Hedge Funds, Prime Brokers, and Corporate Bond Offerings*

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August 14, 2022

ABSTRACT

Hedge funds make abnormally large and profitable trades in stocks before corporate bond announcements when their prime broker serves as a bond underwriter, and these trades outperform other trades. The outperformance is not concentrated in announcement periods, nor in funds serviced by prime brokers whose equity analysts follow the firm, or in new positions. Bond-market activity by hedge funds represents one possible channel of information transfer. Bonds of firms held by connected hedge funds are associated with higher secondary market volume and number of transactions during their first six months of trading, suggesting that hedge funds support underwriters in liquidity provision activities during the first months of bonds' life when lengthy searches for high-valuation investors in the secondary market might be very costly.

JEL classification: G10, G12, G14, G20, G23.

Keywords: Hedge funds, prime brokers, corporate bonds, information acquisition.

*I am grateful for the comments and suggestions from George Aragon, Nils Friewald, Nataliya Gerasimova, Darya Yuferova, Ran Xing (discussant), and seminar participants at the Norwegian School of Economics, as well as conference participants at the 2022 PhD Nordic Finance Workshop (Stockholm) and 2022 World Finance Conference (Turin).

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I. Introduction

Prime brokerage and debt capital markets are among the largest divisions by revenues in the investment banking industry, accounting for 12% and 12.3% of total revenues respectively in 2018.[1] Prime brokers are of critical importance to day-to-day hedge fund operations (Aragon and Strahan (2012)), directly contributing to 44.12% of hedge funds' total borrowings in 2020.[2] The same banks perform multiple functions during corporate bond offerings, often getting access to non-public information (e.g. Rajan (1992), Sufi (2007) and Goldstein et al. (2021)). While the distinct relevance of these services is unequivocal, the spillover effects between these two banking functions have received little attention in the literature. In this paper, I aim to fill this gap by empirically investigating the connection between hedge fund managers and underwriter banks.

Investment banks frequently obtain access to firms' private information as part of the due diligence process (e.g. Rajan (1992) and Sufi (2007)), from their unique access to information about investor demand and bond placement (Goldstein et al. (2021)) and with multiple in-person contacts an additional layer of information can be grasped, including value-relevant information about management plans and opinions (Liberti and Petersen (2018)). I show that hedge funds gain an information advantage regarding issuing firms, by exploiting the close relationships with their prime broker banks and that the information combined with internal resources gives the funds an edge with respect to the competitors. Specifically, I show that hedge funds undertake abnormally large and profitable trades in stocks of firms issuing corporate bonds prior to the announcement, when their prime broker bank serves as bond underwriter.

[1] According to the data-analytics company Coalition, which tracks 12 major banks, prime brokerage generate about $14.7 billion in revenues in 2018 while debt underwriting about $17.9 billion, corresponding to 12% and 12.3% of their total revenues respectively (https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/global-i-bank-revenues-to-grow-in-2018-thanks-to-strong-equities-trading-48419320).

[2] According to SEC Form PF, prime brokers contributed to 44.12% of total borrowings by qualifying hedge funds in 2020, while indirectly they might have contributed up to 85.56% when reverse repo are included. The latest statistics about hedge funds can be found at: https://www.sec.gov/divisions/investment/private-funds-statistics.shtml.

To establish my findings, I combine multiple data sources in a merged data-set consisting of quarterly holdings of 1263 hedge fund management companies,[3] using 52 distinct prime brokers. I define connected fund as a hedge fund whose prime broker is a lead underwriter in a bond offering and treated position as the trade of a connected hedge fund in the company issuing a bond in the following quarter. As such, the control positions are all other holdings changes, both trades in the bond offering firms done by non-connected hedge funds and connected funds' trades in other companies. My empirical strategy relies on a stringent set of fixed effects, namely fund × quarter and firm × quarter fixed effects, to control for fund or stock characteristics, which could consistently differ between connected and non-connected funds and treated and control position. This combination of fixed effects effectively removes concerns about connected hedge funds being systematically more profitable, i.e. more skilled, than non-connected hedge funds, and information about the same firm reaching both connected and non-connected hedge funds through different channels.

I begin my analysis by examining how hedge funds' trades are affected by their relationship with prime broker banks. First, I show that connected hedge funds make abnormally larger trades in the issuing firms, as measured by the absolute dollar value of holding changes in the prior quarter, scaled by asset under management (AUM). Specifically, treated positions have a 9% (67.5%) higher than the average (median) absolute portfolio weight change. Second, I find that connected trades are more profitable than other trades. I measure the profitability of each trade by multiplying the quarterly portfolio weight change by the following quarter Fama and French (2015) five factors plus Jegadeesh and Titman (1993) momentum alpha or by Hou et al. (2014) five factors alpha. Each connected trade adds 0.14 (0.17) bps to fund's performance over and above the average trade. The effect is economically large, as these magnitudes are four (three) times as large as the sample average of 0.04 (0.09) bps per quarter. Furthermore, I show that a portfolio that buys the bond issuers' stocks bought by connected funds, and sells the bond issuers' stocks sold connected funds,

[3]Form 13F reports holding at the management company level, thus in this setting, I will use hedge fund and hedge funds management companies interchangeability.

significantly outperforms the same strategy done by non-connected funds. The long-short connected strategy creates an average five factors alpha of 0.505% per month, while the non-connected strategy creates an average of -0.185%. I further show that the abnormal profit is not driven by temporary price pressure, on the contrary, it lasts two quarters without reverting in the following two quarters.

To identify the underlying mechanism of information transfer, I focus on the bond market trading activity. In an over-the-counter (OTC) market, such as the one corporate bonds trade in, liquidity provision depends on the ability of dealers to hold inventory. Bessembinder et al. (2018), Friewald and Nagler (2019), and He et al. (2022) show that dealer capital commitment affects both transaction costs and prices. Nagler and Ottonello (2022) show that underwriters often rely on existing relationships with bond investors to enlarge their inventory capacity, by allocating the bond in the primary market to an investor with a preexisting relationship and then buying it back within six to twelve months after the offering. Nikolova et al. (2020) and Goldstein et al. (2021) show that investors in the underwriters' trading network (such as hedge funds) are most likely to participate in the book-building process, and to be rewarded with more profitable allocations. If underwriters use connected hedge funds to assist them to provide liquidity, I should observe different secondary market outcomes between connected and non-connected offerings. I indeed find support for this mechanism in the data. During the first week after the offering date, bonds in which at least one underwriter has at least one connected hedge fund exhibit 36% higher secondary market volume and 27% higher number of secondary transactions. This effect is not transitory, it persists up to six months after the offering date, suggesting connected hedge funds assist underwriters in liquidity providing activities during the first months of life of the bond, when lengthy searches for high-valuation investors in the secondary market might be unfeasible.

I then investigate alternative explanations for the source of connected hedge funds' abnormal profitability. First, I find no difference between trades of funds whose prime broker has an analyst following the offering firm and the funds which do not, in contrast with

Chen and Martin (2011) and Kumar et al. (2020) which argue that equity analysts are one possible conduit of information transfer from prime brokerage firms. Differently from these studies, my focus is on large public bond-offering firms, which differ across many dimensions from companies relying on bank financing. Second, the profitability does not differ between offerings with a single or with multiple underwriters, as well as new or old underwriter relationships. Since issuances occurring during periods of higher market uncertainty are associated with smaller syndicates (Bessembinder et al. (2020)), and existing underwriter relationships reduce asymmetric information between the issuer and the investors (Dick-Nielsen et al. (2021)), these results indicate the abnormal profitability is unrelated to the differential asymmetric information among bond offerings.

Lastly, I investigate whether the profitability is driven by the fund companies' propensity to engage in misconduct or violation of regulations. Hedge funds that previously engaged in misconduct exhibit lower profits in their connected trades compared to other funds. Prior literature suggests that fund managers that engaged in legal or regulatory misconduct are more likely to pursue higher risk-taking and have higher operational risk (e.g., Brown et al. (2008) and Brown et al. (2018)). Differently from these papers, I examine a profitability coming from a relationship, thus underwriters appear to value compliance in their related parties, mitigating concerns about out-performance coming from insider trading activities.

Next, I carry out a set of tests to understand the determinants of the abnormal performance. First, I test whether the information acquired by hedge funds relate to firms in their portfolios or unrelated securities. I find that hedge funds' abnormal profitability comes from existing and long-lasting positions, suggesting that hedge funds are information-hungry and search for additional value-enchaining pieces of information rather than prime brokers broadly circulate information to all their related funds. Then, I investigate the content of the informational advantage. I divide the abnormal returns into bond offering announcement returns and quarterly residual part.

The profitability does not come from announcement returns, indicating that hedge funds

do not know ex-ante the direction of abnormal returns around the issuing days, while having an informational edge on the borrowing firm per-se.

Second, I examine whether connected hedge funds' abnormal profits are driven by positive or negative information. I find that the abnormal profitability, differently from the abnormal volume, does not differ between positive and negative alpha quarters.

In the final part of the paper, I conduct a series of robustness and placebo tests. First, I show that quantitative hedge funds do not exhibit abnormal performance in their connected trades, intuitively, as they follow statistical rules and do not search for information. Second, I show that hedge funds do not profit from connected stocks in the financial sector. Possibly, because of the thigh relationship between the issuing institution and the prime broker banks, the information spreading incentives are altered, preventing hedge funds to gather relevant information. Then, I show that co-underwriters in the bond offering do not receive the same information as the lead-underwriters. In fact, hedge funds connected with a co-underwriter instead of a lead-underwriter do not exhibit significant abnormal returns. This fact points to the lead-underwriters being able, through meetings and due diligence, to grasp relevant information that is not revealed to co-underwriters, as they are only responsible for the bond placement. Finally, I show that the results are not driven by small funds and, by changing the dates of the bond offerings, I do not find any evidence of information advantage during placebo periods.

Overall, my paper contributes to the literature that examines the influence of prime brokers on hedge funds' investment decisions. Boyson et al. (2010) documents that large adverse shocks to prime brokers' stock prices are associated with a significant increase in the probability of hedge fund contagion. Aragon and Strahan (2012) shows that hedge funds using Lehman Brothers as prime broker were more likely to fail and their holdings experienced a larger declines in market liquidity following the bankruptcy. Kruttli et al. (2019) shows that an idiosyncratic liquidity shock to a major prime broker significantly decreases credit to connected hedge funds. Chung and Kang (2016) and Gerasimova (2016)

find that hedge funds sharing the same prime broker have a high return co-movement and that the co-movement is likely due to common information. Sinclair (2020) shows that prime brokers play an important role in intermediating capital to hedge funds, while Aragon et al. (2022) shows that prime brokers facilitate investors' search for informed hedge fund managers in the context of fund of funds. Qian and Zhong (2017) shows that hedge funds profit more from IPO stocks in which their prime broker is an underwriter, while Kumar et al. (2020) shows that hedge funds profit from their prime brokers banks' corporate borrowers. I add to this literature by uncovering a mechanism of information brokerage provided by prime broker banks to hedge fund clients and a market-maker function of hedge funds in prime broker banks related offerings.

I also add to the literature that examines the relationship between the OTC market structure and offerings of corporate bonds. Nagler and Ottonello (2022) studies underwriters' aggregate inventory behavior and under-pricing; Bessembinder et al. (2020), relies on post-2010 reporting of primary market trades to Trade Reporting and Compliance Engine (TRACE) to study the determinants of the underwriting syndicate structure and aggregate over-allocation by the syndicate as a group; Goldstein et al. (2021) relates expected secondary market liquidity based on characteristics of the syndicate to primary market pricing. Unlike these prior studies, I show an important link between dealers and hedge funds in newly issued corporate bonds both in the bond market as well as in the equity market.

The remainder of the paper is organized as follows. Section 2 provides the institutional background and details hypotheses. Section 3 describes the data sources and summary statistics and Section 4 discusses the main empirical strategy. Section 5 presents the results and robustness checks, while Section 6 concludes.

II. Institutional background and hypotheses

A. Structure of the primary and secondary market for corporate bonds

During a corporate bond offering, investments banks perform two separate functions: lead-underwriters (or lead underwriters) and co-underwriters. Lead-underwriters are directly contacted by the issuing company and they advise the issuer on the security characteristics, they perform due diligence on the company's financial situation, they act as book runners, and they act as underwriters as well as dealers in the secondary market. Co-underwriters, instead, are contacted by the lead-underwriters with the only aim of helping in the placement of the bond. Lead and co-underwriters constitute the so-called syndicate. Usually, the syndicate buys the bond from issuers at the offering price net of fees; with commonly lead-underwriters taking the largest portion of the issue. Then, syndicate members are free to allocate the bond in the primary market at the offering price to investors or to hold a fraction of the bond in their own books and sell it later on in the secondary market.

The primary market for corporate bonds utilizes a bookbuilding process during which underwriters obtain information about demand that is used to set a fixed offering price and determine allocations. Not all investors have equal access to an underwriter to obtain bonds in the primary market. Typically, institutions that lack an existing trading relationship with an underwriter are less likely to participate in the book-building process, and to receive their desired allocation, and thus may need to purchase bonds in the secondary market, usually at a price above the offering price (Goldstein et al. (2021)). Furthermore, existing underwriter relationships, along with information production, are rewarded with more profitable allocations (Nikolova et al. (2020)).

Underwriters benefit from their unique access to information about the issuing firms, investor demand and placement of the bonds learned from their role in the bookbuilding and allocation processes. This information advantage enables underwriters to sell to customers at relatively higher prices in the period following the offering (Goldstein et al. (2021)). The

profit underwriters can extract from a lengthy search of high valuation investors in the secondary market depends on their ability to hold inventory. Thus, underwriter inventory constraints might affect negatively the outcome of a bond offering, by forcing underwriters to mark the offering price down (or the coupon up), to allocate more bonds in a shorter time window. This will lead to an increase in the offering yield and thus the cost of financing for the issuing firm, which could induce firms to switch underwriter. Nagler and Ottonello (2022) show that inventory-constrained underwriters are more likely to place a bond to an investor with a pre-existing relationship and then buying it back within 6 to 12 months after the offering. Thus, by parking bonds with relationship investors, underwriters mitigate inventory constraints.

An over-the-counter (OTC) market, such as the one corporate bonds trade in, is characterized by inventory, search, and bargaining frictions. Theoretical literature starting with Duffie et al. (2005, 2007) rationalizes deviations of prices from fundamentals through OTC market frictions, and empirically Bessembinder et al. (2018), Friewald and Nagler (2019), and He et al. (2022) show that OTC market frictions affect both transaction costs and prices. Since underwriters can more credibly commit to find alternative buyers in the aftermarket, relationship investors might be less hesitant to accept additional holdings and might contribute more likely to secondary liquidity provision. Hence, strong underwriter relationships are important to keep client financing cost low and to maintain a profitable relationship with offering firms, and could contribute to secondary market liquidity provision.

B. Hypotheses

Based on the structure of the corporate bond offering process and market, I develop the following hypotheses regarding hedge funds connected with underwriters banks. These hypotheses reflect the relevance and interplay of prime brokerage and underwriting services.

Connected hedge funds outperformance

Prior research shows that investors in the underwriters' network are more likely to participate in the bookbuilding process and receive a primary market allocation (Jenkinson et al. (2018); Nikolova et al. (2020)). Underwriters gain information about the offering firm from due diligence, investor demand and placement of the bonds from their role in the bookbuilding and allocation processes. This information could be valuable for investors in the underwriters' network, and could give them an edge in their trades. If hedge funds connected with an underwriter through prime brokerage services gain access to this information, I expect them to undertake more aggressive trades and more profitable trades than hedge funds who lack an existing relationship with the underwriter. Furthermore, since lead and co-underwriter have differential access to firm information, within the subset of hedge funds with an underwriter connection, I expect funds connected with a lead-underwriter to be more profitable than funds connected with a co-underwriter.

Sources of profitability

The ability of an underwriter to keep a large share of the bond in-house means a lengthy search for investors in the secondary market, where they are able to extract more profit, by selling to higher valuations investors compared to the primary market. Previous literature shows that underwriters rely on existing relationships with bond investors to enlarge their inventory capacity (Nagler and Ottonello (2022)), they reward existing relationships and information production during book-building with more profitable allocations (Nikolova et al. (2020)). Investors with an existing relationship are easily reachable at any point in time thanks to lower search frictions (Hendershott et al. (2020)), thus underwriters can credibly commit to find buyers in the aftermarket and hence allocate them additional holdings in the primary market. Thus, if connected hedge funds help underwriters in placing the bonds, I expect to observe different secondary market outcomes between corporate bond offering with connected and non-connected funds. Specifically, I expect to observe higher dollar volume

and more transactions, since additional primary allocations coming from connected hedge funds will be reallocated to high valuation investors.

Information content

The universe of stocks held by hedge funds is fairly limited and sticky (Koijen and Yogo (2019)). Thus, one relevant question is whether or not hedge funds trade in all companies clients of their prime broker bank, or only in firm previously part of their portfolio. I expect hedge funds themselves to look for information about their holdings, thus participating in the related corporate bond offering and extracting information from their underwriters, rather than participating in all underwriters' offerings. Hence, I expect to find no abnormal profit in newly established positions. Furthermore, in this context, two types of information are relevant for hedge funds: bond details information, such as issue characteristics or investor demand, or firm information, such as expected returns on investment of the bond proceeds. If the information edge is purely about the bond issue details, then the connected hedge funds' profits should be driven by the announcements returns on the offering day, rather than the whole quarter, indicating that their profitability comes primarily from issue-specific news rather than overall firm information. I expect hedge funds to gain firm specific information and thus profit on the overall quarter rather than around the issuing date.

III. Data

This study data comes from a variety of sources. The hedge funds characteristics data comes from the union of multiple databases. Using a simplified version of the method developed by Joenväärä et al. (2021), I combine hedge fund data from Lipper TASS and Morningstar. I first harmonize the hedge fund characteristics in each database using the merging tables in Joenväärä et al. (2021). Then, I create a unique firm identifier consistent across databases, by manually clustering all database firm names into name-based firm

clusters. Two funds are considered equivalent when their Firm IDs, category, and domicile are equal, their USD-converted return correlation is at least 80% and their mean returns are statically equivalent.[4] Furthermore, to avoid commercial databases self-reporting bias, I complement the data using SEC forms ADV. I define a reporting entity as a hedge fund when they identify as hedge funds in their filing, have performance-based fees and more than 50% of their asset under management comes from high net worth individuals or pooled investment vehicles. I identify the hedge fund prime broker relationship complementing the methodology of Kumar et al. (2020) with forms ADV data. Hedge funds report to multiple databases at different points in time (Jorion and Schwarz (2014)); I first employ this strategic reporting decision to create a time series of hedge funds-prime broker observations. When available, I supplement this information with the prime broker relationships reported in their form ADV. For each hedge fund, I consider the first reported prime broker as the fund's broker since inception, and subsequently, I update the prime broker each time the fund reports to a new database or submit a new form ADV filing. I consider the last reported prime broker as the fund's broker until the fund stops filing 13Fs or the sample period ends. This results in a time series of hedge fund prime broker relationship, comprehending 1263 funds using 52 brokers.[5]

Funds' holdings data comes directly from form 13F filings. SEC regulations require all institutional investment managers, conditional on exercises investment discretion over $100 million or more on equity securities, to report their equity-linked holdings (including options) on form 13F filings.[6] Commercial databases such as Thomson Reuters provide only

[4] I require at least four common return observations when comparing returns and when comparing fund names, I pre-process the names by disregarding their case and removing periods, commas, and the fund specific stop-words: the, lp, llc, ltd, ag, inc, llp, co, company, pty, capital, management, corp, uk, sa, and limited.

[5] Chung and Kang (2016), using multiple snapshots of the TASS database, find that only 6.86% of funds in their sample ever change their prime broker, alleviating concerns of unidentified broker changes affecting the results.

[6] The institutional manager does not have to list certain small positions of securities on their form 13F if the position in the security meets two specific requirements. First, they must hold fewer than 10,000 shares of a given issuer, and second, the aggregate fair market value of the holdings in that same issuer must be less than $200,000. They must meet both of these requirements.

equity holdings, are prone to mistakes and omit confidential holdings (Agrawal et al. (2013)); therefore, I directly parse the funds' holding from the 13F and amended 13F files from SEC's EDGAR for the period 1999 Q1 to 2020 Q4.

Form 13F is required to be filed within 45 days of the end of a calendar quarter. The SEC has the discretion to delay or prevent disclosure of certain holdings if "necessary or appropriate in the public interest or for the protection of investors". When filers request confidential treatment for certain holdings, they are allowed to omit those confidential positions from their form 13F pending a decision by the SEC. Such holdings are disclosed in an amendment to the original form 13F after a request is denied, or after the confidentiality period expires. This interval lasts up to one year (and can be extended further) from the date required for the original 13F form. Agrawal et al. (2013) show that hedge funds' confidential holdings are associated with information-sensitive events, exhibit superior performance up to twelve months, and tend to take longer to build. This evidence supports private information and the associated price impact as the dominant motives for confidentiality. To avoid biases, I use the last reported filing for each fund-holding in each reporting quarter, hence accounting for amended 13Fs (Agrawal et al. (2013)).

The SEC requires disclosure of all equity-linked instruments, including equity option holdings for which the reported number of shares are the shares to which the manager is entitled if the option is exercised. Using this reporting feature, I aggregate the stock and options positions at the firm-level, i.e. to the equity holdings I add the shares reported in call options and I remove the shares reported in put options, resulting in holdings aggregated at the underlying firm level and thus better reflect the institutional investment manager exposure. Since I am interested in trading on firm fundamental information, I manually identify and remove all quantitative funds from the baseline sample,[7] as these funds are unlikely to use ad hoc information in their investment decisions. Following Agrawal et al. (2013), I retain only pure-play funds, investment companies in which hedge funds represent

[7] I define a fund quantitative following the main strategy stated in their websites, or based on news searches in case of missing website.

their core business, thus not including banks whose investment arms engage in hedge fund business or mutual fund management companies that enter the hedge fund business (Nohel et al. (2010)). I further remove fund of funds and macro categories of funds, as I am interested in trading on firm fundamental information and because through 13Fs only equity and equities-linked instruments are observed. Such restrictions ensure that 13Fs holdings are informative about the investments of hedge funds.

Corporate bond issues data comes from both Mergent Fixed Income Securities Database and Thomson Reuters SDC Platinum. Following the literature related to corporate bonds, I restrict the sample to corporate debentures and exclude bonds that have variable coupons, are convertible,[8] putable, asset-backed, exchangeable, privately placed perpetual, preferred securities, secured lease obligations, unrated, or quoted in a foreign currency. I define the issue date as the earliest between issue and filing date when they are in the same quarter or in different quarters and they differ less than 30 days, otherwise, when the issue and filing date are in different quarters and more than 30 days apart, as the reported issue date. This distinction is due to SEC Rule 415 which allows companies to register offerings in advance, usually not specifying the amounts and timing of offering. Sporadically, these registrations include a shortly subsequent issue, which announcement return is already embodied in the registration day. As I am concerned about the relationship with prime brokers, I remove all issues from the financial sector (SIC code 6000 to 6999) as issuing firm and prime broker are usually the same conglomerate. The sample of corporate bond transactions is from the enhanced Trade Reporting and Compliance Engine (TRACE) maintained by the Financial Industry Regulatory Authority (FINRA). I follow the cleaning steps from Dick-Nielsen (2014), thus cleaning same-day corrections and cancellations, removing reversals, and removing double counting of agency trades. Using TRACE intraday data, I first eliminate transactions with special trades flag. Then I calculate the daily clean price as the trading

[8]Retaining convertible debt as well does not qualitatively affect the results. Connected trades in firms issuing convertible debt do not significantly over-perform non-connected trades, behaving similarly to SEO (Qian and Zhong (2017)).

volume-weighted average of intra-day prices to minimize the effect of bid-ask spreads in prices, following Bessembinder et al. (2009). I use the U.S. Treasury yield curve estimates obtained from the Federal Reserve Board as my risk-free benchmark. Finally, I use CRSP for stock returns and Compustat for accounting variables. After the merging procedures, the final sample consists of 1263 hedge funds with their respective holdings from 1999 Q1 to 2020 Q4, they use 52 different prime brokers and hold positions in 1054 companies issuing 4757 distinct bonds.

A. Sample of Hedge Funds Holdings

Table I reports hedge funds summary statistics. Panel A reports hedge fund companies' statistics. The average (median) fund uses 2.12 (2.00) prime brokers and manages 1.44 (0.38) billion dollars in reported securities, by holding positions in 117 (36) firms, and during the sample time-span, it holds 659 (237) distinct firms. The average fund holds positions in 2.05 connected firms each quarter. Not all funds have a connected issue. Out of the 1148 unique hedge funds, 827 have at least a connected issue. The funds are moderately larger, with an average of 1.65 billion of AUM, and each have on average 2.51 connected securities per quarter.

[Insert Table I here.]

Panel B reports hedge fund holdings statistics. On average (median) there are 465 (592) funds in the sample each quarter, owning 0.37 (0.05) % of each company shares outstanding, and each fund is present in the sample 35 (33) quarters. I measure the amount of trade as the quarterly dollar change in position scaled by the fund's AUM (ΔOwn). To measure the quantity of trading activity disregarding its direction, I use the absolute value of dollar position change ($|\Delta Own|$); thus, regardless of whether the fund is buying or selling, $|\Delta Own|$ will be large if the fund has changed its position by a large dollar amount.

In my sample, the average (median) change in position is small, 7 (0) bps, whereas the

absolute value of position change ($|\Delta Own|$) is 30 (4) bps. As a measure of profitability, I use either the quarterly six factors alpha, embodying Fama and French (2015) market, size, value, profitability, and investment, plus the momentum factor of Jegadeesh and Titman (1993), or the five factors of Hou et al. (2014), consisting of a market factor, a size factor, an investment factor, and a profitability factor. I estimate alphas for each firm by first estimating the betas for each stock in a quarter using the past year's daily stock returns. I then calculate the quarterly alphas as the stock's cumulative return for a given quarter minus the sum product of its factor exposures times the factors' cumulative returns. To measure the profitability of each quarter's trades, I multiply the quarterly position change scaled by the fund's AUM (ΔOwn) by the following quarter factor alphas (i.e $\Delta Own_{i,j,t} \times \alpha_{i,t+1}$ ($\Delta Own_{i,j,t} \times \alpha_{Q5i,t+1}$), where j is the hedge fund, i is the stock and t is the quarter). Figure 1 provides a graphical representation of the timeline of the event, and of the trade and profitability measures.

[Insert Figure 1 here.]

The profitability measures capture the contribution to the abnormal fund performance of each trade. Intuitively, if a fund reduces its position in a company which subsequently exhibits negative alpha, the profitability measure will be positive as the fund is less exposed to the negative abnormal performance, and thus has profited from the trade. For example, if a fund reduces its holding of a security in a quarter by 1% of AUM and the abnormal return measure for the stock in the subsequent quarter is -2%, the trade profitability measure will 0.02%, or 2 bps.

B. Sample of Debt Issues

Table II reports bond offering summary statistics. Panel A reports the characteristics of bonds offerings. There are 4757 unique debt issues in the sample, from 1054 unique firms. The average (median) issue has a maturity of 12 (10) years, an offering amount of 1.07 (0.5) billion dollars, and coupon of 5.26% (5.12%). On average (median) 3.75 (3) investment

banks act as a lead-underwriter in the issuance while there are 2.97 (2) co-underwriter in each issue. Table II Panel B reports the summary statistics of bond offering market data. Out of 4757 debt issues in the sample, 3364 have complete data and are available in TRACE.[9] The average (median) issue has an offering yield of 4.97% (4.64%), has a primary market volume during the first week of trading of 673 (518) million dollars coming from 144 (90) transactions.[10] In the secondary market, the average (median) bond is traded 132 (86) times during the first week, with a dollar volume of 231 (154) million.

IV. Empirical Settings

I begin the analysis by laying down the main empirical strategy. I define connected funds as hedge funds whose prime broker is a lead-underwriter in a bond offering and treated position as the holding changes of connected hedge funds in the company issuing the bond. I conjecture that connected funds should exhibit "abnormal" trading activity and performance in the treated positions. As the change in portfolio weights (ΔOwn) is measured in the quarter before the issue and profitability ($\alpha_{i,j,t+1}$ or $\alpha_{Q5i,t+1}$) is measured in the quarter of the issue, I measure the change in firm exposure in the quarter before the information is due to become public. Intuitively, if hedge funds receive valuable information, they will act on it in advance, while I measure the performance during the quarter of the issue as it is the quarter in which profit or losses are realized. The time series and cross-sectional dimensions of the data allow me to control for across-funds variation each quarter and across-holdings variation for each event-firm since both connected and non-connected funds are present in the data. To do so,

[9]Specifically, 3972 issues are available in TRACE, as transaction-level data in all TRACE-Eligible Securities began reporting on July 1, 2002. Out of 3972, only 3364 have first-week secondary market transactions, a match with CRSP/Compustat data, and non-missing gross spread from SDC/Mergent Fisd. Non-controlling for gross spread leaves 330 observations more, does not affect the secondary market effect of hedge funds while overstating the primary market effect of hedge funds. To be conservative, I remove missing gross spread observations and I control for it in all regression specifications.

[10]Trace began reporting distinct primary transactions in March 2010, resulting in only 66% of the bonds issue having primary market observations.

I run the following regression:

$$Y_{i,j,t} = \beta_1 Bond_{i,j,t} + \lambda_{j,t} + \psi_{i,t} + \varepsilon_{i,j,t} \tag{1}$$

where i is the firm, j is the fund and t is the quarter. $Bond_{i,j,t}$ is a dummy variable that takes the value of 1 if fund j prime broker bank is lead-underwriter in a debt issue of company i in quarter $t+1$. $Y_{i,j,t}$ is either the trade measure $|\Delta Own_{i,j,t}|$ or the profitability measures $\Delta Own_{i,j,t} \times \alpha_{i,j,t+1}$ and $\Delta Own_{i,j,t} \times \alpha_{Q5i,t+1}$. $\lambda_{j,t}$ are fund $\times$ quarter fixed effects, to control for fund specific variation within the quarter across holdings, and $\psi_{j,t}$ are firm $\times$ quarter fixed effects, to control for firm specific variation within the quarter across funds. Considering this stringent set of fixed effects, the remaining variation is entirely fund-firm specific information; therefore removing all the concerns about connected hedge funds being more profitable than non-connected hedge funds and information reaching both connected and non-connected hedge funds. In short, these fixed effects allow me to control for confounding factors and rule out alternative explanations unrelated to their connections to prime broker banks.

V. Results

In this section, I first discuss the results on hedge fund trading before corporate bond offerings both in a regression setting and in a portfolio approach. Then, I investigate the sources of profitability coming from the bond market and I rule out alternative explanations. After, I explore the information content driving the hedge fund profits. Last, I carry out several tests to investigate the robustness of the findings.

A. Connected hedge funds outperfomance

I start with analyzing hedge funds' trade size in the calendar quarter before a bond offering announcement. I hypothesize that, if hedge funds obtain an information advantage from their connections to prime broker banks, they will exhibit larger trades on the treated stocks in the quarter before the bond is issued. Table III column (1) tests this hypothesis in a panel regression setting estimating of Eq. (1) using as dependent variable the trade measure $|\Delta Own|$. The trade measure is defined as the absolute quarterly dollar change in ownership scaled by AUM. This measure perfectly fits the findings that debt offerings are events in which the direction of the stock price during the announcement is not obvious (Howton et al. (1998) Jung et al. (1996)), and thus allowing me to identify abnormal trades without any assumption on the underlying return. Hence, the absolute value, not depending on the direction of the trade, represents the quarterly change in the portfolio weight. Note that in the regression specifications the ownership change is measured in the quarter prior to the bond announcement, and furthermore that all specifications include both fund × quarter and firm × quarter fixed effects, thus all potential fund company or stock confounding variables would be subsumed.

[Insert Table III here.]

The key coefficient of interest is *Bond* which is positive and significant at the 1% level, with a coefficient of 2.7 bps and a t-stat of 4.5. Thus, connected hedge funds make trades in treated stocks that are 2.7 bps larger than the trades in the control groups (either non-connected bond issuing firms or firms non-issuing bonds in the following quarter). The coefficient is also economically large when compared to the sample mean and median of 30 and 4 bps. When considering that the average connected fund AUM is 1.65 billion of dollars, the average treated stocks exhibit $ 442,916 bigger trades.

Next, I investigate whether these larger trades are also abnormally profitable. To test this hypothesis, I estimate the regression described in Eq. (1) using as dependent variables

the profitability measures $\Delta Own \times \alpha$ and $\Delta Own \times \alpha_{Q5}$. As shown in Figure 1, the profitability measures are at the fund-firm-quarter level and are equal to the product of the change in ownership scaled by the fund's AUM (ΔOwn) in the quarter before the bond issue announcement and the subsequent quarter stock factor alphas (either the Fama and French (2015) plus momentum or Hou et al. (2014) factors). This measure is meant to capture the incremental contribution to the fund's quarterly alpha from each of the individual stock trades. It is important to notice that the sign of the ownership change is taken into account, such that both the sign and size of the trade are reflected in the profitability measures. Columns (2) and (3) in Table III present the results. The coefficient on *Bond* is positive and significant at 1% level in both cases with a magnitude of 0.141 and 0.17 bps on the six factors alpha and on the five factors alpha respectively. These estimates are economically significant, as their magnitudes are three (two) times as large as the sample average of 0.04 (0.09) bps per quarter. Considering the average connected fund, this out-performance results in an additional \$23,437-\$28,104 abnormal profit each connected trade, and \$1.96-\$2.35 million abnormal profit during its lifetime.

I then confirm that the abnormal profitability is not driven by temporary price pressures. Specifically, I estimate Eq. (1) using instead of the following quarter returns, the returns the fund would have earned over the next four quarters. In particular, I consider the change in ownership during the quarter prior to the bond issuance and multiply it with the following four quarter alphas. If the connected stocks' profit is driven by temporary price pressure, I should observe a reversal in the following quarters.

[Insert Table IV here.]

Table IV reports the results. Columns (1) to (4) shows the six factors results while columns (5) to (8) the five factors ones. Notice that columns (1) and (5) are identical to columns (2) and (3) in Table III. I find no evidence of price reversal in the following quarters; instead, the abnormal profit seems to persist in the quarter after the issue (*t+2*),

with a magnitude of around 60% of the baseline results. Hence, the out-performance add up to $40,092-$47,216 abnormal profit for each connected trade for the average connected fund.

In addition to the regression results, I test the main hypothesis in a portfolio test, following an approach similar to Pool et al. (2015). Each quarter, I assign funds' holdings in firms issuing bonds during the following quarter to two different portfolios based on whether the fund bought or sold the stock during. Then, I create two sub-portfolio based on whether the trade was in treated stock or not. This process leaves me with four different portfolios for each fund. I create monthly returns for these portfolios by weighting the portfolio holdings within fund by past quarter dollar trade value and aggregating them across fund weighting by the past quarter dollar asset of under management. The portfolios are rebalanced quarterly.

[Insert Table V here.]

Table V reports the results. Columns (1) and (2) report the average monthly returns of the connected funds buy and sell portfolios, respectively. Columns (4) and (5) report the results for the buy and sell portfolios for non-connected funds. Finally, columns (3) and (6) show the difference of the returns of the buy and sell portfolios for the connected and non-connected funds, respectively, and column (7) provides the difference-in-difference estimate. Risk adjustment is based on either the Hou et al. (2014) factors, Fama and French (2015) plus Jegadeesh and Titman (1993) factors, Daniel et al. (1997) characteristic adjusted returns, or Bessembinder et al. (2018) characteristic adjusted returns. Regardless of the risk adjustment used, the long-short connected portfolio outperforms the non-connected long-short portfolio. The long-short connected strategy create an average five factors alpha of 0.505% per month significant at the 10% level, while the non-connected buy minus non-connected sell strategy reports a non statistically significant average of -0.185%. The difference between the two strategies averages 0.69% monthly, significant at the 5% level. Overall, these results are consistent with the regression tests, pointing to connected hedge funds being more profitable

in their trades than non-connected ones. Furthermore, I conduct additional tests to ensure that the results in Table III are not driven by funds option holdings or by funds of a certain size. Lastly, I conduct a placebo test in which I change the bond issue quarter to either one or two quarters prior to the actual date. I do not find evidence of abnormal profit during the placebo periods, suggesting that the information advantage connected hedge funds exhibit is specific to the time period the prime broker is actually offering the bond (See Internet Appendix Table XIII for the option results and Table XII for the size robustness and the time placebo tests).

B. Sources of profitability

In order to shed light on the underlying mechanism, I shift my focus to the bond market trading activity. Using bonds transaction-level data available in TRACE, I am able to observe whether bond offering outcomes, in both primary and secondary markets, are affected by the presence of connected hedge funds. During the bond offering process, lead-underwriters usually buy the largest portion of the issue from issuers. Then, they must decide how large their initial allocation in the primary market will be and what fraction of the bond they will keep in their inventory.[11] For a dealer the ability to keep a large share of the bond in-house means a lengthy search for investors in the secondary market, where they might be able to profit more, by selling the bond to buyers with higher valuations. Nagler and Ottonello (2022) shows that underwriters often rely on existing relationships with bond investors to enlarge their inventory capacity, by allocating the bond in the primary market to an investor with preexisting relationships and then buying it back within 6 to 12 months after the offering. This is because relationship investors are easily reachable at any point in time thanks to lower search frictions (Hendershott et al. (2020)) and they might be less hesitant to accept additional holdings in the primary market because underwriters can more

[11] Underwriting syndicates in the U.S. corporate bond market are allowed to keep part of newly offered bonds in their own inventory and distribute it in the secondary market. This is referred to as underwriting position and is allowed under the Volcker Rule, see Section 4 (A), p. 5571, downloadable at https://www.govinfo.gov/content/pkg/FR-2014-01-31/pdf/2013-31511.pdf.

credibly commit to find alternative buyers in the aftermarket. Thus, if underwriters use connected hedge funds to help them in placing the bonds, I should observe different secondary market outcomes between connected and non-connected offerings.

Since hedge fund holdings in corporate bonds are not disclosed, I cannot perform a similar analysis to Eq. (1); thus I will proxy hedge fund presence in the bond offering with their connection to the underwriter. The variable of interest is *HF*, a dummy that takes the value of 1 if at least one hedge fund holding shares in the firm is connected to one of the bond's lead underwriters. 89% of the bond offerings have at least one connected hedge fund. Then, I test the hypotheses by running linear regressions of offering outcomes variables on the *HF* dummy, using the connected and non-connected bond offering. Out of 4757 bond offerings, 3972 exist in the TRACE database, with only 3364 having first-week secondary market transactions, a match with CRSP/Compustat data, and non-missing gross spread. In all regression specifications, I include quarter, industry (3 digit sic code), rating, and underwriter fixed effects, and I include bond controls (log of offering amount, log of time to maturity, coupon rate, IPO dummy, and gross spread) and firm control (log of market value, log of book value, cumulative returns of the past 12 months, cumulative returns of the past 60 months, log of book to market, yearly change in total asset, and yearly change in shares outstanding).[12]

[Insert Table VI here.]

Table VI reports the results using reported all transactions.[13] In columns (1) and (2), the dependent variables are respectively the offering yield spread computed as offering yield minus cash-flow matched treasury yield (*Off. YS*) and underpricing computed as the difference between the offering yield and the yield of the first trading day in the secondary market plus the change in duration-matched cash flow treasury from the offering date to the

[12]Table XIV in the Internet Appendix, reports the extended version of Table VI.

[13]In Table XVI and Table XVII in the Internet Appendix, I report results using only transactions of size above 100,000 dollars and using only customers trades. Results are qualitatively and quantitatively similar.

first secondary market trading day (*Underpricing*). I do not find evidence of different underpricing or offering yield spread depending on whether a connected hedge fund is present or not. Columns (3) to (8) report results using as dependent variables the natural logarithm of 1 plus either the secondary dollar volume (*Vol*) or the number of secondary transactions (*Trans*), in the first week, month or six months separately. In all columns, I find support for the hypothesized mechanism in the data. During the first week after the offering date, bonds in which at least one underwriter has at least one connected hedge fund exhibit 36% higher secondary market volume and 27% higher secondary number of transactions. This effect is not transitory, in fact in columns (5) and (6) I run the same regression using the first month after the offering and I find similar results, while in columns (7) and (8) I use the first six months after the offering and I find even more pronounced results resulting in 41% higher secondary market volume and 44% higher secondary number of transactions. The persistence, indicate that connected hedge funds help underwrites in liquidity providing activities during the first months of the life of the bond when lengthy searches for high-valuation investors in the secondary market might be unfeasible.

Lastly, in Table VI columns (9) and (10), I report results using as dependent variables the natural log of 1 plus either the primary dollar volume (*Vol*) or the number of primary transactions (*Trans*), in the first week after the offering. There are only 2226 observations in two columns since TRACE introduced the distinction between primary and secondary market only in March 2010.[14] I do not find evidence of different first-week primary volume depending on whether a connected hedge fund is present or not, while they are associated with a higher number of first-week primary transactions. Thus, when a connected hedge fund is present, the initial allocation of the offering, even though of similar size, is more dispersed among investors.

I then investigate alternative explanations for the source of connected hedge funds' abnormal profitability. Chen and Martin (2011), Kumar et al. (2020), and Chung et al. (2021)

[14]In Table XV, I repeat the analysis of Table VI using only the sample post-March 2010, when the distinction between primary and secondary market is clear and results are quantitatively similar.

suggest that analysts are one possible conduit of information transfer from prime brokerage firms to hedge funds. In Table VII columns (1) and (2) I test this hypothesis. In the sample, 73% percent of the corporate bond offerings have an analyst within the underwriting bank following the firm. For this reason, I create the variable *No Analyst*, which takes the value of 1 when there is no analyst following the underlying firm in all hedge funds' prime broker banks. The $Bond \times NoAnalyst$ coefficient is not significant and small in magnitude in both columns, suggesting that there is no difference between trades of funds whose prime broker has an analyst following the offering firm and other funds.

[Insert Table VII here.]

Motivated by the fact that offerings occurring during periods of higher market uncertainty are associated with smaller syndicates with more concentrated syndicate allocations (Bessembinder et al. (2020)), I investigate whether sole lead offerings (i.e. bond offerings executed by only one underwriter) have higher profits. Table VII columns (3) and (4) report the baseline results I interact the *Bond* variable with *Sole Lead*, a dummy that takes the value of 1 if the bond offering is executed by one underwriter and 0 otherwise. The interaction terms are small and not significant, indicating that the profitability does not differ between offerings with a single or with multiple underwriters.

After, I study whether new relationships (i.e. bond offerings executed by a new underwriter) drive the profitability. It has been shown that existing underwriter relationships lower both the indirect and direct issuance costs. Thus underwriter certification helps reduce asymmetric information between the issuer and the investors (Dick-Nielsen et al. (2021)), and when a firm chooses a new underwriter for their bond offering, asymmetric information is likely to be high. Table VII columns (5) and (6) report the baseline results I interact the *Bond* variable with *New Rel*, a dummy that takes the value of 1 if the bond offering is the first offering by the firm using a specific underwriter and 0 otherwise.[15] The interaction

[15]To create the *New Rel* dummy, I used the full Mergent/SDC sample of corporate debentures, thus not accounting for other specific relationships between firms and underwriter banks such as equity offerings or

terms are not significant, suggesting that the profitability does not differ between new or old underwriters. Results from columns (2) to (4) suggest that asymmetric information about the firm is not driver of the abnormal profitability. This is an expected result since bond offering firms are usually large and established public firms with, on average, low asymmetric information.

Lastly, I investigate whether results are driven by the fund companies' propensity to engage in misconduct or violation of regulations. Prior literature suggested that fund managers that involved in legal or regulatory misconduct are more likely to engage in higher risk-taking and have higher operational risk (e.g., Brown et al. (2008) ; Brown et al. (2018)). Kumar et al. (2020) show that funds that had one or more violation in their ADV form profit more from their trades in connected banks' corporate borrowers. Thus, in case the information advantage is solely derived from their connection to the prime broker banks, I would expect these funds to exploit and hence profit more than well behaving funds. To examine it, I match the funds in the sample to their Form ADV filings and I estimate the baseline regression Eq. (1), with the variable *Bond* interacted with an indicator variable *Violation*, which takes the value of 1 if the fund discloses any prior civil, regulatory or criminal violation in Item 11 of its Form ADV file and 0 otherwise.

[Insert Table VIII here.]

Table VIII reports the results. Columns (1) and (2) contain the results when I construct the variable *Violation* based on the disclosure of any prior civil, regulatory, or criminal violations, while in columns (3) and (4), the variable is based on the disclosure of civil and regulatory violations only since these violations are closer to insider trading violations.[16] Since hedge funds were not required to file Form ADV until 2008, and criminal violations

loans. In Table VII, I do not consider bonds IPOs as new relationships, but only the change in underwriter. If bond IPO are considered as well, the results are qualitatively similar.

[16]To construct the variable *Violation*, in columns (1) and (2) of Table VII Panel B, I use responses to questions A, B, C, D, and H of Item 11 in Form ADV, while in columns (3) and (4), I use responses to questions C, D, and H of Item 11. Note that questions A and B are on criminal violations, questions C and D are on regulatory violations (e.g., the SEC, Commodity Trading Futures Commission, other federal regulatory agencies, or state regulatory agencies), and question H is on civil violations.

have been reported since 2012, the sample size for Table VII Panel B differs from the baseline. The coefficient on the interaction term is negative in all columns and significant in three of them. Thus, hedge funds that have previously engaged in misconduct exhibit lower profits in their trades compared to other funds. A possible explanation is that underwriters value compliance in their related parties and thus provided better information or allocations to more compliant funds.

C. Information content

One natural question arising is whether or not the information hedge funds trade on is about new companies, not previously part of the hedge fund portfolio. If all prime broker related hedge funds gain information about issuing companies, assuming that hedge fund managers dislike leaving profit on the table, some of them will not hold the treated stock in their portfolio and will then act on the new information. In this case, I should observe abnormal volume and profit from new connected positions. Otherwise, if hedge funds themselves look for information about their holdings, thus extracting information from prime brokers about existing positions, I should find no abnormal volume or profit in newly established connected positions. Therefore, the additional profitability could be due to prime brokers banks having access to better and more detailed information about the companies they advise, and hedge funds being able to extrapolate data from this relationship. Furthermore, if the information is not fundamental, hedge funds might hold the connected firm for a limited amount of time and thus shortly open and close the position. Otherwise, if hedge funds use their prime broker relationship in connection with firm events to gather additional soft information they will not have access to, I should observe long-standing positions to be the ones driving the profitability. I test this conjecture by running the baseline regression in Eq. (1) and interacting the *Bond* variable with two dummies: *Open* and *Close*, where *Open* is a dummy that takes the value of 1 if a firm has entered in the fund portfolio in the previous four quarters, and *Close* is a dummy that takes the value of 1 if a firm has been completely

liquidated by the fund in the following four quarters.

[Insert Table IX here.]

Table IX reports the results. Column (1) reports the regression results using the trade variable ($|\Delta Own|$) as the dependent variable, while columns (2) and (3) use the profitability measures ($\Delta Own \times \alpha$ and $\Delta Own \times \alpha_{Q5}$). The *Open* dummy is positive and significant, indicating that when hedge funds add a new holding in their portfolio use more capital and profit more from them, while the *Close* dummy shows the opposite pattern, closed positions are smaller and nonprofitable. All the coefficients on the *Bond* dummy point in the same direction: abnormal trading and profits come from incumbent positions, suggesting that hedge funds are the ones initiating the information search and not prime brokers providing information to their related parties. Furthermore, it could indicate an interdependence between prime broker provided information and internal research, i.e. the information retrieved through their prime broker connection is profitable as long as it is used in conjunction with their own in-house established research.

Next, I shed light on what type of information connected hedge funds profit from. Thus, I test whether or not funds extrapolate issue-specific information. If the information edge is purely about the bond issue details, then the connected hedge funds' profits should be driven by the announcements returns when the issue is publicly disclosed. In this scenario, I should observe abnormal returns only around debt issue announcements rather than the whole quarter, indicating that their profitability comes primarily from issue-specific news rather than overall firm information. Intuitively, in case the issue announcement returns are positive while the overall quarter abnormal returns are negative, increasing the position is only profitable around the issue and not overall. On the other hand, if the information edge is about the borrowing firms in general, I would expect to see the opposite pattern. To test this conjecture, I decompose the quarterly alphas in three days announcement returns (-1 day to +1 day) around the bond issue announcement and the remaining component (quarterly

alpha minus the three days buy and hold abnormal returns (BHARs))[17]. I run Eq. (1) using each of the two return components to calculate the trade performance measure.

[Insert Table X here.]

Table X Panel A reports the estimation results. The coefficient on *Bond* is only significant when quarterly returns minus the BHARs are considered, indicating that the information edge funds have is firm rather than issue-specific. The return concentration outside the announcement window indicate that hedge funds collect more information about the firm fundamental value through their prime broker bank, rather than debt issue details and timing. Following on the same question, I investigate whether connected hedge funds' abnormal profits are driven by positive or negative information. To do so, I interact the *Bond* variable in the baseline specification with a dummy that takes the value of 1 if the abnormal returns is positive and 0 otherwise (***Positive***). If connected funds profit from positive (negative) information, I should observe concentrate outperformance among in the stocks with positive (negative) abnormal returns. Table X Panel B reports the results. The ***Positive*** dummy is small and insignificant in all specifications, pointing towards the abnormal profitability being equal between positive and negative information.

D. Robustness Tests

Lastly, in Table XI, I run some robustness tests. First, I focus on the omitted subsample of quantitative funds. These firms are unlikely to use outside ad hoc information in making trading decisions, as they ordinarily do not engage in stock picking but base their strategies on statistical analyses. Thus, quantitative hedge funds whose prime broker banks act as lead underwriter in a debt offering might not gain an information edge, as they are not looking for it, and consequently, should not over-perform in their connected trades. I test this hypothesis by adding the sub-sample of quantitative funds to the full sample and

[17] When 7 days announcement returns (-3 days to +3 days) are used I obtain qualitatively and quantitatively similar results.

interacting the *Bond* variable with *Quant*, which is a dummy variable taking the value of 1 if the fund is a quantitative hedge fund. The regression results, reported in columns (1) and (2), corroborate the conjecture. While the *Bond* coefficient remains positive and significant, the interaction term is negative and statistically significant at the 1% level. The interaction coefficient magnitude is very close to the *Bond* coefficient one, indicating a zero overall additional profit from quantitative hedge funds, suggesting that these funds do not profit from their prime broker relationships, plausibly because of their rigid statistical rules.

[Insert Table XI here.]

Second, I look into debt issues from financial institutions (SIC 6000 to 6999). These firms are either banks or are tightly related to them; thus, in a bond offering context, the advisory and underwriting services are mostly made in-house. The tighter connection, might alter the incentives to use relationship investors in the placement process. When only one lead-underwriter is present, all necessary services are made in house, thus there is no information production, while when more than one lead-underwriter are present, it is mutually beneficial not to disseminate information as the co-lead underwriters share the issue's gross spread, also it might be beneficial for future issues to be in good terms with one or more banks which could act co-lead or co-underwriters. Hence, I do not expect information about those firms to be revealed easily by related parties, and consequently hedge funds to profit from it. I test these conjectures, in Table XI column (2) by substituting in the baseline regression the variable *Bond* with *Bond Financial*, a dummy variable that takes the value of one if the fund prime broker bank is lead-underwriter in a debt issue, where the issuing company is in the financial sector (SIC 6000 to 6999). The dummy coefficient is negative and not significant, indicating that hedge funds do not exhibit abnormal profit from connected trades in financial firms. Intuitively, either prime broker's banks do not gain additional value relevant information about their related parties or they are unwilling to share details with hedge funds or a combination of the two. Nonetheless, this finding supports the information transmission

mechanism highlighted in the baseline results.

Last, I test whether information acquisition differs among prime brokers banks. Lead underwriters establish a relationship with the firm, perform screening and due diligence, are responsible for the book-building and underwriting processes, while co-underwriters are responsible only for bringing a small share of the offering to market. Thus, I do not expect all participants in the debt offering to have the same information about the issuing firm. Consequently, hedge funds whose prime broker banks participate in the issue but do not perform the role of lead underwriter might not gain an information edge, thus might not exhibit an abnormal profit. I test this hypothesis running Eq. (1), where *Bond* is substituted by *Co-Under*, which is a dummy variable that takes the value of 1 if the fund prime broker bank is a co-underwriter in a debt issue of the underlying company in the following quarter. Table XI, column (3) reports the results. The coefficient on *Co-Under* is small and statistically indistinguishable from zero. Suggesting that hedge funds whose prime broker banks are mere participants in a bond offering do not gain the same information edge as hedge funds whose prime broker banks are lead underwriters, highlighting the unique advantage of lead-underwriters in the information gathering process. Lead-underwriters through their multiple services get both hard and soft information on the related companies, while co-underwriters receive only the necessary information from the lead-underwriters contacting them. This evidence thus suggests that interactions with the prime broker bank allows hedge funds to fetch valuable information that is exclusive to the lead-underwriter.

VI. Conclusion

In this paper, I present empirical evidence on hedge funds trading on their prime broker banks' underwriting clients. Using a sample of hedge funds holdings from 1999 to 2020, I document that connected hedge funds make abnormally large trades in offering firms prior to bond issue announcements, and these trades outperform other trades. I find evidence

that the abnormal profitability does not come from funds' option positions and it is not driven by known risk factors. I show that the abnormal returns come from long-standing positions and are not concentrated in announcement periods, supporting the conjecture that the profitability is due to connected hedge funds' ability to process additional information gathered throughout their prime brokers and not because of material information sharing.

Finally, my evidence suggests that hedge funds bond market activity represents one possible channel of information transfer and production. Bonds offering with a connected hedge fund exhibit 36% higher secondary market volume and 27% higher number of secondary transaction during the first week, with a persistent effect up to 6 months after the offering date. Hence, connected hedge funds might help underwriters in liquidity provision activities during the first months of the life of the bond, when lengthy searches for high-valuation investors in the secondary market might be very costly.

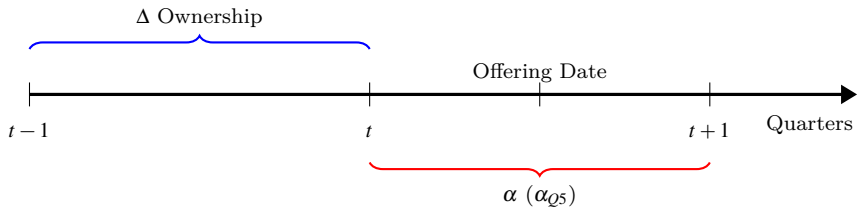

Figure 1. Timeline of change ownership and profitability
Figure 1 shows the timeline of the bond offering and the measurement of the trade and profitability measure. ΔOwn is measured from quarter end in $t-1$ to quarter end in t, i.e. the quarter end before the offering. α or α_{Q5} are measured from quarter beginning in t to quarter end in $t+1$, thus the quarter of the offering.

Table I
Summary statistics: Hedge Funds
Panel A reports fund-specific variables. *Broker* is the number of prime brokers per quarter, *AUM* is the asset under management in millions and *# Connected stocks held* is the number of treatment firms in the funds' portfolio each quarter. Panel B reports fund holding level variables. *Bond Offering* is a dummy taking the value of 1 if the firm has a bond issuance in the quarter, *Ownership* is the shares owned divided by the total shares outstanding. ΔOwn is the quarterly position change scaled by the fund's AUM. $|\Delta Own|$ is the absolute value of ΔOwn. $\Delta Own \times \alpha$ is the product of the quarterly position change scaled by the fund's AUM (ΔOwn) and the following quarter's six factors alpha,$\Delta Own \times \alpha_{Q5}$ is the product of the quarterly position change scaled by the fund's AUM (ΔOwn) and the following quarter's five factors alpha. Quarters is the number of quarters each fund is present in the sample and Funds is the number of funds available each quarter. All fund-specific variables have been winsorized at the 1% level.

Panel A: Hedge Fund Characteristics						
	Obs	Mean	Std. dev	10th	50th	90th
Broker	24412	2.12	1.63	1.00	2.00	4.00
AUM (mil)	24412	1442.90	3399.13	84.19	385.56	3096.56
# Connected stocks held	24412	2.05	6.00	0.00	0.00	5.00
Panel B: Hedge Fund Holdings						
Bond Offering	2859411	0.05	0.23	0.00	0.00	0.00
Ownership (%)	2859411	0.37	0.94	0.00	0.05	0.92
ΔOwn (%)	2859411	0.07	0.74	-0.21	0.00	0.43
$\lvert\Delta Own\rvert$ (%)	2859411	0.30	0.67	0.00	0.04	0.84
$\Delta Own \times \alpha$ (bps)	2859411	0.04	8.64	-2.82	0.00	2.84
$\Delta Own \times \alpha_{Q5}(bps)$	2859411	0.09	8.67	-2.78	0.00	2.90
Quarters	2859411	35.54	18.32	15.00	33.00	65.00
Funds	2859411	465.67	210.21	134.00	592.00	637.00

Table II
Summary statistics: Bond offerings

Panel A reports bond offering variables. *Lead-underwriters* is the number of banks acting as lead underwriters per issue and *Co-underwriters* is the number of banks acting as co-underwriters per issue. *Offering Amt* is the dollar amount offered in millions. *Time to maturity* is the years to maturity at the issue date. *Rating* is the bond offering numerical rating and *Coupon* is the debt coupon measured in percentage. Panel B reports bond market variables. *HF* is a dummy taking the value of 1 if at least one hedge fund holding shares in the firm is connected to one of the bond's lead underwriters, *Offer YTM* is the offering yield to maturity and *Underpricing* is the difference between the sum of the offering yield and the change in duration-matched cash flow treasury from the offering date to the first secondary market trading day and the yield of the first trading day in the secondary market. *Primary Volume* and *# Primary Transactions* are respectively the sums of the first-week volume in millions of dollars or number of transactions in the primary market, while *Secondary Volume* and *# Secondary Transactions* are respectively the sums of the first-week volume in millions of dollars or number of transactions in the secondary market.

Panel A: Bond offering characteristics						
	Obs	Mean	Std. dev	10th	50th	90th
Lead-underwriters	4757	3.75	2.33	1.00	3.00	7.00
Co-underwriters	4757	2.97	2.83	0.00	2.00	7.00
Offering Amt (mil)	4757	1075.16	1925.14	200.00	500.00	2200.00
Time to maturity (years)	4757	12.07	9.43	5.02	10.05	30.44
Rating	4074	9.04	3.30	5.33	9.00	14.00
Coupon (%)	4757	5.26	2.26	2.50	5.12	8.12
Panel D: Bond offering market data						
HF	3364	0.89	0.30	0.00	1.00	1.00
Offer YTM (%)	3364	4.75	2.72	2.34	4.50	7.12
Underpricing (bps.)	3364	6.59	11.50	-0.19	3.31	16.84
Primary Volume (mil.)	2226	716.14	882.90	297.00	530.00	1252.75
# Primary Transactions	2226	156.81	701.78	48.00	94.00	162.00
Secondary Volume (mil.)	3364	241.01	380.98	29.41	161.20	501.28
# Secondary Transactions	3364	138.77	229.27	15.00	90.00	272.40

Table III
Baseline results

Table III reports results that compare the size and returns on hedge fund trades in firms that issue debt using their prime brokers as lead-underwriter to that of other trades in the control groups, following Eq. (1). Column (1) reports panel regression results using as dependent variable the trade size measure $|\Delta Own_{i,j,t}|$, while columns (2) and (3) use the profitability measures $\Delta Own_{i,j,t} \times \alpha_{i,j,t+1}$ and $\Delta Own_{i,j,t} \times \alpha_{Q5i,t+1}$. $|\Delta Own_{i,j,t}|$ is defined as the absolute quarterly dollar change in ownership (in percentage value of AUM), where i is the firm, j is the fund and t is the quarter. $\Delta Own_{i,j,t} \times \alpha_{i,j,t+1}$ and $\Delta Own_{i,j,t} \times \alpha_{Q5i,t+1}$ are the quarterly position change multiplied by the following quarter $(t+1)$ factor alphas (either six factors of Fama and French (2015) plus Jegadeesh and Titman (1993), or the five Q factors of Hou et al. (2014)) (in basis points of AUM). *Bond* is a dummy variable that takes the value of 1 if fund j prime broker bank is lead-underwriters in a debt issue of company i in quarter $t+1$ and 0 otherwise. All regression includes both fund × quarter and firm × quarter fixed effects and the standard errors reported in brackets are three-way clustered at the firm, fund, and quarter level. Coefficients marked with ***, **, and * are significant at the 1%, 5%, and 10% level, respectively.

	(1) $\lvert\Delta Own\rvert$ (1)	(2) $\Delta Own \times \alpha$ (2)	(3) $\Delta Own \times \alpha_{Q5}$ (3)
Bond	0.027***	0.141***	0.170***
	(0.006)	(0.048)	(0.054)
Fund×Quarter FE	Yes	Yes	Yes
Firm×Quarter FE	Yes	Yes	Yes
R^2	0.525	0.181	0.181
Adjusted R^2	0.467	0.081	0.080
Observations	2,859,411	2,859,411	2,859,411

Table IV
Information or temporary price pressure

Table IV reports estimation results of Eq. (1) to examine whether the trade profitability is permanent or temporary. Column (1) to (4) reports panel regression results using as dependent variable $\Delta Own \times \alpha$, while columns (5) to (8) use $\Delta Own \times \alpha_{Q5}$. $\Delta Own_{i,j,t} \times \alpha_{i,j,t+k}$ and $\Delta Own_{i,j,t} \times \alpha_{Q5i,t+k}$ are the quarterly position change multiplied by the following quarters $(k = 1,2,3,4)$ factor alphas (either six factors of Fama and French (2015) plus Jegadeesh and Titman (1993), or the five factors of Hou et al. (2014)) (in basis points of AUM). *Bond* is defined in the same way as in Table III. All regression includes both fund × quarter and firm × quarter fixed effects and the standard errors reported in brackets are three-way clustered at the firm, fund, and quarter level. Coefficients marked with ***, **, and * are significant at the 1%, 5%, and 10% level, respectively.

	$\Delta Own \times \alpha$				$\Delta Own \times \alpha_{Q5}$			
	(1) $t+1$	(2) $t+2$	(3) $t+3$	(4) $t+4$	(5) $t+1$	(6) $t+2$	(7) $t+3$	(8) $t+4$
Bond	0.141***	0.101*	-0.007	0.002	0.170***	0.115**	-0.056	-0.031
	(0.048)	(0.053)	(0.062)	(0.042)	(0.054)	(0.050)	(0.056)	(0.042)
Fund×Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm×Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.181	0.177	0.176	0.177	0.181	0.179	0.175	0.176
Adjusted R^2	0.081	0.076	0.075	0.075	0.080	0.077	0.074	0.074
Observations	2,859,411	2,798,530	2,726,812	2,635,272	2,859,411	2,798,530	2,726,812	2,635,272

Table V
Portfolio strategy

Table V reports the performance of portfolios based on hedge fund's trades in bond issuing firms. Each quarter, I assign funds' holdings in firms issuing bonds during the quarter to two different portfolios based on whether the fund bought or sold the stock in the previous quarter. Then I create two sub-portfolio based on whether the trade was a connected trade or not. This process leaves me with four different portfolios for each fund. I create monthly returns for these portfolios by weighting the portfolio holdings within a fund by the past quarter dollar trade value and aggregating them across fund weighting by the past quarter dollar asset of under management. The portfolios are rebalanced quarterly. Columns (1) and (2) report the risk-adjusted average monthly returns of the connected buy and sell portfolios, respectively. Risk adjustment is based on either the Hou et al. (2014) factors, Fama and French (2015) plus Jegadeesh and Titman (1993) factors, Daniel et al. (1997) returns, or Bessembinder et al. (2018) returns. Columns (4) and (5) report the corresponding results for the buy and sell portfolios for non-connected stocks. Finally, columns (3) and (6) show the difference of the returns of the buy and sell portfolios for the connected stocks and non-connected stocks, respectively, and column (7) provides the difference-in-difference estimate. Values in parentheses are t- statistics based on Newey and West (1987) standard errors. Coefficients marked with ∗∗∗, ∗∗, and ∗ are significant at the 1%, 5%, and 10% level, respectively.

	Connected			Non Connected			
	Buy (1)	Sell (2)	Diff (3)	Buy (4)	Sell (5)	Diff. (6)	Diff. - Diff. (7)
Excess Returns	0.903***	0.423	0.480*	0.614*	0.693**	-0.079	0.560*
	(3.354)	(1.140)	(1.899)	(1.954)	(2.430)	(-0.568)	(1.772)
Q 5	0.347**	-0.158	0.505*	-0.049	0.135	-0.185	0.690**
	(2.017)	(-0.724)	(1.942)	(-0.281)	(0.782)	(-1.067)	(2.086)
FF6	0.217	-0.226	0.443**	-0.089	0.003	-0.092	0.534*
	(1.571)	(-0.938)	(1.989)	(-0.552)	(0.018)	(-0.636)	(1.765)
DGWT	0.243*	-0.291	0.533**	-0.018	0.045	-0.063	0.597**
	(1.701)	(-1.480)	(2.009)	(-0.134)	(0.304)	(-0.572)	(2.025)
C14	0.191	-0.361	0.553**	-0.032	0.141	-0.174	0.726**
	(0.635)	(-1.071)	(1.968)	(-0.107)	(0.465)	(-1.360)	(2.310)

Table VI
Bond market evidence

Table VI examine whether the presence of connected hedge funds affects the bond offering pricing and liquidity. *Off. YS* is the offering yield spread computed as offering yield minus cash flow matched treasury yield, reported in percentage, *Underpricing* is the difference between the offering yield and the sum of the yield of the first trading day in the secondary market and the change in cash flow treasury from the offering date to the first secondary market trading day, reported in basis points. *Vol* and *Trans* are the natural log 1 plus respectively the sum week dollar volume or the sum of the number of transactions. These two variables are reported separately for the first week, month, or six months of secondary market trading and the first week of primary market. *HF* is a dummy variable taking the value of 1 if at least one hedge fund holding shares in the firm is connected to one of the bond's lead underwriters, *# Lead underwriters* is the number of lead underwriters in the bond offering and *# Co-underwriters* is the number of co-underwriters. All regressions include bond controls and firm controls as well as quarter, industry, rating and underwriter fixed effects. The standard errors reported in brackets are two-way clustered at the industry and quarter level. Coefficients marked with $***$, $**$, and $*$ are significant at the 1%, 5%, and 10% level, respectively.

			1 Week		1 Month		6 Months		Primary	
	Off. YS	Underp.	Vol	Trans	Vol	Trans	Vol	Trans	Vol	Trans
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
HF	0.114	0.752	0.312***	0.238***	0.287***	0.261***	0.343***	0.364***	0.710	0.254**
	(0.092)	(0.876)	(0.098)	(0.060)	(0.083)	(0.067)	(0.086)	(0.078)	(0.509)	(0.104)
# Lead-underwriters	-0.197**	-1.46**	0.039	0.055*	0.027	0.048	-0.003	0.010	0.061	0.086***
	(0.083)	(0.560)	(0.046)	(0.032)	(0.040)	(0.031)	(0.041)	(0.033)	(0.068)	(0.030)
# Co-underwriters	-0.020	-0.225***	0.014	0.023**	0.011*	0.024***	0.010*	0.025***	0.021	0.018**
	(0.014)	(0.072)	(0.008)	(0.009)	(0.006)	(0.008)	(0.005)	(0.008)	(0.014)	(0.007)
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rating FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Underwriter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bond Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.466	0.339	0.494	0.564	0.537	0.553	0.552	0.552	0.475	0.421
Adjusted R^2	0.412	0.273	0.443	0.520	0.490	0.507	0.506	0.506	0.407	0.347
Observations	3,364	3,364	3,364	3,364	3,364	3,364	3,364	3,364	2,226	2,226

Table VII
Alternative information sources

Table VII reports results for alternative sources of information. In all columns, I run Eq. (1), while interacting *Bond* with indicator variables *No Analyst*, *Sole Lead* or *New Rel*. *No Analyst* takes the value of 1 when there is no analyst following the underlying firm in all hedge funds' prime broker banks and 0 otherwise. *Sole Lead*, a dummy that takes the value of 1 if the bond offering is executed by one underwriter and 0 otherwise, while *New Rel* takes the value of 1 if the bond offering is the first offering by the firm using a specific underwriter and 0 otherwise. Odd-numbered columns use the profitability measure $\Delta Own_{i,j,t} \times \alpha_{i,j,t+1}$, while even-numbered columns use the profitability measure $\Delta Own_{i,j,t} \times \alpha_{Q5i,t+1}$. In both panels *Bond* is defined in the same way as in Table III. All regression includes both fund × quarter and firm × quarter fixed effects and the standard errors reported in brackets are three-way clustered at the firm, fund, and quarter level. Coefficients marked with ∗∗∗, ∗∗, and ∗ are significant at the 1%, 5%, and 10% level, respectively.

Panel A: Alternative Sources

	$\Delta Own \times \alpha$ (1)	$\Delta Own \times \alpha_{Q5}$ (2)	$\Delta Own \times \alpha$ (3)	$\Delta Own \times \alpha_{Q5}$ (4)	$\Delta Own \times \alpha$ (5)	$\Delta Own \times \alpha_{Q5}$ (6)
Bond	0.145**	0.184**	0.144***	0.168***	0.161***	0.176***
	(0.064)	(0.071)	(0.048)	(0.054)	(0.051)	(0.057)
Bond×No Analyst	-0.010	-0.046				
	(0.111)	(0.096)				
Bond×Sole Lead			-0.060	0.045		
			(0.278)	(0.281)		
Bond×New Rel					-0.100	-0.032
					(0.111)	(0.108)
Fund×Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm×Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.181	0.181	0.181	0.181	0.181	0.181
Adjusted R^2	0.081	0.080	0.081	0.080	0.081	0.080
Observations	2,859,411	2,859,411	2,859,411	2,859,411	2,859,411	2,859,411

Table VIII
ADV violations

Table VIII investigates whether results are driven by the fund companies with a high propensity to engage in misconduct. In all columns, I run Eq. (1) interacting *Bond* with indicator variable *Violation*, a dummy variable taking the value of 1 if the fund discloses any prior violations. Columns (1) and (2) contain the results based on prior civil, regulatory, or criminal violations, while columns (3) and (4) based on prior civil and regulatory violations only. Odd-numbered columns use the profitability measure $\Delta Own_{i,j,t} \times \alpha_{i,j,t+1}$, while even-numbered columns use the profitability measure $\Delta Own_{i,j,t} \times \alpha_{Q5i,t+1}$. In both panels *Bond* is defined in the same way as in Table III. All regression includes both fund × quarter and firm × quarter fixed effects and the standard errors reported in brackets are three-way clustered at the firm, fund, and quarter level. Coefficients marked with ∗∗∗, ∗∗, and ∗ are significant at the 1%, 5%, and 10% level, respectively.

	Criminal or Civil or Regulatory		Civil or Regulatory	
	$\Delta Own \times \alpha$	$\Delta Own \times \alpha_{Q5}$	$\Delta Own \times \alpha$	$\Delta Own \times \alpha_{Q5}$
	(1)	(2)	(3)	(4)
Bond	0.243***	0.290***	0.199***	0.252***
	(0.073)	(0.089)	(0.066)	(0.078)
Bond×Violation	-0.172*	-0.197**	-0.138	-0.166*
	(0.089)	(0.095)	(0.082)	(0.087)
Fund×Quarter FE	Yes	Yes	Yes	Yes
Firm×Quarter FE	Yes	Yes	Yes	Yes
R^2	0.146	0.147	0.161	0.162
Adjusted R^2	0.077	0.078	0.076	0.077
Observations	2,029,125	2,029,125	2,223,285	2,223,285

Table IX
Extensive vs Intensive

Table IX reports results that compare the size and returns on hedge fund extensive trades to the intensive ones. *Open* is a dummy that takes the value of 1 if a firm was initially bought in the previous four quarters, and *Close* is a dummy that takes the value of 1 if the firm has been completely liquidated in the following four quarters. *Bond* is defined in the same way as in Table III. Column (1) reports panel regression results using as dependent variable the trade measure $|\Delta Own_{i,j,t}|$, while columns (2) and (3) use the profitability measures $\Delta Own_{i,j,t} \times \alpha_{i,j,t+1}$ and $\Delta Own_{i,j,t} \times \alpha_{Q5i,t+1}$, respectively. All regression includes both fund × quarter and firm × quarter fixed effects and the standard errors reported in brackets are adjusted for heteroskedasticity and three-way clustered at the firm, fund, and quarter level. Coefficients marked with ∗∗∗, ∗∗, and ∗ are significant at the 1%, 5%, and 10% level, respectively.

	$\lvert\Delta Own\rvert$ (1)	$\Delta Own \times \alpha$ (2)	$\Delta Own \times \alpha_{Q5}$ (3)
Bond	0.022***	0.139**	0.158**
	(0.008)	(0.056)	(0.061)
Open	0.036***	0.080***	0.126***
	(0.005)	(0.030)	(0.027)
Close	-0.044***	-0.021	-0.034
	(0.004)	(0.036)	(0.026)
Bond×Open	-0.008	0.164	0.144
	(0.010)	(0.112)	(0.106)
Bond×Close	0.006	-0.181	-0.119
	(0.007)	(0.111)	(0.117)
Open×Close	-0.024***	-0.183***	-0.217***
	(0.005)	(0.054)	(0.033)
Bond×Open×Close	0.035**	0.148	0.086
	(0.016)	(0.219)	(0.159)
Fund×Quarter FE	Yes	Yes	Yes
Firm×Quarter FE	Yes	Yes	Yes
R^2	0.526	0.181	0.181
Adjusted R^2	0.468	0.081	0.080
Observations	2,859,411	2,859,411	2,859,411

Table X
Source of information

Table X reports results examining whether the information advantage that hedge funds gain from their prime broker connections is driven by bond offering or firm information and whether is positive or negative information. In both panels *Bond* is defined in the same way as in Table III. Panel A reports results of Eq. (1) except that I use in columns (1) and (3) the three-day bond issue announcement returns (buy and hold abnormal returns (BHARs)) and in columns (2) and (4) the quarterly return minus the three-day bond issue announcement return as a measure of abnormal return. Columns (1) and (3) use the profitability measure $\Delta Own_{i,j,t} \times \alpha_{i,j,t+1}$, while columns (2) and (4) use the profitability measure $\Delta Own_{i,j,t} \times \alpha_{Q5i,t+1}$. In Panel B, I repeat the main analysis of Eq. (1) interacting with the variable *Positive*, which takes the value of 1 if the abnormal returns is positive and 0 otherwise. Column (1) reports panel regression results using as dependent variable the trade measure $|\Delta Own_{i,j,t}|$, columns (2) uses the profitability measure $\Delta Own_{i,j,t} \times \alpha_{i,j,t+1}$ while columns (3) uses the profitability measure $\Delta Own_{i,j,t} \times \alpha_{Q5i,t+1}$. All regression includes both fund × quarter and firm × quarter fixed effects and the standard errors reported in brackets are three-way clustered at the firm, fund, and quarter level. Coefficients marked with ∗∗∗, ∗∗, and ∗ are significant at the 1%, 5%, and 10% level, respectively.

Panel A: Information Content

	Bond announcement BHARs		Quarterly return minus BHARs	
	$\Delta Own \times \alpha$	$\Delta Own \times \alpha_{Q5}$	$\Delta Own \times \alpha$	$\Delta Own \times \alpha_{Q5}$
	(1)	(2)	(3)	(4)
Bond	-0.0002	0.022	0.130***	0.164***
	(0.028)	(0.032)	(0.045)	(0.054)
Fund×Quarter FE	Yes	Yes	Yes	Yes
Firm×Quarter FE	Yes	Yes	Yes	Yes
R^2	0.184	0.184	0.181	0.181
Adjusted R^2	0.082	0.083	0.080	0.080
Observations	2,859,411	2,859,411	2,859,411	2,859,411

Panel B: Positive vs Negative

	$\lvert\Delta Own\rvert$	$\Delta Own \times \alpha$	$\Delta Own \times \alpha_{Q5}$
	(1)	(2)	(3)
Bond	0.020***	0.200***	0.201***
	(0.008)	(0.075)	(0.071)
Bond×Positive	0.013*	-0.119	-0.063
	(0.007)	(0.144)	(0.142)
Fund×Quarter FE	Yes	Yes	Yes
Firm×Quarter FE	Yes	Yes	Yes
R^2	0.525	0.181	0.181
Adjusted R^2	0.467	0.081	0.080
Observations	2,859,411	2,859,411	2,859,411

Table XI
Robustness Test

Table XI reports results from robustness tests on quantitative funds, financial sector bond issues, and co-underwriters. In column (1), I added the previously omitted sample of quantitative hedge funds to the full sample and run Eq. (1) interacting *Bond* with *Quant*, where *Quant* is a dummy variable taking the value of 1 if the fund is a quantitative hedge fund, while *Bond* is defined in the same way as in Table III. In column (2), Bond Financial is a dummy variable that takes the value of one if fund prime broker bank is lead-underwriters in a debt issue, where the issuing company is in the financial sector (SIC 6000 to 6999). In column (3), $Co-underwriter$ is a dummy variable that takes the value of 1 if the fund prime broker bank is a co-underwriter, but not lead-underwriter in a debt issue of the underlying firm. Column (1), (3) and (5) reports panel regression results using as dependent variable $\Delta Own_{i,j,t} \times \alpha_{i,j,t+1}$, while columns (2), (4) and (6) use $\Delta Own_{i,j,t} \times \alpha_{Q5i,t+1}$. All regression includes both fund × quarter and firm × quarter fixed effects and the standard errors reported in brackets are three-way clustered at the firm, fund, and quarter level. Coefficients marked with ∗∗∗, ∗∗, and ∗ are significant at the 1%, 5%, and 10% level, respectively.

	$\Delta Own \times \alpha$ (1)	$\Delta Own \times \alpha_{Q5}$ (2)	$\Delta Own \times \alpha$ (3)	$\Delta Own \times \alpha_{Q5}$ (4)	$\Delta Own \times \alpha$ (5)	$\Delta Own \times \alpha_{Q5}$ (6)
Bond	0.124**	0.153***				
	(0.047)	(0.054)				
Bond×Quant	-0.116***	-0.147***				
	(0.043)	(0.044)				
Bond Financial			0.087	0.037		
			(0.069)	(0.077)		
Co-underwriter					-0.103	-0.119
					(0.097)	(0.089)
Fund×Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm×Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.174	0.174	0.181	0.181	0.181	0.181
Adjusted R^2	0.077	0.077	0.081	0.080	0.081	0.080
Observations	3,044,161	3,044,161	2,859,411	2,859,411	2,859,411	2,859,411

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Internet Appendix

Table XII
Time placebo and size robustness

Table XII reports results from robustness tests on the timing of the issues and funds' size. Panel A reports the debt issue time placebo. The variable of interest is Bond, an indicator variable equal to one if hedge fund company's prime broker bank act as lead underwriter in the firm debt issue in quarter t+2 for columns (1) and (2) and quarter t+3 for columns (3) and (4), and zero otherwise. $|\Delta Own_{i,j,t}|$ is defined in percentage value, while $\Delta Own_{i,j,t} \times \alpha_{i,j,t+1}$ in basis points. Panel B reports the results of Table III using funds with more than 100 millions of asset under management in columns (1) and (2) and with more than 200 million assets under management in columns (3) and (4). The *Bond* dummy is defined in the same way as in Table III. In both panels, columns (1) and (3) reports results using as dependent variable $\Delta Own_{i,j,t} \times \alpha_{i,j,t+1}$, while columns (2) and (4) using $\Delta Own_{i,j,t} \times \alpha_{Q5i,t+1}$. All regression includes both fund × quarter and firm × quarter fixed effects and the standard errors reported in brackets are three-way clustered at the firm, fund, and quarter level. Coefficients marked with ∗∗∗, ∗∗, and ∗ are significant at the 1%, 5%, and 10% level, respectively.

Panel A: Time Placebo				
	-1 Quarter		**-2 Quarter**	
	$\Delta Own \times \alpha$ (1)	$\Delta Own \times \alpha_{Q5}$ (2)	$\Delta Own \times \alpha$ (3)	$\Delta Own \times \alpha_{Q5}$ (4)
Bond	-0.087	-0.069	0.068	0.063
	(0.053)	(0.046)	(0.046)	(0.049)
Fund×Quarter FE	Yes	Yes	Yes	Yes
Firm×Quarter FE	Yes	Yes	Yes	Yes
R^2	0.181	0.181	0.181	0.181
Adjusted R^2	0.081	0.080	0.081	0.080
Observations	2,859,411	2,859,411	2,859,411	2,859,411
Panel B: AUM Size				
	AUM > 100mil		**AUM > 200mil**	
	$\Delta Own \times \alpha$ (1)	$\Delta Own \times \alpha_{Q5}$ (2)	$\Delta Own \times \alpha$ (3)	$\Delta Own \times \alpha_{Q5}$ (4)
Bond	0.151^{***}	0.180^{***}	0.166^{***}	0.197^{***}
	(0.051)	(0.054)	(0.051)	(0.057)
Fund×Quarter FE	Yes	Yes	Yes	Yes
Firm×Quarter FE	Yes	Yes	Yes	Yes
R^2	0.177	0.177	0.170	0.169
Adjusted R^2	0.072	0.072	0.059	0.058
Observations	2,721,120	2,721,120	2,497,626	2,497,626

Table XIII
Option holdings

Table XIII reports results that compare the size and returns on connected hedge fund trades in equity securities to the ones using equity-linked options. In columns (1), (2), and (3), *Call* is a dummy variable that takes the value of 1 if the fund has at least one call option on the underlying firm. In columns (4), (5), and (6), *Put* is a dummy variable that takes the value of 1 if the fund has at least one put option on the underlying firm. In columns (6), (7), and (8), *Option* is a dummy variable that takes the value of 1 if the fund has at least one option on the underlying firm, regardless of the type. In all columns *Bond* is defined in the same way as in Table III. Columns (1), (4), and (7) reports panel regression results using as dependent variable the trade measure $|\Delta Own_{i,j,t}|$, while columns (2), (4), and (6) use the profitability measure $\Delta Own_{i,j,t} \times \alpha_{i,j,t+1}$, and columns (3), (5), and (7) use the profitability measure $\Delta Own_{i,j,t} \times \alpha_{Q5i,t+1}$. All regression includes both fund × quarter and firm × quarter fixed effects and the standard errors reported in brackets are three-way clustered at the firm, fund, and quarter level. Coefficients marked with ***, **, and * are significant at the 1%, 5%, and 10% level, respectively.

	$\lvert\Delta Own\rvert$	$\Delta Own \times \alpha$	$\Delta Own \times \alpha_{Q5}$	$\lvert\Delta Own\rvert$	$\Delta Own \times \alpha$	$\Delta Own \times \alpha_{Q5}$	$\lvert\Delta Own\rvert$	$\Delta Own \times \alpha$	$\Delta Own \times \alpha_{Q5}$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Bond	0.022***	0.142***	0.161***	0.026***	0.143***	0.169***	0.019***	0.142***	0.161***
	(0.007)	(0.053)	(0.059)	(0.006)	(0.051)	(0.062)	(0.007)	(0.050)	(0.059)
Call	0.154***	-0.041	-0.012						
	(0.040)	(0.053)	(0.052)						
Bond×Call	-0.001	0.005	0.073						
	(0.014)	(0.082)	(0.088)						
Put				-0.018*	0.121*	0.085*			
				(0.010)	(0.062)	(0.049)			
Bond×Put				0.014	-0.041	-0.021			
				(0.012)	(0.119)	(0.146)			
Option							0.141***	0.036	0.043
							(0.032)	(0.045)	(0.044)
Bond×Option							0.017	-0.013	0.047
							(0.014)	(0.103)	(0.108)
Fund×Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm×Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.527	0.181	0.181	0.526	0.181	0.181	0.527	0.181	0.181
Adjusted R^2	0.468	0.081	0.080	0.467	0.081	0.080	0.468	0.081	0.080
Observations	2,859,411	2,859,411	2,859,411	2,859,411	2,859,411	2,859,411	2,859,411	2,859,411	2,859,411

Table XIV
Bond market evidence: Explicit controls

Table XIV examines whether the presence of connected hedge funds affects the bond offering pricing and liquidity. *Off. YS* is the offering yield spread computed as offering yield minus cash flow matched treasury yield, reported in percentage, *Underpricing* is the difference between the offering yield and the sum of the yield of the first trading day in the secondary market and the change in cash flow treasury from the offering date to the first secondary market trading day, reported in basis points. *Vol* and *Trans* are the natural log 1 plus respectively the sum week dollar volume or the sum of the number of transactions. These two variables are reported separately for the first week, month, or six months of secondary market trading and the first week of primary market. *HF* is a dummy variable taking the value of 1 if at least one hedge fund holding shares in the firm is connected to one of the bond's lead underwriters, *# Lead-underwriters* is the number of lead underwriters in the bond offering and *# Co-underwriters* is the number of co-underwriters. Furthermore, all regression reports bond controls (log of offering amount, log of time to maturity, coupon rate, IPO dummy and gross spread) and firm control (log of market value, log of book value, cumulative returns of the past 12 months, cumulative returns of the past 60 months, log of book to market, yearly change in total asset, and yearly change in shares outstanding). All regressions include quarter, industry, rating and underwriter fixed effects. The standard errors reported in brackets are two-way clustered at the industry and quarter level. Coefficients marked with $***$, $**$, and $*$ are significant at the 1%, 5%, and 10% level, respectively.

			1 Week		1 Month		6 Months		Primary	
	Off. YS	Under.	Vol	Trans	Vol	Trans	Vol	Trans	Vol	Trans
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
HF	0.114	0.752	0.312***	0.238***	0.287***	0.261***	0.343***	0.364***	0.710	0.254**
	(0.092)	(0.876)	(0.098)	(0.060)	(0.083)	(0.067)	(0.086)	(0.078)	(0.509)	(0.104)
# Lead-underwriters	-0.197**	-1.46**	0.039	0.055*	0.027	0.048	-0.003	0.010	0.061	0.086***
	(0.083)	(0.560)	(0.046)	(0.032)	(0.040)	(0.031)	(0.041)	(0.033)	(0.068)	(0.030)
# Co-underwriters	-0.020	-0.225***	0.014	0.023**	0.011*	0.024***	0.010*	0.025***	0.021	0.018**
	(0.014)	(0.072)	(0.008)	(0.009)	(0.006)	(0.008)	(0.005)	(0.008)	(0.014)	(0.007)
log(1+Off. Amt))	-0.044	0.383	0.366***	0.140***	0.424***	0.173***	0.446***	0.205***	0.204	0.065
	(0.041)	(0.449)	(0.046)	(0.035)	(0.047)	(0.040)	(0.055)	(0.050)	(0.160)	(0.053)
log(1+Tmt)	-0.899***	-5.31***	0.240***	0.044	0.183***	-0.029	0.066	-0.178***	0.166	0.167**
	(0.119)	(0.634)	(0.053)	(0.055)	(0.049)	(0.057)	(0.050)	(0.060)	(0.136)	(0.069)
Coupon	0.966***	2.71***	0.130***	0.207***	0.138***	0.224***	0.125***	0.200***	-0.040	0.034
	(0.054)	(0.395)	(0.027)	(0.025)	(0.027)	(0.028)	(0.029)	(0.033)	(0.078)	(0.027)
IPO	0.242	2.09**	0.053	-0.020	0.056	-0.024	0.006	-0.044	-0.145	-0.030
	(0.178)	(0.928)	(0.058)	(0.050)	(0.061)	(0.059)	(0.065)	(0.077)	(0.239)	(0.086)
Gross Spread	0.008	0.079	0.045***	0.046***	0.046***	0.044***	0.051***	0.048***	0.028***	0.028***
	(0.007)	(0.083)	(0.008)	(0.007)	(0.007)	(0.007)	(0.008)	(0.007)	(0.008)	(0.007)
log(1+Me)	-0.114	-0.653	0.228***	0.179***	0.210***	0.231***	0.280***	0.285***	0.057	0.024
	(0.103)	(0.554)	(0.061)	(0.060)	(0.056)	(0.066)	(0.060)	(0.073)	(0.088)	(0.044)
Cum $\text{Ret}_{t-12,t-1}$	0.116	3.13***	-0.112	-0.116*	-0.112	-0.167**	-0.151**	-0.240***	-0.775**	-0.116

	(0.135)	(0.798)	(0.080)	(0.064)	(0.070)	(0.066)	(0.070)	(0.080)	(0.332)	(0.105)
Cum $\text{Ret}_{t-60,t-1}$	-0.005	-0.171	-0.015	-0.022	-0.020	-0.027	-0.014	-0.027	0.089^{**}	0.008
	(0.016)	(0.165)	(0.018)	(0.018)	(0.016)	(0.019)	(0.017)	(0.020)	(0.036)	(0.013)
log(1+Be/Me)	0.045	-2.75	0.316^{**}	0.071	0.199	0.143	0.303^{**}	0.187	-0.527	-0.072
	(0.370)	(1.72)	(0.131)	(0.165)	(0.125)	(0.169)	(0.120)	(0.174)	(0.395)	(0.218)
Growth AT	0.133	0.756	-0.185	-0.036	-0.117	-0.084	0.023	-0.009	-0.442	-0.158
	(0.162)	(1.37)	(0.153)	(0.162)	(0.150)	(0.166)	(0.164)	(0.184)	(0.577)	(0.165)
Growth Shrout	1.06	-0.342	-0.0010	-0.081	-0.194	-0.162	-0.276	-0.363	0.653	0.307
	(1.05)	(3.31)	(0.275)	(0.270)	(0.288)	(0.315)	(0.324)	(0.388)	(0.972)	(0.291)
log(1+Be)	0.078	-0.006	-0.082	-0.005	-0.036	-0.002	-0.036	0.016	0.148^{*}	0.060
	(0.100)	(0.508)	(0.055)	(0.062)	(0.056)	(0.069)	(0.057)	(0.075)	(0.079)	(0.048)
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rating FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Underwriter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.466	0.339	0.494	0.564	0.537	0.553	0.552	0.552	0.475	0.421
Adjusted R^2	0.412	0.273	0.443	0.520	0.490	0.507	0.506	0.506	0.407	0.347
Observations	3,364	3,364	3,364	3,364	3,364	3,364	3,364	3,364	2,226	2,226

Table XV
Bond market evidence: Post 2010

Table XV examines whether the presence of connected hedge funds affects the bond offering outcome and liquidity using only the observation after March 2010, when TRACE started reporting primary market as separate. *Vol* and *Trans* are the natural log 1 plus respectively the sum week dollar volume or the sum of the number of transactions. These two variables are reported separately for the first week, month, or six months of secondary market trading and the first week of primary market. *HF* is a dummy variable taking the value of 1 if at least one hedge fund holding shares in the firm is connected to one of the bond's lead underwriters, *# Lead-underwriters* is the number of lead underwriters in the bond offering and *# Co-underwriters* is the number of co-underwriters. All regressions include bond controls and firm controls as well as quarter, industry, rating and underwriter fixed effects. The standard errors reported in brackets are two-way clustered at the industry and quarter level. Coefficients marked with ***, **, and * are significant at the 1%, 5%, and 10% level, respectively.

	1 Week		1 Month		6 Months		Primary	
	Vol	Trans	Vol	Trans	Vol	Trans	Vol	Trans
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
HF	0.309***	0.291***	0.302***	0.301***	0.306***	0.325***	0.710	0.254**
	(0.094)	(0.101)	(0.090)	(0.101)	(0.090)	(0.113)	(0.509)	(0.104)
# Lead-underwriters	0.132***	0.085**	0.124***	0.073**	0.105***	0.063*	0.061	0.086***
	(0.039)	(0.032)	(0.035)	(0.030)	(0.032)	(0.034)	(0.068)	(0.030)
# Co-underwriters	0.011	0.013*	0.009	0.014*	0.006	0.012	0.021	0.018**
	(0.007)	(0.007)	(0.007)	(0.007)	(0.006)	(0.008)	(0.014)	(0.007)
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rating FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Underwriter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bond Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.539	0.505	0.599	0.538	0.656	0.564	0.475	0.421
Adjusted R^2	0.480	0.442	0.547	0.478	0.612	0.508	0.407	0.347
Observations	2,226	2,226	2,226	2,226	2,226	2,226	2,226	2,226

Table XVI
Bond market evidence: Only Institutional trades

Table XVI examines whether the presence of connected hedge funds affects the bond offering outcome and liquidity excluding retail traders (i.e. using only transactions above 100,000 dollars). *Off. YS* is the offering yield spread computed as offering yield minus cash flow matched treasury yield, reported in percentage, *Underpricing* is the difference between the offering yield and the sum of the yield of the first trading day in the secondary market and the change in cash flow treasury from the offering date to the first secondary market trading day, reported in basis points. *Vol* and *Trans* are the natural log 1 plus respectively the sum week dollar volume or the sum of the number of transactions. These two variables are reported separately for the first week, month, or six months of secondary market trading and the first week of primary market. *HF* is a dummy variable taking the value of 1 if at least one hedge fund holding shares in the firm is connected to one of the bond's lead underwriters, *# Lead-underwriters* is the number of lead underwriters in the bond offering and *# Co-underwriters* is the number of co-underwriters. All regressions include bond controls and firm controls as well as quarter, industry, rating and underwriter fixed effects. The standard errors reported in brackets are two-way clustered at the industry and quarter level. Coefficients marked with ***, **, and * are significant at the 1%, 5%, and 10% level, respectively.

			1 Week		1 Month		6 Months		Primary	
	Off. YS	Under.	Vol	Trans	Vol	Trans	Vol	Trans	Vol	Trans
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
HF	0.120	0.881	0.287***	0.243***	0.309***	0.279***	0.361***	0.356***	0.711	0.270**
	(0.094)	(0.910)	(0.098)	(0.060)	(0.090)	(0.062)	(0.094)	(0.074)	(0.510)	(0.103)
# Lead-underwriters	-0.199**	-1.49***	0.053	0.066**	0.028	0.042	-0.001	0.002	0.060	0.072**
	(0.084)	(0.543)	(0.044)	(0.031)	(0.041)	(0.029)	(0.043)	(0.031)	(0.068)	(0.028)
# Co-underwriters	-0.020	-0.226***	0.013	0.018**	0.011	0.016**	0.009	0.014**	0.020	0.011*
	(0.014)	(0.073)	(0.008)	(0.008)	(0.007)	(0.007)	(0.006)	(0.006)	(0.014)	(0.006)
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rating FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Underwriter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bond Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.466	0.343	0.492	0.592	0.531	0.598	0.546	0.596	0.474	0.444
Adjusted R^2	0.412	0.276	0.441	0.551	0.484	0.557	0.500	0.555	0.406	0.372
Observations	3,358	3,358	3,358	3,358	3,358	3,358	3,358	3,358	2,226	2,226

Table XVII
Bond market evidence: Only costumer trades

Table XVI examines whether the presence of connected hedge funds affects the bond offering outcome and liquidity excluding dealer traders (i.e. using only transactions where the dealer counter-party is a customer). *Off. YS* is the offering yield spread computed as offering yield minus cash flow matched treasury yield, reported in percentage, *Underpricing* is the difference between the offering yield and the sum of the yield of the first trading day in the secondary market and the change in cash flow treasury from the offering date to the first secondary market trading day, reported in basis points. *Vol* and *Trans* are the natural log 1 plus respectively the sum week dollar volume or the sum of the number of transactions. These two variables are reported separately for the first week, month, or six months of secondary market trading and the first week of primary market. *HF* is a dummy variable taking the value of 1 if at least one hedge fund holding shares in the firm is connected to one of the bond's lead underwriters, *# Lead-underwriters* is the number of lead underwriters in the bond offering and *# Co-underwriters* is the number of co-underwriters. All regressions include bond controls and firm controls as well as quarter, industry, rating and underwriter fixed effects. The standard errors reported in brackets are two-way clustered at the industry and quarter level. Coefficients marked with ***, **, and * are significant at the 1%, 5%, and 10% level, respectively.

			1 Week		1 Month		6 Months		Primary	
	Off. YS	Under.	Vol	Trans	Vol	Trans	Vol	Trans	Vol	Trans
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
HF	0.114	0.534	0.325***	0.231***	0.286***	0.237***	0.345***	0.342***	0.708	0.249**
	(0.093)	(0.941)	(0.088)	(0.046)	(0.070)	(0.053)	(0.070)	(0.060)	(0.508)	(0.103)
# Lead-underwriters	-0.200**	-1.54***	0.038	0.048*	0.025	0.041*	0.002	0.012	0.063	0.082***
	(0.084)	(0.538)	(0.044)	(0.026)	(0.038)	(0.024)	(0.040)	(0.028)	(0.068)	(0.030)
# Co-underwriters	-0.019	-0.235***	0.006	0.017**	0.004	0.016**	0.002	0.018**	0.019	0.016**
	(0.014)	(0.066)	(0.008)	(0.008)	(0.006)	(0.007)	(0.005)	(0.007)	(0.014)	(0.007)
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rating FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Underwriter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bond Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.464	0.349	0.481	0.556	0.528	0.542	0.544	0.541	0.473	0.415
Adjusted R^2	0.409	0.283	0.428	0.511	0.480	0.496	0.498	0.495	0.405	0.340
Observations	3,341	3,341	3,341	3,341	3,341	3,341	3,341	3,341	2,225	2,225