SYNDICATE STRUCTURE, PRIMARY ALLOCATIONS, AND SECONDARY MARKET OUTCOMES IN CORPORATE BOND OFFERINGS

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SYNDICATE STRUCTURE, OVERALLOCATION, AND SECONDARY MARKET LIQUIDITY IN CORPORATE BOND OFFERINGS

Abstract

We study corporate bond offerings, including underwriting syndicate structure, primary placement transactions, and secondary market outcomes. Syndicate structure and allocations vary with issue complexity and risk, and across investment grade and high yield issues. The syndicate "overallocates" deals with weaker anticipated demand, particularly for high yield issues, even though bond offerings do not include a "Greenshoe" option. The syndicate incurs trading losses on short-covering secondary market purchases of overallocated issues, and are compensated by higher commissions. Secondary market liquidity is better for overallocated issues, which also appreciate less in the aftermarket, i.e., are less underpriced, despite syndicate purchases.

1. Introduction

Primary issuance markets, where companies raise capital from investors, are crucial to allocational efficiency in market-based economies. While dozens of research papers have studied initial and secondary offerings of common equity, issuances of corporate bonds have received much less research attention. This gap is all the more striking in light of the fact that corporations in recent years raised significantly more capital through bond than stock issuances.[1] We study the entirety of the corporate bond issuance process, including syndicate structure, primary allocations, and secondary market outcomes, with a particular focus on how underwriters manage uncertainty and how syndicate structure and activities impact primary and secondary market outcomes.

There are notable institutional and market structure differences between bond and the more-studied equity offerings, and also across investment grade (IG) versus high yield (HY) bond offerings. First, while equity IPOs occur in the absence of public trading of the issuing firm's equity, most firms issuing bonds are repeat issuers and prior issues are often publicly traded. As a consequence, asymmetric information between investors and managers and between better and less-informed investors likely plays less of a role in bond offerings, allowing a sharper focus on the uncertainty that remains, particularly regarding the level of investor demand for the issue.

Second, while the underwriting syndicate in both equity IPO and bond offerings is understood to assume obligations to stabilize the offering in the secondary market should demand prove to be weaker than expected, most equity offerings include a "Greenshoe" option which allows the syndicate to cover short positions by purchasing additional shares from the issuer at the offer price, while bond offerings generally do not. Since short positions can only be covered with aftermarket purchases that typically occur at prices higher than the offer price, overallocation is potentially more costly to the syndicate in bond offerings. Thus, it is of particular interest to assess the nature of overallocation and aftermarket trading in corporate bond offerings.

Third, the issuance process for bond offerings is typically rapid relative to the IPO process for equities. Most bond issues are completed over the period of a few days, and some "drive by" issues are completed in a matter of a few hours.

Finally, secondary market structure differs substantially across equities and bonds. Equities are listed on Exchanges that are organized as limit order markets with high rates of public

[1] Bessembinder, Spatt, and Venkataraman (2020) report that the dollar amount of debt issuances by U.S. Corporations in 2017 was nearly eight times as large as equity issuances. U.S. corporate investment-grade bond issuances reached a record level of $1.35 trillion between January and August 2020. See https://www.bloomberg.com/news/articles/2020-08-17/u-s-high-grade-bond-sales-topple-record-reach-1-342-trillion.

participation and frequent trading. In contrast, bonds are traded in over-the-counter dealer markets that are less transparent, dominated by institutional traders, and characterized by less frequent and more costly trading. These differences in microstructure across the equity and corporate bond markets potentially affect syndicate structure and aftermarket trading outcomes.

Our sample includes 5,573 bond issuances during the period March 2010 (when FINRA began to collect information on primary market allocations) through March 2018. For each issue, we merge data on bond characteristics from the Mergent Fixed Income Securities Database (FISD), syndicate structure and underwriting fees from the Securities Data Company (SDC), and primary and secondary market transactions from the Trade Reporting and Compliance Engine (TRACE). In addition to the data contained in the academic version of FINRA's TRACE dataset, including masked dealer identifiers, uncapped secondary market transaction sizes, and the primary placement transactions associated with each bond issue, we obtain from FINRA additional information to link the syndicate members identified by the SDC database to individual primary and secondary market transactions completed by thirty-four prominent dealer firms.

We study how the syndicate manages uncertainty regarding investor demand before, during, and subsequent to the offering. We document that the underwriting syndicate is structured in anticipation of deal complexity and uncertainty. In particular, larger issues, those with multiple tranches, as well as issues by firms with non-public stock and lower credit ratings are more widely distributed across bookrunners. Issuances that occur during periods of higher market uncertainty are associated with smaller syndicates and more concentrated syndicate allocations, potentially because smaller bookrunners are less willing to participate at those times.

We also study the syndicate's primary market decisions. We exploit a less-known industry practice whereby a single bookrunner serves as "bill and deliver" agent and allocates the issue on behalf of the syndicate. This convention implies that each primary market transaction reported on TRACE represents the entire allocation received by the investor, which allows us to measure the breadth of the primary allocation. The number of primary investors in our sample of bond offerings is relatively small (median of 91 investors) but involve substantive dollar amounts (the median size of a primary allocation is $6.7 million in the IG and $5.8 million in the HY market), reflecting the institutional nature of the primary market. We measure the degree to which corporate bond issues are overallocated by comparing the sum of the primary placement quantities to the issue amount. As discussed more fully in Section 2.2, we view the extent of overallocation as informative regarding the syndicate's view of issue strength. The average overallocation for IG issues is $10.1 million, or

about 1.4% of the issue amount, but most offers are overallocated by zero or small amounts. In contrast, the average overallocation for HY issues is $27.3 million, or 4.9% of the issue amount and more than three quarters of HY issues are overallocated by more than two percent (the full sample median) of the offer size, compared to just 30% of IG offers. We attribute the greater overallocation of HY offerings to more uncertainty, as IG issuers tend to be larger firms that issue bonds frequently, have more outstanding bonds, and a broader investor base.

We provide evidence indicating that overallocation reflects weakness and/or uncertainty regarding investor demand. Large and long maturity issues as well as issues with low credit quality and more bookrunners are more likely to be overallocated, as are bonds offered during difficult market conditions. We also observe a higher incidence of overallocation when recent history is characterized by fewer related offerings, more dispersion in issuance day prices, low bond or equity index returns, and higher VIX levels.

We consider the economics of overallocation and develop the testable implication that the amount of "underpricing" (measured by comparing average secondary market prices to the offer price) will be smaller for overallocated offerings, despite syndicate purchases in the aftermarket. Consistent with this prediction, we document that for issues overallocated by over two percent (the sample median), the average underpricing two days after the offering date is 0.27% for IG bonds and 0.87% for HY bonds, as compared to 0.37% for IG bonds and 1.5% for HY bonds in non-overallocated offerings.

Syndicate members are aggressive net purchasers in the aftermarket for overallocated issues. These short-covering trades often involve substantial dollar amounts; the median net purchase by the syndicate is $18 million in the first two days of trading for IG and HY issues. The syndicate, on average, incurs losses on trading activities undertaken for price stabilization in overallocated issues. However, in line with the equity market results reported by Aggarwal (2000) and Ellis, Michaely, O'Hara (2000), underwriting fees, which are negotiated early in the process, more than compensate the underwriter for such losses.

Finally, we assess the impact of the overallocation on secondary market outcomes in the first month after issuance. The period after issuance is particularly important for bonds, because trading activity tends to decline markedly as bonds are absorbed as long-term portfolio holdings. We find that retail participation is markedly higher for overallocated issues. Institutions and other dealers are typically net sellers, effectively supplying the bonds purchased by the underwriting syndicate to cover their short positions in overallocated deals. Syndicate activities in the aftermarket result in bid-ask

spreads that are about 20% narrower for overallocated relative to other issues in the first month of trading.

Our empirical results support the following conclusions. The structure of the bond underwriting syndicate is endogenous to deal characteristics, including issue size, complexity, and uncertainty, evidenced in part by differing practices across IG vs. HY offers. The syndicate is able to use information gained in the book building process to identify issues where secondary market demand is expected to be weak, and responds by overallocating such that the syndicate attains a net short position that hedges the purchases required to provide secondary market support for a weak issue. Despite the stabilizing effect of the short covering purchases, overallocated issues ultimately trade at a small secondary market premium, which reflects the more modest investor demand that motivated the overallocation. Although the underwriting team incurs losses from short covering activities, the syndicate's total compensation on overallocated issues is positive due to income from commissions, and the syndicates short covering trades are associated with improved secondary market liquidity. Collectively, the study offers evidence on the anatomy of the corporate bond offering process and syndicate strategies to facilitate capital raising for issuers facing uncertainty regarding investor demand.

2. Related Literature, Institutional Background and Testable Predictions

In this section, we provide an overview of the related literature and the corporate bond issuance process.

2.1. The Related Literature

Our study is related to the literature that considers "book building" in equity offerings.[2] During the book building process, underwriters gauge demand via indications of interest, and use this information to determine the final offer price and allocation. To induce investors to reveal their demand or to incur information acquisition costs, the underwriter sets the offer price below the level that is expected to prevail in secondary market trading.[3] Our study also contributes to the literature

[2] See Benveniste and Spindt (1989), Benveniste and Wilhelm (1990), Spatt and Srivastava (1991), Sherman (2000), and Sherman and Titman (2002) for theory and Beatty and Ritter (1986), Welch (1989), Hanley (1993), and Cornelli and Goldreich (2003) for related empirical evidence. Altinkilic and Hansen (2003) and Huang and Zhang (2011) examine the underwriting and book building process for seasoned equity offerings. Underwriter activities can influence not only price but also quantity. Aggarwal (2000) finds that underwriters often overallocate equity IPOs and Zhang (2004) and Fishe (2002) find that underwriters in equity IPOs use overallocation strategically to improve offering outcomes.

[3] Most asymmetric information models focused on equity IPOs anticipate that the investor may have an information advantage over the issuer. Booth and Smith (1986) discuss the certification role of the underwriter in the IPO in

studying the role of underwriters in new security issuance. Ellis et al. (2000), using a sample of 306 equity IPOs between 1996 and 1997, finds that underwriters accumulate substantial inventory positions in the aftermarket, especially for less successful offerings. Aggarwal (2000) studies 137 equity IPOs over a two-month period in 1997, reporting that underwriters overallocate selectively, and sometimes cover short positions with aftermarket purchases rather than relying on the Greenshoe option. In bond markets, Auh, Kim, and Landoni (2019) show that bond underwriters trade strategically in existing bonds prior to the issue to reduce issuance costs. Goldstein, Hotchkiss, and Nikolova (2019) study post-issue trading by bond underwriters, reporting that small customers pay widely varying prices for bonds, primarily when trading with non-underwriter dealers, while the lead underwriter dominates liquidity provision.

The prior literature has documented that corporate bonds, like equity IPOs, are underpriced on average.[4] We extend this literature by relating underpricing to the decision to overallocate the offering. Our paper is also related to the literature that studies issuance costs. Brugler, Comerton-Forde, and Martin (2019) consider the impact of secondary market transparency while Gande, Puri, Saunders, and Walter (1997) link issuance costs to the quality of underwriter certification. Finally, our paper is related to the literature that considers bond allocation decisions. Using institutional holding and NAIC data, Nagler and Ottonello (2018), Nikolova, Wang, and Wu (2019), and Flanagan, Kedia, and Zhou (2019) document a degree of favoritism in initial primary market allocations. Our data provides a detailed view into underwriter activities for both those decisions made prior to the issue, such as syndicate structure and primary market allocations, as well as post-issue outcomes such as secondary market trading and liquidity.

2.2. Book Building and Overallocation

Corporate bonds are issued more frequently than equity. In fact, some large U.S. and multinational firms have in excess of one hundred distinct bonds outstanding. Similar to equity issues, corporate bond issues are brought to the market by a syndicate of "bookrunners," who work with the issuer and handle the book building process, and co-managers, who typically have a less

mitigating the asymmetry between the firm and the investor, and Rock (1986) discusses the investors information advantage to the broader market as compared to the firm, while Benveniste and Spindt (1989) form related empirical predictions. Other theories consider that the issuer may have superior information relative to the investors (e.g., Welch, 1989; Allen and Faulhaber, 1989; Chemmanur, 1993).

[4] See Ederington (1974), Lindvall (1977), Weinstein (1978), Sorenson (1982), Fung and Rudd (1986), Wasserfallen and Wydler (1988), Datta, Isakndar-Datta and Patel (1997), Helwege and Kleiman (1998), Cai, Helwege and Warga (2007), Hale and Santos (2009), Helwege and Wang (2019), and Brugler, Comerton-Forde, and Martin (2019). Ellul and Pagano (2006) propose that underpricing reflects compensation for secondary market illiquidity.

active role. Prior to the issuance date, the issuer and the syndicate agree on broad terms, including initial ranges for issue amounts and price, and negotiate fees, as a percentage of the issue amount, paid by the issuer to the syndicate.[5] While a stock IPO may take weeks or months to complete, the issuances process for IG corporate bonds is much faster; in fact, it is not uncommon for a bond to be issued as a "drive by", where the bond is priced, allocated to investors, and secondary market trading commences all within a single day. The relative speed of the corporate bond issue process reflects in part that many bond issuers are already known to the market because of prior issuances, and for firms with publicly traded equity, are facilitated through shelf registration, per SEC Rule 415. While many corporate bonds are issued to the public, a significant portion are privately issued (144A) bonds, from which retail investors are virtually excluded.[6]

On the day of the bond issue, the syndicate circulates information regarding the issue amount and price range to potential investors and solicits indications of interest. Based on the investor response, the syndicate in consultation with the issuer then circulates a tighter price range and solicits firm investor commitments (book building). The issuer observes the resulting order book and remains involved in the final pricing and allocation decisions. The issuer may choose a higher coupon rate or a smaller issue size if investor interest is weaker than expected. While an investor can place orders with any syndicate member, one of the bookrunners, referred to as the "bill and deliver" agent makes the actual allocation of bonds to initial investors.

The syndicate's goal is typically that the bond should trade slightly above par in the secondary market, so that initial investors earn a positive return on their allocation, but not so far above par that the cost to the issuer is excessive. As in equity issuances, the syndicate can choose to "overallocate," i.e. to allocate a quantity of bonds at the issue price that exceeds the issue size. Overallocation effectively leaves the syndicate with a short position, so that net purchases by the syndicate in the secondary market for purposes of stabilization initially reduce the short position rather than necessarily inducing a long position. However, unlike equity issuances, bond offerings

[5] The descriptions in this section are based in part on our discussions with investment bankers involved in underwriting syndicates, institutional investors who purchase bonds in the primary market, and CFOs of firms who issue corporate bonds.

[6] Private bonds have fewer regulatory requirements as compared to publicly listed bonds but the sale is restricted to Qualified Institutional Buyers (QIBs), which include both accredited individuals and institutions. Most IG 144A bonds are issued by large foreign financial and industrial firms which do not wish to meet SEC listing requirements. Some firms with lower credit ratings issue 144A HY bonds to speed up the issuance process. Bonds with registration rights become public at a later date, often on the day of the first coupon payment. Alternatively, firms may wish to access the corporate bonds markets but not incur the regulatory costs and disclosure requirements necessary to be public issue bonds (i.e., "144A for life"). Han, Huang, Kalimipalli and Wang (2019) find that the public registration of 144A bonds improves market liquidity, especially for issues with higher ex-ante information asymmetry.

do not include a "Greenshoe" option that allows the syndicate to purchase additional bonds from *the issuer at the issue price.* In the absence of a Greenshoe option, the syndicate must purchase bonds *from the secondary market* to cover any residual short position and will incur a trading loss if the secondary market prices are higher than the issue price. Since overallocation is potential costly for the syndicate, the syndicate "puts on a short" selectively. We next discuss the economic incentives for overallocation and the testable predictions that arise.

2.3. Testable Predictions

Figure 1 provides a graphical summary of the economics of the decision to overallocate bonds. When investor interest is normal, anticipated demand (depicted by D') and the selected issue amount (vertical line Q) intersect to give P* as the anticipated aftermarket equilibrium price. The issue is offered at a lower price P' which leads to oversubscription (Q' > Q*) of the offer by institutional customers.[7] In normal circumstances, the market is expected to support an aftermarket price that is higher than the issue price without market stabilization activity. However, oversubscription allows the underwriting syndicate to overallocate the issue if it chooses.

If the degree of oversubscription observed during the book building process is smaller than expected (Q" < Q'), it reveals that expected demand is lower than originally anticipated, depicted by the demand curve (D"), and gives rise to a new forecast of the aftermarket equilibrium price (P**). Further, since decisions are made based on anticipated demand, while actual secondary market demand may vary, weakness in the book building process reveals a higher risk that the bond will trade in the secondary market at a lower price than the offer, requiring the underwriting syndicate to engage in market stabilization activities.[8] To facilitate the increased possibility that market stabilization will be required, the syndicate can shift the quantity placed with investors from Q* to Q**, even while the issue size is unchanged. This overallocation places the syndicate in a net short position, allowing for stabilizing secondary market purchases without necessarily leaving the syndicate in a long position in a weak issue.

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[7] Although comprehensive data on oversubscription is not available, Bank of America recently reported that corporate bond issues that the bank managed were oversubscribed relative to issue size by 3.2 times in 2019 and 4.3 times in first nine months of 2020. See https://www.sec.gov/spotlight/fixed-income-advisory-committee/fimsac-100520-sdt.pdf.

[8] When oversubscription is very small, or in extreme cases, the offer is undersubscribed (Q"< Q*), the issuer in consultation with the syndicate can increase the coupon rate (i.e., price the issue lower than P') and/or reduce the issue amount (i.e., move the vertical line to the left of Q*) and resume book building under revised deal terms. The issuer can also abandon the bond offering if the issuance terms are too expensive (see Bloomberg 05/08/2020, United Air Scraps $2.25 Billion Bond Deal After Terms Disappoint).

This simple framework points to several testable predictions. First, it implies that overallocation is an observable indicator that the syndicate forecasts weak secondary market demand. Further, since overallocation is triggered by indications of weak investor demand, we anticipate that on average the demand curve for overallocated issues is indeed reduced, such that the average aftermarket price is reduced. That is, the analysis predicts that, while overallocated issues are still underpriced on average, they are less underpriced than issues without overallocation.

This reasoning also implies that overallocation is associated with purchases by the syndicate in the secondary market. That is, the short position is not entered because the syndicate intends to profit from anticipated price declines, but because the syndicate may need to support the secondary market price with purchases that also cover the short position. The analysis therefore implies that overallocation is associated with net secondary market trading losses for the syndicate.

IG issuers are typically larger firms with more prior issues already trading, and with a broad and dispersed investor base, relative to HY issuers. The larger pool of potential buyers for IG issues reduces the risk that flipping activity would push the secondary market price below the offer price. For HY bonds, in contrast, less frequent issuance activity, higher uncertainty regarding valuation, and a narrower base of potential investors leads to heightened risk that weak demand or significant flipping activity will cause downward price pressure. To the extent that overallocation is an ex-ante measure of the syndicate's (unobservable) perception of deal risk, we expect that the incidence and extent of overallocation, as well as underwriter fees, will be higher for HY than IG issues.

The primary issuance process is sequential in nature. We begin by analyzing syndicate structure (e.g., the number of syndicate firms), move to primary market outcomes such as overallocation and breadth of distribution, and finally to secondary market outcomes such as underwriter trading activities, liquidity, and retail participation. In a broad sense, many of the variables studied herein are endogenous. However, we exploit that the decision variables at one stage of the process (e.g. how broadly the issue is allocated across primary investors) can be considered predetermined when used as explanatory variables for subsequent outcomes (e.g. the liquidity of the secondary market).

3. Data & Sample Characteristics

3.1. Data Description

We rely on Securities Data Company (SDC) for information regarding the syndicate that oversees each bond issue, and FINRA' enhanced TRACE database for information on bond

transactions. SDC reports the names of the bookrunners and managers in the syndicate. For public (non 144A) issuances, SDC also contains information on bond allocations to each bookrunner and manager, as well as the percentage fee or "gross spread" collected by the syndicate.

The public version of the TRACE data includes information on bond CUSIP, the date and time of execution, the transaction price and volume (in dollars of par, up to a maximum "cap" size), and whether the trade represents a customer sale or purchase, or a trade between two dealers. The enhanced TRACE data made available to academics by FINRA include information on both publicly disseminated and non-disseminated historical transactions, including those in non-registered 144A bonds, unmasked trade sizes, masked identification numbers for individual dealers participating in a transaction, and the primary placement transactions associated with each bond issue (flagged as "P1" trades). In addition, FINRA provided us with information that is sufficient to link individual TRACE primary and secondary transactions for 34 prominent dealers examined by Bessembinder, Jacobsen, Maxwell, and Venkataraman (2018) to specific syndicate members identified by SDC. In particular, for each issue, we have information on whether each of these thirty-four dealers was a syndicate member or bookrunner, and in the case of HY issues, whether the dealer was the "lead left".[9] The data begins March, 2010 (when FINRA began to collect information on primary market allocations) and runs through March, 2018.

Panel A of Table I reports data regarding the sample. We rely on FISD to identify corporate bond issuances, focusing on non-puttable U.S. Corporate Debentures and U.S. Corporate Bank Notes (bond type=CDEB or USBN) with a specified maturity date, resulting in an initial sample of 14,409 issuances. We require that the FISD data can be matched with both SDC and TRACE data, which reduces the sample to 9,958 issues. We retain issues with at least one trade in both the primary and secondary market in the year following the offer. We exclude bonds with variable interest rates, issues by financial firms, and Yankee bonds (those with a non-US issuer). We also exclude issues with any bookrunner that is not listed as a member on FINRA's website (and thus not subject to TRACE reporting requirements) or those issues where none of the aforementioned thirty-four large dealers participated as bookrunners, leaving 5,971 issues.[10]

[9] The thirty-four dealers are generally the most active in the corporate bond market. More specifically, they are the dealers at the intersection of the "Constant Dealer" and "Top 70%" samples described by Bessembinder, Jacobsen, Maxwell, and Venkataraman (2018).

[10] The list of FINRA member firms is available at: https://www.finra.org/about/firms-we-regulate.

3.2. Overallocation Computation

To measure the extent to which a given issue is overallocated, we sum dealer sell quantities across all primary placement ("P1") transactions in the enhanced TRACE data, and compare to the issue size. We exclude P1 trades between syndicate members. We compute overallocation on both a dollar and percent-of-issue basis. We exclude issues with overallocation greater than 115% or less than 95% of the offering amount, as these are likely indicative of data errors, such as misreported trade quantities or S1 trades reported as P1 trades (or vice versa). This restriction reduces our final sample to 5,573 issues.

Conversations with industry participants indicate that issues are not underallocated. In a few cases, the total volume of reported P1 transactions is less than the offer amount. We therefore attributed these cases to data errors (such as a missing P1 transaction) and set the computed overallocation to zero. We mitigate the effects of any remaining data errors by dividing the sample into two groups: those with measured overallocation greater than two percent (the sample median) of the issue size (referred to as Overallocated issues) and other issues (referred to as Non-Overallocated issues).

3.3. Issue Characteristics

Panel B of Table I contains descriptive information regarding issue characteristics, separately for the IG and HY samples. The median issue size for the full sample is $500 million. The majority (3,611 of 5,573, or 65%) of the sample issues are IG. About 69% of IG issues are multiple-tranche deals and 57% of the deals, summed across tranches, are greater than $1 billion.[11] By comparison, multiple tranches are less prevalent in high yield (HY) issues (14%) and only 19% of the deals are larger than $1 billion. IG issues are of longer average maturity (10 years) than HY issues (7 years). Only a minority, 23% for HY and just 4% for IG, of bond issuances in our sample are initial issuances, i.e. the first offering by the issuing firm in FISD. Since IG and HY issues differ substantively in terms of issuance characteristics and market norms, we report separate results for the IG and HY samples going forward.[12]

[11] For example, in March of 2016, Exxon issued $2.5 billion in five-year bonds, $1.25 billion in seven-year bonds, $2.5 billion in ten-year bonds, and $2.5 billion in thirty-year bonds, all on the same date.

[12] The full sample results for subsequent analyses (including both IG and HY issues simultaneously) can be found in the Internet Appendix.

4. Issuance Structure

4.1. Syndicate Structure

IG issuances typically include co-equal bookrunners. Each bookrunner is typically allocated the same amount of the issuance (including overallocation), and since compensation is typically proportional to the issue amount, receives the same compensation. Each bookrunner also participates in any secondary market stabilization trading. One bank (typically rotated across deals) is selected to coordinate the process and serve as the "bill and deliver" agent. However, the bank playing this role receives no additional compensation.

In the case of HY issues, a single bookrunner typically controls and manages the issuance process. As in stock IPOs, this bank is referred to as the "lead left" underwriter, although such a designation is not made in IG issues. From conversations with underwriters, the lead left bookrunner typically receives an extra five to ten percent of fees above that earned based on their allocation percentage. Potential investors typically contact only the lead bookrunner to request allocations. The lead bookrunner serves as the "bill and deliver" agent, chooses whether and to what extent to overallocate, and engages in stabilizing trades in the secondary market.

We report descriptive statistics regarding the underwriting syndicate in Table II. The syndicate includes a median of eleven managers for IG issuances and seven managers for HY issuances. For both groups, the median number of bookrunners is four. The database includes the allocation to each bookrunner for most public deals. For these, aggregate bookrunner allocations exceed 80% for both groups. The median percentage of the total issue size allocated to each bookrunner is 18% for IG issues and 17% for HY issues. HY bookrunners are more often (50%) "Top 10" dealers (based on total issue volume within the sample) as compared to IG issues (29%).

Panel B of Table II reports data regarding the Top 10 bookrunners, while Panel C reports on non-Top 10 bookrunners for those issues reported in the SDC database. Bank of America and J.P. Morgan hold the top two spots while Wells Fargo and Citibank are placed in the next two spots for both HY and IG issues.[13] Over 95% of issuances and issuance volume in the sample includes at least one Top 10 bookrunner. Non-Top 10 bookrunners participate in the majority of deals, ranging

[13] Some contrasts to the equity IPO market are noteworthy. Bond issues are dominated by dealers with a large US commercial banking presence. In contrast, equity IPO league tables for 2018 list traditional investment banks Morgan Stanley and Goldman Sachs first and second, while Wells Fargo ranks only fifteenth. See https://data.bloomberglp.com/professional/sites/10/Bloomberg-Global-Equity-Capital-Markets-League-Tables-FY-2018.pdf.

from 54% of HY issuances to 67% of IG issuances. However, the median allocation to a non-Top 10 bookrunner is 5% of the issue size, compared to 13% IG and 14% HY for a Top 10 bookrunner.

4.2. Primary Market Allocations

In Table III, we report market allocations by the syndicate to initial investors. We anticipate that secondary market trading is likely to be affected by both the breadth of the distribution and the types of initial investors receiving the allocation. For example, the issuer and the syndicate may favor investors with long holding horizons, avoiding investors with a history of "flipping"; i.e., selling the initial allocation on the first day of secondary market trading.[14] Some banks outline factors that can affect initial allocation decisions on their website.[15]

In Panel A of Table III, we report primary issuance trades by time of day. Only a few primary trades (1% of IG trades and 3% of HY trades) occur before 9:30 AM. More primary trades, 3% for IG issues and 10% for HY issues, occur between 9:30 AM and 1 PM. Afternoon primary trades are most common, as 80% of the primary trades in IG issues occur between 1:00 and 4:30 PM, with the remaining 16% occurring after the typical 4:30 PM close of secondary markets. Primary trades in HY issues also frequently occur between 1:00 and 4:30 PM (49%), but after close primary trades are not unusual (38%).

Panel B of Table III reports primary market allocations. The median offer price for HY issues is par, while the median IG issue price is slightly discounted to 99.79% of par.[16] As noted, a single dealer known as the "bill-and-deliver" agent makes the actual allocation of bonds to initial investors, and each primary trade represents the entire allocation received by a distinct investor.[17] Consistent with this industry practice, the enhanced TRACE data shows a single dealer identification

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[14] Industry sources indicate that the institutions most likely to flip their allocations are hedge funds, although mutual funds may also flip, potentially due to investor redemptions. Insurance companies are generally viewed as long-term investors who are less likely to flip. Regional and smaller broker-dealers with a retail sales network, or mutual funds who did not receive sufficient primary market allocations tend to be among the buyers in the secondary market. See Aggarwal (2003) for an analysis of flipping activity of initial public offerings in the equity market.

[15] See for example, https://www.bofaml.com/content/dam/boamlimages/documents/articles/ID17_1174/BofAML_EMEA_Capital_Markets_Allocation_and_Distribution_Policy_Summary_Version_1_0_January_2018.pdf

[16] Unlike corporate bonds, where initial allocations are reported on TRACE at a single price on the offering date, Green, Hollified and Schorhoff (2007) and Schultz (2012) show that the lead underwriter in municipal issues sells the bonds to syndicate members at a slight mark-up to the offering price (i.e., takedown price) and the syndicate sells the bonds to the public at a higher, re-offering price, over the next week. Schultz (2012) shows that initiation of transaction reporting by MSRB results in a sharp reduction in the dispersion of secondary market transaction prices.

[17] For example, while an investor may place orders with multiple bookrunners, it will receive its entire allocation in a single P1 trade from the "bill-and-deliver" agent. The investor may choose to reallocate the offering across funds within the family, but the reallocation is not reported to TRACE. Reflecting their shared responsibility, each active bookrunner receives information regarding allocations to each initial investor. However, this information is generally not available to the passive bookrunners or the co-managers until secondary market trading opens in the bond.

associated with almost all the "primary" (P1) transactions for each bond issue.[18]

A median of 91 investors (for both HY and IG issues) receive primary allocations. While the data do not identify the investors who receive primary allocations, the size of the typical allocation suggest that these are primarily institutions. The median sizes of primary trades are $5.8 million (1.2% of issue size) for HY issues and $6.7 million (1.1% of issue size) for IG issues. Some primary trades are very large, with the largest individual placements averaging $49.9 million (8.4% of the offer size) for IG offerings and $45 million (10% of the amount size) for HY offerings.

The median time from the first primary trade to the last is over two hours for IG offerings. Remarkably, the median time from first to last primary trade for HY offerings is only two minutes. The first secondary market trade (S1 trades in the TRACE data) tends to occur shortly after the bond begins to be placed, as the median elapsed time from the first P1 trade to the first S1 trade is 26 minutes for HY issues and 38 minutes for IG issues. Secondary trading can commence before primary trading is complete; the median time from last P1 trade to the first S1 trade is -5 minutes for HY issues but over an hour (67 minutes) after for IG issues.

We next report on a systematic assessment of the variables that are relevant in explaining cross-deal variation in syndicate structure and primary market allocations. In particular we seek to explain the number of bookrunners involved in each deal, the period of time over which primary placements occur (measured as the time of the last P1 trade relative to the first) and the concentration of the issue placement across initial investors, measured by the Herfindahl index.[19]

Table IV reports the outcomes of multivariate regressions, for the IG (columns 1 to 3) and HY (columns 4 to 6) subsamples, estimated at the issue-level. Explanatory variables include bond and syndicate attributes, as well as measures of market conditions. The bond attributes include the (natural log of) the issue size, the time to maturity, the credit rating, and indicator variables that identify issues by industrial firms, publicly listed firms, non-public 144A offerings and if the issue contains multiple tranches. When explaining primary allocations to initial investors, the syndicate attributes are the number of bookrunners and the percentage of Top 10 bookrunners. Market conditions are measured by the number of corporate bond offerings that occur in the week prior to

[18] The median percent of P1 transactions completed by a single dealer is 98% for IG issues and 100% for HY issues. Under FINRA Rule 2090, a Bookrunner must meet a "Know Your Customer" rule to transact with that customer. The "bill and deliver" agent may on occasion ask other Bookrunners to handle allocations for (typically small) investors that do not meet this requirement. Interdealer P1 trades typically represent only 3% of P1 trades.

[19] In Appendix III, we report results for the full sample and include the SDC allocation Herfindahl as a dependent variable. SDC allocation data is not available for all issues, particularly for 144A bonds, as reflected in the smaller sample size for results in column (3).

the issue, the dispersion in bond prices for bond offerings during the previous quarter, as well as trailing five-day averages on the stock index return, the bond market index return, the VIX index, and the three-month LIBOR interest rate.

Results for the IG (column 1) and HY (column 4) samples reported in Table IV are broadly similar and indicate that the number of bookrunners employed is related to the complexity and risk of the deal; larger issues, those with multiple tranches, issuers without publicly-traded stock, and lower credit ratings are all associated (with statistical significance) with larger syndicates. Columns (2) and (5) report coefficients obtained when the dependent variable is the elapsed time from the first to the last primary market trade. These results indicate that it takes longer to fully allocate larger issues, those with multiple tranches, and when issues occur at more volatile times, measured both by VIX and the volatility of recent offer prices. It takes less time to complete the primary issue for non-public (144A bonds), when issuers have publicly listed stock, when credit ratings are higher, and if more top-10 bookrunners are involved.

In columns (3) and (6), we report results obtained when the concentration of primary market allocation across initial investors is the dependent variable, for the IG and HY samples, respectively. The results show that the offering is more widely distributed (less concentrated) across initial investors when the issue amount is larger, when the issuer is industrial, and when the deal has more bookrunners, for each sample. IG issues with multiple tranches and registered (non-144A) bonds have less concentrated placements, but these results are not observed for HY issues (which rarely include multiple tranches and are more likely to be 144A issues). Market conditions have a significant impact on the concentration of primary placements. For IG issues, high recent stock return and lower dispersion of bond prices are associated with wider distribution of the initial offering with primary investors. For HY bonds, consistent with a crowding-out effect, the greater the number of corporate bond offerings during the offering week, the more concentrated the distribution among initial investors. Somewhat surprisingly, the VIX index does not significantly impact the distribution of IG or HY issuances.

On balance, these results support the conclusion that syndicate structure, in particular the number of bookrunners and the concentration of primary market customer placements are systematically related to the perceived uncertainty about investor demand, as captured both by offer characteristics and market conditions. Among the explanatory variables, issue size, credit rating, 144A designation, and recent issue price variability are particularly important.

4.3. The Overallocation Option

In Table V we report summary statistics regarding underwriters' overallocation decisions. IG issues are only slightly overallocated, with the median quantity allocated in P1 trades 100.5% of the issue amount. Only 30% of IG issues involve allocations that exceed 102% of the issue amount and thus enter our overallocated subsample. However, since IG issue amounts are large, dollar overallocations are also large, with median (mean) overallocation of $2.5 million ($10.1 million). HY issues are overallocated to a greater degree than IG issues. The average overallocation is 4.9%, or $27.3 million. The corresponding median is 4.5%, or $19.7 million. Seventy seven percent of HY offerings are overallocated by more than two percent. Figure 2 displays the frequency distribution of overallocation by credit quality and issue size.

Underwriting fees, or gross spreads, are on average also higher for HY issues (1.5%) as compared to IG issues (0.65%). We conjecture that the higher fees compensate underwriters for increased difficulty in placing HY issues, as well as greater uncertainty about investor demand for HY offerings. Gross spreads for bond offerings are substantially smaller than for equity IPOs, where the spread is typically 7%. The lower underwriting fees for bond offerings as compared to stocks likely reflect investor's familiarity with bonds offerings that are more frequent than stock offerings, the relatively efficient book building and issuance process, as well as lower secondary market volatility in prices. As might be expected, the average offering interest rate spread relative to the benchmark Treasury is much higher for HY issues (443 basis points) compared to IG issues (122 basis points), reflecting higher credit risk.

We next implement a multivariate analysis to assess the determinants of overallocation. The dependent variable, *Overallocation,* is an indicator variable that equals one for offerings with allocations that exceed 102% of the offer size (i.e., exceed the full sample median) and zero otherwise. We use a binary rather than a continuous variable to minimize the effect of potential data errors as discussed in Section 3. In Table VI, we report the results obtained in the IG and HY subsamples, relying on the same explanatory variables as previously employed for Table IV. We hypothesize that overallocation will be positively related to variables that indicate greater uncertainty regarding secondary market demand for the issue.

The results, in column (1) for IG issues and column (4) for HY issues, indicate that larger issues, issues with more bookrunners, and issues brought to the market under difficult market conditions (as evidenced by higher dispersion in bond prices), are associated with overallocation. IG issues are more likely to be overallocated when recent stock and bond returns have been low and

when VIX has been high. Non-public 144A bonds are less likely to be overallocated. Additionally, for IG bonds, issues with longer maturity and those with multiple tranches are more likely to be overallocated. The results reported in column (2) of Table VI parallel those reported in column (1), but include the underwriter gross spread (commission) for the smaller sample where this data is available. The estimated coefficient on gross spread is positive, indicating that the syndicate on average negotiates a higher gross spread on the issues that it chooses to overallocate.[20] In columns (3) and (5) we include the offering interest rate spread relative to the benchmark Treasury as an additional independent variable. When doing so, in column (3) for the IG sample, we find that deals that are overallocated are associated with higher offering spreads. On balance these results support the reasoning that the syndicate overallocates issues when there is more uncertainty regarding market demand. Further, since the issuer and the syndicate negotiate commissions upfront, the higher commissions for overallocated issues point to the syndicate's ability to identify issues with greater demand uncertainty before book building is initiated.

5. Overallocation and Secondary Market Outcomes

We next assess relations between underwriters' overallocation decisions and secondary market trading outcomes. We measure secondary market outcomes over periods including 1-2 days, 3-5 days, 6-21 days, and 1-21 days after the offer (where day 1 is the offer date itself). Information regarding secondary market outcomes in the first month after the issue is of particular importance for corporate bonds, as trading activity thereafter tends to decline as bonds are absorbed as long-term portfolio holdings.

5.1. Overallocation and Syndicate Trading in the Secondary Market

We report on the underwriting syndicate's market stabilization activities, with focus on overallocated issues. For IG bonds we study secondary market trades for the entire underwriting syndicate, while for HY bonds we study the trades of the "lead left" bookrunner only, reflecting the industry practice whereby the lead left bookrunner alone is responsible for stabilizing HY issues. We calculate the *Signed Net Order Flow* of the syndicate, which is secondary market purchases minus secondary market sales for all members of the syndicate in combination, *Cumulative Signed Net Order Flow,* which includes both the syndicate's secondary market trading and their initial overallocation (if

[20] Gross spread data is not available for private 144A bonds. As such, we remove the 144A dummy as an independent variable in Table VI, Column 2, and do not estimate a corresponding regression for high yield bonds, which contain a large proportion of 144A bonds.

any), and the percentage of the syndicate's volume that involves purchases from customers and/or other dealers.

In Panels A and B of Table VII we report medians for several variables related to secondary market trading, for overallocated and non-overallocated issues, for IG and HY bonds, respectively. The data in Panel A shows that the syndicate quickly covers their short position in overallocated IG issues. On days 1-2, two thirds of syndicate secondary market volume is comprised of purchases, and the median signed net order flow on those days is $18.37 million, compared to median overallocation of $20 million. For fifty-nine percent of these issues the short position attributable to the overallocation is fully offset within two days. After twenty-one days the syndicate has made median net purchases of $19.0 million in the secondary market, and the initial short position has been fully offset for 81% of issues.

For overallocated HY offerings (Panel B), the lead left bookrunner plays a large role in stabilizing secondary trading. The median overallocation for these HY offerings is $26.3 million. The lead left underwriter aggressively covers the short position during the first two days, with purchases accounting for 65% of total volume and a median net purchase of $18.1 million. The overallocation is fully covered during the first two days for 40.2% of issues (the comparable figure for the syndicate in IG offerings is 59.2%), but despite the aggressive purchases, the lead left underwriter still has a median short position (inclusive of the initial overallocation) of $7.3 million after two days of secondary market trading. The lead left underwriter in overallocated HY issues continues to purchase thereafter; median net purchases are $3.6 million during days 3-5 and $2.9 million in days 6-21. After 21 days, the lead left underwriter in overallocated HY offerings has completed median net purchases of $27.6 million and has a median net long position (inclusive of the original overallocation) of $0.8 million. The initial short position is fully offset after 21 days for 82% of issues. On balance, the results in Table VII indicate that the syndicate for IG issues and lead left underwriter for HY issues actively stabilize the market for overallocated issues with aggressive secondary market purchases, particularly during the first two days.

Interestingly, the underwriting syndicate is also, on average, a net purchaser in the secondary market for issues without overallocation. In Table VII Panel A, for the IG sample, the median purchase is $7.3 million during the first two days and $4.2 million over the first 21 days, while for the HY sample, median purchases are $4.6 million during the first two days and $4.0 million over the first 21 days. As a consequence, the syndicate attains a net long position in these issues. The fact that the syndicate on balance purchases in the secondary market even for deals without large

overallocation likely reflects that it is not possible to forecast with complete accuracy whether it will be necessary to engage in secondary market purchases to support an issue. In some cases, the need for secondary market support is not anticipated in advance, and as a consequence, the syndicate did not overallocate the issue. The resulting secondary market purchases then leave the syndicate with a long position.

In Table VIII we report the results of multivariate regressions where we assess the determinants of dealer secondary market trading activities, while allowing for variation in issue and syndicate characteristics and market conditions. The key explanatory variables are indicator variables that identify the issues that are overallocated and the dealers who enter short positions on those issues. In Columns 1-4, which focus on IG issues, the latter indicator variable identifies dealers who are listed as syndicate members by SDC and included among the 34 large dealers examined by Bessembinder et al. (2018), as well as the dealer who engages in P1 trades (if that dealer is not already identified). In Columns 5-8, which focus on HY issues, this indicator identifies only the "lead left" dealer who engages in P1 trades. This analysis includes two observations per issue: the trading activity of the syndicate (signed volume summed across members) or lead left dealer, and the trading activity of all other non-syndicate dealers. We consider as dependent variables the syndicate or lead left net signed order flow in thousands of dollars (columns 1, 2, 5, and 6) and the percentage of syndicate or lead left volume that are purchases (columns 3, 4, 7 and 8), during the first two days and the first 21 days, starting from the offer date.

Coefficient estimates on the indicator variable denoting that the dealer is a member of the underwriting syndicate (or is the lead left underwriter for HY offers) are uniformly positive and significant, implying that syndicate members are on average net purchasers in the secondary market, even for issues without large overallocation. The key finding that can be observed on Table VIII is that the coefficient on the product of the overallocation indicator and the syndicate/lead left membership indicator is positive and significant in every column. These estimates imply that syndicate members (or the lead left in the case of high yield issues) make significantly *larger* net secondary market purchases in overallocated issues over the first two, as well as the first 21 days, as compared to issues without large overallocation, after controlling for other bond attributes, syndicate attributes and market conditions. These coefficient estimates are economically large, equal to $11.9 million (IG) and $18.9 million (HY) for days 1-2 and $16.0 million (IG) and $31.7 million (HY) for days 1-21. In contrast, the coefficient estimate on the indicator variable for issues with large overallocation is negative and significant when explaining signed net order flow, for both HY

and IG issues, and over both the first two and first twenty-days. The implication is that dealers who are not members of the underwriting syndicate are on average net sellers in the secondary market in the days following the issue.

Regarding the control variables employed for the regressions reported on Table VIII, it can be observed that dealers tend to purchase more IG 144A bonds in the secondary market, particularly after the first two days, that aftermarket purchases as a percent of volume tend to be lower for issues that are more widely distributed (i.e., there are more P1 trades), that dealers tend to purchase more on balance when the volatility of offer prices has been higher, and for IG bonds, when stock market returns have been higher and VIX has been lower.

5.2 Overallocation and Underpricing

Prior studies (e.g., Datta, Iskandar-Datta, Patel, 1997; Cai, Helwege and Warga, 2007; Helwege and Wang, 2016; Brugler, Comerton-Ford, and Martin, 2016) show that corporate bonds trade in the secondary market at average prices higher than the offer price on average, though the magnitude of such "underpricing" is less than in the case of equity IPOs. Our sample also indicates underpricing of bond offerings. The key innovation of our study with regard to corporate bond underpricing stems from our analysis of underwriter incentives to overallocate some issues. As noted, our analysis predicts that overallocated issues are associated with weaker expected investor demand, and as a consequence these issues should experience smaller aftermarket price increases, i.e. less underpricing, on average. To measure underpricing at various horizons, we compute the percentage change from the offer price to the weighted average secondary market price expressed as the sum of the flat price and accrued interest n days after the offer, for n = 1, 2, 5, and 21 days. To enhance statistical power, we adjust for general bond market conditions by subtracting the cumulative bond index return over the same n days. For IG issues we employ the Bank of America Merrill Lynch U.S. Corporate Total Return Index, and for HY issues we subtract the Bank of America Merrill Lynch U.S. High Yield Total Return Index.

In Table IX we report median underpricing for both IG and HY issues, for samples with (over 102%) and without (less than 102%) overallocation, as well as tests for statistical differences between the two samples. The results confirm that corporate bond offerings are underpriced on average. Consistent with the findings in Datta et al. (1997) and Cai et al. (2007), high yield bonds are more underpriced than investment grade bonds. The underpricing of IG bonds ranges from an average of 0.28% (measured as of the first day of trading) to 0.41% (measured as of the fifth day of

trading), while the underpricing of HY bonds ranges from an average of 0.88% (measured as of the first day of trading) to 1.21% (measured as of the fifth day of trading).

The results for both IG and HY issues indicate that offerings with large overallocation are associated with *smaller* underpricing, i.e. less secondary market appreciation, than offerings with small overallocation. Focusing, for example, on underpricing measured two days after the issue, IG offerings with large overallocation are underpriced by an average of 0.27%, versus 0.37% for issues with small overallocation, and the difference is statistically significant. The differential in underpricing for HY issues is larger. Again, focusing on underpricing measured two days after the issue, HY offerings with large overallocation are underpriced by an average of 0.87%, compared to 1.50% for offerings with small overallocation, with the difference again statistically significant. By the fifth day of trading, 26% of IG and 17% of HY overallocated issues are trading below the offer price, whereas 23% and 10% of non-overallocated issues are trading below the offer price.

In Table X we report results that examines the determinants of underpricing in a multivariate setting. Specifically, this table reports results of OLS regressions with underpricing and the propensity to trade below the offer price in the secondary market as dependent variables, and high yield and overallocation indicator variables, offering and syndicate characteristics, primary allocation measures, and market conditions as explanatory variables. Similar to the Table IX, we report results for Days = 1, 2, 5, and 21 days after the offer. The sample mean of each dependent variable is reported at the top of the table as a basis for comparison.

Focusing first on control variables, the results in Table X indicate that underpricing is related to issue characteristics. In particular, large deals and tranched deals are less underpriced, and long maturity, low credit rating, and 144A issues are more underpriced. Underpricing is also related to syndicate and primary allocation characteristics: underpricing is decreasing in the number of bookrunners and increasing in the number of primary trades.

Focusing on overallocation, it can be observed in column (1) of Table X that overallocated issues experience 0.22% less underpricing than non-overallocated issues, after allowing for control variables. This estimate is substantive relative to the sample mean underpricing measured during the first trading day, which is 0.58%. Similar results are observed when the dependent variable is underpricing measured over horizons of 2, 5 and 21 days after the issue. In particular, the coefficient on the overallocation indicator decreases to -0.249%, -0.264%, and -0.329%, respectively, as the horizon is increased. The results in columns 5 and 6 indicate that the percent of issues with

negative returns from the offering price to one and five days later is increased by 4.9% and 3.9% for overallocated issues when returns are measured over one and five days after the issue, respectively.

These results imply that offerings with overallocation in the primary market trade at a smaller premium to offer price in the secondary market, despite the fact that the syndicate makes large net purchases subsequent to the offer. This outcome supports our hypothesis that the underwriting syndicate chooses to overallocate those issues where they detect weak or uncertain secondary market demand, as illustrated in Figure 1. As a consequence, the price at which the market supports itself after stabilization activities are completed reflects a lower premium to offer price as compared to the non-overallocated issues where the syndicate detects normal demand.

5.3. Commissions and Trading Profits

Syndicate members are net purchasers of bonds in the secondary market, particularly when issues are overallocated. Since overallocated offerings are underpriced, albeit by a smaller amount than other issues, these purchases may on average be completed at prices higher than the offering price and the syndicate may incur trading losses on covering the short positions.

Of course, the underwriting syndicate is also compensated through underwriting fees or commissions, also referred to as the "gross spread." In Table XI, we report both dealers' secondary market trading profits and commissions. Commission data is available for the large majority of IG issues, including 79% of issues that are not overallocated and 89% of issues that are overallocated. In contrast, commission data is available for only a minority of HY issues, including 11% of issues that are not overallocated and 22% of issues that are overallocated. To facilitate comparisons of secondary trading profits to commissions, we report in Table XI results for the subsample for which commission data is available; conclusions regarding secondary market trading profits are similar for the full sample and reported in Appendix VII. The "Dollar Gross Spread" reported in in Panels A.1 and B.1 refers to syndicate commissions. While the average issue size is larger for IG, the median commission is much larger for HY issues.

We next report secondary market trading profits, for the underwriting syndicate (or the lead left underwriter for HY issues) as well as dealers that are not underwriters. For each trading profit measure, we report *p*-Values for tests of statistical differences between the distribution of outcomes between the non-overallocated and overallocated samples.

In Table XI, we report the mean and median price for dealer purchases and sales during the first 21 days of secondary market trading, each scaled by the offer price for the bond. Mean and median prices exceed one for each sample, reflecting the fact that the bonds were on average

underpriced at issue. Further, for each subsample, the difference between the mean dealer sell price and the mean dealer purchase price, referred to in the table as the weighted-average spread, is positive, as dealers earn gross profits from round-trip trades in the secondary market. Spreads are on average larger for HY bonds than IG bonds. For example, the mean bid-ask spread for syndicate trades in IG issues that are not overallocated is 0.106%, while the mean spread earned by the lead-left underwriter on HY issues that are not overallocated is 0.189%. Mean spreads for dealers who are not part of the syndicate (not the lead left for HY issues) are similar.

Although secondary market trading spreads are positive on average, they are negative for some issues. The proportion of issues where the syndicate's weighted-average bid-ask spread during the 21-day interval is negative is higher for offerings with large overallocation (35% for IG issues and 24% for HY issues) relative to offerings with small overallocation (29% for IG issues and 19% for HY issues), though the HY differential is not statistically significant. This result is consistent with the reasoning that aftermarket demand for overallocated issues is more uncertain.

We measure two components of dealers' dollar trading profits. First, we calculate the bookrunners' total purchases and sales over the 21-day trading period. We calculate "round-trip volume" as the minimum of total purchases and total sales and round-trip profits as the product of round-trip volume and the weighted-average spread. In addition to profits and losses from round-trip secondary market trading, bookrunners who attain short positions on the offer date due to the overallocation can subsequently earn profits (losses) if they purchase to cover their short positions at prices lower (higher) than the offer price. We focus on those issues where overallocation is positive. For these, we compute dealers' net signed order flow as the difference between their total secondary market purchases and sales. Net signed order flow will tend to be positive for dealers covering short positions in the secondary market. Having done so, we compute the second component of dealer trading profits as the minimum of the dollar overallocation and net order flow (to allow for the fact that some short positions may not be fully covered within the 21 days considered) times the difference between the offer price and the dealer's weighted-average secondary market buy price. We exclude from this measure trades that occur after an overallocated issue is fully covered.

Mean secondary market trading profits to non-syndicate dealers (who do not cover overallocations) range from $124,000 to $149,000 (Panels A.2 and B.2. of Table XI) across subsamples, and do not differ meaningfully across issues that are or are not overallocated. These exceed mean trading profits to syndicate members, as discussed further below.

The results on Table XI indicate that trading losses associated with the covering of any initial short position are minimal for deals where allocations were less than 102% of the issue size; the mean loss for such IG issues is $10,084 (Panel A.1), while for HY issues (Panel B.1) the mean loss is $16,691. When syndicate members cover short positions on overallocated (over 102% allocation) issues, they incur larger trading losses. For overallocated IG issues the mean trading loss is $75,393, while for overallocated HY issues the mean trading loss incurred by the lead-left underwriter is $307,922. In some cases, trading losses can be large; the 25th percentile loss is $108,606 for IG issues and $437,886 for HY issues. For overallocated IG offerings overall trading profits, inclusive of both short covering and round-trip secondary market trades, are essentially zero ($7,698) on average. For HY issues with large overallocation, the lead left underwriter incurs an average combined trading loss of $246,078.

However, the commissions earned by the syndicate on these issues are much larger than secondary market profits or losses. For overallocated IG issues, the syndicate earns average commissions of $4.4 million, while for overallocated HY issues the average commission $8.1 million. Thus, trading losses incurred during market stabilization activities are on average less than five percent of commissions even in overallocated HY issues. Combined syndicate profits are on average greater for offerings in the overallocated sample than for offerings in the non-overallocated sample, implying that the syndicate is compensated by the issuer for exposure to the higher deal uncertainty associated with weaker bond offerings.

6. Offering Characteristics and Secondary Market Outcomes

We next turn to an assessment of the determinants of secondary market trading outcomes. We are particularly interested in the determinants of secondary market liquidity and retail trader participation. In Table XII, we report the weighted-average spread between the prices paid and the prices received in secondary market transactions, the percentage of trades that are likely instituted by retail traders (less than or equal to $100,000), the signed net buy-sell volume of institutional-sized trades (trades larger than $1,000,000) and retail-sized trades (each scaled by own trading volume). Each measure is computed over the 21 days from issue.

Panel A of Table XII reports results for IG bonds, while Panel B reports results for HY bonds. The sample mean of each dependent variable is reported at the top of each panel. The secondary market customer spread averages 9.8 basis points for IG bonds and 21.4 basis points for HY bonds. Retail size trades are more frequent in IG bonds (22.5% of total trades on average) than

in HY bonds (9.7%). Retail customers are, on average, net purchasers of IG bonds in the secondary market (net signed volume is 48% of overall trading) but, somewhat surprisingly, are net sellers (net signed volume is -12% of overall trading) in HY bonds, while institutional customers are on average net sellers in both IG (net signed volume is -8% of overall volume) and HY (net signed volume is -12% of overall volume). These results reflect the fact that short covering of overallocated issues requires net sales by all other market participants.

In Table XII, we also report the results of multivariate regressions, where the dependent variable is the weighted average customer secondary market spread (columns 1 and 2), the percent of trades that are retail size (columns 3 and 4), net signed order flow by institutions (columns 5 and 6) and retail traders (columns 7 and 8). Focusing first on secondary market spreads, it can be observed that spreads are on average significantly lower (by 2.1 basis points for IG offerings and 3.6 basis points for HY offerings) for overallocated issues. We conjecture that the likelihood that the underwriting syndicate will engage in net purchases to cover short positions in overallocated deals encourages market participants to supply liquidity, in line with the strategic complement argument advanced by Bessembinder, Hao, and Zheng (2020) with regard to designated market makers, and consistent with the empirical evidence in Hanley, Kumar and Seguin (1993) for new equity issues. It can also be observed that spreads are significantly lower for larger issues and multiple tranche issues, in both IG and HY offerings.

Some empirical results with regard to the weighted-average secondary market spread differ across IG vs. HY offers. In particular, spreads are negatively related to signed syndicate trading volume (i.e. spreads are lower when the syndicate engages in more short covering) for overalloted issues in IG offerings. This result supports the reasoning that short-covering purchases by syndicate members improve liquidity, but somewhat puzzlingly the result is not observed for HY issues. Spreads are significantly lower for public (non-144A) HY offerings, but not for public IG offerings. Spreads are negatively related to the number of bookrunners involved in the offering for HY issues, but not for IG issues.

Issues that are overallocated involve a significantly higher proportion of retail trading in the aftermarket, for both IG and HY issues. Further, the proportion of trading attributable to retail size trades is positively related to signed syndicate order flow for oversubscribed issues but not for other issues, for both HY and IG offerings. These results support the reasoning that the syndicates' aftermarket purchases in overallocated issues (for purposes of short covering) attract retail investors. Not surprisingly, retail trading is much lower for 144A offerings in both IG and HY offers. Results

with regard to the concentration of the placement differ across HY offerings, where retail participation is positively related to the number of primary customers (P1 trades), and IG offerings, where retail participation is positively related to the concentration of the primary distribution (Herfindahl index).

It can be observed (column 5) that signed institutional order flow (but not signed retail order flow) is lower for issues with large positive overallocation. This result implies that institutions, on average, supply the bonds purchased by the underwriting syndicate to cover their short positions in overallocated deals. Notably, signed retail order flow is significantly higher for overallocated IG issues, which also supports the reasoning that overallocation effectively invites retail participation in the aftermarket. Interestingly, net signed institutional order flow is negatively related to, while net signed retail order flow is positively related to, the number of primary market trades. This finding supports the reasoning that allocations that are dispersed across more primary customers are associated with subsequent flipping of a portion of the offer by institutions to retail customers. On balance, the results reported in Table XII support the conclusion that the underwriting syndicate's decision to overallocate in the primary market and their associated secondary market trading activity are important determinants of secondary market liquidity and retail trading patterns.

7. Conclusions

We study the corporate bond issuance process, focusing in particular on underwriting syndicate structure, the decision of the syndicate to overallocate some issues, underwriter activities in the aftermarket, and secondary market trading outcomes. Such linkages are of interest, in part, because members of the underwriting syndicate typically also play an active role as bond dealers in the secondary market. Of particular relevance, similar to new equity issues, the syndicate's obligations to stabilize secondary trading implies that any perceived weaknesses in the secondary market demand for a bond offering are likely to inform the syndicate's primary market allocation decisions. However, unlike equities, corporate bond offerings generally do not include a "Greenshoe" option, implying that overallocation is potentially more costly to the syndicate in bond offerings. Thus, it is of particular interest to assess the nature of overallocation, aftermarket trading, underpricing, and liquidity in corporate bond offerings.

We exploit the enhanced TRACE database to study the structure of the underwriting syndicate, including the magnitudes and distribution of commitments across bookrunners and managers. We also present evidence on the degree to which initial bond placements to investors at

primary issuance are concentrated versus dispersed. We hypothesize, and provide evidence to support, that the underwriting syndicate structures the offering to allow for the degree of uncertainty about investor demand.

We document that many issues are "overallocated", that is, the syndicate distributes quantities that exceed the issue amount, leaving the syndicate with a net short position at the time of the issue. The incidence and extent of overallocation is greater for HY offerings than IG offerings because the syndicate anticipates a higher likelihood that stabilizing secondary market purchases will be required for HY bonds. The multivariate evidence supports the interpretation that the syndicate tends to overallocate on riskier deals and at times when market conditions are uncertain, as evidenced by higher dispersion in bond prices and, for IG issues, higher VIX.

We also assess relations between overallocation and secondary market trading activity after the offer, focusing in particular on bond offerings with overallocation that exceed the sample two percent median. For IG issues in the overallocated sample, two thirds of the syndicate's secondary market volume during the two days after the offering consists of bond purchases, allowing the syndicate to cover on average about 79% of the overallocation. For HY issues in this sample the "lead left" bookrunner on average makes secondary market purchases equating to 69% of the overallocation during the first two days.

Consistent with the literature, bonds in our sample are underpriced. Our contribution is to show that overallocated offerings trade at a smaller premium to offer price relative to issues with no overallocation, despite large net purchases by the underwriting syndicate. That is, overallocated bonds are less underpriced. These results support the reasoning that the syndicate overallocates bonds when it perceives relatively weak investor demand. We also document that the issuing syndicate on average incurs losses on the trading activity undertaken for price stabilization purposes, as the purchases made in the secondary market to cover the short position created by the overallocation, occur at prices higher than the offering price.

Our empirical results support the following conclusions. The structure of the underwriting syndicate is affected by both the size and the complexity of the issue. The underwriting syndicate is able to identify, using information obtained during the book building process, issues where secondary market demand is weak or uncertain, and responds by overallocating weaker issues, such that the syndicate attains a net short position. This short position effectively hedges the purchases required to provide secondary market support for a weak issue. Despite the stabilizing effect of the short covering purchases, overallocated issues ultimately trade at a small secondary market premium,

which reflects the more modest investor demand that motivated the overallocation. Even though the syndicate incurs trading losses while covering short positions, it earns higher total profits on overallocated issues because of higher negotiated commissions. Finally, the presence of the underwriting syndicate on the buy side of the secondary market is associated with narrower secondary market bid-ask spreads for overallocated issues.

Although the bond issuance process has historically been notably opaque, investing firms have in recent years pushed for increased transparency and greater consistency in how information is disseminated.[21] Our results indicate that information gained by the syndicate during book building plays an important role in managing demand uncertainty and providing secondary market support for a weak issue. Disclosing order book updates in regular intervals during the book building phase might help mitigate information asymmetry for investing firms. The largest bond underwriters have proposed an electronic platform named DirectBooks to partially automate the process. It will be of interest to assess the extent to which underwriters and/or other market participants benefit from a more transparent and standardized issuance process should the proposed reforms be enacted.

[21] See https://www.ifre.com/story/2498707/buyside-body-wants-changes-in-how-us-bonds-are-sold-l8n2fn0el and https://www.bloomberg.com/press-releases/2019-10-11/global-bank-consortium-creates-capital-markets-syndication-platform-directbooks.

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Figure 1
Primary Issuance Process and Overallocation

This figure shows a graphical illustration of the primary issuance process and the decision to overallocate bonds. When investor interest is normal, demand (D') and supply (Q) curves intersect at quantity Q*, the issue size, and P*, the aftermarket equilibrium price. The issue is offered at a lower price P' which leads to over subscription (Q' > Q*). The market is expected to support itself after issuance and no market stabilization is necessary. When oversubscription observed during the book building process is smaller than expected (Q'' < Q'), the syndicate revises the demand curve (D'') and the aftermarket equilibrium price (P**) downward, and revised upwards the uncertainty regarding investor interest in the secondary market, which increases the likelihood that the bond will trade below the offering price. To facilitate market stabilization, the syndicate overallocates bonds and shifts the quantity from Q* to Q**. The short position allows the syndicate to purchase bonds in the aftermarket and end with a flat position after market stabilization.

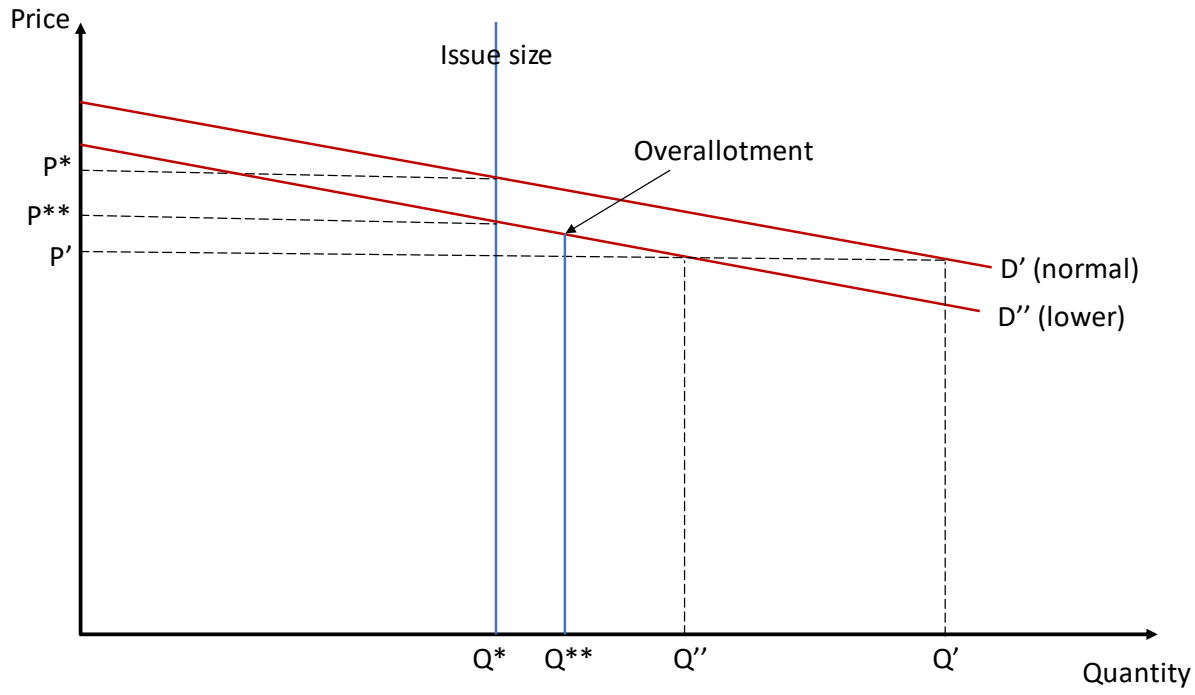

Figure 2
Distribution of Overallocation

This figure shows a histogram of overallocation for investment grade, high yield, small issue, and large issue categories. Small (large) issues are defined as issues less (greater) than $500 million. Green dot pattern bars denote investment grade (IG) small issues, green solid bars denote investment grade large issues, red striped pattern bars denote high yield (HY) small issues, and red pattern bars denote high yield large issues.

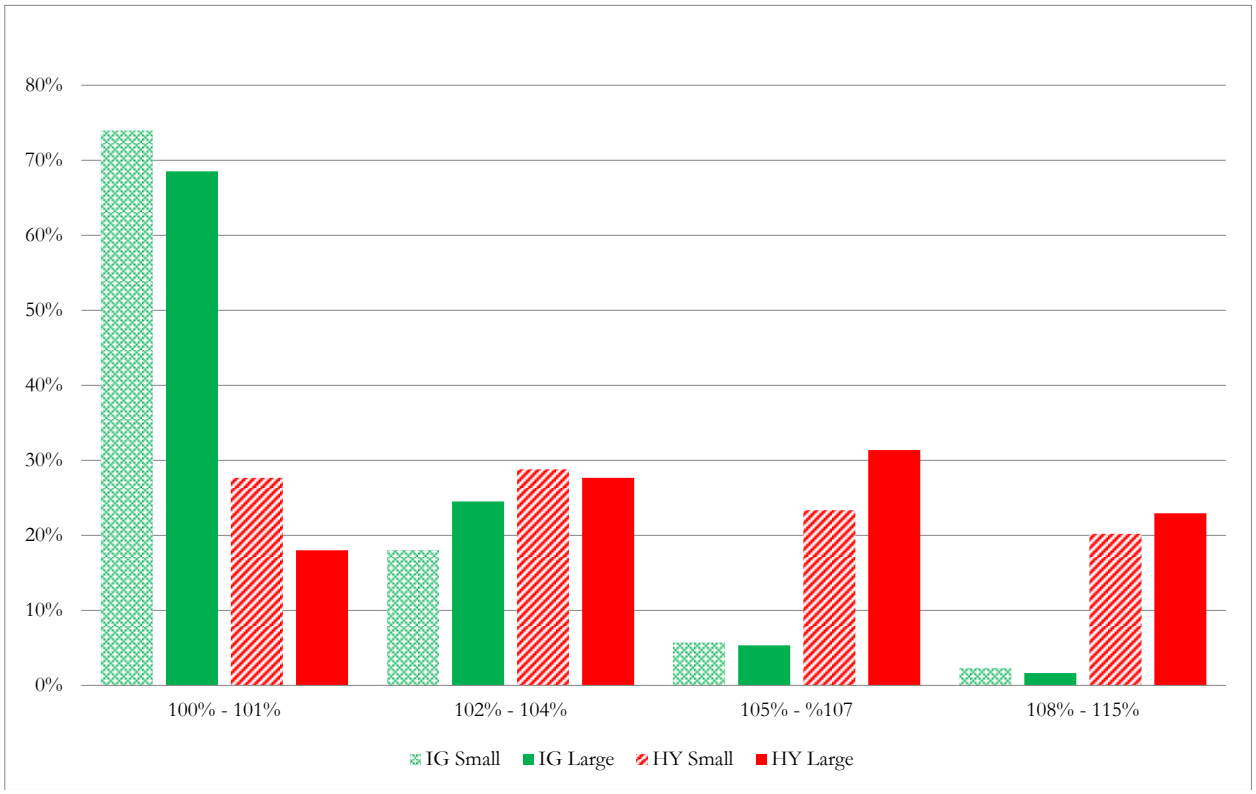

Table I
Sample Overview

Panel A summarizes the sample construction. Corporate bond trade data are from TRACE, bond descriptive data are from the Mergent Fixed Income Securities Database (FISD), and issue and underwriter data are from Thompson Reuters Securities Data Company (SDC). The sample period is March 2010 to March 2018. We match FISD to SDC data with the same CUSIP, offering amount, and if both offering and maturity dates are within 3 days. We match to TRACE data based on CUSIP. Our sample consists of 5,573 bond issues between 2010 and 2018. Panel B provides descriptive statistics for the full sample, investment grade issues, and high yield issues. We report median values (except percent statistics).

Panel A: Sample Construction

	# Issues
Corporate bonds in FISD	14,409
Match to SDC	10,756
Match to TRACE	9,958
Retain all trades between offering date + 1 year, with a trade size < issue size	9,950
Exclude issues without at least one P1 trade and one S1 trade	9,849
Exclude variable rate issues	9,156
Exclude issues by financial firms	6,925
Exclude Yankee issues	6,072
Exclude issues without P1 trades on offering date (-1,+1)	6,063
Exclude issues with non-FINRA member bookrunners	5,990
Exclude issues without P1 trades by Top 34 dealers	5,971
Exclude issues with overallotment > 1.15	5,922
Exclude issues with overallotment < .95	5,573

Panel B: Sample Description

	Full Sample	Investment Grade	High Yield
# Observations	5,573	3,611	1,962
Issue Size ($ in 000s)	500,000	500,000	450,000
# Tranches	1	2	1
% > 1 Tranche	49%	69%	14%
% Tranche Size > $1B	43%	57%	19%
Maturity	8	10	7
% Maturity < 5 years	21%	14%	35%
% Maturity >=5 and < 10 years	31%	23%	47%
% Maturity >=10 and < 30 years	33%	41%	18%
% Maturity >= 30 years	15%	23%	0%
% First issue reported in FISD	11%	4%	23%
% 144A	35%	11%	80%

Table II

Syndicate Structure

This table reports median syndicate structure statistics. Manager, bookrunner, and allocation data are from SDC. In Panel A, we report statistics for all bookrunners. In Panel B, we provide statistics for the top 10 bookrunners (BR) based on volume as a bookrunner over the sample period. In Panel C, we provide statistics for the remaining bookrunners that are not in the top 10 by volume.

	Full Sample (N=5,573)	Investment Grade Sample (N=3,611)	High Yield Sample (N=1,962)
Panel B: All Bookrunners			
Issue Size ($ in 000,000)	500	500	450
# Managers	10	11	7
# Bookrunners	4	4	4
% Bookrunners in Top 10	33%	29%	50%
SDC Allocation ($ in 000,000)	50	50	50
SDC Allocation/Issue Size	9%	8%	10%
SDC Allocation Herfindahl	0.16	0.16	0.17
SDC Allocation - Bookrunners ($ in 000,000)	96	98	83
SDC Allocation/Issue Size - Bookrunners	17%	18%	17%
% Total SDC Allocation - Bookrunners	80%	80%	83%
SDC Allocation Herfindahl - Bookrunners	0.25	0.25	0.26
SDC Allocation - Largest Allocation ($ in 000,000)	120	117	136
SDC Allocation/Issue Size - Largest Allocation	22%	22%	30%
Panel B: Top 10 Bookrunners			
Top1	JPM	JPM	BOA
Top2	BOA	BOA	JPM
Top3	WF	WF	CITI
Top4	CITI	CITI	WF
Top5	BARC	BARC	DEUT
% Deals w/ at least 1 top10 BR	98.1%	98.8%	96.9%
% Volume w/ at least 1 top10 BR	98.6%	98.8%	98.1%
Allocation/Issue Size	13%	13%	14%
Allocation Herfindahl	0.16	0.16	0.17
Panel C: Top 10+ Bookrunners			
% Deals w/ at least 1 top10+ BR	62.2%	66.9%	53.5%
% Volume w/ at least 1 top10+ BR	63.4%	67.1%	54.2%
Allocation/Issue Size	5%	5%	5%
Allocation Herfindahl	0.16	0.16	0.16

Table III
Primary Market Trading

This table provides primary market trading statistics. Panel A provides mean statistics on the timing of primary market trades. Panel B provides median primary market statistics. Variable definitions are provided in Appendix I.

	Investment Grade Sample (N=3,611)	High Yield Sample (N=1,962)
Panel A: Timing of Primary Market Trades		
Before 9:30am	1%	3%
9:30am - 1pm	3%	10%
1pm - 4:30pm	80%	49%
After 4:30pm	16%	38%
Panel B: Primary Market Statistics		
Offering Price	99.79	100.00
# Primary Trades	91	91
Trade Size	6,743,705	5,815,690
Trade Size / Offering Amt.	1.1%	1.2%
Largest Primary Trade	49,883,500	45,000,000
Largest Primary Trade / Offering Amt.	8.4%	10.0%
Primary Herfindahl	0.038	0.040
Minutes from first P1 to last P1	132	2
Minutes from first P1 to first S1	38	26
Minutes from last P1 to first S1	-67	-5
% P1 Trades Interdealer	5%	2%
% P1 Trades Customer Buy	95%	98%
% Customer Sell Volume of Largest Dealer	98%	100%

Table IV

Determinants of Syndicate Structure and Primary Market Outcomes

This table reports OLS regressions of syndicate structure and primary market outcomes on offering and syndicate characteristics and market conditions. Columns 1-3 report regression results for the investment grade sample and Columns 4-6 report regression results for the high yield sample. Variable definitions are provided in Appendix I. Dependent variable averages are shown above the regression results. Standard errors are estimated using the Huber-White sandwich estimator. ***, **, and * stand for statistical significance at the 1%, 5%, and 10% level, respectively.

	Investment Grade			High Yield		
	(1)	(2)	(3)	(4)	(5)	(6)
	# Book-runners	Minutes from first P1 to last P1	Primary Herfindahl	# Book-runners	Minutes from first P1 to last P1	Primary Herfindahl
Dependent Variable Average	4.9	225	5.3	4.5	126	6.0
Ln(Offering Amount)	1.164***	100.4***	-1.302***	1.392***	51.7***	-1.976***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Maturity	0.004	-0.5	-0.001	-0.043**	-0.9	-0.073*
	(0.308)	(0.151)	(0.894)	(0.015)	(0.488)	(0.070)
Industrial	-0.248**	-7.0	-0.362	-0.360*	-1.5	-0.543
	(0.024)	(0.444)	(0.163)	(0.088)	(0.907)	(0.189)
Multiple Tranche	0.949***	37.3***	-0.758***	0.403**	26.2*	-0.148
	(0.000)	(0.000)	(0.002)	(0.032)	(0.056)	(0.647)
144A Dummy	-0.532***	-44.6***	0.570*	-1.044***	-62.2***	0.018
	(0.001)	(0.000)	(0.062)	(0.000)	(0.000)	(0.953)
Public Stock Dummy	-0.649***	22.2***	-0.224	-0.548***	14.2	-0.101
	(0.000)	(0.005)	(0.236)	(0.000)	(0.110)	(0.739)
Credit Rating	0.351***	-29.6***	-0.591***	-0.106	-1.0	1.213***
	(0.000)	(0.000)	(0.000)	(0.216)	(0.877)	(0.000)
# Bookrunners		1.4	-0.117***		-2.5	-0.131***
		(0.384)	(0.007)		(0.157)	(0.006)
% Bookrunners in Top 10		-64.0***	0.289		-8.6	-0.606
		(0.000)	(0.721)		(0.565)	(0.255)
# Corporate Bond Offerings (t-1 to t-5)	0.008	-1.1**	0.013	-0.028*	3.3**	0.116***
	(0.140)	(0.036)	(0.256)	(0.075)	(0.015)	(0.008)
S.D. of Offering Date Prices for Issues (q-1)	-5.139***	1,713.1***	9.939***	-4.453**	674.2***	-3.568
	(0.000)	(0.000)	(0.002)	(0.011)	(0.000)	(0.513)
Ave. Corp Bond Index Return (t-1 to t-5)	-86.203**	-707.3	-118.117	43.232	287.0	-114.122
	(0.010)	(0.817)	(0.130)	(0.380)	(0.940)	(0.417)
Ave. Stock Market Index Return (t-1 to t-5)	-13.151	2,073.3**	-53.356**	8.475	6,979.1***	-56.825
	(0.147)	(0.029)	(0.032)	(0.601)	(0.000)	(0.256)
Ave. 3-Month Libor (t-1 to t-5)	0.280**	-38.4***	0.111	0.434**	-16.4	-1.055***
	(0.011)	(0.000)	(0.653)	(0.018)	(0.125)	(0.002)
Ave. Daily VIX (t-1 to t-5)	-0.027***	4.1***	-0.013	-0.056***	9.1***	0.058
	(0.000)	(0.000)	(0.494)	(0.000)	(0.000)	(0.152)
Constant	-10.632***	-1,386.2***	24.117***	-9.312***	-836.6***	26.433***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	3,611	3,611	3,611	1,962	1,962	1,962
Adjusted R2	0.191	0.271	0.0592	0.187	0.141	0.104

Table V
Overallocation and Pricing Statistics

This table reports median (unless otherwise denoted) overallocation and pricing statistics. To compute the overallocation we do the following: 1) retain all P1 buy trades (dealer sells to customer or another dealer), 2) exclude P1 interdealer trades between syndicate members, 3) divide these P1 trades by the offering amount. Statistics are reported for both investment grade and high yield samples. Variable definitions are provided in Appendix I.

	Investment Grade	High Yield
% Overallocation	100.5%	104.5%
% Overallocation (Mean)	101.4%	104.9%
$ Overallocation	2,500,000	19,719,500
$ Overallocation (Mean)	10,145,435	27,335,649
% Overallocation >= 100% & < 102%	70%	23%
% Overallocation > =102%	30%	77%
Offering Price	99.79	100.00
Offering Spread over Benchmark Treasury	122	443
Gross Spread	0.65%	1.50%

Table VI

Determinants of Overallocation

This table reports OLS regressions of overallocation on offering and syndicate characteristics and market conditions. We report regression results for the investment grade (columns 1-3) and high yield (columns 4-5) samples. Overallocation is a dummy variable for issues that are overallocated by at least 102%. Variable definitions are provided in Appendix I. Dependent variable averages are shown above the regression results. Standard errors are estimated using the Huber-White sandwich estimator. ***, **, and * stand for statistical significance at the 1%, 5%, and 10% level, respectively.

	Investment Grade			High Yield	
	(1)	(2)	(3)	(4)	(5)
	Overallocated Dummy				
Dependent Variable Average	0.305			0.771	
Ln(Offering Amount)	0.065***	0.087***	0.061***	0.076***	0.064***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Maturity	0.005***	0.002	0.004***	0.001	0.003
	(0.000)	(0.272)	(0.000)	(0.852)	(0.361)
Industrial	0.024	0.023	0.007	0.028	0.031
	(0.260)	(0.342)	(0.725)	(0.333)	(0.316)
Multiple Tranche	-0.051***	-0.029	-0.038**	-0.032	-0.028
	(0.006)	(0.165)	(0.042)	(0.239)	(0.324)
144A Dummy	-0.148***		-0.176***	-0.091***	-0.073***
	(0.000)		(0.000)	(0.001)	(0.009)
Public Stock Dummy	-0.004	-0.017	-0.000	0.007	0.004
	(0.838)	(0.411)	(0.985)	(0.734)	(0.858)
Credit Rating	0.009	-0.014	-0.021*	-0.002	0.010
	(0.421)	(0.325)	(0.097)	(0.871)	(0.567)
# Bookrunners	0.009***	0.007*	0.008**	0.013***	0.012***
	(0.006)	(0.072)	(0.026)	(0.001)	(0.003)
% Bookrunners in Top 10	0.033	0.075	0.031	0.022	-0.023
	(0.394)	(0.121)	(0.424)	(0.536)	(0.529)
Gross Spread		0.023***			
		(0.001)			
Offering Spread over Benchmark Treasury			0.063***		-0.004
			(0.000)		(0.588)
# Corporate Bond Offerings (t-1 to t-5)	0.000	-0.001	-0.001	0.005*	0.005*
	(0.828)	(0.657)	(0.611)	(0.084)	(0.092)
S.D. of Offering Date Prices for Issues (q-1)	1.351***	1.244***	1.343***	0.566*	0.685**
	(0.000)	(0.000)	(0.000)	(0.077)	(0.045)
Ave. Corp Bond Index Return (t-1 to t-5)	-18.599***	-11.472	-19.502***	-7.952	-3.918
	(0.007)	(0.148)	(0.005)	(0.364)	(0.671)
Ave. Stock Market Index Return (t-1 to t-5)	-7.278***	-5.301**	-7.976***	-2.347	-1.111
	(0.000)	(0.026)	(0.000)	(0.471)	(0.741)
Ave. 3-Month Libor (t-1 to t-5)	-0.010	-0.025	0.001	-0.025	-0.038
	(0.655)	(0.314)	(0.980)	(0.385)	(0.208)
Ave. VIX (t-1 to t-5)	0.004***	0.005***	0.002	-0.003	-0.003
	(0.007)	(0.004)	(0.147)	(0.265)	(0.273)
Constant	-0.994***	-1.293***	-0.866***	-0.364	-0.277
	(0.000)	(0.000)	(0.000)	(0.176)	(0.338)
Observations	3,611	2,969	3,538	1,962	1,752
Adjusted R2	0.0549	0.0487	0.0616	0.0338	0.0276

Table VII

Syndicate Secondary Market Trading Activity: First Month

This table reports secondary market trading activity over the first 21 days following the issue date where Day 1 is the offering date. Unless otherwise denoted, median statistics are reported. Statistics are reported for both the non-overallocated and overallocated (overallocation greater than or equal to 102%) samples. Panel A reports statistics for syndicate trading activities for the investment grade sample and Panel B reports statistics for lead underwriter trading activities (defined as the dealer who is the P1 allocator) for the high yield sample.

	Non-Overallocated				Overallocated			
	Day 1-2	Day 3-5	Day 6-21	Day 1-21	Day 1-2	Day 3-5	Day 6-21	Day 1-21
Panel A: Investment Grade Syndicate								
$ Overallotment					20,000,000	20,000,000	20,000,000	20,000,000
% Overallotment					3.20%	3.20%	3.20%	3.20%
% Overallotment Offset (mean)-Conditional on OA>0					78.87%	84.42%	88.26%	88.17%
% Issues 100% Offset-Conditional on OA>0					59.21%	70.35%	80.76%	80.76%
Signed Net Order Flow (Excl. Over/Under Allotment)	7,370,000	0	(1,025,000)	4,200,000	18,370,000	1,000,000	(925,000)	19,047,000
Signed Net Order Flow / Volume (Excl. Over/Under Allotment)	18%	0%	-3%	4%	34%	7%	-3%	13%
Cumulative Signed Net Order Flow (Incl. Over/Under Allotment)	5,400,000	5,200,000	2,140,000	2,140,000	(1,560,000)	(1,000)	(595,000)	(595,000)
Cum. Signed Net Order Flow / Volume (Incl. Over/Under Allotment)	13%	8%	2%	2%	-2%	0%	0%	0%
% Volume Buy from Customer	49%	39%	38%	44%	49%	39%	37%	43%
% Volume Interdealer Buy (w/ Non-Syndicate)	8%	5%	5%	8%	15%	11%	7%	13%
% Volume Buys	60%	50%	48%	52%	67%	54%	49%	57%
Panel B: High Yield Lead Bookrunner								
$ Overallotment					26,345,000	26,345,000	26,345,000	26,345,000
% Overallotment					5.74%	5.74%	5.74%	5.74%
% Overallotment Offset (mean)					68.66%	81.91%	93.63%	93.77%
% Issues 100% Offset					40.24%	55.21%	81.89%	82.09%
Signed Net Order Flow (Excl. Over/Under Allotment)	4,625,000	100,000	0	3,987,000	18,090,000	3,617,500	2,936,000	27,597,500
Signed Net Order Flow / Volume (Excl. Over/Under Allotment)	7%	1%	0%	4%	30%	30%	11%	25%
Cumulative Signed Net Order Flow (Incl. Over/Under Allotment)	2,314,500	2,350,000	1,803,500	1,803,500	(7,283,500)	(1,779,500)	830,500	830,500
Cum. Signed Net Order Flow / Volume (Incl. Over/Under Allotment)	4%	3%	1%	1%	-9%	-2%	1%	1%
% Volume Buy from Customer	48%	47%	47%	47%	48%	50%	50%	50%
% Volume Interdealer Buy (w/ Non-Syndicate)	5%	0%	0%	4%	16%	6%	2%	12%
% Volume Buys	54%	51%	50%	52%	65%	66%	56%	63%

Table VIII

Secondary Market Trading Activity: Dealer Capital Commitment

This table reports OLS regressions of dealer secondary market trading activity on offering and syndicate characteristics and market conditions. We focus on secondary market trading activity over the first 21 days following the issue date where Day 1 is the offering date. We report regression results for investment grade (columns 1-4) and high yield (columns 5-8) samples. In columns 1-2 and 5-6, the dependent variable is signed net order flow excluding overallocation (in 000s). The Syndicate/Lead dummy refers to the full syndicate for investment grade issues and the lead underwriter (defined as the P1 allocator) for high yield issues. Overallocated is a dummy variable for issues that are overallocated by at least 102%. Variable definitions are provided in Appendix I. Dependent variable averages are shown above the regression results. Standard errors clustered at the issue level. ***, **, and * stand for statistical significance at the 1%, 5%, and 10% level, respectively.

	Investment Grade				High Yield			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Signed Net Order Flow		% Volume Buys		Signed Net Order Flow		% Volume Buys	
	Day 1-2	Day 1-21	Day 1-2	Day 1-21	Day 1-2	Day 1-21	Day 1-2	Day 1-21
Dependent Variable Average	12,654	8,773	59.5	52.9	11,322	15,432	58.1	56.3
Syndicate/Lead Underwriter Dummy	3,719***	7,544***	6.629***	2.927***	4,721***	7,240***	6.202***	4.538***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Overallocated Dummy	-1,222**	-1,373**	-0.668**	0.041	-2,221***	-3,915***	-0.734*	-0.550*
	(0.027)	(0.023)	(0.032)	(0.813)	(0.000)	(0.000)	(0.096)	(0.064)
Syndicate/Lead x Overallocated	11,932***	16,007***	7.617***	5.176***	18,865***	31,656***	10.971***	10.266***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ln(Offering Amount)	6,452***	4,931***	1.133**	0.079	8,048***	16,596***	0.524	0.928***
	(0.000)	(0.000)	(0.015)	(0.783)	(0.000)	(0.000)	(0.151)	(0.006)
Maturity	151***	71***	0.037**	0.002	124	-23	-0.004	-0.056*
	(0.000)	(0.004)	(0.022)	(0.809)	(0.336)	(0.867)	(0.934)	(0.091)
Industrial	854	131	-1.184**	-1.109***	89	703	-0.346	-0.158
	(0.114)	(0.831)	(0.017)	(0.000)	(0.929)	(0.539)	(0.493)	(0.701)
Multiple Tranche	210	385	0.484	-0.055	-90	1,804	1.186***	1.045***
	(0.628)	(0.442)	(0.206)	(0.801)	(0.937)	(0.182)	(0.003)	(0.001)
144A Dummy	2,947***	6,358***	0.524	1.467***	1,631	2,849**	-0.231	-0.040
	(0.000)	(0.000)	(0.374)	(0.000)	(0.179)	(0.033)	(0.572)	(0.891)
Public Stock Dummy	-348	476	-0.041	0.448**	689	372	0.489	0.108
	(0.480)	(0.403)	(0.915)	(0.039)	(0.379)	(0.677)	(0.135)	(0.675)
Credit Rating	-356	286	-0.971***	-0.058	235	-180	-0.186	-0.512***
	(0.300)	(0.482)	(0.000)	(0.668)	(0.772)	(0.834)	(0.456)	(0.006)
# Bookrunners	-93	106	-0.115*	-0.034	-199	-124	0.075	0.138***
	(0.401)	(0.455)	(0.100)	(0.326)	(0.187)	(0.491)	(0.193)	(0.002)
% Bookrunners in Top 10	2,844**	1,403	1.811*	0.137	1,903	2,122	2.261***	1.412***
	(0.011)	(0.271)	(0.053)	(0.793)	(0.274)	(0.264)	(0.000)	(0.004)
# Primary Trades	88***	49***	-0.040***	-0.012***	37***	-29*	-0.045***	-0.048***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.005)	(0.061)	(0.000)	(0.000)
Primary Herfindahl	11,683***	5,596	11.928***	2.047	7,545**	5,473	14.615***	9.073***
	(0.002)	(0.221)	(0.001)	(0.446)	(0.050)	(0.278)	(0.000)	(0.002)
# Corporate Bond Offerings (t-1 to t-5)	-58**	-38	0.019	0.008	271*	159	0.056	0.008
	(0.050)	(0.276)	(0.420)	(0.578)	(0.093)	(0.347)	(0.248)	(0.832)
S.D. of Offering Date Prices for Issues (q-1)	43,150***	28,122***	1.556	-0.942	19,140*	27,405**	7.816	8.511**
	(0.000)	(0.001)	(0.746)	(0.721)	(0.058)	(0.017)	(0.115)	(0.025)
Ave. Corp Bond Index Return (t-1 to t-5)	-2,202	-152,921	-123.749	-61.293	491,901*	277,064	108.870	-14.743
	(0.991)	(0.520)	(0.396)	(0.475)	(0.061)	(0.379)	(0.514)	(0.896)
Ave. Stock Market Index Return (t-1 to t-5)	197,681***	106,839*	44.971	0.206	255,537***	117,868	72.083	31.208
	(0.000)	(0.083)	(0.297)	(0.993)	(0.001)	(0.241)	(0.208)	(0.410)
Ave. 3-Month Libor (t-1 to t-5)	229	2,410***	-0.465	0.069	822	1,615	1.559***	1.151***
	(0.725)	(0.001)	(0.384)	(0.804)	(0.458)	(0.233)	(0.002)	(0.002)
Ave. Daily VIX (t-1 to t-5)	-182***	-213***	-0.172***	-0.076***	-33	-142	0.084*	0.010
	(0.000)	(0.000)	(0.000)	(0.000)	(0.673)	(0.125)	(0.064)	(0.752)
Constant	-92,885***	-74,721***	49.555***	52.681***	-116,385***	-221,292***	42.847***	40.982***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	7,114	7,114	7,013	7,071	3,872	3,872	3,794	3,842
Adjusted R-squared	0.249	0.211	0.170	0.153	0.189	0.326	0.424	0.490

Table IX
Price Statistics

This table reports underpricing and return statistics for investment grade and high yield issues and for non-overallocated and overallocated issues (issues that are overallocated by at least 102%). Raw returns are computed as the return of the weighted-average price on day *n* (expressed as the sum of the flat price and accrued interest) relative to the offering price; we then subtract the cumulative index return over *n* days. For investment grade bonds we use the BofA Merrill Lynch U.S. Corporate Total Return Index and for high yield bonds we use the BofA Merrill Lynch U.S. High Yield Total Return Index. Underpricing statistics are based on medians and % Negative return statistics are based on means. We report Wilcoxon (t-test) *p*-Values based on tests of the difference between underpricing (% Negative Return) for non-overallocated and overallocated issues.

	Full Sample			Investment Grade			High Yield		
	Investment Grade	High Yield	Difference *p*-Value	Non-Overallocated	Overallocated	Difference *p*-Value	Non-Overallocated	Overallocated	Non-Overallocated
Underpricing-Day 1	0.28	0.88	<.0001	0.30	0.21	<.0001	1.29	0.80	<.0001
Underpricing-Day 2	0.34	0.99	<.0001	0.37	0.27	<.0001	1.50	0.87	<.0001
Underpricing-Day 5	0.41	1.21	<.0001	0.44	0.35	0.0022	1.59	1.05	<.0001
Underpricing-Day 21	0.57	1.66	<.0001	0.57	0.57	0.8034	2.41	1.50	<.0001
% Negative Day 1 Return	19.3%	5.6%	<.0001	17.5%	23.1%	0.0002	3.0%	6.4%	0.0014
% Negative Day 5 Return	24.0%	15.3%	<.0001	23.0%	26.3%	0.0529	9.9%	16.8%	0.0003

Table X
Underpricing

This table reports OLS regressions of underpricing and the propensity to trade below the offer price in the secondary market on high yield and overallocation indicator variables, offering and syndicate characteristics, primary allocation measures, and market conditions. Our underpricing measure is computed over the following days relative to the offering date: 1 (offering date), 2, 5, and 21. Overallocated is a dummy variable for issues that are overallocated by at least 102%. All variable definitions are provided in Appendix I. Dependent variable averages are shown above the regression results. Standard errors are estimated using the Huber-White sandwich estimator. ***, **, and * stand for statistical significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Underpricing-Day 1	Underpricing-Day 2	Underpricing-Day 5	Underpricing-Day 21	% Negative Day 1 Return	% Negative Day 5 Return
Dependent Variable Average	0.58	0.67	0.80	1.14	0.15	0.21
High Yield Dummy	0.302***	0.441***	0.663***	1.059***	-0.070***	-0.095***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.005)	(0.003)
Overallocated Dummy	-0.218***	-0.249***	-0.264***	-0.329***	0.049***	0.039***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.004)
Ln(Offering Amount)	-0.236***	-0.213***	-0.189***	-0.040	0.061***	0.086***
	(0.000)	(0.000)	(0.000)	(0.647)	(0.000)	(0.000)
Maturity	0.015***	0.015***	0.018***	0.043***	-0.005***	-0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.312)
Industrial	0.041**	-0.026	-0.059	-0.040	-0.022	0.029*
	(0.046)	(0.366)	(0.189)	(0.637)	(0.106)	(0.087)
Multiple Tranche	-0.056***	-0.050**	-0.001	0.023	0.031**	0.017
	(0.002)	(0.048)	(0.986)	(0.779)	(0.013)	(0.269)
144A Dummy	0.250***	0.262***	0.210***	0.289***	-0.075***	0.016
	(0.000)	(0.000)	(0.000)	(0.004)	(0.000)	(0.380)
Public Stock Dummy	-0.033*	-0.049	-0.096***	-0.196***	0.006	0.036***
	(0.067)	(0.165)	(0.009)	(0.006)	(0.593)	(0.006)
Credit Rating	0.099***	0.072***	0.063**	0.157***	-0.023***	-0.020**
	(0.000)	(0.000)	(0.011)	(0.001)	(0.002)	(0.035)
# Bookrunners	-0.015***	-0.012**	-0.016**	-0.027**	-0.000	0.006**
	(0.000)	(0.017)	(0.027)	(0.049)	(0.846)	(0.038)
% Bookrunners in Top 10	0.060	0.002	0.080	0.044	0.010	0.058**
	(0.129)	(0.978)	(0.334)	(0.763)	(0.598)	(0.027)
# Primary Trades	0.005***	0.006***	0.005***	0.005***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Primary Herfindahl	0.001	0.124	0.134	1.216	0.244**	0.247*
	(0.996)	(0.665)	(0.768)	(0.178)	(0.019)	(0.074)
# Corporate Bond Offerings (t-1 to t-5)	0.000	-0.000	0.001	0.013***	-0.002***	-0.002*
	(0.691)	(0.750)	(0.616)	(0.004)	(0.006)	(0.055)
S.D. of Offering Date Prices for Issues (q-1)	0.751***	0.141	-0.301	-3.306***	-0.003	0.305
	(0.002)	(0.716)	(0.549)	(0.001)	(0.984)	(0.114)
Ave. Corp Bond Index Return (t-1 to t-5)	-9.399	-22.491	-16.066	-39.571	-7.809*	-2.264
	(0.199)	(0.112)	(0.265)	(0.144)	(0.079)	(0.677)
Ave. Stock Market Index Return (t-1 to t-5)	-6.406**	-12.658***	-17.310***	-54.425***	5.915***	4.655***
	(0.011)	(0.000)	(0.000)	(0.000)	(0.000)	(0.005)
Ave. 3-Month Libor (t-1 to t-5)	-0.071***	-0.108***	-0.147***	-0.435***	0.033**	0.044**
	(0.002)	(0.001)	(0.002)	(0.000)	(0.028)	(0.023)
Ave. Daily VIX (t-1 to t-5)	0.005***	0.009***	0.027***	0.082***	0.000	-0.003**
	(0.005)	(0.000)	(0.000)	(0.000)	(0.932)	(0.022)
Constant	2.350***	2.346***	2.038***	-0.445	-0.370**	-0.828***
	(0.000)	(0.000)	(0.001)	(0.685)	(0.018)	(0.000)
Observations	5,300	5,317	4,539	3,924	5,300	4,539
Adjusted R-squared	0.344	0.164	0.146	0.133	0.0712	0.0336

Table XI
Dealer Profit Analysis

This table reports dealer spreads and profits for non-overallocated and overallocated issues (issues that are overallocated by at least 102%). Panel A provides statistics for the investment grade sample and Panel B provides statistics for the high yield sample. Panel A.1 provides statistics for the members of the underwriting syndicate and Panel B.1 provides statistics for the lead underwriter (defined as the dealer who is the P1 allocator). Panels A.2 and B.2 provide statistics for dealers that are not part of the underwriting syndicate. Statistics are computed using trade data between the offering date and 21 days subsequent to the offering date. All statistics are computed using the sample of issues with available gross spread data. We report Wilcoxon *p*-Values based on tests of the difference between the non-overallocated and overallocated issues with exception to the % Negative Spread for which we compute a *t*-test.

Panel A.1: Investment Grade - Syndicate Profit

	Non-Overallocated				Overallocated				Difference
	Mean	Q1	Median	Q3	Mean	Q1	Median	Q3	*p*-Value
W.A. Dealer Sell Price / Offer Price	1.0057	1.0007	1.0041	1.0093	1.0047	0.9993	1.0039	1.0091	0.0226
W.A. Dealer Buy Price / Offer Price	1.0046	1.0003	1.0030	1.0076	1.0037	0.9994	1.0029	1.0075	0.0276
W.A. Spread / Offer Price	0.106%	-0.016%	0.079%	0.216%	0.102%	-0.062%	0.079%	0.265%	0.3867
% Negative Spread	29%				35%				0.0017
Profit/Loss from Round-Trip Volume	76,202	(5,024)	27,981	109,418	83,091	(30,348)	33,576	167,387	0.6700
Profit/Loss from Covering Overallotment	(10,084)	(1,810)	0	0	(75,393)	(108,606)	(20,019)	2,541	<.0001
Total Profit	66,118	(8,086)	24,514	102,350	7,698	(81,601)	4,005	112,915	<.0001
Dollar Gross Spread	3,847,041	1,950,000	3,000,000	4,375,000	4,352,214	2,500,000	3,500,000	5,250,000	<.0001
Total Profit + Fee	3,913,159	1,972,347	2,995,546	4,563,643	4,359,912	2,428,928	3,511,901	5,189,579	<.0001
Gross Spread (% of Proceeds)	0.60%	0.45%	0.65%	0.65%	0.65%	0.45%	0.65%	0.88%	<.0001
# Observations w/ Gross Spread Data	1,959				968				
% Observations w/ Gross Spread Data	79%				89%				

Panel A.2: Investment Grade - Non-Syndicate Profit

	Non-Overallocated				Overallocated				Difference
	Mean	Q1	Median	Q3	Mean	Q1	Median	Q3	*p*-Value
W.A. Dealer Sell Price / Offer Price	1.0056	1.0010	1.0042	1.0092	1.0047	0.9994	1.0039	1.0096	0.0176
W.A. Dealer Buy Price / Offer Price	1.0043	1.0003	1.0031	1.0071	1.0034	0.9990	1.0027	1.0074	0.0048
W.A. Spread / Offer Price	0.124%	0.025%	0.098%	0.202%	0.132%	0.009%	0.106%	0.223%	0.3483
% Negative Spread	20%				23%				0.0728
Profit/Loss from Round-Trip Volume	124,186	7,576	60,211	180,013	127,463	5,969	79,831	219,496	0.0240

Panel B.1: High Yield - Lead Bookrunner Profit

	Non-Overallocated				Overallocated				Difference
	Mean	Q1	Median	Q3	Mean	Q1	Median	Q3	*p*-Value
W.A. Dealer Sell Price / Offer Price	1.0138	1.0081	1.0143	1.0216	1.0110	1.0046	1.0105	1.0175	0.0633
W.A. Dealer Buy Price / Offer Price	1.0119	1.0056	1.0108	1.0194	1.0095	1.0037	1.0085	1.0151	0.0654
W.A. Spread / Offer Price	0.189%	0.074%	0.217%	0.337%	0.151%	0.010%	0.175%	0.330%	0.4751
% Negative Spread	19%				24%				0.4691
Profit/Loss from Round-Trip Volume	127,993	22,224	84,162	189,904	61,844	1,229	64,793	151,270	0.0632
Profit/Loss from Covering Overallotment	(16,691)	(30,034)	(3,741)	0	(307,922)	(437,886)	(172,181)	(61,349)	<.0001
Total Profit	111,302	12,619	69,797	174,800	(246,078)	(385,563)	(107,498)	13,832	<.0001
Dollar Gross Spread	7,728,226	2,812,500	5,820,000	10,000,000	8,083,995	5,000,000	6,750,000	10,500,000	0.0693
Total Profit + Fee	7,839,528	2,853,925	5,748,560	10,149,155	7,837,917	4,910,931	6,490,783	9,789,482	0.1845
Gross Spread (% of Proceeds)	1.37%	1.00%	1.46%	1.75%	1.43%	1.25%	1.50%	1.75%	0.2770
# Observations w/ Gross Spread Data	47				329				
% Observations w/ Gross Spread Data	11%				22%				

Panel B.2: High Yield - Non-Syndicate Profit

	Non-Overallocated				Overallocated				Difference
	Mean	Q1	Median	Q3	Mean	Q1	Median	Q3	*p*-Value
W.A. Dealer Sell Price / Offer Price	1.0142	1.0077	1.0134	1.0202	1.0100	1.0040	1.0089	1.0163	0.0087
W.A. Dealer Buy Price / Offer Price	1.0127	1.0067	1.0114	1.0187	1.0085	1.0027	1.0075	1.0144	0.0050
W.A. Spread / Offer Price	0.151%	0.097%	0.138%	0.202%	0.147%	0.077%	0.148%	0.219%	0.9280
% Negative Spread	6%				13%				0.1192
Profit/Loss from Round-Trip Volume	144,650	61,046	130,205	190,670	148,988	51,251	125,221	231,263	0.9177

Table XII

Underwriter Activity and Secondary Market Quality

This table reports OLS regressions of secondary market quality measures on overallocation, syndicate/lead left trading activities, offering and syndicate characteristics, and market conditions. Our measures are computed over the first 21 days following the issue date. Panel A reports results for investment grade and Panel B reports results for high yield. The Syndicate/Lead dummy refers to the full syndicate for investment grade issues and the lead underwriter (defined as the P1 allocator) for high yield issues. Overallocation is a dummy variable for issues that are overallocated by at least 102%. 'Syndicate/Lead Left Net Order Flow' is the signed order flow of syndicate members/lead left scaled by volume over the 21-day post-issue period as reported in Table VIII. 'Retail' is defined as trades less than or equal to $100,000 and 'Institutional' is defined as trades of at least $1 million. We compute the percentage of all trades that are retail-sized trades and the signed net order flow scaled by volume for both retail and institutional-sized trades. All other variable definitions are provided in Appendix I. All regressions include the six market condition controls utilized in Table VIII. Dependent variable averages are shown above the regression results. Standard errors are estimated using the Huber-White sandwich estimator. ***, **, and * stand for statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Investment Grade								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	W.A. Spread (bp)		% Trades Retail (%)		Order Flow-Institutions		Net Order Flow-Retail	
Dependent Variable Average	9.8		22.5		-0.08		0.48	
Overallocated Dummy	-2.141***		3.008***		-0.0688***		0.0491***	
	(0.001)		(0.000)		(0.000)		(0.002)	
Syndicate Net Order Flow x Overallocated		-8.980***		8.639***		-0.6061***		0.0994
		(0.001)		(0.000)		(0.000)		(0.141)
Syndicate Net Order Flow x Non-Overalloc.		-2.818		3.504*		-0.5519***		0.0470
		(0.358)		(0.072)		(0.000)		(0.445)
Ln(Offering Amount)	-4.226***	-4.279***	2.507***	2.657***	-0.0200**	-0.0184**	0.1411***	0.1440***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.030)	(0.016)	(0.000)	(0.000)
Maturity	0.249***	0.243***	-0.684***	-0.674***	0.0011***	0.0009***	-0.0118***	-0.0116***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Industrial	-0.174	-0.338	3.249***	3.440***	0.0082	-0.0063	0.0559**	0.0586**
	(0.832)	(0.679)	(0.000)	(0.000)	(0.319)	(0.317)	(0.017)	(0.013)
Multiple Tranche	-2.020***	-2.029***	0.454	0.426	-0.0056	-0.0088*	0.0329*	0.0319*
	(0.004)	(0.004)	(0.478)	(0.509)	(0.367)	(0.058)	(0.085)	(0.095)
144A Dummy	1.706	1.953*	-22.974***	-23.385***	-0.0100	0.0050	-0.5824***	-0.5895***
	(0.120)	(0.076)	(0.000)	(0.000)	(0.306)	(0.513)	(0.000)	(0.000)
Public Stock Dummy	0.962	1.001	2.756***	2.706***	-0.0097	-0.0036	0.0323*	0.0316*
	(0.126)	(0.113)	(0.000)	(0.000)	(0.109)	(0.419)	(0.089)	(0.096)
Credit Rating	0.005	-0.023	-1.411***	-1.374***	0.0030	0.0018	-0.0426***	-0.0420***
	(0.989)	(0.953)	(0.000)	(0.000)	(0.457)	(0.523)	(0.000)	(0.000)
# Bookrunners	-0.034	-0.052	-0.113	-0.089	-0.0014	-0.0018**	-0.0041	-0.0037
	(0.749)	(0.624)	(0.303)	(0.413)	(0.156)	(0.010)	(0.206)	(0.255)
% Bookrunners in Top 10	3.815**	3.940**	0.301	0.198	0.0185	0.0307***	-0.0127	-0.0134
	(0.039)	(0.034)	(0.832)	(0.889)	(0.229)	(0.010)	(0.761)	(0.749)
# Primary Trades	0.027***	0.025***	0.010	0.012	0.0005***	0.0003***	-0.0014***	-0.0013***
	(0.001)	(0.003)	(0.297)	(0.224)	(0.000)	(0.000)	(0.000)	(0.000)
Primary Herfindahl	-4.188	-4.047	15.293**	15.449**	-0.0979	-0.0417	-0.1044	-0.0976
	(0.613)	(0.622)	(0.045)	(0.042)	(0.247)	(0.518)	(0.520)	(0.549)
Constant	60.385***	62.044***	-7.065	-10.154	0.1680	0.2340**	-1.1857***	-1.1806***
	(0.000)	(0.000)	(0.435)	(0.261)	(0.164)	(0.021)	(0.000)	(0.000)
Market Controls	YES	YES	YES	YES	YES	YES	YES	YES
Observations	3,498	3,498	3,547	3,547	3,557	3,557	3,531	3,557
Adjusted R-squared	0.0464	0.0473	0.325	0.323	0.0580	0.475	0.196	0.194

	Panel B: High Yield							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	W.A. Spread (bp)		% Trades Retail (%)		Order Flow-Institutions		Net Order Flow-Retail	
Dependent Variable Average	21.4		9.7		-0.12		-0.11	
Overallocated Dummy	-3.643**		1.929***		-0.0974***		-0.0315	
	(0.034)		(0.000)		(0.000)		(0.309)	
Lead Left Net Order Flow x Overallocated		0.968		3.690***		-0.5507***		-0.1400**
		(0.900)		(0.003)		(0.000)		(0.038)
Lead Left Net Order Flow x Non-Overalloc.		-17.627		2.040		-0.6779***		0.0176
		(0.415)		(0.309)		(0.000)		(0.885)
Ln(Offering Amount)	-10.963***	-11.563***	-1.854***	-1.920***	-0.0216**	0.0099	0.3006***	0.3100***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.019)	(0.110)	(0.000)	(0.000)
Maturity	0.127	0.117	-0.135**	-0.131**	0.0019**	0.0011*	0.0001	0.0001
	(0.517)	(0.559)	(0.021)	(0.026)	(0.033)	(0.094)	(0.988)	(0.987)
Industrial	-2.330	-2.337	2.241***	2.228***	0.0065	0.0077	-0.0190	-0.0170
	(0.336)	(0.342)	(0.001)	(0.001)	(0.532)	(0.192)	(0.652)	(0.687)
Multiple Tranche	-5.286***	-5.041***	0.447	0.327	-0.0193**	-0.0025	0.0498	0.0523
	(0.001)	(0.002)	(0.580)	(0.688)	(0.012)	(0.646)	(0.198)	(0.175)
144A Dummy	1.226	1.765	-20.037***	-20.140***	0.0072	0.0078	-0.6136***	-0.6144***
	(0.446)	(0.273)	(0.000)	(0.000)	(0.353)	(0.163)	(0.000)	(0.000)
Public Stock Dummy	-2.934**	-3.105**	2.277***	2.298***	-0.0017	-0.0026	0.0117	0.0122
	(0.015)	(0.012)	(0.000)	(0.000)	(0.806)	(0.544)	(0.678)	(0.663)
Credit Rating	0.188	0.282	-0.863**	-0.800**	0.0076	-0.0042	0.0767***	0.0739***
	(0.870)	(0.808)	(0.019)	(0.031)	(0.167)	(0.234)	(0.000)	(0.001)
# Bookrunners	-0.563***	-0.627***	-0.102	-0.102	-0.0029**	-0.0004	-0.0055	-0.0050
	(0.010)	(0.008)	(0.252)	(0.257)	(0.046)	(0.660)	(0.350)	(0.400)
% Bookrunners in Top 10	0.995	0.913	0.211	0.106	-0.0196	0.0006	-0.0063	-0.0014
	(0.711)	(0.735)	(0.798)	(0.897)	(0.154)	(0.939)	(0.898)	(0.977)
# Primary Trades	0.075***	0.080***	0.030***	0.035***	0.0016***	0.0004***	-0.0043***	-0.0046***
	(0.000)	(0.004)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Primary Herfindahl	7.142	8.083	5.583	4.456	-0.1326*	0.0406	-0.2008	-0.1814
	(0.524)	(0.515)	(0.164)	(0.265)	(0.073)	(0.375)	(0.356)	(0.405)
Constant	169.797***	174.229***	52.553***	53.744***	0.0971	-0.1824**	-3.2598***	-3.3647***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.453)	(0.022)	(0.000)	(0.000)
Market Controls	YES	YES	YES	YES	YES	YES	YES	YES
Observations	1,886	1,886	1,930	1,930	1,936	1,936	1,936	1,936
Adjusted R-squared	0.0533	0.0526	0.403	0.402	0.231	0.683	0.195	0.196

Appendix for

Syndicate Structure, Primary Allocations, and Secondary Market Outcomes in Corporate Bond Offerings

This Appendix provides the following tables. Appendix I provides detailed variable definitions. Appendix II provides primary market trading statistics for the full sample of 5,573 issues. Appendix III reports OLS regressions of syndicate structure and primary market outcomes on offering and syndicate characteristics and market conditions for the full sample of 5,573 issues. Appendix IV provides overallocation statistics for the full sample of 5,573 issues. Appendix V reports OLS regressions of overallocation on offering and syndicate characteristics and market conditions for the full sample of 5,573 issues. Appendix VI reports secondary market trading activity over the first 21 days following the issue date for the full sample of 5,573 issues. Appendix VII is a companion table to Table XI, except trading profits are computed for the full sample of issues rather than conditioned on the issues with reported gross spread data.

Appendix I
Variable Definitions

Variable	Definition
144A Dummy	Dummy variable for non-public 144A offerings.
Ave. 3-Month Libor (t-1 to t-5)	Average 3-Month Libor in the week prior to the offering date.
Ave. Corp Bond Index Return (t-1 to t-5)	Average BofA Merrill Lynch U.S. Corporate Total Return Index return in the week prior to the offering.
Ave. Daily VIX (t-1 to t-5)	Average VIX level in the week prior to the offering.
Ave. Stock Market Index Return (t-1 to t-5)	Average S&P 500 stock index return in the week prior to the offering.
Bookrunners in Top 10	Of the 34 large dealers for which we can link syndicate names in SDC to TRACE transactions, this is the top 10 bookrunners by issue volume over the full 2010 to 2018 sample period.
Credit Rating	Credit rating data is from FISD and range from 1 (highest credit quality issuers) to 7 (lowest credit quality issuers). We use Moody ratings, except when the Moody rating is unavailable (i.e., set to 99 or reported after the issue date); in these instances we use the Standard & Poor rating. For issuers without credit rating data, we assign investment grade issues a 4 and high yield issues a 7.
Cumulative Signed Net Order Flow (Incl. Overallocation)	Cumulative signed net order flow cumulates both the overallocation (the underwriter's short after the issue) and signed order flow over the period from secondary market trading. Signed net order flow is the difference between secondary market purchases and sales during the period. This measure is both reported in dollars and scaled by volume during the period.
Gross Spread	The underwriting commission; the difference between the price that the issuer receives for its securities and the price that investors pay for them. Data is obtained from Mergent FISD. The gross spread is reported both in dollar amounts and as a percentage of the offering amount.
Industrial	Dummy variable for industrial industry issues based on Mergent FISD Industry Group.
Issues 100% Offset	This measure is computed only for issues with positive overallocation. We calculate the signed net order flow of the syndicate for investment grade (lead left for high yield) issues, which is the difference between secondary market purchases and sales during the period. The percent offset is the signed order flow divided by the dollar overallocation if net buys > 0, otherwise the percent offset is set to zero. If the syndicate/lead left does not trade during the period, percent offset is set to zero. Percent offset is bound between 0 and 1. Percent offset remains at 100% once the overallocation is fully offset (covered) during a period.
Minutes from first P1 to first S1	Total time in minutes from the first primary placement ("P1") transaction to the first secondary market transaction.
Minutes from first P1 to last P1	Total time in minutes to distribute the primary placement ("P1") transactions; the time between the first P1 and last P1 transaction.
Minutes from last P1 to first S1	Total time in minutes from the last primary placement ("P1") transaction to the first secondary market transaction.
Multiple Tranche	Dummy variable if the issue is part of a larger tranched issue.
Negative Day Return	Negative Day Return is set to 1 when underpricing < 0, otherwise 0.
Number of Bookrunners	Number of bookrunners for the issue from SDC.
Number of Corporate Bond Offerings (t-1 to t-5)	Number of corporate bond offerings in the week prior to the issue. Totals are based on investment grade offerings for investment grade issues and high yield offerings for high yield issues.
Number of Managers	Number of managers for the issue from SDC.
Number Primary Trades	Number of primary placement ("P1") transactions in the enhanced TRACE data for each issue.
Offering Spread over Benchmark Treasury	Yield spread over a comparable maturity treasury at offering. Data obtained from SDC.
Overallocation	We first sum dealer sell quantities (dealer sells to a customer or to another dealer) across primary placement ("P1") transactions in the enhanced TRACE data; P1 interdealer trades between syndicate members are excluded. Dollar overallocation is the difference between the sum of the dealer sell quantities and the offering amount. Percent overallocation is dollar overallocation scaled by the offering amount.
Overallocation Dummy	Dummy variable for overallocation greater than or equal to 102%.
Percent Total SDC Allocation - Bookrunners	Based on SDC, the portion of the offering amount allocated to all bookrunners relative to the total allocated to bookrunners and all managers.

Variable	Definition
Percent Volume Buy from Customer	Percent of dealer volume that is secondary market purchases from customers.
Percent Volume Buys	Percent of dealer volume that is secondary market purchases from customers or in the interdealer market.
Percent Volume Interdealer Buy (w/ Non-Syndicate)	Percent of dealer volume that is secondary market purchases in the interdealer market. Interdealer trades with other syndicate members are not included.
Primary Herfindahl	For each P1 trade *i*, the sum of each (P1 trade$_i$/total P1 trades)^2.
Profit/Loss from Covering Overallocation	If the dollar overallocation is positive and syndicate/lead dealers are net buyers, the profit/loss from covering the overallocation is: minimum (dollar overallocation, net order flow) * (offer price – weighted average buy price). Once the overallocation has been fully covered, this measure is set to zero. If dealers are net sellers, this measure is set to zero. If the dollar overallocation is negative, this measure is set to zero.
Profit/Loss from Round-Trip Volume	Round-trip volume is the minimum of total purchases and total sales over a period. Trading profits/losses from round-trip volume is the weighted average spread for the syndicate/lead left multiplied by round-trip volume.
Public Stock Dummy	Dummy variable for issuers with publicly traded stock.
S.D. of Offering Date Prices for Issues (q-1)	Median standard deviation of secondary market prices on the offering date and day after the offering date for offerings in the previous quarter. This measure is based on investment grade offerings for investment grade issues and high yield offerings for high yield issues.
SDC Allocation	Based on SDC data, the portion of the offering amount allocated to bookrunners and managers. This variable is reported both in dollar amounts for each bookrunner/manager (in millions) and a percent allocation which is the bookrunner or manager allocation amount scaled by issue size.
SDC Allocation - Bookrunner	Based on SDC data, the portion of the offering amount allocated to all bookrunners. This variable is reported both in dollar amounts for each bookrunner (in millions) and a percent allocation which is the bookrunner allocation amount scaled by the sum of all bookrunner allocation amounts.
SDC Allocation - Largest Allocation	The largest bookrunner percent and dollar SDC allocation amount in the issue.
SDC Allocation Herfindahl	This is the sum of the (percent allocation * percent allocation) across all bookrunner/managers. We compute this measure for both all bookrunners and managers and for bookrunners only.
Signed or Absolute Net Order Flow (Excl. Overallocation)	We calculate the signed net order flow of the syndicate for investment grade (lead left for high yield) issues, which is the difference between secondary market purchases and sales during the period. This measure does not incorporate the overallocation (the underwriter's short after the issue). This measure is both reported in dollars and scaled by volume during the period. Absolute net order flow is the absolute value of the signed net order flow.
Total Profit	Total profit is the profit/loss from round-trip trading + profit/loss from covering overallocation.
Underpricing	Raw returns are computed as the return of the weighted-average price on day *n* (expressed as the sum of the flat price and accrued interest) relative to the offering price; we then subtract the cumulative index return over *n* days. For investment grade bonds we use the BofA Merrill Lynch U.S. Corporate Total Return Index and for high yield bonds we use the BofA Merrill Lynch U.S. High Yield Total Return Index. We compute underpricing for day n = 1, 2, 5, and 21.
W.A. Dealer Buy Price / Offer Price	Volume-weighted average dealer buy price for the period scaled by the offering price.
W.A. Dealer Sell Price / Offer Price	Volume-weighted average dealer sell price for the period scaled by the offering price.
W.A. Spread / Offer Price	Difference between the volume-weighted average dealer sell price and the volume-weighted average dealer buy price scaled by the offering price.

Appendix II
Primary Market Trading - Full Sample

This table provides primary market trading statistics for the full sample of 5,573 issues. Panel A provides mean statistics on the timing of primary market trades. Panel B provides median primary market statistics. Variable definitions are provided in Appendix I.

Panel A: Timing of Primary Market Trades	
Before 9:30am	2%
9:30am - 1pm	5%
1pm - 4:30pm	69%
After 4:30pm	24%
Panel B: Primary Market Statistics	
Offering Price	99.90
# Primary Trades	91
Trade Size	6,481,774
Trade Size / Offering Amt.	1.2%
Largest Primary Trade	49,787,500
Largest Primary Trade / Offering Amt.	9.0%
Primary Herfindahl	0.039
Minutes from first P1 to last P1	92
Minutes from first P1 to first S1	33
Minutes from last P1 to first S1	-50
% P1 Trades Interdealer	3%
% P1 Trades Customer Buy	96%
% Customer Sell Volume of Largest Dealer	99%

Appendix III

Determinants of Syndicate Structure and Primary Market Outcomes - Full Sample

This table reports OLS regressions of syndicate structure and primary market outcomes on offering and syndicate characteristics and market conditions. These results are based on the full sample of 5,573 issues. Variable definitions are provided in Appendix I. In Column 3, BR refers to 'bookrunner'. Dependent variable averages are shown above the regression results. Standard errors are estimated using the Huber-White sandwich estimator. ***, **, and * stand for statistical significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)
	# Book-runners	Minutes from first P1 to last P1	SDC Allocation Herfindahl - BR	Primary Herfindahl
Dependent Variable Average	4.7	190.3	0.27	5.6
Ln(Offering Amount)	1.264***	82.4***	-0.052***	-1.567***
	(0.000)	(0.000)	(0.000)	(0.000)
Maturity	-0.001	-0.3	-0.000	-0.004
	(0.885)	(0.283)	(0.102)	(0.661)
Industrial	-0.299***	3.2	0.026***	-0.372*
	(0.002)	(0.662)	(0.000)	(0.074)
Multiple Tranche	0.745***	44.2***	-0.040***	-0.515**
	(0.000)	(0.000)	(0.000)	(0.011)
144A Dummy	-0.605***	-61.1***	0.044	0.463**
	(0.000)	(0.000)	(0.137)	(0.028)
Public Stock Dummy	-0.571***	16.8***	0.029***	-0.222
	(0.000)	(0.004)	(0.000)	(0.175)
Credit Rating	0.334***	-36.0***	-0.011***	-0.184
	(0.000)	(0.000)	(0.000)	(0.114)
# Bookrunners		-1.4		-0.151***
		(0.220)		(0.000)
% Bookrunners in Top 10		-37.6***		-0.062
		(0.001)		(0.896)
# Corporate Bond Offerings (t-1 to t-5)	-0.000	-0.2	-0.000	0.029***
	(0.971)	(0.637)	(0.112)	(0.007)
S.D. of Offering Date Prices for Issues (q-1)	-2.512***	1,047.0***	0.252***	3.456
	(0.001)	(0.000)	(0.000)	(0.110)
Ave. Corp Bond Index Return (t-1 to t-5)	-50.125*	250.5	2.701	-112.062
	(0.074)	(0.917)	(0.148)	(0.104)
Ave. Stock Market Index Return (t-1 to t-5)	-7.217	3,769.7***	0.274	-58.302**
	(0.361)	(0.000)	(0.629)	(0.012)
Ave. 3-Month Libor (t-1 to t-5)	0.426***	-46.9***	-0.010*	-0.405**
	(0.000)	(0.000)	(0.079)	(0.031)
Ave. Daily VIX (t-1 to t-5)	-0.042***	6.5***	0.000	0.012
	(0.000)	(0.000)	(0.645)	(0.438)
Constant	-11.923***	-1,049.8***	0.949***	27.299***
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	5,573	5,573	2,877	5,573
Adjusted R2	0.181	0.245	0.136	0.0658

Appendix IV
Overallocation and Pricing Statistics - Full Sample

This table provides median overallocation and pricing statistics for the the full sample of 5,573 issues. To compute the overallocation we do the following: 1) retain all P1 buy trades (dealer sells to customer or another dealer), 2) exclude P1 interdealer trades between syndicate members, 3) divide these P1 trades by the offering amount. Variable definitions are provided in Appendix I.

% Overallocation	101.5%
% Overallocation (Mean)	102.7%
$ Overallocation	7,700,000
$ Overallocation (Mean)	16,197,328
% Overallocation >= 100% & < 102%	53%
% Overallocation > =102%	47%
Offering Price	99.89
Offering Spread over Benchmark Treasury	165
Gross Spread	0.65%

Appendix V

Determinants of Overallocation - Full Sample

This table reports OLS regressions of overallocation on offering and syndicate characteristics and market conditions for the full sample of 5,573 issues. Overallocation is a dummy variable for issues that are overallocated by at least 102%. Variable definitions are provided in Appendix I. Dependent variable averages are shown above the regression results. Standard errors are estimated using the Huber-White sandwich estimator. ***, **, and * stand for statistical significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)
	Overallocated Dummy		
Dependent Variable Average		0.47	
Ln(Offering Amount)	0.075***	0.088***	0.075***
	(0.000)	(0.000)	(0.000)
Maturity	0.004***	0.001	0.004***
	(0.000)	(0.329)	(0.000)
Industrial	0.021	0.026	0.013
	(0.212)	(0.245)	(0.442)
Multiple Tranche	-0.084***	-0.050**	-0.078***
	(0.000)	(0.011)	(0.000)
144A Dummy	-0.050***		-0.064***
	(0.004)		(0.000)
Public Stock Dummy	0.011	-0.006	0.011
	(0.409)	(0.749)	(0.426)
Credit Rating	0.072***	0.016	0.055***
	(0.000)	(0.184)	(0.000)
# Bookrunners	0.014***	0.010***	0.013***
	(0.000)	(0.005)	(0.000)
% Bookrunners in Top 10	0.055**	0.095**	0.032
	(0.033)	(0.025)	(0.245)
Gross Spread		0.025***	
		(0.000)	
Offering Spread over Benchmark Treasury			0.019***
			(0.001)
# Corporate Bond Offerings (t-1 to t-5)	-0.003***	-0.002	-0.003***
	(0.009)	(0.123)	(0.005)
S.D. of Offering Date Prices for Issues (q-1)	2.543***	1.850***	2.470***
	(0.000)	(0.000)	(0.000)
Ave. Corp Bond Index Return (t-1 to t-5)	-22.592***	-17.056**	-22.103***
	(0.000)	(0.019)	(0.000)
Ave. Stock Market Index Return (t-1 to t-5)	-7.333***	-5.887***	-7.205***
	(0.000)	(0.008)	(0.000)
Ave. 3-Month Libor (t-1 to t-5)	0.041**	0.011	0.039**
	(0.016)	(0.623)	(0.026)
Ave. VIX (t-1 to t-5)	-0.003*	0.002	-0.003**
	(0.054)	(0.132)	(0.023)
Constant	-1.456***	-1.505***	-1.385***
	(0.000)	(0.000)	(0.000)
Observations	5,573	3,351	5,290
Adjusted R2	0.206	0.151	0.211

Appendix VI

Syndicate and Lead Bookrunner Secondary Market Trading Activity: First Month - Full Sample

This table reports secondary market trading activity over the first 21 days following the issue date where Day 1 is the offering date for the full sample of 5,573 issues. Unless otherwise denoted, median statistics are reported. Statistics are reported for both the non-overallocated and overallocated (overallocation greater than or equal to 102%) samples. Variable definitions are provided in Appendix I.

	Non-Overallocated				Overallocated			
	Day 1-2	Day 3-5	Day 6-21	Day 1-21	Day 1-2	Day 3-5	Day 6-21	Day 1-21
$ Overallotment					23,227,500	23,227,500	23,227,500	23,227,500
% Overallotment					4.51%	4.51%	4.51%	4.51%
% Overallotment Offset (mean)-Conditional on OA>0					72.96%	82.96%	91.37%	91.41%
% Issues 100% Offset-Conditional on OA>0					48.22%	61.58%	81.41%	81.53%
Signed Net Order Flow (Excl. Overallocation)	6,750,000	0	(809,000)	4,130,000	18,218,000	2,787,500	1,319,000	23,777,500
Signed Net Order Flow / Volume (Excl. Overallocation)	16%	0%	-3%	4%	32%	18%	4%	20%
Cumulative Signed Net Order Flow (Incl. Overallocation)	4,590,000	4,390,000	2,000,000	2,000,000	(4,507,500)	(1,077,500)	495,000	495,000
Cum. Signed Net Order Flow / Volume (Incl. Overallocation)	10%	7%	2%	2%	-6%	-1%	0%	0%
% Volume Buy from Customer	49%	40%	40%	44%	49%	45%	46%	46%
% Volume Interdealer Buy (w/ Non-Syndicate)	8%	4%	4%	8%	16%	8%	4%	13%
% Volume Buys	58%	50%	48%	52%	66%	60%	52%	60%

Appendix VII

Dealer Profit Analysis - All Issues (Unconditional on Gross Spread Data)

This is a companion table to Table XI except trading profits are computed for the full sample of issues rather than conditioned on the issues with reported gross spread data. Panel A provides statistics for the members of the underwriting syndicate for investment grade issues and Panel B provides statistics for the lead bookrunner for high yield issues. Statistics are computed using trade data between the offering date and 21 days subsequent to the offering date. We report Wilcoxon *p*-Values based on tests of the difference between the non-overallocated issues and the overallocated issues with exception to the % Negative Spread for which we compute a *t*-test.

	Non-Overallocated				Overallocated				Difference
	Mean	Q1	Median	Q3	Mean	Q1	Median	Q3	*p*-Value
Panel A: Investment Grade - Syndicate Profit									
Profit/Loss from Round-Trip Volume	73,654	(5,909)	26,197	108,680	74,849	(34,918)	32,705	165,130	0.7299
Profit/Loss from Covering Overallotment	(10,321)	(1,426)	0	0	(73,128)	(109,330)	(21,241)	4,186	<.0001
Total Profit	63,332	(9,909)	22,237	98,346	1,721	(90,695)	3,068	111,870	<.0001
Panel B: High Yield - Lead Bookrunner Profit									
Profit/Loss from Round-Trip Volume	161,578	26,731	124,866	253,636	67,018	0	60,927	154,957	<.0001
Profit/Loss from Covering Overallotment	(28,411)	(34,018)	0	0	(307,985)	(416,069)	(161,922)	(51,629)	<.0001
Total Profit	133,167	11,608	92,260	225,731	(240,967)	(320,646)	(102,462)	9,636	<.0001