of 67.5% and 66.8% are not significantly different.

In contrast, monitoring for default is more important than recovery for bank lenders. Facility spread on fully covenanted loans of 192.4 bps for bank lenders compared to 489.1 bps for non-bank lenders results primarily from a default probability of 1.9% for bank lenders that is more than 4 times lower than 8.3% for non-bank lenders. Recovery rate is higher for bank than non-bank lenders in fully covenanted leverage loans of 77.5% and 67.5% respectively.

In fully covenanted leverage loans, facility spread of 325.990 bps for mixed lenders is lower than 489.142 bps for non-bank lenders. Estimated likelihoods of default of 6.3% and 8.3% are lower for mixed lenders than non-bank lenders. Recovery rates of 75.5% and 66.8% are also higher for mixed lenders than non-bank lenders.

IV. Impact of Borrower-Lender Matches in Facility Spreads

In Panel A of Table 6, the default and bankruptcy hazard ratios show how borrower-lender matches affect the relative rates of default and bankruptcy in covenant-lite and fully covenanted leverage loans. How facility spreads reflect the expected rates of default and recovery are shown in Panel B of Table 6. In the analysis, I focus on the impact of borrower rating, financial sponsors, and trading.

In Panel A, differences in the default and bankruptcy hazard ratios are most important for non-bank lenders where the predicted probability that the leverage loan is covenant-lite is also the highest. In this subsample of leverage loans, the predicted probability of a covenant-lite leverage loan is highest

(0.632) when the leverage loan is traded, and the borrower is rated and affiliated with a financial sponsor. In this subsample, the default and bankruptcy hazard ratios are 31% and 7% lower for covenant-lite than fully covenanted leverage loans.

For non-bank lenders, the predicted probability that the leverage loan is covenant-lite is most sensitive to trading, followed by whether the borrower is rated and has a financial sponsor. Eighty-eight percent of covenant-lite leverage loans by non-bank lenders are traded, but only half of fully covenanted loans by non-bank lenders are traded. This suggests that non-bank lenders value trading over monitoring in covenant-lite leverage loans. Trading imposes a market discipline on private and publicly-listed borrowers that reduces the need for traditional bank monitoring. Leveraged loans by bank lenders are predominantly fully covenanted and rarely traded. Only 4 of the 4,372 fully covenanted loans by bank lenders are traded. If covenants create monitoring incentives (Rajan and Winton, 1995; Park, 2000) and banks are particularly adept at monitoring (Diamond, 1984; 1991), then trading of loans by bank lenders should be less prevalent.[28]

I estimate default and implied recovery rates for the different borrower-lender matches. From Panel B, the estimated default rates of covenant-lite loans by non-bank lenders and fully covenanted loans by bank lenders are, on average, similar. But leverage loans by non-bank lenders have a lower bankruptcy hazard ratio than leverage loans by bank lenders. Given default, the likelihood of bankruptcy is lower for covenant-lite leverage loans by non-bank lenders than fully covenanted leverage loans by bank lenders. But recovery rates implicit in facility spreads are lower for covenant-lite leverage loans by non-bank lenders than for fully covenanted loans by bank lenders. This suggests that covenant-lite loans exhibit a 'peso' problem – lenders expect leverage loans with looser covenant packages to have lower rates of default and bankruptcy than leverage loans with tighter bank monitoring. But losses from lower recovery rates given default and bankruptcy will be higher for

[28] Cantillo and Wright (2000) document that publicly traded obligations should be most closely associated with firms that present lower default hazard.

covenant-lite than fully covenanted leverage loans and lenders care more about losses. Despite no significant difference in the average rates of default and bankruptcy on covenant-lite leverage loans, a 250 bps higher yield spread on covenant-lite leverage loans suggests lenders give substantial weight to a 6% (0.701 vs. 0.759) lower recovery rate on covenant-lite leverage loans.

To examine how lenders view differences in default and recovery rates, Panel B details the recovery rates implied by facility spreads and estimated default rates for the different borrower-lender matches. Differences in expected loss given default between covenant-lite leverage loans by non-bank lenders and fully covenanted leverage loans by banks are largest in subsample 8 relative to subsample 10, where both subsamples have rated borrowers and relatively similar loan sizes ($585 million and $630 million, respectively). The estimated default rate of subsample 8 is 1.4% with a recovery rate of 60%. In contrast, the estimated default rate of 7% for subsample 10 is *five times* higher but with a higher recovery rate of 94.2%. Subsample 8, however, represents 60% of all covenant-lite loans and subsample 10 represents less than 10% of fully covenanted loans. Loan pricing suggests the default of traded covenant-lite leverage loans by non-bank lenders to speculative grade rated borrowers with financial sponsors will be more severe than a default by non-traded fully covenanted leverage loans by bank lenders to investment grade rated borrowers with no financial sponsors.

A. Impact of Rated Borrowers

For non-bank lenders, rated borrowers are speculative grade but investment grade for bank and mixed lenders. Screening rated borrowers is more important for non-bank and mixed lenders when borrowers have financial sponsors and leverage loans are traded. Monitoring rated borrowers is more important for bank lenders in which leverage loans largely do not involve borrowers with financial sponsors and are not traded.

Results in fully covenanted leverage loans subsamples 7 and 8 show that monitoring speculative grade rated borrowers decreases the likelihood of default from 3% to 1.8% but worsens recovery rate from 76.5% to 65.3% for non-bank lenders. But conversely when borrowers are investment grade

rated in fully covenanted leverage loans subsamples 9 and 10 with bank lenders; a marked rise from 0.3% to 7% in the probability of default. Similarly, for mixed lenders in fully covenanted leverage loans subsamples 23 and 24, the probability of default increased from 5.2% to 38.2% but recovery rate improved from 87.9% to 93.9%. The changes in facility spreads are insignificantly higher by 4.9 bps and 13.8 bps for non-bank and mixed lenders respectively, but significantly lower by 31.7 bps for bank lenders. For non-bank and mixed lenders, monitoring of rated borrowers in fully covenanted leverage loans produces worse outcomes. A notable decline in facility spread of 33.6 bps from fully covenanted to covenant-lite leverage loans with non-bank lenders in subsamples 6 and 7 substantiates this finding.

B. Impact of Financial Sponsors

Borrowers with financial sponsors are more likely in leverage loans by non-bank lenders.[29] Their involvement has an adverse effect on expected outcomes in leverage loans by bank lenders. Yield spreads of fully covenanted loans are higher.

Non-bank (bank) lenders participate in 42.9% (18.7%) of all leverage loans to borrowers with financial sponsors. Overall, facility spreads when borrowers have financial sponsors are higher by 69.5 bps in fully covenanted leverage loans, but only 8.5 bps higher in covenant-lite leverage loans. Non-bank lenders extend 92.3% of all covenant-lite loans to borrowers with financial sponsors; less than 1% are extended by bank lenders. But 29.2% (23.7%) of fully covenanted loans to borrowers with financial sponsors are from non-bank (bank) lenders. In the subsample of leverage loans by non-bank lenders, borrowers with financial sponsors are evenly divided across covenant-lite and fully covenanted leverage loans.

Default and recovery rates in leverage loans by non-bank lenders are relatively similar across covenant-lite and fully covenanted leverage loans; the lowest default and worst recovery rates occur in subsample 8. For bank and mixed lenders, however, borrowers with financial sponsors are more

[29] Demiroglu and James (2010), using a sample of leveraged buyouts over the January 1997 to August 2007 period, also find that financial sponsors rely heavily on non-bank loans.

prevalent in fully covenanted loans. The recovery rate implied by yield spreads in fully covenanted loans by bank lenders is remarkably low when borrowers have financial sponsors; 40.1% in subsample 11. In contrast, the impact of borrowers with financial sponsor on recovery rates in fully covenanted leverage loans by mixed lenders is moderate. For non-bank lenders, expected outcomes are poorer in leverage loans that are traded when borrowers have financial sponsors. In traded leverage loans with non-bank lenders, speculative rated borrowers with financial sponsors reduce the probability of default but also lower the rate of recovery regardless of covenant structure. In the covenant-lite subsamples 6 and 8, default rates drop from 2.5% to 1.4% while recovery rates drop from 76.9% to 60%. In the fully covenanted subsamples 6 and 8, the corresponding declines are from 6.2% to 1.8% for probability of default, and from 88.2% to 65.3% in recovery rates.

C. Impact of Trading

Secondary market trading of leverage loans moderates the impact of default and recovery rates. When borrowers have financial sponsors, trading diminishes expected outcomes in leverage loans with non-bank and mixed lenders. For example, comparing subsamples 5 and 8, where speculative grade borrowers with financial sponsors are paired with non-bank lenders, trading decreases the rate of default but also the rate of recovery. In fully covenanted leverage loans, the probability of default declines from 4.5% to 1.8% while the recovery rate declines from 83.7% to 65.3%. The trading effect on the outcomes of covenant-lite leverage loans are similar, with default rates declining from 6.3% to 2.5% and recovery rates falling from 87.1% to 73.7%. Facility spreads are not meaningfully higher by 9.8 bps in covenant-lite leverage loans but markedly higher by 67.5 bps in fully covenanted leverage loans.

In the fully covenanted leverage loans subsamples 3 and 7 where unrated borrowers with financial sponsors are paired with non-bank lenders, trading decreases the probability of default from 19.3% to 3% and recovery rate from 89% to 76.5%. Facility spreads are significantly higher by 36.5 bps in fully covenanted leverage loans and practically identical in covenant-lite leverage loans. In

subsamples 21 and 24, where investment grade borrowers with financial sponsors are paired with mixed lenders, trading increases the rate of default, but the rate of recovery improves. In fully covenanted leverage loans, expected default rates increase from 7.2% to 38.2% but yield spreads rise in response to a modest increase in implied recovery rate from 90.7% to 93.9%. In subsamples 19 and 23, where unrated borrowers with financial sponsors are paired with mixed lenders, trading also increases the rate of default and rate of recovery. In fully covenanted leverage loans, a rise in default from 1.9% to 5.2% and from 71.7% to 87.9% in the rate of recovery. Facility spreads are insignificantly lower by 6.4 bps.

V. Conclusion

In this paper I examine borrower-lender matches into covenant-lite and fully covenanted leverage loans and show how the resulting rates of default and bankruptcy as well as losses from recovery are priced. The results corroborate prior findings of lender specialization in leveraged capital markets (Denis and Mihov, 2003; Huang and Ramirez, 2010) and present new evidence of the segmentation of borrowers by non-bank and bank lenders. Non-bank lenders match with speculative grade rated borrowers with financial sponsors. Bank lenders focus on fully covenanted loans to unrated and investment grade rated borrowers. For non-bank lenders, the secondary trading of loans imposes a market discipline on borrowers that mitigates agency conflicts. For bank lenders, monitoring is more important. Almost all loans by non-bank lenders are traded; loans by bank lenders are rarely traded.

Since the inception of covenant-lite leverage loans, financial markets forecast larger losses given default for covenant-lite leverage loans despite lower expected default. I show that leverage loan prices assign more weight to potentially high losses from low probability events. Higher risk premiums on covenant-lite leverage loans represent catastrophic insurance premiums that borrowers pay to lenders to compensate them for low probability but high loss events. From the borrower's perspective, the risk premiums exemplify the price of flexibility associated with reducing the lender's discretion on

triggering default. In this regard, the paper adds to a sparse empirical literature that document 'peso' phenomena (Evans, 1996).

Table 1 – Summary Statistics on Leverage Loans. The table reports the number and average size of leverage loans by year over the period 1999 - Q3:2016. Average size is measured in billions of dollars.

	All Loan Facilities			Covenant-Lite				Non-Bank Lenders			Bank Lenders			Mixed Lenders		
Year	Total No.	Aggregate Amount ($Bil)	Facility Spread (bps)	No.	Amount ($Bil)	% of Total Amt	Facility Spread (bps)	No.	% of Total Amt	Facility Spread (bps)	No.	% of Total Amt	Facility Spread (bps)	No.	% of Total Amt	Facility Spread (bps)
1999	791	272.2	256.7	5	0.4	0.1%	350.2	34	1.7%	413.9	386	43.5%	206.8	371	54.7%	294.3
2000	720	231.0	257.1	2	0.3	0.1%	281.3	26	2.5%	389.9	375	45.7%	206.6	319	51.8%	305.6
2001	463	173.7	264.2	2	0.4	0.2%	75.0	17	1.6%	385.7	262	46.6%	224.3	184	51.8%	309.9
2002	466	163.5	276.2	1	0.1	0.1%	901.0	47	9.4%	355.2	216	33.8%	216.1	203	56.8%	321.9
2003	585	215.9	324.8	3	0.5	0.2%	433.3	149	21.5%	397.8	143	19.6%	259.8	293	58.9%	319.4
2004	913	351.8	326.8	2	0.2	0.0%	287.5	327	22.7%	430.0	133	17.8%	224.2	453	59.5%	282.4
2005	1,017	385.6	313.4	7	3.9	1.0%	403.6	338	18.4%	466.6	192	17.9%	186.2	487	63.7%	257.2
2006	1,158	555.9	311.9	54	32.5	5.8%	289.7	395	20.8%	456.8	184	12.6%	170.0	579	66.6%	258.2
2007	1,221	717.4	301.8	209	142.3	19.8%	301.5	521	31.7%	389.5	224	12.0%	183.7	476	56.3%	261.3
2008	413	257.0	315.2	3	8.3	3.2%	206.3	86	22.7%	494.9	209	31.4%	214.6	118	45.9%	362.4
2009	281	102.8	445.2	10	6.6	6.4%	482.0	81	27.1%	620.1	125	37.0%	335.2	75	36.0%	439.7
2010	557	243.8	441.1	15	8.1	3.3%	508.2	153	23.8%	581.8	144	20.2%	278.6	260	55.9%	448.3
2011	769	399.4	412.3	87	62.4	15.6%	444.4	297	36.1%	524.2	212	27.4%	233.5	260	36.5%	430.3
2012	1,064	506.3	409.4	218	115.7	22.9%	514.8	512	43.0%	536.8	311	28.2%	159.3	241	28.8%	461.7
2013	1,516	829.4	369.5	550	375.1	45.2%	422.8	892	63.8%	457.6	358	15.4%	145.3	266	20.8%	375.7
2014	1,356	585.6	359.7	575	313.8	53.6%	467.5	781	64.9%	493.0	423	20.7%	102.1	152	14.4%	392.1
2015	974	491.7	381.6	406	246.8	50.2%	453.0	541	59.1%	491.2	330	31.1%	185.0	103	9.8%	435.4
Q3: 2016	531	334.5	351.2	217	174.2	52.1%	426.6	305	62.7%	449.2	171	29.6%	147.0	55	7.7%	442.7
Total	**14,795**	6,817.6	340.4	**2,366**	1,491.3	21.9%	434.7	**5,502**	36.4%	472.0	**4,398**	23.6%	192.2	**4,895**	39.9%	325.6

Table 2 – Covenant-Lite vs. Fully Covenanted Leverage Loans. This table reports the mean attributes of covenant-lite and fully covenanted leverage loan facilities over the period 1999-Q3:2016. In a covenant-lite loan facility compliance is tested when a specific event occurs, e.g. when borrowers take on additional debt. In a fully covenanted loan facility, compliance is tested on a quarterly basis. Superscript [a,b,c] denotes statistical significance at the 10%, 5%, and 1% of differences between covenant-lite and fully covenanted group means.

	Covenant-Lite				Fully Covenanted			
	Total	Non-Bank Lenders	Bank Lenders	Mixed Lenders	Total	Non-Bank Lenders	Bank Lenders	Mixed Lenders
Number of Loans	2,366	2,194	26	146	12,429	3,308	4,372	4,749
% of Total	0.160	0.927	0.011	0.062	0.840	0.266	0.352	0.382
% Commercial Bank Arranger	0.556 [c]	0.561	0.462	0.493	0.660	0.555	0.797	0.607
% Relationship Bank Arranger	0.432 [c]	0.431	0.192	0.500	0.306	0.457	0.226	0.273
% Multi-tranche	0.029 [c]	0.005	0.000	0.384	0.461	0.007	0.290	0.934
Deal Size, $mil.	630.325 [c]	607.425	263.912	1039.71	428.535	348.296	366.849	541.217
Facility Term, qtrs.	25.735 [c]	25.863	20.592	24.718	21.160	22.077	17.587	23.812
% Facility is Rated	0.951 [c]	0.959	0.385	0.932	0.550	0.707	0.361	0.615
Facility Rating if Rated	13.678 [c]	13.823	4.962	13.062	7.433	9.978	4.579	8.287
% Asset-backed	0.008 [c]	0.000	0.654	0.014	0.067	0.008	0.160	0.021
% Acquisition	0.228	0.233	0.038	0.185	0.230	0.205	0.221	0.256
% Leveraged Buyout	0.247 [c]	0.246	0.423	0.240	0.175	0.124	0.129	0.253
% Capital Expenditure	0.005 [c]	0.004	0.038	0.014	0.026	0.026	0.028	0.023
% General Corporate Purpose	0.023 [c]	0.021	0.115	0.041	0.041	0.030	0.078	0.014
% Recapitalization	0.165	0.162	0.192	0.199	0.173	0.199	0.146	0.180
% Refinancing	0.332 [c]	0.334	0.192	0.322	0.355	0.416	0.397	0.274
% Traded	0.872 [c]	0.882	0.000	0.877	0.304	0.499	0.001	0.447
% Sponsored	0.765 [c]	0.762	0.654	0.842	0.526	0.578	0.354	0.648
% International	0.118 [c]	0.117	0.154	0.123	0.055	0.079	0.051	0.042
% Listed	0.232 [c]	0.232	0.192	0.226	0.260	0.238	0.341	0.201
% 1st Time	0.361 [c]	0.365	0.346	0.301	0.494	0.368	0.554	0.526
Debt/Assets	0.229	0.229	0.213	0.224	0.220	0.251	0.217	0.201
% Borrower is Rated	0.952 [c]	0.955	0.769	0.938	0.600	0.695	0.525	0.602
Borrower Rating if Rated	13.820 [c]	13.868	11.192	13.575	8.375	9.944	7.123	8.436
Facility Spread, bps	434.698 [c]	446.053	158.627	313.236	322.413	489.142	192.375	325.990
Default Rate	0.019 [c]	0.020	0.077	0.000	0.027	0.036	0.009	0.037
Bankruptcy Rate	0.009 [c]	0.010	0.038	0.000	0.019	0.026	0.006	0.025
Time to Default|Default (Qtr)	12.522 [c]	12.318	17.000	0.000	10.644	9.992	9.875	11.270
% Rated Borrower	0.952	0.955	0.769	0.938	0.600	0.695	0.525	0.602
Default Rate	0.019 [c]	0.019	0.100	0.000	0.032	0.036	0.014	0.043
Bankruptcy Rate	0.008 [c]	0.009	0.050	0.000	0.021	0.024	0.009	0.028
% Unrated Borrower	0.048	0.045	0.231	0.062	0.400	0.305	0.475	0.398
Default Rate	0.035 [c]	0.040	0.000	0.000	0.020	0.038	0.004	0.027
Bankruptcy Rate	0.026 [c]	0.030	0.000	0.000	0.015	0.029	0.003	0.021

Table 3 – Borrower-Lender Match. Table report probit regressions that capture the self-selection of borrowers and lenders in leverage loans. Limited dependent variable is a binary variable that equals 1 when the leveraged loan facility is covenant-lite, and 0 when fully-covenanted. ‡ Standardized variable. Average marginal effects are computed from Model (5).

Models	(1)	(2)	(3)	(4)	(5)	Change	From	To	*p value*
Borrower and Lender Characteristics									
Non-Bank Lender Only	1.320***				0.401***	0.044	0.158	0.203	0.000
	(0.000)				(0.000)				
Bank Lender Only	-1.112***				-1.122***	-0.101	0.158	0.058	0.000
	(0.000)				(0.000)				
Bank Loan Share				-1.056***					
				(0.000)					
CLO Volume ‡	0.011***			0.011***	0.011***	0.014	0.158	0.172	0.005
	(0.006)			(0.004)	(0.004)				
Debt/Assets		0.068		-0.136*	-0.134*	-0.004	0.158	0.154	0.086
		(0.307)		(0.085)	(0.092)				
Borrower is Rated		0.924***		0.257*	0.279**	0.031	0.158	0.189	0.029
		(0.000)		(0.051)	(0.029)				
Sponsored		0.461***		0.474***	0.466***	0.052	0.158	0.210	0.000
		(0.000)		(0.000)	(0.000)				
International		0.225***		0.033	0.038	0.004	0.158	0.162	0.693
		(0.000)		(0.743)	(0.692)				
Listed		-0.074*		-0.073	-0.063	-0.007	0.158	0.151	0.276
		(0.099)		(0.192)	(0.278)				
First Time Borrower		-0.089***		0.006	0.001	0.000	0.158	0.158	0.989
		(0.004)		(0.926)	(0.989)				
Lead Underwriter and Facility Characteristics									
Commercial Bank	-0.029			-0.061	-0.055	-0.006	0.158	0.152	0.494
	(0.631)			(0.447)	(0.493)				
Relationship Bank	-0.042			0.049	0.002	0.000	0.158	0.158	0.972
	(0.180)			(0.349)	(0.972)				
Multi-Tranche Facility			-1.750***	-1.661***	-1.480***	-0.122	0.158	0.037	0.000
			(0.000)	(0.000)	(0.000)				
Ln Facility Size			0.162***	0.263***	0.247***	0.030	0.158	0.189	0.000
			(0.000)	(0.000)	(0.000)				
Facility Term - quarters			0.068***	0.054***	0.053***	0.040	0.158	0.198	0.000
			(0.000)	(0.000)	(0.000)				
Facility is Rated			0.586***	0.325**	0.302**	0.033	0.158	0.191	0.031
			(0.000)	(0.018)	(0.025)				
Asset-Backed Loan			-0.167*	0.326***	0.608***	0.069	0.158	0.227	0.000
			(0.078)	(0.001)	(0.000)				
Traded			0.766***	0.501***	0.442***	0.049	0.158	0.207	0.000
			(0.000)	(0.000)	(0.000)				
LIBOR plus Spread			1.132***	0.638***	0.430***	0.048	0.158	0.206	0.002
			(0.000)	(0.000)	(0.001)				
Constant	-2.700***	-3.139***	-5.614***	-4.930***	-5.102***				
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)				
Observations	14,795	14,795	14,795	14,795	14,795				
McFadden R^2	0.476	0.323	0.535	0.562	0.566				
Tjur's R^2	0.448	0.275	0.521	0.549	0.552				
% Correctly Pred (PCP)	89.6%	85.1%	91.4%	91.5%	91.8%				
Expected PCP	85.4%	80.8%	87.3%	88.0%	88.1%				
Industry & Year FE	Yes	Yes	Yes	Yes	Yes				

Table 4 - Default and Bankruptcy Hazard. This table presents the Cox estimated proportional hazard model for default on leveraged loans. The Efron (1977) method is used to address tied failure times. The dependent variable equals 1 when the loan defaulted over the sample period and 0 otherwise. The survival periods are measured in quarters beginning with the loan issuance date. The hazard ratios are odds ratios of covenant-lite to fully covenanted rates for default and bankruptcy given default. General corporate purpose is the reference group for use of proceeds. IMR is computed from Model (5) of Table 5.

	***Prob*(Default)**				***Prob*(Bankruptcy | Default)**			
	b	**Hazard Ratio**	**b**	**Hazard Ratio**	**b**	**Hazard Ratio**	**b**	**Hazard Ratio**
Covenant-Lite	-0.528**	0.590**			-1.071***	0.343***		
	(0.049)	(0.049)			(0.008)	(0.008)		
Estimated *Prob(*Cov-Lite)			-0.612**	0.542**			-1.276***	0.279***
			(0.036)	(0.036)			(0.002)	(0.002)
Borrowed Prior to Crisis	0.851***	2.341***	0.840***	2.316***	0.809***	2.246***	0.795***	2.214***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
IMR	0.123***				0.212***	1.236***		
	(0.006)				(0.000)	(0.000)		
Harrell's C	0.594		0.565		0.619		0.590	
Somers D	0.187		0.131		0.237		0.179	
Number of Observations	14,795		14,795		14,795		14,795	

Hazard Rates by Quarter End	**Covenant Lite**	**Fully Covenanted**	**Covenant Lite**	**Fully Covenanted**	**Covenant Lite**	**Fully Covenanted**	**Covenant Lite**	**Fully Covenanted**
0	0	0	0	0	0	0	0	0
10	0.0093	0.0157	0.0106	0.0155	0.0038	0.0118	0.0039	0.0119
20	0.0171	0.0276	0.0165	0.0279	0.0073	0.0193	0.0063	0.0198
30	0.0235	0.0344	0.0213	0.0354	0.0102	0.0217	0.0074	0.0229
40	0.0235	0.0554	0.0213	0.0566	0.0102	0.0217	0.0074	0.0229
50		0.0554		0.0566				

Table 5 – Facility Spread and Hazard Rates. Table reports the estimated rates of default and bankruptcy given default using a Cox proportional hazard model for covenant-lite and fully covenanted leverage loans by lender types. Implied recovery rates are computed from facility spreads that reflect the expected loss from default.

	Covenant-Lite				Fully Covenanted			
	Total	**Non-Bank Lenders**	**Bank Lenders**	**Mixed Lenders**	**Total**	**Non-Bank Lenders**	**Bank Lenders**	**Mixed Lenders**
Number of Loans	2,366	2,194	26	146	12,429	3,308	4,372	4,749
Number of Defaults	46	44	2	0	334	120	40	174
Number of Bankruptcies	22	21	1	0	221	85	26	120
% of Total	0.160	0.927	0.011	0.062	0.840	0.266	0.352	0.382
Default Rate	0.019 [c]	0.020	0.077	0.000	0.027	0.036	0.009	0.037
Bankruptcy Rate	0.009 [c]	0.010	0.038	0.000	0.019	0.026	0.006	0.025
Facility Spread, bps	434.698 [c]	446.053	158.627	313.236	322.413	489.142	192.375	325.990
Estimated Default Rate	0.022	0.020	0.000	0.064	0.047	0.083	0.019	0.063
Estimated Bankruptcy Rate	0.008	0.007	0.000	0.027	0.023	0.033	0.015	0.020
Implied Recovery Rate	0.684	0.675	1.000	0.761	0.738	0.668	0.775	0.755

Table 6 – Facility Spread Regressions. Columns 1-4 in the table report regression results from a joint estimation of facility spreads across lender types and covenant structures. using maximum likelihood. Estimated rates of default use a Cox proportional hazard model for covenant-lite and fully covenanted leverage loans by lender types. Implied recovery rates are computed from facility spreads adjusted for the effects of lead arrangers, issuer/issue characteristics, and use of proceeds as well as expected losses from default. †Demeaned by covenant-lite and fully covenanted averages. Columns 5-8 report average values of the covariates.

	Non-Bank Lenders		Bank Lenders	Mixed Lenders	Non-Bank Lenders		Bank Lenders	Mixed Lenders
	Covenant Lite	Fully Covenanted	Fully Covenanted	Fully Covenanted	Cov-Lite	Full-Cov	Full-Cov	Full-Cov
Bank is Lead Arranger	-33.715***	-76.537***	-17.392*	-25.190***	0.561	0.555	0.797	0.607
	(0.000)	(0.000)	(0.077)	(0.000)				
Relationship Bank	-47.016***	-81.488***	-2.957	-3.718	0.431	0.457	0.226	0.273
	(0.000)	(0.000)	(0.422)	(0.267)				
Institutional Loan Share				95.947***				0.641
				(0.000)				
Traded	-188.368***	-54.978***		-19.013***	0.882	0.499		0.447
	(0.000)	(0.000)		(0.001)				
Borrower is Rated	-189.815***	-45.038***	-28.590***	-12.717	0.955	0.695	0.525	0.602
	(0.000)	(0.003)	(0.000)	(0.171)				
Traded*Rated Borrower	171.884***	49.044***		-8.677	0.850	0.416		0.364
	(0.000)	(0.003)		(0.186)				
Sponsored	49.350***	60.467***	36.398***	26.648***	0.762	0.578	0.354	0.648
	(0.000)	(0.000)	(0.000)	(0.000)				
Listed	-8.687	-11.361	-12.714**	-11.795**	0.232	0.238	0.341	0.201
	(0.596)	(0.340)	(0.024)	(0.028)				
Listed*Sponsored	-57.848***	-52.076***	-0.652	-10.383	0.107	0.086	0.056	0.078
	(0.001)	(0.008)	(0.950)	(0.190)				
International	5.041	-57.233***	-12.495**	-11.566**	0.117	0.079	0.051	0.042
	(0.744)	(0.001)	(0.036)	(0.049)				
First Time Borrower	7.285	21.059***	-0.689	10.419***	0.365	0.368	0.554	0.526
	(0.216)	(0.001)	(0.834)	(0.003)				
Issue Size†	-0.049***	-0.093***	-0.011**	-0.007***	-23.191	-80.119	-61.567	112.801
	(0.000)	(0.000)	(0.042)	(0.003)				
Acquisition-GCP	2.100	-40.173***	-11.196***	-6.970*	0.458	0.300	0.272	0.496
	(0.811)	(0.004)	(0.001)	(0.081)				
LBO-GCP	39.466***	98.981***	28.415***	7.420**	0.225	0.095	0.051	0.240
	(0.000)	(0.000)	(0.000)	(0.019)				
Capex-GCP	-55.444*	49.907***	8.450	22.848**	-0.017	-0.003	-0.050	0.010
	(0.077)	(0.004)	(0.308)	(0.015)				
Dividend Recap-GCP	61.273***	35.124*	20.268**	-0.371	0.103	0.086	-0.034	0.077
	(0.000)	(0.053)	(0.041)	(0.907)				
Refi-GCP	-29.507***	-70.507***	-7.970**	-15.925***	0.313	0.386	0.318	0.260
	(0.000)	(0.000)	(0.011)	(0.000)				
Constant	383.434**	448.759***	232.912***	261.205***				
	(0.013)	(0.000)	(0.000)	(0.000)				
Adjusted R^2	0.2467	0.2295	0.1543	0.4416				
Observations	14,795							
Wald Chi-square	3,443.8							
Log Pseudolikelihood	-92,141.4							
Estimated Default Rate	0.0200	0.0830	0.0190	0.0630				
Implied Recovery Rate	0.6980	0.6887	0.7558	0.7877				

Table 7 – Lender-Borrower Match and Facility Spreads. Table reports facility spreads, default rates, and implied recovery rates across different lender-borrower matches as well as trading in covenant-lite and fully covenanted leverage loans. Default is estimated using a Cox proportional hazard model. *,**,*** reflect statistical significance at the 10%, 5%, and 1% levels respectively.

					Covenant-Lite				Fully Covenanted			
Sub-Samples	**NOBS**	**Borrower is Rated**	**Sponsored**	**Traded**	**Total**	**Facility Spread**	**Estimated Default Rate**	**Implied Recovery Rate**	**Total**	**Facility Spread**	**Estimated Default Rate**	**Implied Recovery Rate**
Non-Bank Lenders Only					2,194	446.053			3,308	489.142		
1	336	0	0	0	14	507.371	–	–	322	491.881	0.073	0.671
2	400	1	0	0	38	346.816	–	–	362	390.143	0.060	0.723
3	423	0	1	0	14	507.214	–	–	409	611.816	0.193	0.535
4	135	0	0	1	22	382.341	0.143	0.706	113	499.290	0.056	0.673
5	755	1	1	0	192	460.096	0.063	0.690	563	473.280	0.045	0.686
6	1,049	1	0	1	449	366.358	0.025	0.716	600	397.233	0.062	0.720
7	213	0	1	1	49	503.507	0.025	0.663	164	535.845	0.030	0.656
8	2,191	1	1	1	1,416	*469.873*	*0.014*	*0.646*	775	540.821	0.018	0.637
Bank Lenders Only					26	158.627			4,372	192.375		
9	1,516	0	0	0	4	71.983	–	–	1,512	*192.888*	*0.003*	*0.608*
10	1315	1	0	0	5	190.000	–	–	1,310	*161.209*	*0.070*	*0.845*
11	565	0	1	0	2	168.750	–	–	563	276.446	0.006	0.640
12	0	0	0	1	0				0			
13	998	1	1	0	15	169.924	–	–	983	184.642	0.027	0.799
14	3	1	0	1	0				3	288.514	–	–
15	0	0	1	1	0				0			
16	1	1	1	1	0				1	225.000	–	–
Mixed Lenders					146	313.236			4,749	325.990		
17	427	0	0	0	1	225.000	0.333	0.785	426	299.301	0.046	0.764
18	466	1	0	0	3	290.263	–	–	463	273.175	0.056	0.780
19	1,077	0	1	0	3	414.312	–	–	1,074	*350.042*	*0.019*	*0.709*
20	111	0	0	1	0				111	314.236	0.034	0.746
21	675	1	1	0	11	272.791	0.333	0.746	664	324.129	0.072	0.756
22	692	1	0	1	19	308.522	0.143	0.752	673	287.902	0.027	0.752
23	285	0	1	1	5	311.608	–	–	280	343.632	0.052	0.745
24	1,162	1	1	1	104	317.048	–	–	1,058	*357.391*	*0.382*	*0.672*
Total	**14,795**				**2,366**				**12,429**			

Table A1 - Variable definitions

Variable	Definitions
Covenant-lite indicator	Dummy variable equal to one if loan facility has incurrence-based covenants and zero otherwise
Bank Share	Percent of loan facility contributed by bank investors
Commercial Bank Arranger	Dummy variable equal to one if loan facility has a commercial bank as the lead arranger and zero
Relationship Bank Arranger	Dummy variable equal to one if loan facility is arranged by a bank that has arranged a prior leveraged loan
Borrower is Rated	Dummy variable equal to one if the borrower has a corporate credit rating from either Moody's or S&P
Sponsored	Dummy variable equal to one if the borrower is affiliated with a financial sponsor, or private equity firm,
International	Dummy variable equal to one if the borrower is domiciled outside of the United States and zero
Listed	Dummy variable equal to one if the borrower has stock publicly traded and zero otherwise
1st Time	Dummy variable equal to one if the borrower is taking out its first leveraged loan and zero otherwise
Financial Leverage	Borrower debt to assets ratio at loan issuance
Facility is Rated	Dummy variable equal to one if the loan facility is rated by either Moody's or S&P and zero otherwise
Facility Spread, bps.	The weighted average basis point (bps) spread over LIBOR of the loan facility
Deal Size, $mil.	Size of the loan facility measured in millions of USD
Facility Term, qtrs.	The weighted average maturity of the loan facility measured in quarters
Asset-backed	Dummy variable equal to 1 if the loan facility is secured by current assets and 0 otherwise
Multi-tranche	Dummy variable equal to 1 if the loan facility is comprised of more than one loan type and 0 otherwise
Traded	Dummy variable equal to 1 if any loan within the facility is traded and 0 otherwise
Acquisition	Dummy variable equal to 1 if the loan facility is used to make strategic acquisitions by non-private-equity-related borrowers and 0 otherwise
Leveraged Buyout	Dummy variable equal to 1 if the loan facility is used to complete a leveraged buyout and 0 otherwise
Capital Expenditure	Dummy variable equal to 1 if the loan facility is used to support the build-out of a project and 0 otherwise
General Corporate Purpose	Dummy variable equal to 1 if the loan facility is used to support working capital, general operations, and other business-as-usual purposes and 0 otherwise
Recapitalization	Dummy variable equal to 1 if the loan facility is used to change the composition of the borrower's balance sheet mix between debt and equity and 0 otherwise
Refinancing	Dummy variable equal to 1 if the loan facility is used to refinance existing debt and 0 otherwise
Default Rate	Dummy variable equal to 1 if the borrower misses either an interest or principal payment and 0 otherwise
Bankruptcy Rate	Dummy variable equal to 1 if the borrower files for bankruptcy protection and 0 otherwise

Table A1 – Variable Definitions (cont.)

Variable	Definitions
Time to Default|Default,	Number of quarters elapsed between loan issuance and default
Institutional Only	Dummy variable equal to 1 if the loan facility is funded only by institutional investors
Bank Only	Dummy variable equal to one if the loan facility is funded only by bank investors
CLO Volume	Dollar volume, measured in millions, of the funds by collateralized loan obligation funds during the quarter in which the loan was issued
Debt-to-Assets	Financial leverage
Non-LIBOR-only Spread	Dummy variable equal to 1 if the loan facility is priced at LIBOR plus a premium and 0 otherwise

IV. Conclusion to Essays in Leveraged Capital Markets

Syndicate form impacts the pricing of initial and seasoned public offerings of high yield and has a concomitant effect on shareholder wealth. Utilizing a nested bivariate (double selection) probit model that characterizes syndicate form, I document a positive assortative matching of high (low) quality issuers with more (less) reputable lead underwriters. The matches between issuers and lead arrangers in underwriting syndicates involve self-selection. In sole led syndicates, issuers are older established firms and higher credit rated, but issue ratings are lower, maturities are shorter, secondary market liquidity is impaired, and senior securitization is needed. When higher underwriting risk requires intensive and specialized due diligence and pricing accuracy is important, a more concentrated syndicate is necessary, and certification by reputable lead underwriters is essential. I find that in contrast to joint led syndicates, lead underwriters in sole led syndicates are more likely to be investment banks, underwrite fewer high yield debt issues, and a higher percentage of total fee income stems from underwriting high yield debt. When moral hazard is more severe and rents from collective reputation are low, syndicate size is smaller, and the number of lead underwriters are fewer. Joint above median syndicates have the least reputable lead underwriters. In joint above median led syndicates, issuing firms are lower rated, and more likely to be unlisted and first-time issuers. Additionally, issues are lower rated, less likely to be investment/speculative split-rated, and smaller in size with poorer secondary market liquidity. Issue quality is highest for joint below median led syndicates.

Debt issuances in joint above median led syndicates have the highest average yield spreads. As expected, marginal yield spreads are higher for first-time and unlisted issuers across all syndicates. For uninformed investors, the risk of "winners curse" is considerable in joint above median led syndicate issuances. The solicitation of reservation prices from informed investors has a significant effect on marginal yield spreads of debt issued by sole led and joint below median led syndicates, but an insignificant effect on the marginal yield spreads of debt issued by joint above median led syndicates. Institutional investors seem to find it more advantageous to withhold participation in price

discovery associated with disclosures of private information when the quality of the issuer and reputation of lead underwriter are poor. Seasoned issues have significantly lower average yields. The reduction in yields is highest in debt issuances by joint above median led syndicates where lead underwriters are least reputable, issuers are worst quality, and the resulting certification process is less robust. The retention or change in lead underwriters reduces marginal yield spreads only when debt issues by joint led syndicates are traded. Weighted average yield spreads on traded and non-traded debt issuances are not significantly different, which suggests that higher offer yield spreads are meant to compensate investors for illiquidity rather than to stimulate post-offer market trading. Informed investors are better rewarded when debt issues offered are expected to be illiquid. The data presents little evidence of underpricing. Debt issuances in sole led syndicates by first-time issuers are weakly underpriced, as are debt issuances by first-time and unlisted issuers in joint above median led syndicates. There are, however, no significant cross-sectional differences in underpricing across syndicates. Further, I find no significant changes in shareholder wealth from high yield debt issuances.

In essay 2, I show that the matches between lenders and borrowers are negative assortative on transparency and sophistication, whereby less transparent borrowers will match with more sophisticated informed lenders. I find that creditworthy borrowers are always hurt by the presence of non-creditworthy borrowers when lenders are uninformed. Importantly, by leveraging investor restrictions associated with Rule 144A private placements, the data shows that QIBs as specialized lenders play an important role in certifying creditworthiness.

In my final essay, I examine borrower-lender matches into covenant-lite and fully covenanted leverage loans and show how the resulting rates of default and bankruptcy as well as losses from recovery are priced. The results present new evidence of the segmentation of borrowers by non-bank and bank lenders. Non-bank lenders match with speculative grade rated borrowers with financial sponsors. Bank lenders focus on fully covenanted loans to unrated and investment grade rated borrowers. For non-bank lenders, the secondary trading of loans imposes a market discipline on

borrowers that mitigates agency conflicts. For bank lenders, monitoring is more important. Almost all loans by non-bank lenders are traded; loans by bank lenders are rarely traded.

Since the inception of covenant-lite leverage loans, financial markets forecast larger losses given default for covenant-lite leverage loans despite lower expected default. I show that leverage loan prices assign more weight to potentially high losses from low probability events. Higher risk premiums on covenant-lite leverage loans represent catastrophic insurance premiums that borrowers pay to lenders to compensate them for low probability but high loss events. From the borrower's perspective, the risk premiums exemplify the price of flexibility associated with reducing the lender's discretion on triggering default.

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