

The Information Advantage of Underwriters in IPOs

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January 12, 2015

Abstract:

We examine the extent to which banks trade on client information. Using a unique dataset of dealer-level trading data on recent IPOs, we find strong evidence that lead underwriter trades are significantly related to subsequent IPO abnormal returns among bookbuilding IPOs. In contrast, we find no similar relation for trades by other syndicate members. We also find no relation among a sample of auction IPOs. Our results are consistent with the joint hypothesis that underwriters of bookbuilding IPOs gain unique insight on the values of these client firms, and that they use their knowledge to obtain an advantage over other market participants.

*We would like to thank Laura Field, Peter Iliev, Dalida Kadyrzhanova, Amrita Nain, Ann Sherman, and seminar participants at the Chinese University of Hong Kong, the University of British Columbia summer conference, and the University of New South Wales for valuable comments.

1. Introduction

Investment banks specialize in information, much of which is not publicly available to all investors. In particular, the advising and underwriting arms of banks collect substantial private information on client firms. Despite regulations requiring strict Chinese Walls within banks, several prior papers find evidence suggesting that banks share this client information across divisions. The holdings of affiliated mutual funds, the holdings of the entire financial conglomerate, and the accuracy of analyst forecasts have all been shown to be related to a bank's investment banking relationships (see, for example, Massa and Rehman (2008), Bodnaruk, Massa, and Simonov (2009), Haushalter and Lowry (2011)).

The conclusion that investment banking divisions share client information in order to obtain arguably indirect benefits, for example higher returns in affiliated mutual funds or more accurate analyst forecasts, suggests that they will also seek to obtain more direct benefits for the bank by sharing client information with the proprietary trading department. However, Griffin et al (2012) find no evidence to support this conjecture. Using a proprietary dataset, they find no evidence of banks making informed trades around client firms' earnings announcements. The contrast in results is puzzling: why would banks share client information with affiliated mutual funds but not with their own proprietary trading department?

We tackle this question using a unique dataset, which enables us to isolate a bank's proprietary trading in each firm on a weekly interval and to condition on the nature of the relationship between the bank and the client. Our data is from the Taiwanese market, where banks are required to publicly report such data. In contrast, in the US market banks only report data on aggregated positions (across all portions of the bank, including proprietary trading, market making, mutual funds, etc.) at a quarterly interval. Similar to the US, Taiwanese

regulations impose a firewall prohibiting the underwriting department from sharing information with the trading department.

We focus on trading around IPOs because the information advantage of the financial intermediaries is particularly strong. Private firms disclose substantially less information than public firms, meaning that information asymmetry about IPO firms is, on average, quite high. Underwriter banks are in the unique position of having access to a broad set of data on these private firms. In addition, our focus on the Taiwanese market enables us to compare underwriter bank trading across two offering structures: bookbuilding versus auctions. Prior literature shows that underwriters earn a variety of side-benefits from bookbuilding, and we conjecture that their greater involvement in this type of offering may provide them with greater ability to benefit through proprietary trading as well.

In the first portion of the paper, we provide strong evidence that the post-IPO trades of advisor investment banks are superior to the post-IPO trades of other market participants. Advisor banks' trades in the first three months following the IPO are positively related to abnormal returns over the subsequent six months, one year, and two year periods. Results are robust to a variety of specifications, including company- and offer-specific controls, abnormal returns measured using market-model adjustments, style-adjustments or a four-factor model, and a cross-sectional specification or a calendar-time portfolio specification. In economic terms, a one-standard deviation increase in lead underwriter net purchases is associated with a 6.9 percentage point increase in 6-month market-adjusted abnormal returns.

The second portion of the paper focuses on the differences between the bookbuilding and auction mechanisms. Following Sherman (2005), we hypothesize that investment banks' ability to control both the pricing and the allocation in bookbuilding IPOs may result in greater inside information, relative to auction IPOs. Consistent with this intuition, we find that the

significantly positive relation between advisor banks' trades and subsequent abnormal returns is concentrated solely within the sample of bookbuilding IPOs. We find no evidence of similar information advantages within the subsample of auction IPOs. This contrast is striking, particularly when viewed against the worldwide trend away from auctions and toward bookbuilding. While empirical evidence suggests that auctions result in better deal pricing (see, e.g., DeGeorge, Derrien, and Womack (2007, 2010) Lowry, Officer, and Schwert (2010)), they are becoming less common. Our analysis contributes to this literature, by showing one more reason that underwriters may prefer bookbuilding.

Additional analyses provide further evidence on the information channels that underlie the relation between advisor bank trades and subsequent returns in bookbuilding IPOs. The extent of bank informed trading in recent IPOs, to the extent it does exist, should vary across banks and across issues in predictable ways. First, we posit that the trading of the other syndicate members will be more weakly related to subsequent returns than the trading of the lead underwriter. It is the lead underwriter that sets the offer price and controls most of the share allocation, while other syndicate members play a much more minor role. Second, we posit that the trading of the lead underwriter will most strongly predict subsequent returns among issues that are characterized by the highest information asymmetry. Among companies that are harder to value, underwriters' comparative advantage will be greater. Third, we hypothesize that underwriters with the greatest experience will be best able to profit from their inside information, suggesting that the positive relation between these underwriters' trades and subsequent returns will be greatest. Results support all of these predictions: the relation between banks' inside trading and subsequent returns is strongest in exactly those cases where we expect banks to have the greatest advantage relative to other market participants.

Our findings are consistent with the conclusions of Kedia and Zhou (2011), who find that bond dealers associated with M&A advisors make informed trades in the corporate debt market prior to takeover announcements. However, in stark contrast, Griffin et al (2012) find no evidence of banks making informed stock trades around client firms' earnings announcements.¹ We conjecture that the differences in findings relate to the proposed nature of banks' information advantage. While Griffin et al focus on a relatively narrow window around firms' earnings announcements, we posit that the advisor bank amasses a mosaic of information regarding the firm, which potentially affects trading over a much broader window: banks are better able to assess the difference between 'true' firm value and market price. Moreover, for many firms, and in particular for young firms, the most valuable inside information may relate to the value of future growth opportunities, which are unlikely to show up in near-term earnings announcements. Finally, banks may also wish to 'hide' their informationally advantaged trades by spreading them through time. All of these factors suggest that any informed trading will be spread throughout the weeks and months after an offering, rather than clustered directly around earnings announcements. Results comparing trading across different windows with subsequent returns are consistent with these premises.

Our findings relate to the prior literature on the indirect benefits that underwriters obtain, in addition to direct fees, from serving as the lead bank in an IPO. Loughran and Ritter (2002), Reuter (2006), Nimalendran, Ritter, and Zhang (2007), Ritter and Zhang (2007), Goldstein, Irvine, and Puckett (2011), and Fjesme (2013) show that underwriters of bookbuilt IPOs allocate underpriced shares to buy side clients in exchange for higher trading commissions. Ellis, Michaely, and O'Hara (2000) examine the market-making activity of lead underwriters in

¹ Griffin et al use a proprietary dataset. Griffin et al. (2012) look at both trading in clients' accounts and trading on the bank's own account, excluding any trades that are routed through other brokerage houses. An additional advantage of our data is that it includes all proprietary trading, regardless of who handles the trading.

Nasdaq IPOs, and they find that this market-making activity is profitable, on average.² Our results suggest that banks also benefit more directly from bookbuilding IPOs, through their proprietary trading.

The fact that our analysis is based on Taiwanese data has the additional advantage of providing direct insight into a developing market, and as shown by Doidge, Karolyi, and Stulz (2013), developing markets are capturing a growing portion of worldwide IPO listings. Chiang, Qian, and Sherman (2010) and Chiang, Hirshleifer, Qian, and Sherman (2011) employ Taiwanese auction data to examine the bidding behavior of both individual and institutional investors. In contrast to their focus on investor behavior, for example investor learning and attempts at profit maximization, we focus on underwriter dynamics.

2. Data

2.1 Sample of Taiwanese IPOs

Our data consist of 306 companies that went public via either auction or bookbuilding in Taiwan during the 1996 – 2011 period, after excluding IPOs of foreign companies and IPOs that represent either privatizations or spin-offs from publicly traded parent companies (a total of 2 privatizations and 40 spin-offs during the sample period). We obtain the data from the Taiwan Securities Association, a self-regulatory organization of securities firms. The bookbuilding sample consists of 218 IPOs over the October 2005 - February 2011 time period, and the auction sample consists of 88 IPOs over the 1996 – 2003 time period.³ The switch from auctions to

² Our data on underwriter post-IPO trades includes only trades by the proprietary trading desk, and thus does not include any market making activity.

³ The majority of these bookbuilding IPOs are actually hybrid offerings, in which 10 – 30% of the shares are offered via a fixed price offering that is mostly geared towards retail investors and the bid size equals 1000 shares. Because we are focused on dealer trading in these offerings, we focus on the bookbuilding tranche for most analyses. We examine the cross-sectional variation in the size of the retail tranche in section xxx. For more details on the IPO process in Taiwan, see Chang, Chiang and Qian (2013).

bookbuilding was caused by 2004 regulatory changes that increased flexibility regarding IPO method.⁴ During the post-January 2005 period, only two IPOs use non-bookbuilding methods (one uses a hybrid auction and the other uses a fixed-price offering), both of which are excluded from the sample. This lack of overlap between the two samples means that the majority of firms were not choosing between the auction and bookbuilding mechanisms, thus lessening endogeneity and sample selection concerns.

For each IPO we collect data on the underwriter, firm age, firm assets, whether the company is backed by venture capital, and company accounting information from the IPO prospectus. For bookbuilding IPOs, we also obtain the offer price from the prospectus. For the auctions, not all investors pay the same offer price; the auctions are discriminatory, where bids above a certain threshold are considered winning bids, and the investor pays the price they bid. We obtain bid-price quantity combinations as well as winning prices from the Taiwan Securities Association.

For each of these IPOs, the Taiwan Economic Journal (TEJ) provides both daily pricing data and weekly proprietary trading data for dealers. First, we collect daily closing prices, returns, shares outstanding, and aggregate trading volume. Second, at the weekly level, we collect the trading data of each dealer, where dealers are characterized into one of three groups: the lead underwriter, co-underwriters, and unaffiliated dealers. For each dealer, we measure net purchases during a week as the sum of shares purchased minus shares sold, all divided by average daily shares outstanding. For co-underwriters and unaffiliated dealers, we average these

⁴ There are two key regulatory changes: (1) bookbuilding can be used for either primary or secondary share issues whereas it could only been used for primary share issues before; and (2) the bookbuilding and fixed-price public offer tranches for hybrid bookbuilding can run simultaneously rather than consecutively. On the other hand, sequential hybrids (first the discriminatory auction, and then the fixed price tranche) are still required for auctions in Taiwan. For a detailed description of IPO methods used in Taiwan, see Chiang, Qian and Sherman (2010).

net purchases across all entities to obtain a summary NetBuy measure. Dealers that did not trade enter as a zero. For all deals in our sample, there is only one lead underwriter.

By regulation, underwriters of the bookbuilt IPOs are prohibited from selling shares at any price lower than the offering price for the first five days after the offer. Moreover, the lead underwriter may face various regulatory penalties if the aftermarket price on the fifth trading day drops below the offer price.⁵ For this reason, we start our measurement of net purchases at the beginning of the second full week following the offer, to ensure that underwriters' purchases are voluntary rather than driven by regulatory issues. Our main measure of underwriter net purchases equals total net purchases over a three-month period, starting with the first week that is at least five days following the offer, i.e., at the second full calendar week after the IPO.⁶ As discussed in more detail later, this time interval is motivated by the observation that underwriters trade these IPO firms with particularly high frequency over this period, consistent with them having valuable information.

Public securities firms are required to disclose their holdings in semi-annual and annual reports. (Many co-underwriters are not public firms and do not issue such reports, hence we only derive holding data for lead underwriters.) To derive holdings in the IPO firm at the time of IPO, we first hand-collect the holding data from the lead underwriter's first semi-annual or annual report (whichever is earlier) after a firm's IPO. Combining the hand-collected holding data with

⁵ To be precise, both leads and co-underwriters are prohibited from selling shares at a price less than the offer price out of either the proprietary account or the price stabilization account, where the latter is a specific account to hold the overallotment proceeds for the first five days following the offer. If the lead performs price support, i.e., through buying shares, they first draw on funds from the price stabilization account and then from the proprietary account; after buying the lead can't sell from the price stabilization account during that period. Conditional on the overallotment option being exercised, the lead will be subject to a regulatory penalty if both the following occur: the closing price on the 5th trading date drops below the offer price, and the lead didn't buy through the price stabilization account. If the over-allotment option is not exercised, the lead will be subject to a regulatory penalty if the closing price on the 5th trading date drops below the offer price, even if the lead bought through its proprietary account.

⁶ As discussed in the robustness section, we also examine trading over alternative periods.

the trading data between the IPO and the report time, we can then derive the lead's holdings at the time of IPO.

Information on company earnings announcements is also obtained from the TEJ. We collect the earnings filing date, which we use as the announcement date, and the actual earnings per share.

2.2 Descriptive Statistics

A summary of the auction and bookbuilding samples is provided in Table 1. Panel A shows the time-series distribution of our sample. For reference and because the auctions occur over a different time period than bookbuilding IPOs, Figure 1 shows the cumulated value weighted market return on the Taiwan market between 1996 and 2012. Similar to the US, Taiwan experienced a substantial drop in the early 2000s, with the burst of the internet bubble, and in 2008-2009, around the time of the financial crisis.

Panel B of Table 1 shows firm and offer characteristics, for both the bookbuilding and auction subsamples. The bookbuilding firms are slightly younger on average, and they are smaller, measuring size as either pre-IPO assets or post-IPO market capitalization. Firms in the bookbuilding sample also raise less money, measured in terms of either dollar proceeds or percent of the firm sold: relative shares offered, defined as shares offered as a fraction of pre-IPO shares outstanding, equals 10.4% for the bookbuilding IPOs versus 14.2% for the auction IPOs.

The bookbuilding firms are more likely to be listed on the Gre Tai Market (GTSE) rather than the Taiwan Stock Exchange (TSE), where the former is more similar to the Nasdaq and the latter to NYSE. In addition, a greater fraction of the bookbuilding sample firms are backed by venture capital (56% vs 43%), a fact that potentially reflects differences in business focus and growth in the VC industry over time.

In both auctions and bookbuilding offers, there is one lead underwriter per deal; there are an average additional 8.6 other syndicate members in auction IPOs compared to 3.4 additional syndicate members in bookbuilt offerings. These other syndicate members, also referred to as co-underwriters, assist in the selling process, selling on average 14% of the issue, but they do not participate in pricing.

Finally, we calculate the price revision and initial return. For bookbuilding offers, where there is a single offer price paid by all purchasers, this is relatively straightforward: the price revision equals the percentage difference between the midpoint of the price range and the offer price, and the initial return equals the percentage difference between the offer price and the aftermarket closing price on the first day of trading. For auctions, where not all investors pay the same price, the initial return will vary across investors. Moreover, during the auction sample period, all publicly traded stocks in Taiwan (including IPO shares) are subject to a daily return limit of 7% (positive or negative), meaning the price at the end of the first day may not be very informative for some issues. We thus calculate initial returns in auctions based on the average offer price weighted by number of shares bought at each price and on the closing price on the first day when the stock did not hit the regulatory return limit (known as the first non-hit day).⁷ Using these definitions, across the 90 auction IPOs, average initial returns were 6.7%, compared to an average 55.3% for the bookbuilt offerings. The substantially higher initial returns for the bookbuilding sample are consistent with findings of DeGeorge, Derrien and Womack (2007) in a study of French offerings and with Lowry, Officer, and Schwert (2010) in a study of US offerings. The relatively high underpricing of the bookbuilding offers is also consistent with the

⁷ Price revision, which is intended to capture the extent to which the offer price is changed based on indications of interest during the bookbuilding period, is not defined for the auction sample.

regulatory penalties associated with the aftermarket price dipping below the offer price, which arguably give underwriters strong incentives to avoid overpricing an issue.

Figure 2 illustrates the evolution of lead underwriter trading, over the weeks following the offer. Panel A shows the percent of lead underwriters that buy and sell each week, and Panel B shows the sum of lead underwriter purchases and sales, as a percent of shares outstanding, over the first 25 weeks following the IPO. Each panel consists of two figures: one for bookbuilding IPOs and one for auctions. For each, the solid line shows the percent of lead underwriters that trade each event week, and the dotted line shows trading by the same institutions in a sample of matched non-IPO firms. Specifically, the matched sample consists of firms that have been public for at least three years, have not done an SEO within this period, and are in the same industry and the same size quartile.

Looking first at the left hand side of Panel A, over the first seven weeks following the bookbuilding IPOs, approximately 25% of lead underwriters are buying or selling shares. As the time since the offer lengthens, the percent of lead underwriters that are buying or selling shares in the IPO firm diminishes. Through at least week 12, the lead underwriters trade the IPO stocks more frequently than the matched non-IPO stocks. Sometime between weeks 13 and 16, the two series converge. This is consistent with these lead underwriters having less of an information advantage as the time since IPO lengthens. As discussed in more detail later, this convergence motivates the time period over which we measure underwriter trades

The left-hand side of Panel B, which shows the magnitude of underwriter transactions in bookbuilding IPOs, is consistent with this post-IPO information advantage. For each IPO, we tabulate the absolute dollar value of the lead underwriter's transactions (buy or sale) each week as a fraction of firm shares outstanding. These are averaged across all IPOs. Consistent with the greater frequency of trading shortly after the IPO shown for the bookbuilding IPOs in Panel A,

we see that the average transaction size is also largest in the weeks shortly following the IPO. Sometime after week 10, these magnitudes level off, becoming more similar to that observed in the matched non-IPO firms.

The right-hand figures in both Panel A and Panel B contain the analogous information for the auction IPO sample. While trading frequency by the lead underwriter is similarly high immediately after the IPO for the auction sample, this rate decreases more quickly than for the bookbuilding sample. Moreover, there is little evidence that the average transaction size is larger for auction IPOs than for the matched non-IPO firms.

Figure 3 shows that the greater tendency of underwriters to transact in IPO stocks holds for both purchases and sales. Looking first at the bookbuilding sample, Panel A shows that approximately 20% of lead underwriters purchase shares in their client IPO firm within the first three months after the IPO, whereas the likelihood of these same banks purchasing matched nonIPO firms is only 13%. The differences in selling are even greater: 48% of lead underwriters sell stock in the IPO firms during the first three months after the IPO, compared to an analogous rate of only 14% in the matched nonIPO firms. Similar differences, albeit somewhat smaller, exist within the auction sample.

Panel B of Figure 3 examines purchases as a percent of shares outstanding, and sales as a percent of shares outstanding. Similar to conclusions from Panel A, lead underwriters both buy and sell substantially more in IPO firms than in the matched nonIPO firms.

The fact that the differences in selling are even greater than those for buying is consistent with underwriters holding positive inventory in the IPO firm immediately following the offering.⁸ This inventory, in most cases, is left from the market-making activities of the lead in

⁸ Certain pre-IPO investors are subject to a lock-up, including directors, supervisors, and shareholders with holdings of 10% or more. Lock-ups typically start to expire six months after the IPO. None of the underwriters in our sample are subject to lock-up restrictions.

the pre-market. All lead underwriters are required to make a market in the pre-market period, and many co-managers participate in market making in this period as well. Any inventory that is not wound down prior to the IPO is transferred from the market making desk to the proprietary trading desk. The proprietary trading department then has the choice of when to sell the shares.

2.3 Definition of returns periods

To investigate whether underwriters profitably trade on information learned through client firm IPOs, we need to specify windows over which to measure both bank proprietary trading and post-IPO returns. Because theory provides little guideline for when banks are most likely to trade on any information advantage, we focus on trading over a long window following the offering and we compare this to returns over several different subsequent time intervals.

Our choice of the window over which to measure bank trading is based on the patterns in Figure 2. Within our sample of bookbuilding IPOs, lead underwriters trade shares of their client IPO firms at a much higher rate than shares of matched non-IPO firms for the first few months after the IPO. Specifically, 20 – 25% of lead underwriters buy or sell shares in their client IPO firms within the first seven weeks after the IPO, compared to an average 10% analogous rate in firms that have had neither an IPO nor SEO within the past three years and belong to the same size quartile. This higher frequency of trading is consistent with banks having more information on the IPO firms. However, by the end of the first three months, the rate of trading in IPO firms is approximately equal to that of non-IPO firms, suggesting that banks' information advantage has dissipated. For this reason, our primary analysis focuses on bank trading in the IPO stock over the three month period following the IPO. Specifically, we focus on a twelve-week period, beginning with the second full week after the IPO. (As discussed earlier, we omit the first week after the IPO due to regulatory factors that potentially constrain purchases and sales up to five

days after the offer.) Thus, our final net purchases measure equals net purchases each week deflated by average daily shares outstanding during the week, cumulated over this twelve week period.

We compare the net purchases over this period of time with subsequent returns over three intervals: six months, one year, and two years. All return intervals begin with the first week following the conclusion of the net purchase measurement period. If the insight underwriters gain during the pre-IPO period gives them more insight into the firms' valuation and future performance, then we would expect a positive relation.

Table 2 provides descriptive statistics on average abnormal returns to auctions and bookbuilt offerings over the initial three month period following the IPO over which we measure net purchases, and also over the subsequent 6-month, 1-year, and 2-year return periods. We present three alternative measures of abnormal returns: market-adjusted abnormal returns, style-adjusted abnormal returns, and calendar time portfolio abnormal returns. Market-adjusted abnormal returns equal IPO firm returns minus the value-weighted market return, where the market return is measured across all stocks on the TSE and the GTSE over the same interval. Style-adjusted abnormal returns equal IPO firm returns minus returns on a benchmark firm, where the benchmark firm is chosen based on the following algorithm. We first identify all firms that have been publicly traded on the Taiwanese market for at least three years and have not had an SEO within this time, and we divide these firms into size quartiles based on market capitalization. We then select the firm within the same size quartile as the IPO firm that has the closest market-to-book ratio. Finally, we calculate monthly alphas from calendar time portfolio regressions (see, e.g., Barber, Lyon, and Tsai, 1998), where IPOs are included in the portfolio for the six month, one year, or two year periods defined above. We regress returns on this rolling portfolio on four factors calculated following the algorithms behind the three Fama-French (1993)

factors and the Carhart (1997) momentum factor, but based on the Taiwanese market.⁹ The intercept from these regressions, commonly referred to as the alpha, can be interpreted as a measure of abnormal performance and is reported in the table.

Results using all three approaches suggest that the auction offerings perform better after the IPO than the bookbuilt offerings. Moreover, the calendar time portfolio approach indicates that bookbuilding IPOs significantly underperform, on average, in the months and years subsequent to the IPO; auction IPOs do not exhibit this same level of underperformance.

3. Can underwriters profit from private information through aftermarket trades?

Our main research question is whether underwriters of bookbuilding IPOs benefit from an information advantage. To this end, Section 3.1 focuses on regressions of lead underwriter net purchases in bookbuilding IPOs on subsequent returns. Section 3.2 contrasts trading by banks that served as the lead underwriter in the IPO with that of other banks that were less directly involved. Section 3.3 examines underwriter trading over shorter windows, in the periods immediately surrounding earnings announcements. Section 3.4 compares the prices at which underwriters trade to average closing prices during the week of the trade.

3.1 Main results

Our analysis of the relation between lead underwriter net purchases in bookbuilding IPOs and subsequent returns employs three different measures of abnormal returns: market-adjusted abnormal returns, style-adjusted abnormal returns, and calendar time portfolio abnormal returns, all of which were defined in the previous section.

⁹ We also calculate Taiwan-specific cut-offs, for example to determine the breakpoints between the large and small stocks, etc.

Table 3 shows results using the first two of these abnormal return metrics, measured across the 6-month, 1-year, and two-year intervals following the net purchases measurement period. In each regression, the independent variable of interest is underwriter net purchases. Most underwriters have positive inventory in the IPO stock at the time of the IPO, meaning that underwriter net purchases over the three months after the IPO may be either positive or negative. Controlling for pre-IPO underwriter holdings, we predict that net purchases will be positively related to subsequent returns.¹⁰ Specifically, we predict that underwriters will tend to sell shares in IPOs that subsequently underperform, thereby avoiding losses, and to buy more shares in companies that outperform the market.

Additional control variables in Table 3 represent firm and offer characteristics, which were presented and defined in Table 1. We also include one variable related to the cycles in the IPO market: Previous IPO IR equals the average initial return across firms that went public over the prior 12 months.

Across all specifications, Table 3 provides strong support for our prediction that underwriters have an information advantage that influences their post-IPO trading. In all six regressions, the coefficient on net purchases is positive as predicted, and statistically significant in five of the six. In economic terms, a one-standard deviation increase in lead underwriter net purchases (0.433%) is associated with a 4.3 percentage point increase in 6-month market-adjusted abnormal returns. Analogously, one-year and two-year market-adjusted abnormal returns increase by 14.3 and 16.1 percentage points.¹¹

Our findings complement those of Chemmanur, Hu, and Huang (2010) and Field and Lowry (2009), who find that institutional trading predicts subsequent returns of IPO stocks.

¹⁰ We would not expect such a relation if underwriters were merely liquidating pre-IPO positions.

¹¹ No IPOs in our sample delisted within the first two years after the IPO, and these observations are only included in the six-month and one-year return samples.

While the insight from both of these studies is that institutions have an information advantage, there is little question that the underwriter banks of our sample have an information advantage. The unique aspect of our results is that these banks elect to trade on this insider information advantage.

Results are robust to various alternative specifications. For example, we have re-estimated all regressions based on net purchases beginning the first full week after the IPO, instead of in the second full week. We have also estimated these regressions using lead underwriter net purchases as a fraction of pre-IPO holdings as the independent variable of interest.

To further confirm the robustness of our findings, Table 4 re-examines the extent of underwriters' information advantage using a calendar time portfolio approach. Because IPOs tend to cluster in calendar time, standard errors may be understated and significance levels overstated in cross-sectional regressions such as those reported in Table 3. We define the IPO portfolio such that a firm enters the portfolio three months after the IPO (i.e., at the end of the period over which we measure underwriter net purchases), and it remains in the portfolio for 12 months. Returns on this portfolio, net of the risk-free rate, are regressed on the three Fama and French (1993) factors and the Carhart (1997) momentum factor, calculated for the Taiwanese market as discussed previously. We classify all IPOs into one of two portfolios based on whether the net purchases of the lead underwriter over weeks 2 – 13 are above or below the median level. Columns 1 and 2 show regressions based on the high net buy and low net buy portfolios, respectively, and Column 3 shows the regression for the portfolio that is long the high net buy IPO firms and short the low net buy firms.

The intercept on the low net buy portfolio is negative and highly significant (t-statistic = -3.70). We note that the low net buy portfolio consists of cases where underwriters are selling

off shares; the negative coefficient thus indicates that underwriters are quickly selling off their inventory positions in stocks that subsequently perform very poorly. In contrast, the intercept on the high net buy portfolio is insignificantly different from zero. While the bookbuilding IPOs significantly underperform on average, as shown in Table 2, those IPOs with the highest underwriter net purchases exhibit no significant underperformance.

Finally, the intercept in the high minus low regression is significantly positive (t -statistic=2.45), indicating that the IPOs in which the lead underwriter's net purchases over the first three months are above median significantly outperform those with lower net purchases.

3.2 Net purchases by non-lead syndicate members

To the extent that lead underwriters' higher returns stem from unique information they obtain due to their role in valuing the company and pricing and marketing the offering, we would not expect other syndicate members to enjoy similar advantages. In Taiwan, there are no co-managers similar to those observed in the US, and other syndicate members serve only to help sell a small proportion of the shares, on average 14% of the shares in our bookbuilding sample. They do not participate in either providing valuation analysis or determining the final pricing. On average, there are 3.4 other syndicate members in each bookbuilding deal.

As a first step, we compare the frequency of trading by other syndicate members to that of the lead underwriter. Panel A of Figure 3 shows that the other syndicate members trade the IPO stocks with substantially less frequency than the lead underwriter. In addition, Panel B shows that the average trade size of the other syndicate members is substantially smaller than that of the lead. Finally, both panels suggest relatively little difference between the other syndicate members' trading activity of the IPO stock in the weeks immediately following the IPO, compared to in more distant weeks. In contrast, as previously illustrated in Figure 2, the

lead underwriter's decrease in both trade frequency and trade size is consistent with them having inside information around the time of the IPO, and with the value of this information dissipating as the time since IPO lengthens.

Table 5 examines more directly the prediction that other syndicate members do not have information advantages similar to those of lead underwriters. We present regressions similar to those shown in Table 3, with the exception that net purchases by other syndicate members is the independent variable of interest. Consistent with predictions, we find no significant statistical relation between net purchases of the other syndicate members and returns over any interval: six months, one year, or two years.¹² We have also estimated calendar time portfolio regressions, similar to those reported in Table 4, where portfolios are formed based on the net trades of other syndicate members (results not tabulated). Conclusions are similar to those from Table 5: we find no evidence that net purchases by other syndicate members predict abnormal returns. The contrast between the lead underwriters and other syndicate members provides added support for our conjecture that the leads of bookbuilding IPOs enjoy unique information advantages that influence the proprietary trading of the bank.

Finally, we have also estimated these same regressions using net purchases by dealers that are not involved in the IPO in any capacity. These other dealers are investment banks that may be involved in other IPOs. For each of our IPOs, there are many dealers that fall into this category, an average of 44 per deal. These higher numbers potentially increase our power, but economically this group should have less private information that would enable them to forecast future returns. Consistent with the economic prediction, results (not tabulated) show no significant relation between net purchases by other dealers and subsequent abnormal returns.

¹² Results are also much weaker in economic terms. A one standard deviation increase in other syndicate member net purchases is associated with a 5.3% (statistically insignificant) increase in two-year market-adjusted abnormal returns, compared to an analogous 16.1% (highly significant) for lead underwriters. Comparisons are similar using style-adjusted abnormal returns

3.3 Trading in short windows around earnings announcements

Our results suggesting that underwriters of bookbuilding IPOs have an information advantage and benefit from this advantage is consistent with the conclusions of Massa and Rehman (2008), Bodnaruk, Massa, and Simonov (2009), and Ivashina and Sun (2011), and Haushalter and Lowry (2011). Importantly, our finding that banks directly benefit through their proprietary trading provides even stronger evidence of banks benefiting from their private information, compared to the more indirect evidence provided by these earlier papers. However, our findings are seemingly inconsistent with the conclusions of Griffin et al (2012). Using proprietary broker-level trading data in all NASDAQ-listed firms, they find no evidence that brokerage houses make profitable trades in the days surrounding their client firms' earnings announcements or takeovers.

We conjecture that many of the underwriters' informed trades are related to future growth opportunities, which are not incorporated into near-term earnings. In addition, their trades may occur at many different times, for example when they assess the stock to be over- or under-valued. Underwriters' detailed knowledge of these firms, from prior to the IPO, arguably gives them an advantage in assessing the value effects of various firm and industry disclosures and in evaluating whether the trading price accurately reflects firm value. We examine these possibilities directly by comparing our 'long-window' relations (Tables 3 and 4) with 'short window' relations that focus on trading and returns around earnings announcements.

Table 6 shows regressions of the 5-day cumulative abnormal return (CAR), computed around the earnings announcement using the market-adjusted model, on measures of net purchases. In column 1, we regress the CAR around the first quarterly earnings announcement on lead underwriter purchases in the weeks up until this point. In column 2, following the

approach of Yan and Zhang (2009), we examine the relation between underwriter net purchases prior to the first quarter's earnings and abnormal returns across the following four quarters, i.e., quarters one to four. This approach allows for the possibility that the underwriter trades on information about the firm's future profitability, some of which will be realized after the first quarter. We control for net purchases of other syndicate members and for dealers that were not part of the underwriting team.

The contrast between results in the two columns is illustrative. First, column 1 shows that underwriter net purchases over the weeks between the IPO and the first earnings announcement are not significantly related to abnormal returns around first quarter earnings. We similarly find no relation between trading over the four weeks prior to the quarter end and either the quarterly earnings surprise or earnings announcement returns (results not tabulated), which is consistent with the findings of Griffin et al. However, the last column suggests that the lead underwriter's proprietary information, as reflected in their trades over the weeks following the IPO, is revealed in firm earnings throughout the first year.

In sum, results in Table 6 combined with those in earlier tables are consistent with a scenario where the firm-specific information that underwriters obtain about these IPO firms relates more to the value of future growth opportunities and less to near-term earnings. Underwriter net purchases over the period immediately following the IPO are insignificantly related to returns around first quarter earnings, weakly related to cumulated returns over the first four quarters of earnings, and significantly related to returns over longer periods (six months to two years). This evidence is perhaps not surprising, given the growth trajectory of these firms: a much larger portion of these firms' value comes from future growth opportunities rather than from current cash flows.

3.4 Do underwriters strategically time their transactions?

As an additional test of underwriters' advantage over other market participants, we compare the prices at which they buy and sell to the average of the closing prices during the week of the transaction. If underwriters are able to assess the extent of over or undervaluation, they will be more likely to buy low and to sell high. Analogously, if their inside knowledge of the firm gives them an advantage in assessing the ways in which various market developments will affect the firm, they should similarly be able to transact at advantageous prices.

Table 7 examines these conjectures. Looking first at column one, for every case where the lead underwriter buys the IPO stock, we compute the difference between the price at which they bought and the average of the closing prices during that week. We then average these differences across all observations during weeks two through five, during weeks six through nine, during weeks ten through thirteen, and over the entire week 2 – week 13 period. Column two shows the analogous calculations for underwriter sales, and column 3 tests whether the average buy price (net of the average close) is significantly different than the average sale price (similarly net of the average close).

Results are consistent with the lead underwriters selling at higher prices and buying at lower prices, during the first month after the IPO. Specifically, row one shows that the average buy price is 0.66% *below* the average weekly closing price (significant at the 10% level), and the average sell price is 0.58% *above* the average weekly closing price (significant at the 5% level). Moreover, the difference between the two is significant at the 1% level. As the time since IPO lengthens, they lose their ability to trade at similarly advantageous prices. We do not find similarly significant differences for the week 6 – week 9 period or for the week 10 – week 13 period.

4. Sources of underwriter advantage in bookbuilding IPOs

Our hypothesis that underwriters are able to profit from an information advantage is based on the implicit assumption that these IPO firms are characterized by information asymmetry. Indeed, the fact that there is less information available about IPO firms than more mature firms makes the IPO setting particularly attractive: this higher level of information asymmetry makes underwriters' inside information particularly valuable. In the extreme, for a firm with zero information asymmetry, inside information would have no value.

While a zero information asymmetry firm is purely hypothetical, the extent of information asymmetry does vary substantially across firms. We propose two, non-mutually exclusive factors that may relate to underwriters' information advantage. First, there are some IPO firms that are characterized by substantially more information asymmetry than others. For issues characterized by greater information asymmetry, the difference between true firm value and the market's assessment of value is on average greater. Under the assumption that underwriters know more than the market at large, their advantage should be particularly strong among these high information asymmetry issues. Second, conditional on the level of firm information asymmetry, certain factors may cause underwriters to have a comparative advantage. For example, underwriters may have a greater advantage evaluating companies that operate in industries where they (i.e., the underwriters) have more prior experience.

To examine these effects, we develop several proxies. For each proxy, we divide firms into two portfolios based on the median value. We then compare across the subsamples the strength of the relation between lead underwriter net purchases in the three months following the IPO with returns over subsequent six month, one-year, and two-year periods. Specifically, we estimate regressions similar to those shown in Table 3, where the dependent variable equals style-adjusted abnormal returns and the independent variable of interest equals lead underwriter net purchases. Similar to Table 3, net purchases are defined over the three months beginning in

the second full week after the IPO, and returns are defined over the subsequent 6-month, 1-year, and 2-year intervals.¹³

Panel A of Table 8 focuses on the proxies that relate to the extent of information asymmetry surrounding the firm. We form portfolios based on various size metrics. We examine two measures of company size: pre-IPO assets and market-capitalization on the sixth day after the IPO (to avoid the effects of price support). We also examine offer size, which is measured as proceeds raised. For conciseness, for each proxy, we only report the coefficient on underwriter net purchases from the underlying regression. Thus, Panel A of Table 8 shows the coefficient on net purchases in 18 different regressions: three different proxies for information asymmetry * two portfolios for each proxy (high and low information asymmetry) * three return periods (six month, 1 year, and two years).

The first two rows of Panel A subsample the firms based on firm market capitalization after the IPO. Firms with below median market capitalization are posited to have higher information asymmetry, consistent with the large literature relating firm size to the firm's information environment. Results are consistent with our predictions. In column 1, we see that six-month abnormal returns are significantly positively related to lead underwriter purchases in small firms: the coefficient on underwriter net purchases equals 20.15, significant at the 5% level. However, there is no evidence that underwriter net purchases in large firms are similarly related to subsequent returns: the coefficient on underwriter net purchases equals 9.22, insignificant at conventional levels. Abnormal returns over longer intervals yield similar inferences. Among firms with below-median market capitalization, abnormal returns over the six-month, one-year, and two-year periods are significantly positively related to underwriters'

¹³ Limited sample sizes once we subset on these dimensions prevent us from implementing a calendar time portfolio analysis here. However, the smaller sample sizes also mean that cross-correlations are likely to be less of a problem.

net purchases over the first three months. However, there are no similarly significant relations among firms with above-median assets.

Conclusions are similar when we measure size using either assets at the time of IPO or proceeds raised in the IPO. Among firms with below-median assets and also among firms with below-median proceeds, underwriter net purchases are significantly related to future returns over all intervals: six months, one year, and two years. However, there is no evidence of similarly significant relations among their larger counterparts, who would tend to have lower information asymmetry. In sum, subsample results across all three measures of firm and issue size are consistent with our prediction that underwriters' advantage is greatest among issues with higher information asymmetry.

Panel B of Table 8 focuses on the comparative advantage of underwriters, as proxied by their experience. For the lead underwriter we tabulate the number of prior IPOs in the previous five years for which the underwriter has also served as lead and that fall into the same 2-digit industry code. There is considerable variation in experience: for the median deal, the underwriter has been involved with 15 prior IPOs in the same industry, but this measure of experience ranges from 0 to 45 prior IPOs in the same industry. Results provide strong confirmation of the importance of underwriters' prior experience. Among deals where the underwriter has taken fewer than 15 firms public in the same industry in the prior five years, there is no evidence that underwriter net purchases over the first three months after the IPO are significantly related to subsequent abnormal returns. The coefficient on underwriter net purchases is insignificant at conventional levels in explaining abnormal returns of every interval: six months, one year, and two years. In strong contrast, among deals where the underwriter has above-median experience taking firms public in the same industry, we find significant relations between underwriter net purchases over the first three months and subsequent abnormal returns.

We repeat the analysis using underwriters' general experience (i.e., all its previous IPOs in the last 5 years). We do not find similar results. That is, it is specific industry experience, but not overall experience, that matters. Underwriters that have taken more companies in the same industry public have a more in-depth understanding of that industry, which is consistent with Liu and Ritter's (2011) findings regarding the importance of industry expertise. While Liu and Ritter focus on the implications of this expertise around the time of the IPO, our results suggest that this advantage also influences post-IPO trading.

In sum, results suggest that underwriters' information advantage among bookbuilding IPOs is greatest among firms with higher information asymmetry and among firms that belong to industries with which the underwriter has more prior experience.

5. The role of IPO mechanism: bookbuilding vs. auctions

Underwriters of bookbuilding IPOs obtain an information advantage on the companies whose IPOs they underwrite through their access to a broad set of company internal documents, extensive interactions with company management, and interactions with informed investors during the roadshow. In this section we examine the extent to which this information advantage that was observed among bookbuilding IPOs is similar among a sample of auction IPOs. There are several reasons to believe that it may be different.

First, prior literature shows that underwriters in bookbuilding IPOs enjoy many indirect forms of compensation, beyond any direct fees. Most notably, underwriters' ability to allocate underpriced shares to valued clients potentially results in increased business to other divisions of the investment bank. Because underwriters do not control allocations in auction IPOs, they may have less incentive to collect in-depth information. Second, the fact that their role in pricing is substantially diminished means that they may have less access to proprietary company

information. Third, underwriters of bookbuilding IPOs have more opportunity to collect information from informed investors through the roadshow. Based on these differences, we conjecture that underwriters' information advantage may be lower among auction IPOs. Tables 8 and 9 examine this proposition, in a format similar to that of Tables 3 and 4.

Table 9 shows both market-adjusted abnormal returns (columns 1 – 3) and style-adjusted abnormal returns (columns 4 – 6) regressed on lead underwriter purchases, for the sample of auction IPOs. Similar to Table 3, underwriter purchases are measured over weeks 2 – 13, and returns are measured over the six month, one year, and two year periods subsequent to the measurement of purchases. Similar to the bookbuilding IPOs, underwriters of auctions hold shares of the IPO stocks prior to the IPO, and we control for these pre-IPO holdings in all regressions.

In stark contrast to Table 3, we find no evidence that purchases by the lead underwriters of auction IPOs are related to subsequent abnormal returns. In fact, several of the coefficients on lead underwriter purchases are negative. Calendar time portfolio regressions in Table 10 yield similar conclusions. We see no evidence that those offerings in which lead underwriters' net purchases were above-median outperformed those in which the leads' net purchases were below-median. Results in both Table 9 and Table 10 are similar if we define net purchases across other syndicate members (not tabulated).

There exists an ongoing debate regarding the relative merits of the bookbuilding method of bringing companies public versus auction methods. Compared to auctions, underwriters have more control in bookbuilding offers. Sherman (2005) shows that this enables them to elicit more information from informed investors, but it may also result in rent-seeking behavior by

underwriters, whereby they gain an unfair advantage over other market participants.¹⁴ Our results emphasize the importance of both of these factors: underwriters enjoy a unique information advantage in bookbuilding IPOs, and they benefit from this information advantage through their proprietary trading division. Sherman (2005) shows that an increasing number of countries use the bookbuilding mechanism. Our findings provide one measure of the extent to which underwriters appear to gain from this worldwide trend toward bookbuilding.

6. Robustness

We have conducted a number of other tests, in order to ensure that our results suggesting that underwriters have an information advantage in bookbuilding IPOs as well as results suggesting a contrast between bookbuilding and auctions are robust. First, we re-estimate regressions of abnormal returns on previous underwriter net purchases after deleting all cases where underwriters have zero net purchases. Second, we re-estimate these same regressions after winsorizing underwriter net purchases at the 5% and 95% levels. Third, we have started our measurement of net purchases in the first full week after the IPO, rather than the second week. (Main results are reported based on a measurement interval beginning in week two because price support activities potentially continue through week one). Fourth, we have re-estimated regressions eliminating cases where there was price support.¹⁵ Fifth, instead of using net purchases relative to shares outstanding, we use dollar net purchases. In all cases, results are qualitatively similar to those reported in the paper. We continue to find that net purchases by the

¹⁴ A number of studies have empirically examined various dimensions of the IPO auction process. Chiang, Qian, and Sherman (2010) and Chiang, Hirshleifer, Qian, and Sherman (2011) find that retail investors exhibit irrational behaviors in auctions, for example collecting insufficient information about the companies, but institutional investors do not suffer from similar biases. DeGeorge, Derrien, and Womack (2007, 2010) and Lowry Officer and Schwert (2010) find that the auction mechanism results in more accurate price of private firms, compared to bookbuilding. Jagannathan, Jirnyi, and Sherman propose a hybrid auction as a mechanism that provides the best incentives.

¹⁵ Price support is performed if the lead underwriter uses proceeds in the price stabilization account to buy the IPO stock. There were 32 IPOs in which the lead used the price stabilization account to purchase shares.

lead underwriter subsequent to the IPO are positively related to subsequent abnormal returns. However, we find no similar relations when we look at net purchases by other members of the bookbuilding syndicate or when we look at auction IPOs.

We have also examined alternative measurement periods, for example looking at net purchases over the first one or two months (instead of three months) after the IPO. We continue to find a positive, albeit statistically weaker, relation between lead underwriter net purchases and subsequent returns. This is consistent with inferences from Figure 2, which showed that underwriters trade these IPO stocks with elevated frequency (compared to the frequency with which they trade stocks of mature firms) throughout the first three months following the IPO. To the extent that underwriters' trades throughout this period are based on a mosaic of information, isolating the trades over a smaller subperiod is only capturing a subset of the relevant information and thus less likely to be significantly related to subsequent returns.

For syndicate members, we conduct the following robustness checks. First, we look at only those co-underwriters with non-zero net purchases. Second, for each IPO, we consider the possibility that those with the best information are likely to trade the most aggressively, and thus we include only the co-underwriter with the largest net purchases. However, in no case do we find a significant relation between post-IPO returns and the net purchases of either co-underwriters or other syndicate members.

7. Conclusion

Our results suggest that lead underwriters have an information advantage among firms that they have taken public via bookbuilding, an advantage that enables them to divest positions in those IPOs that subsequently perform worse in the aftermarket. The extent of this advantage appears to vary in predictable ways across firm types, being greater among firms where the level

of information asymmetry is greatest and where underwriters have the most prior industry experience.

In contrast, we find no evidence of similar advantages among other syndicate members of bookbuilding IPOs. Moreover, we likewise find no evidence of similar advantages among either the lead underwriters or the other syndicate members in auction IPOs. The unique advantages of underwriters in bookbuilding IPOs are consistent with the greater role they play in bringing these companies public.

References

- Aggarwal, R., Prabhala, N., Puri, M., 2002. Institutional allocation in initial public offerings: empirical evidence. *Journal of Finance* 57 1421 – 1442.
- Barber, B., Lyon, J., Tsai, C., 1999. Improved methods for tests of long-run abnormal stock returns. *Journal of Finance* 54, 165-201.
- Bodnaruk, A., Massa, M., Siminov, A., 2009. Investment banks as insiders and the market for corporate control. *Review of Financial Studies* 22, 4989-5026.
- Chemmanur, T., Hu, G., H. J., 2010. The role of institutional investors in initial public offerings. *Review of Financial Studies* 23, 4496-4540.
- Chiang, Y., Hirshleifer, D., Qian, Y., Sherman, A., 2011. Do investors learn from experience? Evidence from frequent IPO investors. *Review of Financial Studies* 24, 1560 – 1589.
- Chiang, Y., Y. Qian, and A. Sherman. 2010. Endogenous Entry and Partial Adjustment in IPO Auctions: Are Institutional Investors Better Informed? *Review of Financial Studies* 23, 1200–30.
- DeGeorge, F., Derrien, F., Womack, K., 2007. Analyst hype in IPOs: explaining the popularity of book-building. *Review of Financial Studies* 20, 1021-1058.
- DeGeorge, F., Derrien, F., Womack, K., 2010. Auctioned IPOs: The U.S. evidence. *Journal of Financial Economics* 98, 177-194.
- Doidge, C., Karolyi, A., Stulz, R., 2013. Financial globalization and the rise of IPOs outside the US. *Journal of Financial Economics* 110, 546-573.
- Ellis, K., Michalek, R., O'Hara, M., 2000. When the underwriter is the market maker: an examination of trading in the IPO aftermarket. *Journal of Finance* 55, 1039-1074.
- Field, L., Lowry, M., 2009. Institutional versus individual investment in IPOs: the importance of firm fundamentals. *Journal of Financial and Quantitative Analysis* 44, 484-516.
- Fjesme, S., 2013. Laddering in initial public offering allocations. Working paper.
- Goldstein, M., Irvine, P., Puckett, A., 2011. Purchasing IPOs with commissions. *Journal of Financial and Quantitative Analysis* 46, 1193-1225.
- Griffin, J., Shu, T., Topaloglu, S., 2012. Examining the dark side of financial markets: do institutions trade on information from investment bank connections? *Review of Financial Studies* 25, 2155-2188.
- Haushalter, D., Lowry, M., 2011. When do banks listen to their analysts? Evidence from mergers and acquisitions. *Review of Financial Studies* 2011, 321-357.

- Ivashina, V., Sun, Z., 2011. Institutional stock trading on loan market information. *Journal of financial Economics* 100, 284-303.
- Jagannathan, R., Jirnyi, A., Sherman, A., 2014. Share auctions of initial public offerings: global evidence. *Journal of Financial Intermediation*, forthcoming.
- Kedia, S., and X. Zhou. 2014. Informed Trading Around Acquisitions: Evidence from Corporate Bonds. *Journal of Financial Market* 18, 182–205.
- Liu, X., Ritter, J., The economic consequences of IPO spinning. *Review of financial Studies* 23, 2024-2059.
- Loughran, T., Ritter, J., 2002. Why don't issuers get upset about leaving money on the table in IPOs? *Review of Financial Studies* 15, 413-443.
- Lowry, M., Haushalter, D., 2011. When do banks listen to their analysts? Evidence from mergers and acquisitions. *Review of Financial Studies* 24, 321-357.
- Lowry, M., Officer, M., Schwert, G.W., 2010. The variability of IPO initial returns. *Journal of Finance* 65, 425-465.
- Massa, M., Rehman, Z., 2008. Information flows within financial conglomerates: evidence from the banks-mutual funds relation. *Journal of Financial Economics* 89, 288-306.
- Nimalendran, M., Ritter, R., Zhang, D., 2007. Do today's trades affect tomorrow's IPO allocations? *Journal of Financial Economics* 84, 87-109.
- Reuter, J., 2006. Are IPO allocations for sale? Evidence from mutual funds. *Journal of Finance* 61, 2289-2324.
- Ritter, J., Zhang, D., 2008. Affiliated mutual funds and the allocation of initial public offerings. *Journal of Financial Economics* 86, 337-368.
- Sherman, A., 2000. IPOs and long term relationships: an advantage of book building. *Review of Financial Studies* 13, 697-714.
- Sherman, A., 2005. Global trends in IPO methods: book building versus auctions with endogenous entry. *Journal of Financial Economics* 78, 615-649.
- Yan, X., Zhang, Z., 2009. Institutional investors and equity returns: are short-term institutions better informed? *Review of Financial Studies* 22, 893-924.

Table 1: Samples of Auctions and Bookbuilt Offerings in Taiwan

The sample consists of 306 companies that went public via either auction or bookbuilding in Taiwan in the 1996 – 2011 period. Panel A shows the time distribution of the IPOs. Panel B provides mean and median firm characteristics, for bookbuilding and auction IPOs. Firm age equals the number of years between incorporation and the IPO filing date. Pre-IPO assets, market capitalization and proceeds are expressed in millions of inflation-adjusted New Taiwan dollars (2011 NT\$), all deflated to be constant 2011 NT dollars. UW market share is the lead underwriter’s market share based on IPO proceeds in the previous three years. For bookbuilt IPOs, the market capitalization is based on the closing price on the first trading day; for auction IPOs, the variable is based on the closing price on the first non-hit day. Relative shares offered equals shares offered as a fraction of total shares outstanding prior to the IPO. For bookbuilt IPO, the Offer price/EPS ratio is defined as the offer price divided by pre-IPO earnings per share (EPS); for auction IPOs, the ratio equals the quantity-weighted average winning price divided by pre-IPO earnings per share. UW market share is the lead underwriter’s market share based on IPO proceeds in the previous three years. For bookbuilt IPOs, the price revision is defined as the offer price/midpoint of the price range -1; for auction IPOs, it is the quantity-weighted average winning price/reserve price -1. Initial return equals the percent difference between the offer price and the closing price on the first day of trading for the bookbuilding sample, and the percent difference between the weighted average offer price (weighted by number of shares bought at each price) and the closing price on the first day on which the stock did not hit the regulatory return limit (typically day 2 or 3 after the offer date) for auctions. Leverage equals pre-IPO interest bearing debt divided by pre-IPO assets. Companies in which one or more venture capitalists invest prior to the IPO are considered to be venture backed. Companies are categorized by whether or not they operate in the electronics. Companies list shares on either the Taiwan Stock Exchange (TSE) or the Gre Tai Securities Market (GTSE), and we tabulate the frequency of the former. Finally, the lead underwriter is responsible for setting the price and allocating the shares, while other syndicate members only participate in selling.

Panel A: Time-series distribution of sample

Year	Number of Bookbuilding IPOs	Number of Auction IPOs
1996		7
1997		23
1998		23
1999		19
2000		11
2001		3
2002		2
2003		
2004		
2005	8	
2006	42	
2007	51	
2008	33	
2009	37	
2010	35	
2011	12	

Panel B: Firm and Offer Characteristics

	Bookbuilding IPOs <i>n</i> =218 Mean (Median)	Auction IPOs <i>n</i> =88 Mean (Median)
Firm age	13.9 (11.0)	16.5 (14.5)
Pre-IPO assets (in millions NT\$)	2,932.6 (1,261.5)	5,753.8 (2,234.7)
Market Cap (millions 2011 NT\$)	8,292.8 (3,452.2)	12,046.5 (5,799.8)
Proceeds (millions 2011 NT\$)	495.3 (210.9)	674.4 (465.1)
Relative shares offered (%)	10.4 (10.5)	14.2 (14.2)
Offer Price / EPS	18.4 (11.7)	31.5 (25.3)
Leverage (%)	36.2 (35.0)	43.5 (42.3)
% listed on TSE	30.7	56.8
% VC Backed	56.4	44.3
# Lead Underwriters per deal	1	1
# Other syndicate members per deal	3.4 (3.0)	8.5 (7.0)
Underwriter Market Share	7.2 (4.6)	10.3 (4.1)
Price Revision (%)	0.1 (0.0)	N/A
Initial Return (%)	55.3 (36.7)	6.6 (3.1)

Table 2: Abnormal returns Post-IPO

The sample consists of 306 IPOs in Taiwan over the 1996 – 2011 period. Abnormal returns are measured in three ways: market-adjusted buy-and-hold abnormal returns (using the value-weighted market index return as the benchmark), style-adjusted abnormal returns (using matched firms, based on industry, size and BM, as the benchmark), and the monthly alpha of the calendar time portfolio (using Fama-French-Carhart 4-factor model). We measure returns over four intervals: the initial 3 month period over which net purchases are measured (weeks 2 – 13), and the subsequent six month, one-year, and two-year periods beginning after that (i.e., beginning in week 14). Asterisks in the top and middle portions of the table denote whether the returns of the auction sample are significantly different from those of the bookbuilding sample. In the bottom portion of the table, t-statistics shown in parentheses and the associated parentheses denote whether the alpha is significantly different from zero.

	Bookbuilt Offerings (n=218)	Auctions (n=88)
Market-adjusted abnormal returns (%)		
Initial 3-month period	-0.44	2.69
Subsequent 6-months	-0.77	13.31***
Subsequent 1-year	1.79	23.77**
Subsequent 2-years	0.05	16.96*
Style-adjusted abnormal returns (%)		
Initial 3-month period	-3.79	2.48
Subsequent 6-months	-4.21	16.56***
Subsequent 1-year	-8.39	20.65**
Subsequent 2-years	-8.57	31.25***
Monthly alpha from 4-factor calendar time portfolio regressions (%)		
Initial 3-month period	-2.816** (-2.74)	0.148 (0.44)
Subsequent 6-months	-1.769** (-2.10)	-0.035 (-0.13)
Subsequent 1-year	-1.622** (-2.52)	-0.133 (-0.7)
Subsequent 2-years	-1.271** (-2.31)	-0.161 (-0.96)

Table 3: Correlations between Lead Underwriter net purchases, firm and offer characteristics

	Correlation with Lead UW Net Purchases
<i>Firm Characteristics</i>	
Pre-IPO Assets	0.042
VC dummy	0.067
TSE dummy	-0.071
Relative shares offered	-0.014
Leverage	-0.024
Offer price / EPS	0.036
Price Revision	-0.069
<i>Post-IPO Returns</i>	
6-mth AR's	0.176 ^{***}
1-year AR's	0.192 ^{***}
2-yr AR's	0.184 ^{***}
<i>Syndicate Bank Characteristics</i>	
Co-manager net purchases	0.003
Underwriter Market Share	0.001
Pre-IPO Holdings	-0.343 ^{***}

Table 3: Do underwriters in Bookbuilt offerings have private information?

The sample consists of 218 bookbuilding IPOs in Taiwan over the 2005 – 2011 period. Lead underwriter purchases equal cumulated net purchases of the IPO stock by the lead over weeks 2 – 13 after the IPO, deflated by shares outstanding. Abnormal returns in columns 1, 2 and 3 equal firm returns minus returns on the value-weighted market index over the 6 month, 1 year, and 2 year periods, respectively, where each period commences at week 14. Abnormal returns in columns 4 – 6 are style adjusted: among firms that have been traded and have had no SEO for at least three years, we form four size groups based on market capitalization. Among firms in the same size group as the sample firm, the firm with the closest market-to-book ratio as the sample firm is chosen as the matching firm, and abnormal returns equal returns on the sample firm minus returns on the matching firm. Lead UW pre-IPO holding equals the dollar value of the lead underwriter holdings, measured prior to the IPO. All other variables are defined in Table 2. Year fixed effects are included, and robust t-statistics are reported in parentheses.

	Market-adjusted abnormal returns			Style-adjusted abnormal returns		
	6 Month	1 Year	2 Year	6 Month	1 Year	2 Year
Intercept	24.81 (0.78)	136.43** (2.31)	160.13* (1.84)	1.36 (0.03)	111.91 (1.46)	134.68 (1.26)
Lead UW purchases	10.02* (1.74)	33.05*** (3.11)	37.27** (2.4)	7.21 (0.89)	33.27** (2.41)	41.41** (2.18)
Log(assets)	-5.13 (-1.4)	-8.79 (-1.29)	-8.89 (-0.88)	0.60 (0.12)	-9.24 (-1.05)	-10.10 (-0.82)
VC dummy	-0.05 (-0.01)	-14.91* (-1.69)	-22.60* (-1.74)	8.00 (1.19)	-3.38 (-0.29)	-20.21 (-1.27)
TSE dummy	-1.41 (-0.22)	-6.46 (-0.54)	4.08 (0.23)	-13.88 (-1.53)	-4.55 (-0.29)	0.69 (0.03)
Rel. Shrs Offered	0.97 (0.85)	-0.82 (-0.39)	-2.19 (-0.71)	-0.09 (-0.06)	-4.03 (-1.47)	-3.30 (-0.87)
Leverage	0.24 (1.41)	0.04 (0.12)	0.32 (0.71)	0.13 (0.53)	0.40 (1)	0.78 (1.41)
Offer price / EPS	0.27*** (3.11)	0.10 (0.62)	0.03 (0.14)	0.32** (2.56)	0.14 (0.65)	0.13 (0.44)
Previous IPO IR	-0.13 (-0.75)	-1.10*** (-3.33)	-1.22** (-2.52)	-0.07 (-0.29)	-0.59 (-1.37)	-0.85 (-1.43)
Price revision	-0.38 (-0.73)	-1.97** (-2.05)	-2.84*** (-2.02)	-0.43 (-0.58)	-2.90** (-2.32)	-4.69*** (-2.71)
UW market share	-14.85 (-0.49)	-51.05 (-0.92)	-94.43 (-1.16)	-48.63 (-1.15)	-27.05 (-0.37)	-131.78 (-1.32)
Log(Lead pre-IPO holding)	-2.11 (-1.12)	-0.13 (-0.04)	0.86 (0.17)	-4.60* (-1.74)	-0.42 (-0.09)	0.94 (0.15)
N Obs.	214	214	212	214	214	212
R-square	0.18	0.26	0.23	0.10	0.13	0.15

Table 4: Calendar Time Portfolio Abnormal Returns, bookbuilding IPOs

All of the bookbuilding IPOs in the 2005 – 2011 period are put into one of two portfolios based on whether the net buys of the lead underwriter over weeks 2 – 13 following the IPO are above or below the median. Each IPO is then followed for twelve months, beginning in week 15. These returns are aggregated in calendar time, such that an IPO enters the portfolio in the 14th week following its IPO, and exits the portfolio one year later. Returns on the high (low) net buy portfolio represent average returns net of the risk-free rate on all offers in the high (low) net buy group over this one year period.

	High Net Buy	Low Net Buy	High minus Low
Intercept	0.001 (0)	-2.82*** (-3.61)	2.82** (2.49)
RMRF	1.30*** (10.27)	1.23*** (10.4)	0.07 (0.39)
SMB	0.63*** (2.77)	0.73*** (3.46)	-0.11 (-0.35)
HML	-0.68** (-2.36)	-0.45* (-1.68)	-0.23 (-0.58)
Momentum	-0.33 (-1.65)	-0.33* (-1.76)	0.00 (0)
R-square	0.69	0.71	0.008

Table 5: Do other syndicate members in Bookbuilt offerings have private information?

The sample consists of 218 bookbuilding IPOs in Taiwan over the 2005 – 2011 period. Other syndicate purchases equal cumulated net purchases of the IPO stock by the lead over weeks 2 – 13 after the IPO. Abnormal returns in columns 1, 2 and 3 equal firm returns minus returns on the value-weighted TSE index over the 6 month, 1 year, and 2 year periods, respectively, where each period commences at week 14. Abnormal returns in columns 4 – 6 are style adjusted: Among firms that have been traded and have had no SEO for at least three years, we form four size groups based on market capitalization. Among firms in the same size group as the sample firm, the firm with the closest market-to-book ratio as the sample firm is chosen as the matching firm, and abnormal returns equal returns on the sample firm minus returns on the matching firm. All variables are defined in Table 2. Year fixed effects are included, and robust t-statistics are reported in parentheses.

	Market-adjusted abnormal returns			Style-adjusted abnormal returns		
	6 Month	1 Year	2 Year	6 Month	1 Year	2 Year
Intercept	23.98 (0.74)	123.22** (2.04)	148.40* (1.68)	3.05 (0.07)	107.74 (1.4)	120.72 (1.12)
Other Syndicate purchases	25.38 (0.7)	22.73 (0.33)	80.50 (0.82)	15.31 (0.3)	134.25 (1.54)	77.93 (0.65)
Log(assets)	-5.32 (-1.44)	-7.57 (-1.1)	-7.67 (-0.76)	-0.12 (-0.02)	-8.92 (-1.01)	-8.67 (-0.7)
VC dummy	0.35 (0.07)	-13.74 (-1.52)	-21.18 (-1.62)	8.33 (1.22)	-2.09 (-0.18)	-18.64 (-1.16)
TSE dummy	-3.38 (-0.52)	-9.63 (-0.79)	0.90 (0.05)	-16.78* (-1.84)	-7.94 (-0.51)	-2.86 (-0.13)
Rel. Shrs Offered	0.83 (0.71)	-1.02 (-0.47)	-2.50 (-0.8)	-0.25 (-0.15)	-4.46 (-1.61)	-3.62 (-0.94)
Leverage	0.25 (1.44)	0.01 (0.02)	0.30 (0.66)	0.15 (0.62)	0.42 (1.02)	0.76 (1.35)
Offer price / EPS	0.27*** (3.04)	0.12 (0.7)	0.05 (0.2)	0.30** (2.44)	0.14 (0.68)	0.15 (0.5)
Previous IPO IR	-0.13 (-0.71)	-1.01*** (-2.99)	-1.12** (-2.32)	-0.09 (-0.36)	-0.55 (-1.27)	-0.74 (-1.24)
Price revision	-0.48 (-0.91)	-2.19** (-2.22)	-3.08** (-2.16)	-0.54 (-0.73)	-3.13** (-2.49)	-4.96*** (-2.84)
UW market share	-13.12 (-0.43)	-53.08 (-0.93)	-99.09 (-1.21)	-43.38 (-1.02)	-30.63 (-0.42)	-136.72 (-1.36)
N Obs	214	214	212	214	214	212
R-square	0.15	0.22	0.21	0.08	0.11	0.13

Table 6: Does dealers' trading predict earnings announcements?

The sample consists of the 140 bookbuilding IPOs in Taiwan over the 2005 – 2011 period, for which IPO firms' first annual earnings announcements after the IPO are available. The dependent variable equals the cumulative abnormal return (CAR) over days -2 to +2 relative to the quarterly earnings announcement. Column 1 is restricted to just the first quarterly earnings announcement, and Column 2 includes the first four quarterly earnings announcements. Independent variables represent net purchases of the IPO stock between the second week after the IPO and the week prior to the earnings by the lead underwriter, other syndicate members, and non-syndicate members, respectively. T-statistics are reported in parentheses.

	CAR at quarter 1	CAR at quarters 1 - 4
Intercept	-0.20 (-0.31)	-1.05*** (-3.52)
Net purchases by Lead Underwriter	1.97 (0.92)	1.75* (1.75)
Net purchases by other syndicate members	2.42 (0.27)	0.74 (0.17)
Net purchases by non-syndicate members	6.06 (0.09)	15.19 (0.47)
N Obs	174	696
R-square	0.005	0.005

Table 7: Do underwriters trade at advantageous prices?

For each lead underwriter purchase (column 1) and sale (column 2) of the IPO stock, we compare the price at which the stock was bought or sold at to the average weekly closing price. In columns 1 and 2, we compute the average differences across all transactions during weeks 2 – 5 after the IPO, during weeks 6 – 9 after the IPO, and during weeks 10 – 13 after the IPO, and ***, **, and * denote that the average is significantly different from zero at the 1%, 5%, and 10% levels. Column 3 shows the t-statistic testing whether the average (selling price – average weekly closing price) is significantly different than the average (buying price – average weekly closing price).

	Avg Buy price – avg weekly closing price	Avg Sell price – avg weekly closing price	T-stat for difference
Weeks 2 - 5	-0.40%	0.65% **	2.24**
Weeks 6 - 9	-0.09%	0.68% *	-0.75
Weeks 10 - 13	0.03%	0.32%	-0.41
Weeks 2 - 13	-0.23%	0.58% ***	2.15**

Table 8: Sources of underwriter advantage in bookbuilt offerings

Each cell in this table represents the coefficient, β_1 from the following regression:

$$ARs_t = \beta_0 + \beta_1 \text{LeadUWN} \text{NetPurchases}_{\text{wk } 2 \text{ to } 13} + \beta_2 \text{Log}(\text{assets}) + \beta_3 \text{VCDummy} + \beta_4 \text{TSEDummy} + \beta_5 \text{RelativeSize} + \beta_6 \text{Leverage} + \beta_7 \text{PE} + \beta_8 \text{PreviousIPOir} + \beta_9 \text{Pricerevision} + \beta_{10} \text{UWmarketshare} + \beta_{11} \log(\text{Lead pre-IPO Holding}) + \varepsilon$$

where ARs are measured as style-adjusted returns, as defined in Table 3, over six months (col. 1), one year (col. 2), and two years (col. 3). In each specification, the measurement of ARs commences at week 14, i.e., following the calculation period of underwriter purchases. Year fixed effects are included, and robust t-statistics are included in parentheses.

Panel A: Underwriters' information advantage conditional on extent of firm information asymmetry

	6 Month Abnormal Returns	1 Year Abnormal Returns	2 Year Abnormal Returns	Number Obs
Small MktCap	16.19** (2.07)	57.61*** (3.29)	62.72*** (3.56)	109
Large MktCap	0.75 (0.09)	0.47 (0.04)	3.69 (0.13)	105
Small Assets	14.04* (1.78)	50.90*** (2.92)	45.64** (2.02)	109
Large Assets	3.93 (0.44)	8.10 (0.72)	18.73 (0.88)	105
Small Proceeds	16.60** (2)	53.32*** (3.01)	49.24** (2.23)	109
Large Proceeds	3.82 (0.44)	9.76 (0.91)	22.99 (0.94)	105

Panel B: Underwriters' information advantage conditional on experience

	6 Month Abnormal Returns	1 Year Abnormal Returns	2 Year Abnormal Returns	Number Obs
Low UW industry experience	9.08 (0.68)	21.22 (0.86)	6.52 (0.16)	108
High UW industry experience	11.96* (1.82)	34.17*** (2.64)	38.14** (2.24)	106

Panel C: Underwriters' information advantage conditional on retail participation

	6 Month Abnormal Returns	1 Year Abnormal Returns	2 Year Abnormal Returns	Number Obs
Small Retail Tranche	5.72 (0.63)	14.52 (0.90)	19.31 (0.68)	105
Large Retail Tranche	17.20** (2.51)	34.71** (2.28)	43.13** (2.35)	109
Low Retail Subscription Ratio	-0.37 (-0.04)	-7.58 (-0.39)	10.16 (0.30)	99
High Retail Subscription Ratio	24.03** (2.28)	80.31*** (4.86)	89.15*** (4.93)	102

Table 9: Do underwriters in Auction offerings have private information?

The sample consists of the 87 auction IPOs in Taiwan over the 1996 – 2002 period for which we have complete data. Lead underwriter purchases equal cumulated net purchases of the IPO stock by the lead over weeks 2 – 13 after the IPO. Abnormal returns in columns 1, 2 and 3 equal firm returns minus returns on the value-weighted TSE index over the 6 month, 1 year, and 2 year periods, respectively, where each period commences at week 14. Lead UW pre-IPO holding equals the dollar value of the lead underwriter holdings, measured prior to the IPO. All other variables are defined in Table 2. Year fixed effects are included, and robust t-statistics are reported in parentheses.

	Market-adjusted abnormal returns			Style-adjusted abnormal returns		
	6 Month	1 Year	2 Year	6 Month	1 Year	2 Year
Intercept	69.59 (0.81)	164.39 (1.01)	-4.59 (-0.03)	1.64 (0.02)	35.88 (0.24)	-69.19 (-0.42)
Lead UW purchases	13.87 (0.86)	-20.47 (-0.67)	12.39 (0.43)	7.24 (0.46)	-25.32 (-0.89)	9.72 (0.31)
Log(assets)	-7.65 (-0.83)	-24.11 (-1.39)	7.55 (0.45)	-5.66 (-0.63)	-13.57 (-0.83)	19.70 (1.12)
VC dummy	-6.94 (-0.54)	-14.51 (-0.6)	-44.17* (-1.89)	-10.31 (-0.82)	-8.73 (-0.38)	-42.07* (-1.69)
TSE dummy	1.31 (0.08)	23.90 (0.76)	-22.34 (-0.74)	-2.20 (-0.14)	3.07 (0.1)	-41.05 (-1.29)
Rel. Shrs Offered	-0.83 (-0.56)	-1.51 (-0.54)	2.01 (0.75)	0.30 (0.21)	0.25 (0.1)	3.41 (1.19)
Leverage	-0.18 (-0.39)	0.01 (0.01)	-1.27 (-1.55)	-0.02 (-0.04)	0.03 (0.03)	-1.45* (-1.67)
Offer price / EPS	0.09 (0.36)	0.20 (0.42)	-0.67 (-1.45)	0.01 (0.03)	0.09 (0.2)	-0.93* (-1.91)
Previous IPO IR	-1.77* (-1.73)	0.45 (0.24)	-0.83 (-0.45)	-1.60 (-1.61)	-0.29 (-0.16)	-1.30 (-0.66)
UW market share	-0.10 (-0.2)	0.53 (0.57)	0.47 (0.52)	-6.58 (-0.14)	34.96 (0.4)	68.12 (0.72)
Log(Lead UW pre-IPO holding)	0.80 (0.27)	6.94 (1.22)	1.19 (0.22)	1.28 (0.44)	5.52 (1.03)	0.94 (0.16)
N Obs	87	87	87	87	87	87
R-square	0.13	0.09	0.13	0.14	0.07	0.17

Table 10: Calendar Time Portfolio Abnormal Returns, auction IPOs

All auction IPOs between 1996 and 2002 are put into one of two portfolios based on whether the net buys of the lead over weeks 2 – 13 following the IPO are above or below the median. Each IPO is then followed for twelve months, beginning in week 14. These returns are aggregated in calendar time, such that an IPO enters the portfolio in the 15th week following its IPO, and exits the portfolio one year later. Returns on the high (low) net buy portfolio represent average returns net of the risk-free rate on all offers in the high (low) net buy group over this one year period.

	High Net Buy	Low Net Buy	High minus Low
Intercept	-0.11 (-0.44)	-0.28 (-0.83)	0.42 (0.9)
RMRF	0.23*** (8.42)	0.26*** (7.2)	-0.02 (-0.33)
SMB	0.13*** (2.8)	0.26*** (3.72)	-0.15 (-1.61)
HML	-0.15*** (-4.64)	-0.11*** (-2.82)	-0.03 (-0.49)
Momentum	-0.07 (-1.51)	-0.11* (-1.85)	0.05 (0.49)
Adj R-squared	0.67	0.52	0.00

Figure 1: Returns on Taiwan Stock Exchange (TSE) and Gre Tai Market (GTSE)

This figure shows the cumulative monthly value-weighted market returns, over the January 1996 – June 2012 period. Returns are calculated across both the Taiwan Stock Exchange, which includes more mature and established companies, and the Gre Tai Market, which includes younger and less established companies.

Cumulative Monthly Value Weighted Market Return: January 1996 – June 2012

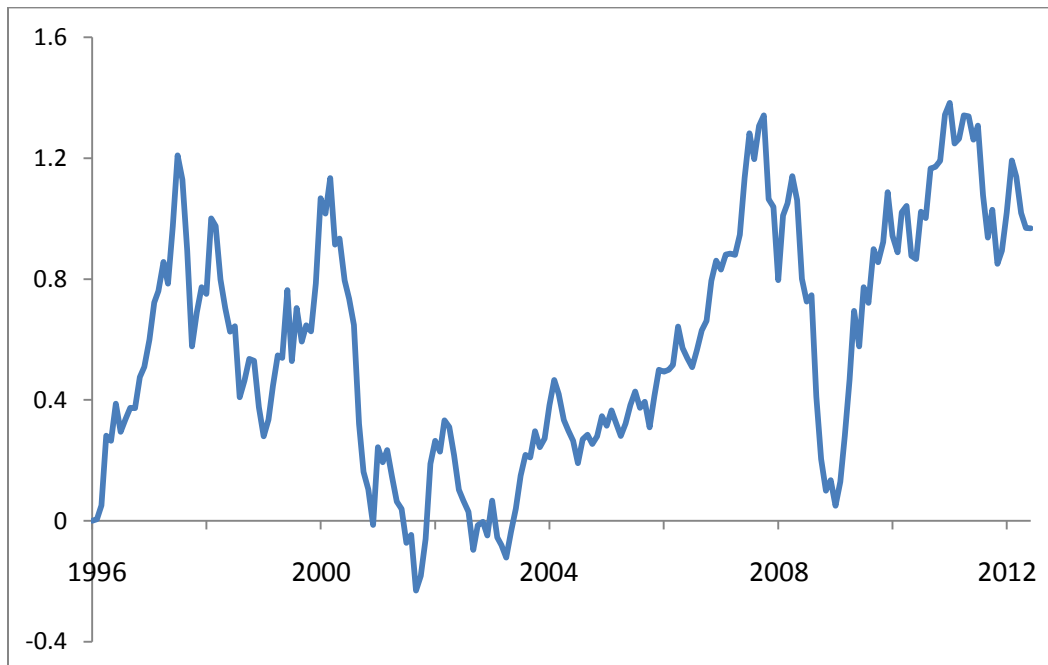
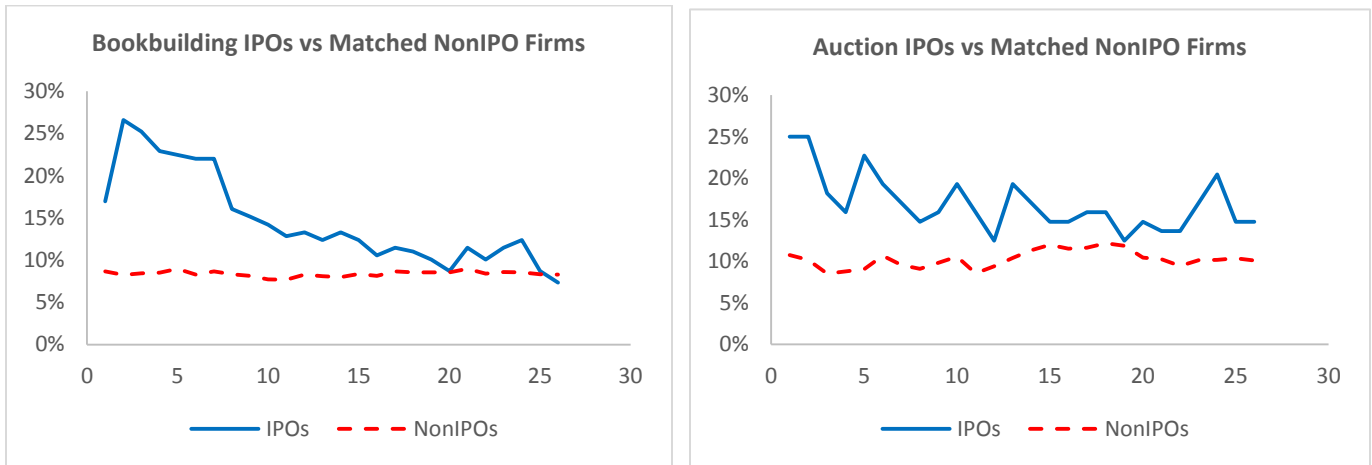


Figure 2: Trading by lead underwriters, in IPO vs non-IPO stocks

The samples consists of 218 bookbuilding IPOs and 88 auction IPOs. For each offering, we tabulate the percent of lead underwriters that buy or sell each week (Panel A) and the sum of lead underwriter purchases and sales, as a percent of thousands of shares outstanding (Panel B). These statistics are computed for the IPO firm and for matched non-IPO firms. The matched sample is computed as follows: for each IPO we obtain data on all firms that have been publicly traded for at least three years, have not had an SEO within this period, and are in the same industry and the same size quartile. These statistics are averaged across all deals, for each of the 25 weeks following the IPO.

Panel A: % of Lead Underwriters that Buy or Sell each Week



Panel B: Average Lead Underwriter Σ (Purchases, Sales) as a % of shares outstanding (000s)

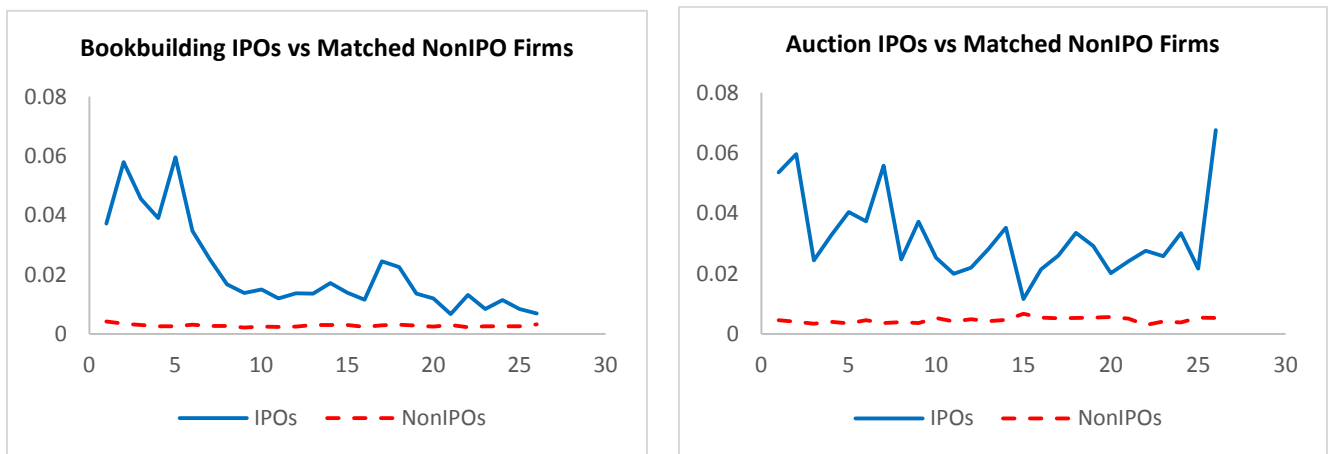
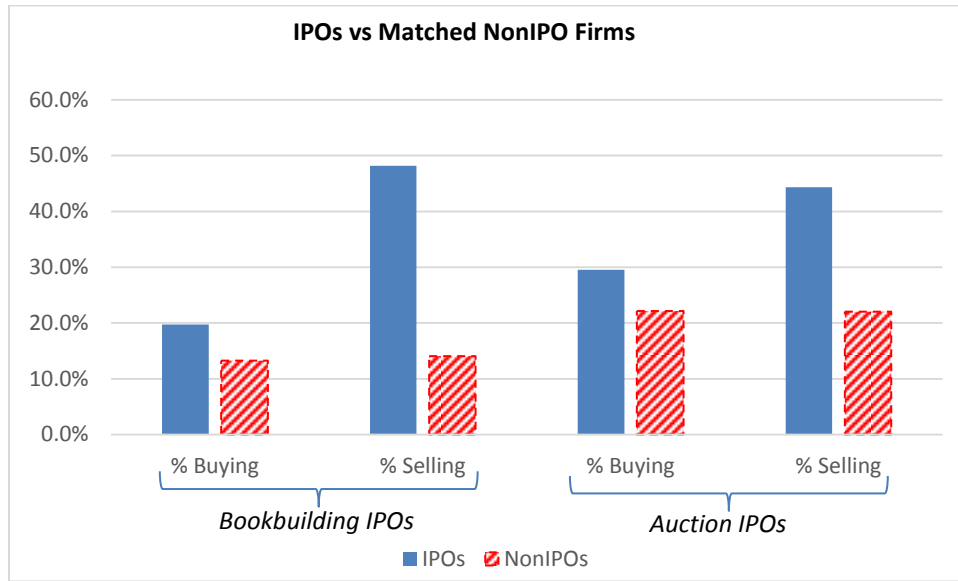


Figure 3: Buying vs Selling of Lead Underwriters

The samples consists of 218 bookbuilding IPOs and 88 auction IPOs. For each offering, Panel A shows the percent of lead underwriters that buy across weeks 2 - 13 and the percent that sell over this same period. Panel B shows lead underwriter purchases as a fraction of shares outstanding over weeks 2 – 13, and lead underwriter sales as a fraction of shares outstanding over the same period. In each Panel, averages for bookbuilding IPOs and for auction IPOs are tabulated separately. These statistics are computed for the IPO firm and for matched non-IPO firms. The matched sample is computed as follows: for each IPO we obtain data on all firms that have been publicly traded for at least three years, have not had an SEO within this period, and are in the same industry and the same size quartile.

Panel A: % of lead underwriters buying, and % of lead underwriters selling, weeks 2 - 13



Panel B: Average Lead Underwriter Purchases as % of shares outstanding, sales as % of shares outstanding, wks 2–13.

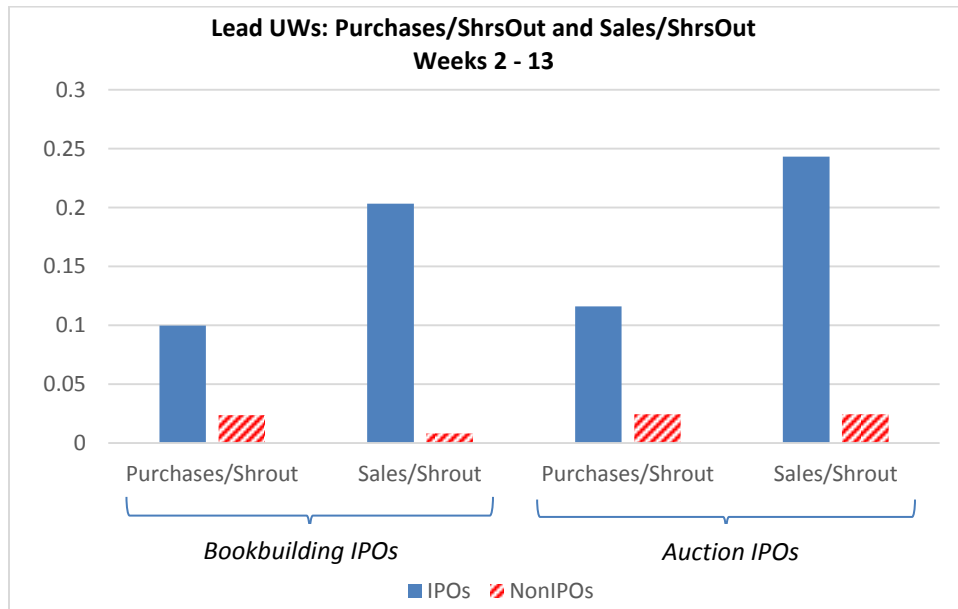
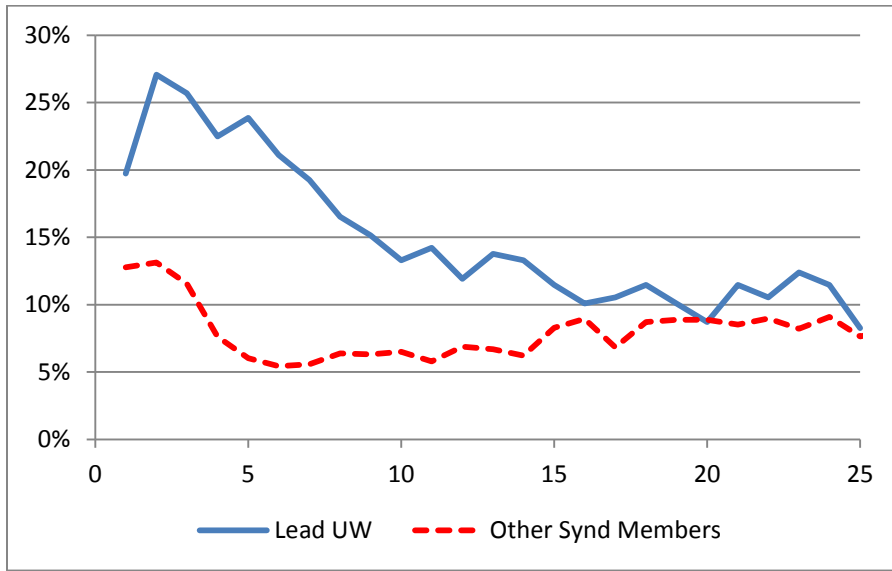


Figure 4: Trading by lead underwriters vs other syndicate members, in IPO stocks

The samples consists of 218 bookbuilding IPOs. Panel A shows the percent of lead underwriters and the average percent of other syndicate members that buy or sell each week. Panel B shows the sum of purchases and sales, as a percent of thousands of shares outstanding, for both the lead underwriter and the other syndicate members. These statistics are averaged across all deals, for each of the 25 weeks following the IPO.

Panel A: % of Lead Underwriters vs. Other Syndicate Members that Buy or Sell each Week



Panel B: Average Σ (Purchases, Sales) as a % of shares outstanding (000s)

