The Role of IPO Underwriting Syndicates: Pricing, Information Production, and Underwriter Competition

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ABSTRACT

We examine syndicates for 1,638 IPOs from January 1997 through June 2002. We find strong evidence of information production by syndicate members. Offer prices are more likely to be revised in response to information when the syndicate has more underwriters and especially more co-managers. More co-managers also result in more analyst coverage and additional market makers following the IPO. Relationships between underwriters are critical in determining the composition of syndicates, perhaps because they mitigate free-riding and moral hazard problems. While there appear to be benefits to larger syndicates, we discuss several factors that may limit syndicate size.

ALMOST ALL IPO SYNDICATES INCLUDE ONE or more co-managers and several non-managing underwriters. Despite this, there has been almost no recent academic research on the functions of syndicate members or the determinants of syndicate participation. What determines the structure of an IPO syndicate? What purpose do co-managers and non-managing syndicate members serve? In this paper, we use a sample of 1,638 IPOs from January 1997 through June 2002 to examine these questions.

We find evidence of information production by syndicate members. Specifically, we examine how syndicate structure affects the likelihood and magnitude of offer price revisions in response to information revealed during the filing period. As a proxy for this information, we use the total return from the midpoint of the filing price range to the closing price on the first day of trading. We find that offer prices are more likely to be adjusted up (down) in response to positive (negative) information when the underwriting syndicate is less concentrated

or has more co-managers. We note that upward price revisions generally result in reduced underpricing. However, after controlling for price revisions, we find no additional relation between syndicate structure and IPO underpricing.

Information from co-managers can be conveyed to the book manager in two ways. First, underwriters may relay information about market interest in an IPO directly to the book manager. Underwriters that we spoke with said they often talked to some book managers during the IPO process. Second, co-managers may convey information indirectly through conversations with the issuer, who then uses this information in negotiations with the book manager. Since issuers are more likely to bring up positive information during pricing negotiations, we expect that information conveyed by co-managers "whispering in the issuer's ear" will more likely lead to upward than downward price revisions. Thus, our finding that syndicate structure affects both upward and downward price revisions suggests that co-managers relay information directly to the book manager in at least some cases.

Syndicate members also provide analyst coverage and market-making services in the aftermarket. All else being equal, we show that each additional co-manager in a syndicate results in one additional market maker. We also find that each additional co-manager results in 0.8 additional analysts issuing reports in the three months after an IPO. The number of non-managing syndicate members is not significantly related to either analyst coverage or market making in the aftermarket.

Additional evidence on the importance of analyst coverage comes from our probit model estimates of the determinants of syndicate participation. For large IPOs, we find that having a top-ranked analyst in the issuer's industry significantly increases the likelihood that an underwriter is included in a syndicate either as a co-manager or in a non-managing role. We also find that geography is a significant determinant of syndicate participation. Underwriters are more likely to be included in a syndicate if they are in the same state as the issuer, particularly if the book manager is based elsewhere. This suggests that local underwriters are better able to market an issue to local investors or may be better equipped to assess demand from these investors.

The single strongest determinant of whether an underwriter is included in a syndicate is participation in recent syndicates led by the same book manager. Almost as important is whether the book manager participated in recent offerings managed by the syndicate member. In other words, underwriter relationships are critical. Pichler and Wilhelm (2001) note that syndicate members are required to exert effort that may be difficult to observe, resulting in potential agency problems. We hypothesize that ongoing relationships may reduce these agency problems in syndicates. The importance of relationships suggests that syndicate members are expected to play an active role in selling IPOs, determining IPO value, or providing aftermarket services.

Our results suggest that issuers benefit from including more underwriters and particularly more co-managers in the IPO syndicate. However, syndicate size may be limited for several reasons. First, prestigious book managers and co-managers demand sizeable share allocations in order to participate in an

IPO syndicate. Thus, syndicate size may be limited by the size of the offer and the choice of book manager. In addition, we find that being a co-manager in the IPO significantly increases an underwriter's chances of becoming the book manager in follow-on offerings. As a result of this competition, book managers may actively discourage the inclusion of additional co-managers. The importance of existing underwriter relationships may further limit the set of potential syndicate members. Finally, it may not be costless to add co-managers. At least for small IPOs, we find that underwriting spreads increase as the number of co-managers in the syndicate increases.

We note that our results may not apply to IPO syndicates from other periods. Even during our relatively short sample period, the nature of IPO syndicates changed. Syndicate size decreased significantly from 1997 to 2002 even as offer proceeds increased. Over the same period, the mean number of co-managers per offer rose. Finally, many smaller underwriters disappeared during our sample period, while the proportion of IPOs underwritten by the largest investment banks increased. These patterns are consistent with those documented by Chen and Ritter (2000) and Ljungqvist and Wilhelm (2003) and suggest that the importance and functions of underwriting syndicates may be changing over time.

The rest of the paper is organized as follows. In Section I, we discuss syndicate formation and operation. In Section II, we review potential functions for syndicate members and related empirical hypotheses. We describe our data in Section III. Section IV presents evidence on the determinants of the size and composition of syndicates, while Section V provides evidence on the functions of syndicate members. Section VI addresses the question of the optimal size for syndicates. We summarize our findings and draw conclusions in Section VII.

I. The Formation and Operation of Underwriting Syndicates

Syndicate formation begins with the selection of the book manager (or lead underwriter) by the issuing firm. Competition to be the book manager can be fierce for the largest, most desirable IPOs, as underwriters vie for top positions in underwriting rankings and seek the higher fees associated with the lead position. For these large IPOs, issuing firms can choose from a number of potential book managers. The Securities Industry Association's *Capital Markets Handbook* (2003), the source of much of our discussion in this section, states that general reputation, research support, industry knowledge, and prior relationships are likely to be important factors in the selection of the book manager. For smaller, less desirable IPOs, issuing firms may not have a choice of book managers. Krigman, Shaw, and Womack (2001) report that many issuers choose a book manager because it is the only one that will underwrite their IPO.

If several underwriters participate in the "bake sale" to be the book manager, the issuer is likely to select some to be co-managers. Co-managers may be chosen because of their ability to provide analyst coverage or market making, or because their distribution system complements that of the book manager. Book managers may, on occasion, advise issuers on the best co-managers to include

in a syndicate. They may also affect the choice of co-managers indirectly. Book managers typically set a lower bound on the portion of the fees that they must get to agree to be the book manager, thereby limiting the potential number of co-managers and their allocations. The book manager may also limit the number of co-managers to avoid competition during the IPO process. As one investment banker told us, "if we're the lead, the best number of co-managers is zero."

Both the issuer and book manager choose non-managing syndicate members. These underwriters do less work than co-managers, but are also relatively cheap to include. Underwriters may be included in the syndicate because they have loaned money to the issuer, because of relationships with the customers of the issuer, or because of personal ties between people at the issuing firm and the underwriter. Others get a place in the syndicate because they clear through or purchase research from the book manager, or because the book manager and issuer want minority-owned firms participating in the IPO.

In a typical IPO, the number of shares underwritten varies substantially across syndicate members. These allocations represent the number of shares each syndicate member agrees to buy from the issuer and are listed in the final prospectus. Underwriting allocations for co-managers are usually decided upfront, but allocations for other syndicate members are at the sole discretion of the book manager and are usually assigned at the due diligence meeting, about 48 hours before the IPO becomes effective. In the analysis to follow, we use these underwriting allocations to measure the distribution of shares within the syndicate.

The number of shares each syndicate member is credited with selling is usually very different from the number they underwrite, and is again at the discretion of the book manager. The *Capital Markets Handbook* states that a standard practice in recent years has been for the book manager to credit each syndicate member with selling 10% of its underwriting allocation. However, the actual selling allocation for a syndicate member may vary, if for instance, the syndicate member provides research coverage or other services for the IPO.

Typically, all of the shares to be sold to institutional investors are allocated to an "institutional pot." This central source for institutional sales serves several purposes. First, it allows institutions to establish large positions without placing orders with numerous syndicate members. Second, it gives the book manager a clearer picture of institutional demand. Finally, an institutional pot allows the book manager to ensure that shares are distributed as they see fit. In general, the book manager does most of the marketing to institutions and receives credit for selling most of the shares in the institutional pot. In an increasing number of IPOs, a "jump ball" or competitive pot is used. In these cases, institutions apportion credit for the shares they purchase to one or more of the syndicate members (including the book manager). This provision provides incentives for all syndicate members to exert institutional selling effort. Regardless of whether the institutional pot includes a jump ball portion, the book manager is usually credited with selling the majority of institutional shares, and co-managers receive more institutional selling credits than non-managing syndicate members.

An underwriter's role within the syndicate and its share allocation have a substantial impact on the fees it receives. Chen and Ritter (2000) provide an example of the fee distribution within an underwriting syndicate. The gross spread, which is typically 7% of offer proceeds, is divided between management fees, underwriting fees, and selling concessions. Management fees are shared between the book manager and co-managers, with the book manager typically receiving a larger share. Underwriting fees, less any underwriting and stabilization expenses, are shared among all syndicate members according to the number of shares underwritten. Finally, the selling concession, which is usually about 60% of the gross spread, is divided among syndicate members based on the number of shares each is credited with selling. Since the vast majority of selling credits are assigned to the book manager, and to a lesser extent to the co-managers, this breakdown awards most of the fees to the book manager, with non-managing syndicate members earning only a small fraction of the total fees paid by the issuer.

We show below that ongoing relationships among underwriters play a critical role in syndicate formation. Book managers tend to include underwriters with whom they have worked in the past or with whom they have other business relationships. These relationships may serve to mitigate agency problems within syndicates. For example, underwriters complain that co-managers shirk, do not work with them, and may undermine their efforts with issuing firms.[1] The possibility of future syndicate work may align the incentives of syndicate members.[2] One underwriter told us that it is included in syndicates managed by specific underwriters who "know what we can do."

II. The Potential Functions of Underwriting Syndicates

Practitioners and academics suggest several potential roles for syndicate members. In this section, we discuss these roles and derive related testable predictions.[3]

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[1] Co-managers may also be hurt by the self-serving behavior of book managers. The December 14, 1998 edition of *Investment Dealers Digest* (p. 11) provides an example. NationsBanc Montgomery was the book manager for a secondary stock offering for Flextronics International. After the deal was priced, NationsBanc decided instead to sell it as a block trade, and all co-managers were cut out of their fees. Syndicate members were described as angry and shocked.

[2] Pichler and Wilhelm (2001) observe that the reliance on reputation and relationships in syndicates makes it harder for new firms to break into the business and may allow members to earn quasirents.

[3] The hypotheses discussed in this section generally refer to active functions of syndicate members. Barzel, Habib, and Johnsen (2000) suggest a motivation for including passive syndicate members. In their model, underwriters are included in a syndicate to avoid the costs of excess search. Excess search occurs when securities firms that are not in the syndicate engage in a costly search for information about an IPO's value that allows them to profit from aftermarket trades, but does not result in more accurate pricing of the IPO or better placement of the shares. The formation of syndicates decreases costly excess search by other underwriters and compensates them for remaining passive.

A. *Information Production*

Underwriters are faced with the difficult task of assigning a price to a stock with no prior trading history. One underwriter offered that pricing an IPO is "part art and part science." The science is using comparable traded companies to assign a price to the IPO. The art is determining the market's interest in the offering. Since valuation methods and the choice of comparables are likely to be similar across underwriters, syndicate members are unlikely to play an important role in the science part of the pricing process. However, different underwriters have different investor clienteles. Some firms, like Merrill Lynch are known for their retail investor base. Others, like Goldman Sachs, specialize in institutional clients. Underwriters also specialize by geographic region. Traditionally, Piper, Jaffrey, and Hopwood's customers were based in the Midwest, while Janney Montgomery Scott's customers came from the East coast. Because their customer bases may differ from the book manager's, co-managers', and syndicate members' demand channels may provide the book manager with additional sources of information about market demand for the IPO. If syndication improves information production, we expect larger syndicates to uncover more information between the filing of the preliminary prospectus and the offer date, resulting in more accurately priced IPOs. The information production hypothesis also suggests that issuers or book managers select syndicate members with different client bases.

Even if co-managers do not provide information directly to the book manager, they may affect IPO pricing through their conversations with issuing firms. Because co-managers are concerned with furthering their own interests, competition among underwriters may continue even after selection of the book manager. While participating in the IPO syndicate, co-managers may work to secure a place as lead manager in follow-on offerings or other future underwriting business. In our conversations with underwriters, they suggested that co-managers influence pricing by "whispering in the issuer's ear." For example, a co-manager might tell the issuer that the book manager mispriced the IPO and that "we would have done better for you." The positive information that co-managers convey to the issuer is likely to be used by the issuer to pressure the book manager to revise the price upward during the pricing negotiations. The underwriters we spoke to stressed that this is a significant problem within syndicates.

We note that the role of syndicate members in IPO pricing may differ from offer to offer. Our conversations with underwriters indicate that some book managers discuss an IPO's progress with co-managers and other syndicate members, while other book managers completely ignore their syndicate. The COO of one smaller underwriter we spoke to noted that even as a non-managing syndicate member, their firm is expected to actively participate in selling and conveys information to book managers about demand from smaller institutional investors. When asked how often they speak to book managers when selling IPOs, she said "about twice a day." At a recent New York Stock Exchange conference, the CEO of Veridian provided an example of information

being transferred indirectly through the issuer. During his firm's IPO, he actively sought out a co-manager for information on the market's reception of the offering.

B. *Certification and Underwriter Reputation*

Another potential reason for including underwriters in a syndicate is to provide additional certification of the issuer's quality. The certification hypothesis suggests that reputable underwriters (or auditors) are associated with reduced uncertainty, and as a consequence, with less underpricing.[4] This follows from theories that predict a positive relation between IPO underpricing and the level of asymmetric information or uncertainty about IPO value (e.g., Rock (1986) and Beatty and Ritter (1986)).[5]

We argue that participation by highly reputable syndicate members and especially co-managers may provide additional certification beyond that of the book manager. This certification is meaningful because underwriters may be jointly and severally liable for damage resulting from false or misleading information provided in the IPO registration statement (Beatty and Welch (1996)). An underwriter's appearance "on the cover" may also signal that it competed to be the book manager for the IPO and was then invited to participate by the issuer. If underwriting syndicates provide incremental certification, we expect IPOs with high-quality syndicate members to be less underpriced than other IPOs, all else being equal. This effect should be strongest for IPOs with highly reputable co-managers.

Of course, an underwriter's reputation and ability to certify an IPO is harmed if the underwriter participates in the syndicates of mispriced IPOs. Thus, co-managers as well as book managers have an incentive to make sure that IPOs are correctly priced. In particular, prestigious co-managers may want to see the offering price revised downward if their assessment of market demand indicates that an IPO is overpriced.

C. *Analyst Coverage*

Among the services provided by underwriters, aftermarket analyst coverage is perhaps the most often cited. Practitioner guides to going public counsel potential issuers to select underwriters that can provide good analyst coverage and that will continue to follow the stock in the aftermarket (e.g., Cable

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[4] For a more formal presentation of these arguments, see Booth and Smith (1986), Carter and Manaster (1990), Titman and Trueman (1986), and Balvers, McDonald, and Miller (1988).

[5] Empirical support for the certification hypothesis is mixed. Carter and Manaster (1990) and Carter, Dark, and Singh (1998), among others, find that offers that are taken public by highly reputable underwriters are associated with reduced underpricing. Beatty (1989) finds similar results related to auditor quality, and Balvers et al. (1988) find evidence of significant reductions in underpricing from both underwriter and auditor quality. However, Beatty and Welch (1996) find that the effects of underwriter quality reversed in the 1990s, with high-quality underwriters being associated with higher, rather than lower, underpricing.

(2001)). Academic studies also note the importance of analyst coverage. For example, Krigman et al. (2001) report that issuers cite analyst coverage as an important determinant when selecting underwriters. Chen and Ritter (2000, p. 1116) state that "an implicit understanding is that the managing underwriters of an IPO will each assign a securities analyst to cover the company, produce research reports, and issue buy recommendations for the stock." The COO of one smaller underwriter tells us that even as a non-managing syndicate member, they are expected to provide aftermarket research coverage (and market making). If underwriters are included in a syndicate to increase aftermarket analyst coverage, we expect the number of analysts covering a stock to increase with syndicate size. If the quality of analyst coverage is also important, we expect that underwriters with a top-ranked analyst will be more likely to be included in a syndicate.

D. *Market Making*

The great majority of IPOs begin trading on Nasdaq, where the lead underwriter almost always acts as the dominant market maker (see Schultz and Zaman (1994) and Ellis, Michaely, and O'Hara (2000)). Though Ellis et al. find that co-managers play a negligible role in aftermarket trading, underwriters told us that co-managers, and even non-managing syndicate members with market-making operations are expected to make a market in the stock once trading begins. If securities firms that participate in a syndicate are more likely to make a market than others, we would expect larger syndicates to be associated with a larger number of market makers for Nasdaq-listed IPOs.

III. Data and Sample Characteristics

A. *Data*

We collect an initial sample of 2,146 IPOs issued between January 1997 and June 2002 from the Securities Data Company's (SDC) Global New Issues Database. For each IPO, SDC includes data on offer characteristics, book manager and syndicate member identity, underwriter roles within the syndicate, and share allocations across underwriters. Again, we note that these allocations reflect the shares underwritten, not the shares sold, by each syndicate member. We begin our sample in 1997 because SDC's syndicate data is very incomplete for earlier IPOs.

Detailed data on syndicate participation is missing for 273 IPOs. For these IPOs, syndicate data and underwriter roles are collected from the final prospectuses. As a check of the underwriting allocation data, we then examine whether the total shares underwritten by all syndicate members equals the total shares offered in the issue (including international shares) as listed in SDC. Discrepancies are evident for 453 IPOs. Where possible, syndicate participation and

share allocation data for these IPOs are corrected using information in the final prospectus.[6]

From the initial sample, we exclude issues by non-U.S. firms, investment funds, REITs, and Units. These restrictions reduce the sample by 208, 100, 41, and 100 issues, respectively. We also exclude 53 IPOs for which discrepancies in underwriting allocations and total shares could not be reconciled and six issues with incomplete share data. The final sample includes 1,638 IPOs.

SDC assigns one of six role designations to each underwriter in the syndicate: book manager, joint book manager, joint-lead manager, co-manager, syndicate member, or global lead. For IPOs that include shares offered outside the United States, syndicate participation and underwriting allocations for internationally offered shares are generally listed separately. In many cases, this results in the same underwriter being listed twice within the syndicate. When this occurs, we combine domestic and international underwriting allocations to determine the total allocations received by each underwriter and the total number of underwriters within the syndicate. In most cases, underwriters listed as global leads are also listed as co-managers, allowing us to ignore the global lead designation. We also performed several checks of the SDC co-manager designations to remove potential data errors. These checks resulted in underwriter role corrections for 17 IPOs.[7]

There is a large number of mergers in the securities industry over our sample period. We treat underwriters who change names following a merger as new firms. So, for example, we examine Morgan Stanley Dean Witter separately from either Morgan Stanley or Dean Witter and we study U.S. Bancorp Piper Jaffrey separately from Piper, Jaffrey, and Hopwood. Our reasoning is that different clienteles and financial capabilities after mergers may change the motives for and characteristics of syndicates. See the Appendix for a list of underwriter merger and acquisition events during our sample period and the associated name adjustments applied to the data. A more detailed description of the name adjustments is available from the authors at www.nd.edu/~scorwin. Merger and acquisition events are identified using *Mergers and Acquisitions*

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[6] Forty-three of the sample's IPOs include a joint book manager, 94 include one underwriter coded as joint lead, and 5 include two underwriters coded as joint lead. For each of these cases, we verify the underwriter roles using the final IPO prospectus. Of the 43 joint book managers listed in the data, 34 are explicitly referred to as joint book managers in the final prospectus. The remaining nine cases could not be verified, but are not changed. Of the managers designated as joint leads, we found no cases in which this underwriter was explicitly referred to as a joint book-running manager. Throughout the paper, we therefore treat joint leads as co-managers rather than as joint book managers. A detailed description of checks and corrections of the data is available from the authors at www.nd.edu/~scorwin.

[7] Underwriter roles were verified using the final prospectus in 7 cases where an underwriter received the same underwriting allocation as the book manager, but was not coded as a co-manager, and in 53 cases where the syndicate included more than five co-managers or was made up of more than 75% co-managers. These checks resulted in 14 corrections. We also verified 66 cases where an underwriter was coded as a global lead, but was not also listed as a co-manager or joint-lead manager. This check resulted in three corrections.

(1997–2002) and the *Securities Industry Yearbook* (Securities Industry Association (1995–2002)). It is also likely that some underwriters enter or exit during our sample period for reasons unrelated to mergers. In the analysis to follow we examine the robustness of the results to this possibility.

We collect data on aftermarket analyst coverage from I/B/E/S. We first identify the number of analysts issuing reports on each IPO firm within three months of the offer. As a measure of the quality of an underwriter's analyst coverage, we then identify all underwriters that employ an *Institutional Investor* (henceforth *II*) All-Star analyst for the IPO's industry. Every October, *II* names the top three analysts in each of several dozen industries. For each of these industries, we obtain the identities of the All-Star analysts and their underwriter affiliations from 1996 through 2002. We then assign each IPO to one or more *II* industries. An underwriter is classified as having a top analyst for an IPO if it employs any of the top three *II* analysts in any of the industries into which the IPO is classified.

Deciding which *II* industries correspond to a particular IPO can be difficult, since *II* industries do not correspond directly to SIC codes, and analysts that *II* places in different industries often follow the same stocks. As a first step in assigning IPOs to industries, we identify up to 10 stocks mentioned in association with each *II* industry. We then output I/B/E/S industry descriptions for each IPO and each firm identified in association with an *II* industry. Finally, we match the I/B/E/S industry description for each IPO with the I/B/E/S industry descriptions corresponding to the *II* industries. We are able to match 1,248 IPOs with *II* industries using this methodology. The remaining IPOs are assigned to industries by hand after examining descriptions of their business. I/B/E/S industry descriptions often correspond to more than one *II* industry. As a result, 682 IPOs fit into one *II* industry, 339 are classified into two industries, and 598 fit into three or more industries. Nineteen of the IPOs defy classification into any of the industries covered by *II* (e.g., soil preparation).

B. Summary Statistics

Panel A of Table I provides descriptive statistics for the sample IPOs. On average, sample IPOs raised $115 million. The mean and median values of underpricing are 39.5 and 14.3%, respectively, and the mean and median adjustments from the filing range midpoint to the offer price are 6.8 and 0.0%. As a measure of risk, we estimate the standard deviation of continuously compounded daily returns from day 21 through day 125 after the offer. The mean aftermarket standard deviation in the sample is 5.9%.

The mean number of underwriters in a syndicate is 15.9, while the number of book managers and co-managers average 1.04 and 2.01, respectively. On average 41.6% of the shares are underwritten by book managers and another 38.2% are underwritten by co-managers. This leaves only 20% of the shares to be underwritten by other syndicate members. As an additional measure of syndicate

Table I
Summary Statistics for Offer and Syndicate Characteristics

Panel A describes the distribution of each variable. Panel B shows the mean value of each variable by year. In Panel B, the last column lists a *p*-value from an *F*-test of the restriction that means are equal across years. The sample includes 1,638 U.S. IPOs issued between January 1997 and June 2002, excluding units, rights, investment funds, and REITs. Underpricing is defined as the percentage return from the offer price to the first day's closing price. Offer proceeds and offered shares include both United States and international tranches. The adjustment from the filing price is the percentage return from the midpoint of the original filing range to the offer price. Aftermarket standard deviation is estimated using continuously compounded daily returns from days 21 through 125 after the IPO and is missing for three IPOs. Carter–Manaster ranks range from one to nine and are based on the relative placement of underwriter names in tombstone ads (see Carter and Manaster (1990)). Adjusted Carter–Manaster ranks are obtained from Jay Ritter's web page at http://bear.cba.ufl.edu/ritter/Rank.HTM. Syndicate characteristics are based on underwriting allocations as listed in the final prospectus or in SDC. Allocations and proceeds for book and co-managers are based on the underwriting allocations assigned to each class of underwriter. The Herfindahl Index is the sum of the squared percentages of total shares underwritten by each investment bank. The number of active underwriters is a count of all underwriters that participate in at least one syndicate during a given year. The numbers of active book managers and co-managers are calculated similarly.

	Mean	Min	25th Percentile	Median	75th Percentile	Max
Panel A: Distribution of Offer and Underwriter Characteristics						
Offer proceeds ($mil)	114.99	2.32	30.00	52.33	92.40	8680.00
Underpricing (%)	39.51	−43.27	1.35	14.29	43.00	697.50
Adjustment from filing price (%)	6.82	−65.91	−9.09	0.00	16.67	344.44
Aftermarket standard deviation (%)	5.90	0.52	3.84	5.71	7.62	38.34
Book manager's Carter–Manaster rank	7.67	1.10	7.10	8.10	9.10	9.10
No. of Book managers per issue	1.04	1.00	1.00	1.00	1.00	2.00
No. of Co-managers per issue	2.01	0.00	1.00	2.00	3.00	25.00
Total underwriters per issue	15.85	1.00	10.00	15.00	21.00	128.00
Herfindahl Index (%)	29.38	3.00	19.85	24.69	31.06	100.00
Book manager allocation (%)	41.57	4.76	31.00	38.70	45.29	100.00
Co-managers' allocation (%)	38.23	0.00	32.00	41.07	48.75	82.50
Book manager proceeds ($mil)	38.30	0.38	10.80	19.76	34.19	2761.65
Co-manager proceeds ($mil)	57.11	0.00	9.96	21.57	40.50	5077.80

Table I—*Continued*

Panel B: Offer and Underwriter Characteristics by Year						
	1997	1998	1999	2000	2001–2002	*p*-value
Number of IPOs	440	287	456	339	116	–
Offer proceeds ($mil)	54.68	79.16	124.19	123.80	370.49	0.000
Underpricing (%)	13.99	20.14	71.27	55.36	13.11	0.000
Adjustment from filing price (%)	−1.62	−0.21	17.91	11.78	−1.91	0.000
Aftermarket standard deviation (%)	4.22	5.45	6.64	7.93	4.55	0.000
Book manager's Carter–Manaster rank	6.94	7.08	8.05	8.35	8.34	0.000
No. of Book managers per issue	1.00	1.01	1.04	1.06	1.19	0.000
No. of Co-managers per issue	1.38	1.56	2.27	2.43	3.21	0.000
Total underwriters per issue	17.84	14.66	15.89	14.59	14.79	0.000
Herfindahl Index (%)	29.80	32.83	27.63	28.12	29.85	0.003
Book managers' allocation (%)	39.64	42.98	40.63	42.41	46.70	0.001
Co-managers' allocation (%)	32.78	33.63	41.34	43.16	43.67	0.000
Book manager proceeds ($mil)	16.67	23.72	39.44	47.21	125.88	0.000
Co-manager proceeds ($mil)	22.43	38.18	61.87	59.89	208.73	0.000
No. of of Active underwriters	391	336	372	259	213	–
No. of of Active book managers	128	100	72	51	28	–
No. of of Active co-managers	135	105	116	81	72	–

structure, we calculate a Herfindahl Index of underwriting allocations within the syndicate. This index is defined as the sum of the squared percentages of shares allocated to each underwriter. The mean and median values of the syndicate Herfindahl Index are 29.4 and 24.7, respectively. For comparison, an IPO with four syndicate members underwriting equal numbers of shares would have a Herfindahl Index of 25.0.

Panel B of Table I provides information on offer and syndicate characteristics by year. Although our sample period covers less than 6 years, there are significant differences in IPO and syndicate characteristics over time. Offer proceeds increased substantially during the sample period. Aftermarket standard deviation increased through 2000 and then decreased in 2001–2002. Mean underpricing is 14.0% in 1997 and 20.1% in 1998, increases to 71.3% in

1999 and 55.4% in 2000, and decreases to 13.1% in 2001–2002.[8] As a measure of underwriter prestige, we obtain adjusted Carter–Manaster rankings from Jay Ritter's website at http://bear.cba.ufl.edu/ritter/rank.htm (see Carter and Manaster (1990)). The average ranking for book managers increases steadily over the sample period from 6.94 in 1997 to 8.34 in 2001–2002.

The mean number of co-managers increased steadily from 1.38 in 1997 to 3.21 in 2001–2002. At the same time, the total number of underwriters fell from 17.8 in 1997 to 14.8 in 2001–2002.[9] All co-managers together underwrote an average of 32.8% of offered shares in 1997 compared to 43.7% in 2001–2002. Finally, the number of active underwriters decreased over the sample period. The sample includes 391 different underwriters, 135 co-managers, and 128 book managers during 1997, but only 213 underwriters, 72 co-managers, and 28 book managers during 2001–2002.

IV. The Size and Composition of Syndicates

A. Syndicate Size and Concentration

As a first look at the determinants of syndicate structure, Table II reports regressions of syndicate size and concentration on expected offer proceeds (defined as shares offered times the midpoint of the initial filing price range), the natural logarithm of the expected proceeds, aftermarket volatility, a dummy for a book manager with a Carter–Manaster ranking of eight or higher, a dummy variable for IPOs listed on the NYSE or AMEX, a dummy for venture capital backing, and year dummy variables. Five measures of syndicate composition are used as dependent variables: the number of underwriters in the syndicate, the number of co-managers, the proportion of shares underwritten by the book manager, the proportion of shares underwritten by the co-managers, and the IPO syndicate's Herfindahl Index. Poisson regressions are run when the dependent variable is a count (number of underwriters or number of co-managers) and ordinary least squares (OLS) regressions are used for the other dependent variables.

As the table shows, the natural log of offer proceeds is highly significant in each of the regressions. Both the number of underwriters and the number of co-managers increase as the amount raised increases, while the Herfindahl Index and the proportion of shares underwritten by the book manager decrease. Venture capitalist participation is associated with more co-managers and less concentrated syndicates. The regressions in Table II also confirm that syndicates have changed over our sample period. After controlling for other factors, the number of underwriters in syndicates declines steadily over the sample period, while the number of co-managers increases. It is also interesting that

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[8] While the level of underpricing in 1999 and 2000 is large by historical standards, it is similar to that found by Loughran and Ritter (2002) for the same period. See Loughran and Ritter, and Ljungqvist and Wilhelm (2003) for possible explanations.

[9] These patterns are consistent with those documented by Ljungqvist and Wilhelm (2003) for 1996–2000 and Chen and Ritter (2000) for 1985–1997.

Table II

Determinants of Syndicate Size and Concentration

The table lists coefficient estimates from regressions of syndicate size and concentration measures on various offer characteristics. The sample consists of 1,638 IPOs issued between January 1997 and June 2002, excluding units, rights, investment funds, and REITs. Aftermarket standard deviation is estimated using continuously compounded daily returns from days 21 through 125 after the IPO and is missing for three IPOs. Expected offer proceeds equals the filing price multiplied by the number of shares offered globally. Carter–Manaster ranks range from one to nine and are based on the relative placement of underwriter names in tombstone ads (see Carter and Manaster (1990)). Adjusted Carter–Manaster ranks are obtained from Jay Ritter's web page at http://bear.cba.ufl.edu/ritter/Rank.HTM. The NYSE/AMEX dummy takes a value of one if the IPO is listed on the NYSE or AMEX, and zero otherwise. The VC dummy takes a value of one if the IPO had venture capital backing and zero otherwise. Poisson regressions are estimated when the dependent variable is a count (number of underwriters and number of co-managers). OLS regressions are reported for other syndicate measures. The t-statistics and z-statistics based on robust standard errors are listed in parentheses below the coefficients. All regressions have dummy variables for primary two-digit SIC codes of 28, 35, 36, 38, 48, 60, 73, 87, and for Internet stocks.

Dependent Variables	Intercept	.01 × Expected Proceeds	Log of Expected Proceeds	Book Manager Rank > 8	σ	NYSE/ AMEX Dummy	VC Dummy	1998 Dummy	1999 Dummy	2000 Dummy	2001–2002 Dummy	R^2
					Poisson Regressions							
Number of underwriters	1.682	−0.005	0.352	−0.047	−0.494	−0.076	−0.054	−0.208	−0.252	−0.421	−0.667	0.1897
	(19.76)	(−1.25)	(17.30)	(−1.34)	(−0.62)	(−1.70)	(−1.81)	(−4.87)	(−6.09)	(−8.20)	(−12.45)	
Number of co-managers	−1.261	−0.002	0.357	0.351	−0.666	0.058	0.108	0.076	0.194	0.172	0.272	0.1728
	(−13.12)	(−0.48)	(14.96)	(9.01)	(−0.91)	(1.53)	(4.65)	(1.87)	(4.74)	(3.91)	(5.87)	
					Ordinary Least Squares Regressions							
Book manager % underwritten	0.721	0.003	−0.087	−0.055	0.492	0.006	−0.019	0.019	0.067	0.117	0.195	0.3549
	(22.62)	(2.48)	(−10.29)	(−4.73)	(1.94)	(0.43)	(−2.25)	(1.39)	(4.89)	(7.89)	(10.91)	
Co-managers % underwritten	0.023	−0.002	0.071	0.084	−0.368	0.016	0.031	0.012	0.019	0.007	−0.009	0.4410
	(0.96)	(−2.42)	(10.86)	(8.39)	(−2.41)	(1.24)	(4.17)	(1.12)	(1.72)	(0.61)	(−0.60)	
Herfindahl Index	0.655	0.005	−0.096	−0.061	0.516	0.030	−0.019	0.016	0.047	0.086	0.1302	0.3870
	(19.05)	(3.38)	(−11.21)	(−5.20)	(1.81)	(2.11)	(−2.35)	(1.07)	(3.31)	(5.45)	(8.38)	

aftermarket volatility is not associated with larger or less concentrated syndicates in any of the five regressions. Thus we find no evidence that larger syndicates handle riskier offers, as predicted by the traditional risk-sharing explanation for syndicates.

B. Syndicate Participation

In this section, we estimate a probit model to determine the likelihood that specific underwriters are included in an IPO syndicate. The effects of offer characteristics provide additional evidence on the determinants of syndicate structure, while the relative importance of various underwriter characteristics sheds light on the potential functions of syndicate members. In estimating the probit model, we use all 1,638 IPOs and include one observation for every eligible underwriter for each IPO, where the set of eligible underwriters is adjusted for mergers and acquisitions during the sample period. This results in approximately 1,000,000 observations. Because the probit model includes multiple observations for each IPO, standard errors are adjusted to allow for IPO-specific effects. The model assumes that observations for a particular IPO are correlated, while observations across IPOs are independent. We examine two alternative dependent variables. The first is set to one if a particular underwriter is included in the IPO syndicate and zero otherwise. The second is set to one if a particular underwriter is included as a co-manager and zero otherwise. The independent variables include offer characteristics, underwriter size and quality measures, geographic characteristics, and measures of relationships between underwriters. These variables and the related results are discussed in more detail below.

Table III presents results for the probit model. Columns 1–3 list results for syndicate inclusion and columns 4–6 list results for co-manager inclusion. The model is estimated separately for the full sample of IPOs and for the smallest and largest offer size quintiles. Standard errors are listed in parentheses below the coefficient estimates. Given the large sample size, it is not surprising that nearly all of the coefficient estimates are statistically significant at standard levels. Nevertheless, the significance differs markedly across variables, as illustrated by the standard errors. The economic importance of the explanatory variables is discussed in more detail below.

The results for offer characteristics and year dummy variables are consistent with results from the previous section. The year dummy variables indicate that the likelihood of being included in a syndicate declines steadily from 1997 to 2002, while the likelihood of being included as a co-manager increases during this period. The coefficient on offer proceeds is positive and significant in both the syndicate and co-manager models, suggesting that underwriters are more likely to be included in a syndicate for larger offers. This result is consistent with the finding from Table II that larger offers are associated with more syndicate members and more co-managers. The coefficient on aftermarket standard deviation is negative and is generally insignificant. Consistent with our earlier findings, this suggests that risk sharing is not an important determinant of syndicate structure.

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Table III

Probit Models for Syndicate and Co-manager Participation

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The sample includes 669 underwriters and 1,638 U.S. IPOs issued between January 1997 and June 2002, excluding units, rights, investment funds, and REITs. The models include one observation for each eligible underwriter for each IPO, where the set of eligible underwriters is adjusted for mergers and acquisitions among underwriters. In columns 1–3, the dependent variable equals one if the underwriter is included in the IPO syndicate and zero otherwise. In columns 4–6, the dependent variable equals one if the underwriter is included as a co-manager and zero otherwise. Results are also provided separately for the full sample of IPOs and for small and large IPOs, where small and large are defined as the lowest and highest quintiles of offer size, respectively. Aftermarket standard deviation is estimated using continuously compounded daily returns from days 21 through 125 after the IPO and is missing for 3 IPOs. Adjusted Carter–Manaster ranks for underwriters are taken from Jay Ritter's web page at http://bear.cba.ufl.edu/ritter/Rank.HTM. Top 3 analyst is a dummy variable equal to one if the underwriter employs one of the top three analysts in the IPO's industry, as ranked by *II*. Book manager analyst is a dummy variable equal to one if the book manager employs one of the top three analysts in the IPO's industry. Dummy variables are created to identify underwriters in the same state or an adjacent state to the book manager and in the same state or an adjacent state to the issuer. Participation in the previous ten syndicates is defined as the proportion of the book manager's last 10 syndicates in which the underwriter was included. Participation in the most recent syndicate is a dummy variable equal to one if the underwriter was included in the book manager's most recent syndicate. Reciprocal participation in the previous 10 syndicates is defined as the proportion of the *underwriter's* last 10 syndicates in which the *book manager* was included. Reciprocal participation in the most recent syndicate is a dummy variable equal to one if the *book manager* was included in the *underwriter's* most recent syndicate. Panel A lists the coefficients from the probit models. Standard errors are adjusted to allow for IPO-specific effects and are listed in parentheses below the coefficients. Panel B lists estimated probabilities based on the probit model coefficients and median offer characteristics.

	Panel A: Probit Model Coefficients					
	Syndicate Participation			Co-Manager Participation		
	All IPOs	Small IPOs	Large IPOs	All IPOs	Small IPOs	Large IPOs
Intercept	−2.297	−2.849	−2.559	−3.258	−3.431	−3.777
	(0.046)	(0.121)	(0.149)	(0.054)	(0.132)	(0.156)
Year 1998 dummy	−0.114	−0.064	−0.097	0.031	0.001	0.006
	(0.023)	(0.070)	(0.046)	(0.020)	(0.080)	(0.049)
Year 1999 dummy	−0.169	−0.199	−0.140	0.080	0.132	0.007
	(0.022)	(0.072)	(0.052)	(0.021)	(0.072)	(0.055)
Year 2000 dummy	−0.188	−0.254	−0.193	0.121	0.105	0.099
	(0.025)	(0.077)	(0.062)	(0.023)	(0.076)	(0.064)
Year 2001–2002 dummy	−0.263	−0.442	−0.306	0.207	0.202	0.239
	(0.032)	(0.097)	(0.080)	(0.027)	(0.092)	(0.060)
Ln(Offer proceeds)	0.141	0.311	0.199	0.110	0.157	0.186
	(0.011)	(0.049)	(0.028)	(0.011)	(0.047)	(0.023)
Aftermarket standard deviation	−1.039	−0.592	−2.206	−0.077	0.072	−0.006
	(0.344)	(0.746)	(0.865)	(0.313)	(0.694)	(0.976)
Carter–Manaster rank ≥ 8	0.103	−0.111	0.325	0.402	0.092	0.755
	(0.102)	(0.041)	(0.032)	(0.025)	(0.069)	(0.049)
Regional underwriter	−0.491	−0.383	−0.547	−0.442	−0.334	−0.572
	(0.012)	(0.031)	(0.025)	(0.024)	(0.066)	(0.046)
Top 3 analyst	0.073	0.086	0.267	−0.002	0.078	0.304
	(0.033)	(0.082)	(0.077)	(0.043)	(0.142)	(0.080)
Top 3 analyst × book manager analyst	−0.159	−0.220	−0.059	0.192	−0.280	0.110
	(0.072)	(0.246)	(0.147)	(0.077)	(0.526)	(0.121)

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(*continued*)

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Table III—*Continued*

Panel A: Probit Model Coefficients

	Syndicate Participation			Co-Manager Participation		
	All IPOs	Small IPOs	Large IPOs	All IPOs	Small IPOs	Large IPOs
Probability of being book manager	3.372	3.497	1.601	3.769	3.678	2.954
	(0.213)	(0.671)	(0.325)	(0.196)	(0.615)	(0.302)
Book manager's state	−0.025	0.066	−0.056	−0.032	0.025	0.009
	(0.013)	(0.039)	(0.026)	(0.019)	(0.059)	(0.047)
Adjacent state to book manager	0.056	0.086	−0.032	−0.069	0.082	−0.152
	(0.072)	(0.038)	(0.026)	(0.032)	(0.066)	(0.079)
Issuer state	0.291	0.313	0.232	0.165	0.320	0.155
	(0.031)	(0.078)	(0.060)	(0.042)	(0.102)	(0.072)
Adjacent state to issuer	0.172	0.118	0.157	0.116	0.059	0.139
	(0.017)	(0.055)	(0.035)	(0.029)	(0.073)	(0.055)
Issuer state × not book manager state	0.235	0.154	0.324	0.285	0.177	0.415
	(0.038)	(0.096)	(0.075)	(0.049)	(0.118)	(0.100)
Participation in previous 10 syndicates	2.340	2.227	2.527	1.153	1.350	1.036
	(0.052)	(0.134)	(0.122)	(0.048)	(0.130)	(0.105)
Participation in the most recent syndicate	0.199	0.321	0.130	0.116	0.113	0.071
	(0.024)	(0.079)	(0.046)	(0.034)	(0.115)	(0.066)
Reciprocal participation in previous 10 syndicates	0.747	0.778	0.652	0.497	0.623	0.459
	(0.035)	(0.097)	(0.069)	(0.046)	(0.140)	(0.085)
Reciprocal participation in the most recent syndicate	0.116	0.275	0.094	0.131	0.183	0.153
	(0.025)	(0.079)	(0.047)	(0.034)	(0.122)	(0.059)
N	997,868	198,235	197,760	997,868	198,235	197,760
Pseudo-R^2	0.2944	0.2625	0.3100	0.3027	0.2226	0.4203

Panel B: Estimated Probability of Syndicate Participation Based on Median Offer Characteristics

	Syndicate Participation Model			Co-Manager Participation Model		
	Regional UW All IPOs	National UW All IPOs	National UW Lg IPOs	Regional UW All IPOs	National UW All IPOs	National UW Lg IPOs
Offer year						
1997	1.10%	3.60%	5.08%	0.05%	0.23%	0.24%
1998	0.81	2.79	4.14	0.06	0.26	0.24
1999	0.70	2.46	3.78	0.07	0.30	0.24
2000	0.66	2.35	3.36	0.08	0.34	0.32
2001–2002	0.54	1.96	2.60	0.11	0.44	0.49
Underwriter characteristics (year = 1999)						
Ranked ≥ 8	0.92%	3.11%	7.32%	0.26%	0.95%	1.96%
Top-ranked analyst	0.85	2.90	6.55	0.07	0.30	0.60
In issuer's state	1.51	4.68	6.12	0.12	0.49	0.39
In issuer's state and not book manager's state	2.67	7.48	11.10	0.31	1.08	1.23
In book manager's most recent synd.	1.19	3.84	4.98	0.11	0.43	0.30
First four effects combined	3.95	10.27	26.46	0.96	2.88	11.75
First five effects combined	7.46	17.07	34.27	1.82	4.93	16.78
In most recent synd. and 50% of last 10	13.78	27.45	35.06	0.63	1.99	1.30
All effects combined and in 50% of last 10 syndicates	39.26	58.64	80.46	6.46	14.12	32.81

The next variables reflect underwriter characteristics. The coefficient on the Carter–Manaster rank dummy suggests that prestigious underwriters are more likely to be included both as syndicate members and co-managers in large offers, and as co-managers for small offers. In contrast, the coefficient on the Carter–Manaster rank dummy is negative for small IPOs. This suggests that large prestigious underwriters are unwilling to participate in small IPO syndicates. We also find for both small and large offers that regional underwriters are less likely to be included in a syndicate or as a co-manager than are underwriters with a national presence.

To test whether potential analyst coverage is an important determinant of syndicate participation, we include in the probit model an indicator of whether an underwriter employs one of *II*'s top three analysts for the IPO's industry. We also interact this variable with a dummy variable that equals one if the book manager also has a top-rated analyst. As expected, we find that an underwriter with a top-ranked analyst is significantly more likely to be included in an underwriting syndicate and is more likely to be a co-manager. However, comparing the results for small and large IPOs suggests that this effect is significant only for large IPOs. One explanation is that top-rated analysts tend to be employed by the largest underwriters and that these underwriters do not typically participate in small IPOs.

If issuers choose syndicate members from among the potential book managers, we would expect a book manager's main competitors to appear in an IPO syndicate. To account for this effect, we include in the probit model an estimate of each underwriter's ex ante probability of being selected as book manager. For each underwriter who leads five or more IPOs, we estimate a probit model for the probability of being book manager using the full sample of 1,638 IPOs. The independent variables are offer proceeds, the log of the offer proceeds, aftermarket standard deviation, a dummy variable for whether the underwriter is in the same state as the issuer, a dummy variable for whether the underwriter has one of the top three analysts in the issuer's industry, and quarterly dummy variables. This estimation results in an estimated probability of being book manager for each underwriter for each IPO. Underwriters who were book manager for fewer than five IPOs during the sample period are assigned a probability of zero.[10]

The probability of being selected as the lead is a highly significant determinant of whether an underwriter is included in a syndicate. One interpretation of this result is that issuing firms often ask the lead underwriter to include in the syndicate other underwriters who vied for the lead position. In addition, lead probability is highly correlated with other measures of underwriter size that have already been shown to be important determinants of syndicate inclusion.

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[10] We also estimated the probability of being lead including industry and state dummy variables, where industries are defined using the four-digit SIC classification of Fama and French (1997). The conclusions based on this alternative estimation are similar, but the convergence of the lead probability models is problematic. Since the lead probability estimates are based on all offerings during the sample period, our results may suffer from a look-ahead bias. Results for all other variables are similar if the lead probability estimate is excluded from the model.

The information production hypothesis suggests that book managers favor syndicate members, and particularly co-managers, with a different client base from their own. As a test of this hypothesis, we include in the probit model several geographic variables to reflect differences in customer bases between underwriters. The first two dummy variables identify underwriters who are in the same state as the book manager or an adjacent state. The next two variables identify underwriters who are in the same state as the issuer or an adjacent state. Finally, the fifth variable is an interaction term that identifies underwriters who are in the same state as the issuer but in a different state from the book manager.[11]

The results suggest that being in the same state as the book manager decreases the likelihood of being included in a syndicate. This is consistent with the information production hypothesis and suggests that underwriters are more likely to be included in a syndicate if they do not duplicate the customer base of the book manager. A much more significant determinant of syndicate inclusion is whether an underwriter is located in the same state as the issuer or in an adjacent state. Underwriters located near an issuer are far more likely to be included in the syndicate, especially if the book manager is not based in the issuer's state. Because local investors may have a preference for investing in nearby companies, these results support the hypothesis that underwriters are added to syndicates to gather information about demand for an IPO. Alternatively, the importance of underwriter location may reflect the book manager's desire to include syndicate members who can more easily place shares with local investors.[12]

The final four variables in the table are proxies for the strength of relationships between the book manager and potential syndicate members. As noted above, ongoing relationships may serve to mitigate agency problems within syndicates when syndicate members are expected to actively participate in acquiring information and distributing shares. We define four relationship variables. The first two variables are the proportion of the book manager's last 10 syndicates in which the underwriter participated and a dummy variable that equals one if the underwriter was included in the book manager's most recent IPO syndicate. The remaining two variables are the proportion of the underwriter's last 10 syndicates in which the book manager participated as a syndicate member (*reciprocal participation*) and a dummy variable for whether the book manager was included in the underwriter's most recent IPO syndicate.

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[11] We also examined whether the likelihood of syndicate inclusion is affected by an underwriter's focus on institutional versus retail clients. We classified underwriters as institutional if they have at least as many institutional as retail representatives and as retail if they have at least four times as many retail as institutional representatives. All other underwriters are classified as mixed. After controlling for other factors, we find no evidence that book managers attempt to include underwriters with different client bases. This may reflect the inherent difficulty in classifying underwriters as retail or institutional. For example, Merrill Lynch and Morgan Stanley Dean Witter are classified as retail, but both have large institutional as well as retail businesses. Alternative classification methods do not alter the results.

[12] Several recent papers document that investors disproportionately hold stocks of local companies (see Coval and Moskowitz (1999), Grinblatt and Keloharju (2001), Huberman (2001), and Loughran and Schultz (2004)).

If relationships are an important determinant of syndicate participation, underwriters who have previously worked with the book manager should be more likely to be included in a syndicate.

We find that the single most important determinant of whether an underwriter is included in the syndicate is the proportion of the book manager's previous 10 syndicates in which the underwriter participated. Reciprocal relationships, or whether the underwriter included the book manager in its recent syndicates, are also very important. Notably, excluding the relationship variables from the model decreases the pseudo-R^2 in the syndicate participation model from 0.294 to 0.153 and in the co-manager model from 0.303 to 0.241. The importance of the relationship variables is consistent with ongoing relationships mitigating agency problems within the syndicate, but may also reflect a broader set of links between underwriters. For example, an underwriter may be included in a syndicate because it buys research from or clears through the book manager.

The role of relationships in picking co-managers is somewhat puzzling, since underwriters tell us that co-managers are selected primarily by issuers and that relationships would therefore seem irrelevant. On the other hand, conversations with underwriters also suggest that they discuss potential co-managers with issuers and may provide advice on which ones would contribute the most to the syndicate. In this case, relationships would be an important determinant of co-manager roles. In addition, both book managers and co-managers have a sort of veto power, since each specifies the fee and share structure needed for their participation.

One potential problem with these probit models is that some underwriters may have entered or exited during the sample period for reasons other than mergers. As a result, an underwriter could be included in the probit regression for a specific IPO although it was not in business at the time. As a robustness check, we reestimated the probit models (not shown) including only those underwriters that appeared in syndicates during both the first half of 1997 and the first half of 2002. The coefficients are almost unchanged, suggesting that our results are not seriously affected by entry and exit of underwriters. Of particular interest is that the likelihood of being included in a syndicate declines over time, even for underwriters that participated during the entire sample period. We also estimated the model separately by year. While there are minor differences year by year, the main results are confirmed.

To get a sense of the economic significance of the explanatory variables, we calculate the probability that an underwriter is included in a syndicate or is a co-manager using the probit model coefficient estimates and the median values for all variables. We then alter specific variables to see how the probability of syndicate participation is affected. Panel B of Table III reports these probability estimates. Results are shown separately for regional and for national underwriters. In addition, we provide separate results for national underwriters based on estimates from the large IPO subsample.

Based on the median offer characteristics, the probability of syndicate participation for a regional underwriter decreases from 1.1% in 1997 to 0.54% in

2001–2002. During this same period, the probability of participation for a national underwriter decreases from 3.6 to 1.96% in the full IPO sample and from 5.1 to 2.6% in the large IPO subsample. To compare the effects of other explanatory variables, we focus on large IPOs from 1999. A national underwriter has a 3.8% chance of inclusion in the syndicate of a large IPO in 1999. The likelihood of inclusion increases to over 26% if the underwriter is based in the issuer's state, has a top-ranked analyst, and has a Carter–Manaster rank of at least eight. What is particularly striking though is that if the underwriter was also in the book manager's previous syndicate and in 50% of the last 10, the probability of inclusion in the syndicate jumps to more than 80%. The conclusions based on the co-manager model are similar, though the probability of participation as a co-manager is much lower. Together, the results in Panel B highlight the economic importance of underwriter quality, analyst coverage, underwriter location, and especially relationships among underwriters.

V. Evidence of Underwriter Functions

A. *Syndicate Structure and Offer Price Revisions*

In this section, we test whether syndicate members produce valuable information about market demand for IPOs. If the underwriting process successfully uncovers information during the filing period, we would expect part of this information to be reflected in a change from the expected offer price to the actual offer price.[13] Our proxy for the expected offer price is the midpoint of the initial filing range, which we henceforth refer to as the filing price. As Table I shows, the median revision from the filing price to the offer price is zero in our sample, suggesting that the filing price is a useful estimate of the expected offer price.

A key to testing how syndicate composition affects information production is to condition on the information that a syndicate could possibly uncover. Our measure of this information is the return from the filing price to the closing price on the first day of trading. We refer to this measure as the IPO's total return. We then perform two alternative tests. First, we use probit models to test whether syndicate structure affects the likelihood of positive and negative offer price revisions in response to this information. Second, we use OLS regressions to test whether syndicate structure affects the magnitude of price adjustments in response to information. As an additional control, we include the total return on the CRSP equal-weighted market index from the filing date to the first day of trading. Since this information is publicly available, additional syndicate members should not influence whether or not it is reflected in offer price revisions.

The probit results for positive price revisions are presented in Panel A of Table IV. The dependent variable equals one if the offer price is greater than

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[13] Hanley (1993) compares underpricing for IPOs that are priced above, below, and within the filing price range and documents that underwriters only partially adjust to information learned before the offering. The result is that underpricing is particularly severe for IPOs whose offer prices are adjusted upward from the filing range.

Syndicate Structure and Offer Price Revisions

Panels A and B of the table report estimates of probit regressions for the likelihood of offer price revisions. Panel C reports OLS regressions where the dependent variable is the percentage change from the midpoint of the initial filing price range to the offer price. The sample includes 1,638 U.S. IPOs issued between 1997 and June 2002, excluding units, rights, investment funds, and REITs. In Panel A, the dependent variable takes a value of one if the offer price is greater than the midpoint of the initial filing range and zero otherwise. In Panel B, the dependent variable takes a value of one if the offer price is less than the midpoint of the initial filing range and zero otherwise. Total return >20% is defined as the return from the midpoint of the filing range to the first day's closing price, if greater than 20%, and zero otherwise. The # Co-managers ≥ (<) 8 is the number of co-managers with Carter–Manaster rankings of at least (below) 8. Ranks are obtained from Jay Ritter's web page at http://bear.cba.ufl.edu/ritter/Rank.HTM. The Negative total return dummy is defined as one if the return from the midpoint of the filing range to the first day's closing price is zero or negative. Positive (negative) market return is the return on the CRSP equal-weighted index from the filing date to the offer date if it is positive (negative) and zero otherwise. Expected offer proceeds is defined as the number of shares issued globally times the midpoint of the initial filing price range. The model also includes dummy variables for two-digit SIC codes 28, 35, 36, 38, 48, 60, 73, and 87. Heteroskedasticity-consistent z-statistics are reported in parentheses below the coefficients in Panels A and B. The t-statistics are reported under coefficients for the OLS regressions in Panel C.

Panel A: Probit Regressions with Upward Price Revision Dependent Variable							
Intercept	−1.355	−1.243	−1.145	−1.302	−1.422	−1.300	−1.492
	(−7.77)	(−6.89)	(−6.26)	(−7.37)	(−6.12)	(−5.50)	(−7.34)
Natural log exp.	0.239	0.211	0.186	0.226	0.203	0.174	0.222
proceeds	(6.09)	(5.12)	(4.43)	(5.65)	(3.92)	(3.29)	(5.17)
Dummy for total	0.962	0.908	0.899	0.964	0.847	0.857	0.914
return > 20%	(5.53)	(6.34)	(5.96)	(5.49)	(5.94)	(5.71)	(5.14)
Total return	0.747	0.383	0.176	0.956	0.490	0.237	0.941
if > 20%	(2.93)	(1.70)	(0.53)	(2.81)	(2.11)	(0.71)	(2.70)
Positive market					1.437	1.329	3.266
return					(1.76)	(1.66)	(4.39)
Negative total	−1.425	−1.419	−1.399	−1.422	−1.489	−1.494	−1.490
return dummy	(−10.86)	(−10.93)	(−10.80)	(−10.89)	(−11.02)	(−11.02)	(−11.01)
Total Return > 20% Times							
No. of Non-managers		−0.010			−0.016		
		(−0.75)			(−1.18)		
No. of Co-managers		0.297			0.323		
		(2.84)			(2.91)		
No. of Co-managers ≥ 8			0.359			0.323	
			(3.33)			(2.91)	
No. of Co-managers < 8			0.124			0.346	
			(0.94)			(2.92)	
Herfindahl Index				−0.762			−0.541
				(−1.71)			(−1.15)

(continued)

the filing price and zero otherwise. Independent variables include three total return measures: a dummy variable that equals one if the total return is zero or negative, a dummy variable that equals one if the total return is greater than 20%, and the total return itself if it exceeds 20%. We focus on total returns

Table IV—*Continued*

Panel A: Probit Regressions with Upward Price Revision Dependent Variable							
Positive Market Return Times							
No. of Non-managers					0.065		
					(1.60)		
No. of Co-managers					0.074		
					(0.31)		
No. of Co-managers ≥ 8						0.319	
						(1.30)	
No. of Co-Managers < 8						0.037	
						(0.99)	
Herfindahl Index							−2.828
							(−1.40)
Pseudo-R^2	0.5401	0.5444	0.5429	0.5410	0.5596	0.5593	0.5560

Panel B: Probit Regressions with Downward Price Revision Dependent Variable							
Intercept	−0.807	−0.382	−0.586	−0.437	−0.378	−0.533	−0.431
	(−4.51)	(−2.02)	(−3.02)	(−2.48)	(−1.99)	(−2.81)	(−2.44)
Natural log exp.	0.043	−0.067	−0.016	−0.053	−0.068	−0.028	−0.054
proceeds	(1.06)	(−1.51)	(−0.36)	(−1.30)	(−1.52)	(−0.64)	(−1.33)
Dummy for total	−0.972	−0.959	−0.949	−0.960	−0.961	−0.964	−0.959
return > 20%	(−5.11)	(−5.06)	(−4.98)	(−5.07)	(−5.06)	(−5.08)	(−5.06)
Total return	−0.313	−0.314	−0.315	−0.314	−0.313	−0.314	−0.314
if > 20%	(−1.44)	(−1.45)	(−1.45)	(−1.45)	(−1.45)	(−1.45)	(−1.45)
Negative total	1.709	0.996	1.425	2.352	0.997	1.396	2.349
return dummy	(16.75)	(5.34)	(9.62)	(16.18)	(5.35)	(9.51)	(16.12)
Negative market					0.009	−0.018	−0.016
return					(0.21)	(−0.24)	(−0.34)
Negative Total Return Times							
No. of Non-managers		0.031			0.031		
		(2.90)			(2.87)		
No. of Co-managers		0.183			0.180		
		(2.81)			(2.74)		
No. of Co-managers ≥ 8			0.165			0.183	
			(2.46)			(2.74)	
No. of Co-managers < 8			0.249			0.184	
			(2.43)			(2.61)	
Herfindahl Index				−1.870			−1.857
				(−6.40)			(−6.32)
Negative Market Return Times							
No. of Non-managers					0.001		
					(0.44)		
No. of Co-managers					−0.012		
					(−0.81)		
No. of Co-managers ≥ 8						−0.002	
						(−0.24)	
No. of Co-managers < 8						−0.001	
						(−0.10)	
Herfindahl Index							0.064
							(0.60)
Pseudo-R^2	0.5289	0.5409	0.5342	0.5472	0.5411	0.5331	0.5473

(continued)

Table IV—*Continued*

Panel C: Percentage Price Update Regressions							
Intercept	0.013	0.029	0.048	0.009	0.003	0.007	−0.005
	(0.48)	(0.80)	(1.44)	(0.31)	(0.11)	(0.28)	(−0.18)
Natural log exp.	−0.004	−0.008	−0.013	−0.003	−0.001	−0.002	0.001
proceeds	(−0.54)	(−0.85)	(−1.52)	(−0.37)	(−0.17)	(−0.36)	(0.13)
Dummy for total	0.091	0.053	0.021	0.113	0.095	0.093	0.090
return > 20%	(7.78)	(2.80)	(0.82)	(6.81)	(8.10)	(7.94)	(7.78)
Total return	0.127	0.125	0.125	0.127	0.120	0.105	0.110
if > 20%	(13.83)	(13.60)	(13.68)	(13.82)	(3.75)	(2.66)	(5.05)
Negative total	−0.174	−0.165	−0.175	−0.200	−0.155	−0.162	−0.203
return dummy	(−21.78)	(−8.55)	(−9.21)	(−15.67)	(−9.07)	(−9.00)	(−16.04)
Market return	0.001	0.001	0.016	0.000	0.001	0.010	0.001
	(0.23)	(0.36)	(1.60)	(0.07)	(0.19)	(1.27)	(0.23)
Negative Total Return Dummy Times							
No. of Non-managers		−0.001			−0.001		
		(−0.75)			(−1.05)		
No. of Co-managers		−0.001			−0.005		
		(−0.17)			(−0.85)		
No. of Co-managers ≥ 8			0.003			−0.006	
			(0.43)			(−0.69)	
No. of Co-managers < 8			−0.003			−0.003	
			(−0.38)			(−0.62)	
Herfindahl Index				0.083			0.092
				(2.52)			(2.83)
Return Greater than 20% Dummy Times							
No. of Non-managers		−0.001					
		(−0.81)					
No. of Co-managers		0.022					
		(3.01)					
No. of Co-managers ≥ 8			0.026				
			(3.74)				
No. of Co-managers < 8			0.015				
			(1.25)				
Herfindahl Index				−0.081			
				(−1.90)			
Return Greater than 20% Times							
No. of Non-managers					−0.001		
					(−0.58)		
No. of Co-managers					0.005		
					(0.49)		
No. of Co-managers ≥ 8						0.005	
						(0.39)	
No. of Co-managers < 8						0.009	
						(0.95)	
Herfindahl Index							0.070
							(0.96)
Pseudo-R^2	0.6901	0.6930	0.6950	0.6921	0.6914	0.6926	0.6920

greater than 20% because some underpricing may be desired and offer prices may only be updated if underpricing is revealed to be significantly larger than expected. We use a dummy for negative or zero returns because aftermarket support by underwriters constrains prices from falling below the offer price (Ruud (1993)). The model also includes several measures of syndicate structure and the natural log of expected offer proceeds, where expected offer proceeds equal offered shares times the filing price.

The first probit regression in Panel A includes only the IPO total return variables and the log of expected proceeds. As expected, the coefficient on the dummy for a return greater than 20% is positive and highly significant, as is the coefficient on the return if it is greater than 20%. Also, as expected, the coefficient on the negative return dummy is negative and significant. If the total return from the filing price is large and positive, the offer price is likely to be revised upward. If the total return is negative, an upward revision in the offer price is less likely.

The probit regressions reported in the next three columns of the table include interactions between positive total returns greater than 20% and measures of syndicate structure. The regression with separate interaction terms for co-managers and non-managing syndicate members reveals that the offer price is more likely to be revised upward when additional co-managers are included, but the inclusion of non-managing syndicate members has no effect. Thus, more co-managers make it more likely that information will be incorporated into offer prices. Similarly, when the return variable is interacted with the syndicate's Herfindahl Index, the coefficient on the interaction term is negative and marginally significant (z-statistic $= -1.71$), suggesting that offer price revisions are more likely with less-concentrated syndicates.

The last three columns of Table IV report probit regressions including market return variables. As expected, the coefficient on a positive market return is positive in each of the three regressions, indicating that a positive return on the market is associated with upward revisions in the offer price. Even after including the market return, however, the coefficient on the interaction between the number of co-managers and the positive total IPO return is positive and statistically significant. With more co-managers, positive information about the value of an IPO is more likely to be reflected in an upward revision of the offer price. In contrast, interactions between the large positive market return and the syndicate structure measures are insignificant in all regressions. Thus, having more syndicate members or more co-managers does not increase the likelihood that publicly available information leads to an upward revision in the offer price. Overall, the results in Panel A provide strong evidence that syndicate structure has a significant impact on the likelihood of positive offer price revisions in response to firm-specific information.

Panel B replicates the probit model of Panel A, except that the dependent variable is now set to one if the IPO offer price is revised downward from the midpoint of the filing range. Here the variables of primary interest are the

interactions between the dummy variable for a zero or negative total return and measures of syndicate size. The results are consistent with but much stronger than those in Panel A. A negative or zero return is more likely to result in a downward price revision if there are many syndicate members, and particularly if there are many co-managers. Negative returns are less likely to lead to a downward revision if the Herfindahl Index for the IPO is high. These results provide strong evidence that larger syndicates, and particularly more co-managers, increase the likelihood that the offer price will be revised downward in response to negative information learned during the filing period.

The last three columns of Panel B include market return variables and interactions. The results are similar to those for positive price revisions. The likelihood that negative market returns lead to a downward price revision is unrelated to syndicate structure. On the other hand, even after controlling for market returns, a negative total IPO return is more likely to result in a downward price revision if there are more co-managers or if the IPO's Herfindahl Index is small. These results, like those in Panel A, indicate that more co-managers and a larger syndicate increase the likelihood that firm-specific information will be incorporated in offer prices, but do not affect the likelihood that IPO prices will reflect public information.

As a robustness check, we reestimated by year the probit models with the most explanatory power in Panels A and B (not shown). In the probit model with a positive price revision as the dependent variable, the interaction term between a positive total return greater than 20% and the number of co-managers is positive for each year from 1997 through 2000, and is significant at the 5% level in 1998 and 1999. For 2001–2002, it is negative and insignificant, perhaps as a result of the smaller number of observations during this period ($N = 116$) and the lack of IPOs with positive total returns. In the probit regressions with a negative price revision as the dependent variable, the interaction between the negative return dummy and the IPO's Herfindahl Index is negative and significant in 1997, 1998, and 1999. It is negative but insignificant in 2000 and 2001–2002.

Given the high correlation between offer size and syndicate size, it is possible that the results in Table IV are partly driven by offer size. As an additional robustness check, we therefore reestimate the probit models with the most explanatory power, including an interaction between the log of expected proceeds and the total return variables (not shown). In the upward price revision model, the interaction between offer size and positive total return greater than 20% is insignificant, while the interaction between the number of co-managers and a large positive return remains positive and significant. Similarly, in the model for downward price revisions, the interaction between offer size and the negative total return dummy is insignificant, while the interaction between the negative return dummy and the Herfindahl Index is negative and significant. We conclude that it is the size of the syndicate, not the size of the offering, that determines whether an offering price will be updated in response to new information.

Panel C of Table IV examines how syndicate structure affects the magnitude of offer price revisions rather than the likelihood that a revision occurs. In these OLS regressions, the dependent variable is the percentage change from the filing price to the offer price. As in prior panels, the regressions include as explanatory variables a dummy for a total return less than or equal to zero, a dummy for total return greater than 20%, and the total return itself if greater than 20%. We note that the intercept is close to zero and insignificant in all regressions in Panel C. This suggests that the average offer price revision is close to zero when the total IPO return is between zero and 20%.

The first regression in Panel C provides results excluding interactions between total returns and syndicate structure. It shows that offering prices decline by 17.4% when the total return is negative. If the total return is greater than 20%, the offering price is raised by 9.1% plus 12.7% of the total return. The second regression adds interactions between the total return dummies and the numbers of non-managing and co-managing underwriters. Both of the negative return interactions are insignificant. In contrast, the interaction between the number of co-managers and the dummy for returns greater than 20% is positive and significant. The coefficients suggest that if the total return exceeds 20%, the offer price is adjusted upward by an additional 2.2% for each additional co-manager.

In the next regression, we interact the total return dummy variables with the number of co-managers ranked below eight and the number ranked eight or higher. Again, interactions between negative total returns and the co-manager counts are insignificant. The interaction between total return greater than 20% and the number of highly ranked co-managers is positive and highly significant, while the interaction with the number of low-ranked co-managers is positive but insignificant. When the total return is greater than 20%, a larger number of highly ranked co-managers is associated with larger offer price revisions. This suggests that high-quality co-managers are either better at producing information, or better able to convey that information to book managers.

The fourth regression includes interactions between the total return dummies and the IPO syndicate's Herfindahl Index. The coefficient on the interaction with the negative total return dummy is positive and significant, while the coefficient on the interaction with total returns greater than 20% is negative and marginally significant. These findings suggest that offer price revisions in response to information tend to be smaller when the IPO is concentrated among only a few underwriters.

In the last three regressions in the table, syndicate measures are interacted with the actual return when greater than 20%, rather than with the dummy variable for large positive returns. In each case, the coefficient on the interaction is insignificant. It appears that having additional co-managers increases the size of positive price revisions, but the effect diminishes for the largest total returns.

To summarize, the likelihood that an offer price is revised in response to new information increases when a syndicate is larger and shares are more

broadly distributed across underwriters. The size of offer price revisions also increases with syndicate size, particularly if more highly ranked co-managers are included. While market-wide returns do lead to offer price revisions, the likelihood that this publicly available information results in a price revision is unaffected by syndicate structure. As noted in Section II, information can be conveyed to the book manager in two ways; directly through conversations with the book manager or indirectly through conversations with issuers, who then use the information in their negotiations with the book manager. It is unclear which is more common. However, our conversations with underwriters suggest that both methods of information transmission occur. In addition, our results for downward price revisions suggest that at least some information production results from co-managers conveying information directly to the book manager.

One last potential explanation for the relation between syndicate size and offer price revisions is in order. It is possible that book managers bring in larger syndicates when a lot of information is revealed during the filing period. This explanation is unlikely to explain our results, however, since co-managers tend to be included in the syndicate from the start of the process. Also, the issuer has a lot of influence on the number of co-managers, leaving the book manager with only a limited ability to alter the set of managing underwriters when faced with a difficult offering.

B. Syndicate Structure and IPO Underpricing

To the extent that larger syndicates increase the likelihood of upward offer price revisions, they also reduce underpricing. But does syndicate size have any additional effect on underpricing after accounting for offer price revisions? If co-managers and non-managing syndicate members help to certify an offerings' quality or reduce asymmetric information associated with IPO value, we might expect a further reduction in underpricing for larger syndicates with high-quality co-managers.

To examine this possibility, we estimate two-stage least squares (2SLS) regressions of underpricing on syndicate characteristics and a set of control variables that have been shown in previous research to affect IPO underpricing. The control variables include expected proceeds, the log of expected proceeds, a dummy variable for lead underwriters with a Carter–Manaster rank of at least eight, a dummy variable for venture-backed issues, aftermarket standard deviation, and the percentage adjustment from the filing price to the offer price. We use 2SLS to account for the endogeneity of syndicate size. In the first stage, we regress the number of underwriters (or co-managers) on the independent variables from the second stage regression as well as a dummy variable for NYSE/AMEX listing, the number of co-managers (or the Herfindahl Index) from the most recent syndicate led by the same book manager, and the previous syndicate measure interacted with the ratio of offer proceeds in the current and previous issues. The latter two variables control for changes over time and for underwriter-specific effects. While these variables significantly

increase the explanatory power of the regressions, the total number of observations is reduced because we require the book manager to have a prior IPO during the sample period. The estimated number of underwriters (or co-managers) from the first stage is used as an explanatory variable in the second-stage regression.

Table V provides the regression results. The price adjustment from the filing price to the offer price is significantly related to the number of co-managers and is also a highly significant predictor of underpricing. However, after adjusting for price revisions, syndicate composition has no further effect on underpricing. We conclude that syndicate structure has no effect on underpricing beyond that associated with the adjustment of the offer price. Although not shown, results based on simple OLS regressions and results based on other syndicate composition measures provide similar conclusions. Thus, our results indicate that additional co-managers and larger syndicates may reduce underpricing only to the extent that their presence increases the likelihood of offer price revisions.

The coefficient on price adjustment requires some additional explanation. The positive coefficient on price adjustment seems to suggest that offerings in which syndicates make upward price revisions result in higher underpricing. Our interpretation though is that the positive coefficient on price adjustment reflects the partial adjustment phenomena predicted by book-building theories. In the model of Benveniste and Spindt (1989), offer prices are only partly adjusted to compensate investors for revealing positive information. As a result, offers with large positive price revisions typically have large initial returns. Hanley (1993) provides empirical support for the model by demonstrating that initial returns are highest for stocks with offering prices above the filing price range. Viewed in the light of book-building theories, upward price adjustment occurs for those IPOs that are later revealed to be the most underpriced when the filing price is set. The adjustment itself reduces ex post underpricing while leaving money on the table for information providers. Thus, while upward price adjustment typically occurs for the most underpriced IPOs, the greater likelihood of a price adjustment with a larger syndicate may result in diminished underpricing for these offerings.

C. Syndicates and Aftermarket Services

As noted above, syndicate members may be included to increase aftermarket analyst coverage or market making. To test whether large underwriting syndicates are associated with more market makers, we obtain the first number of market makers on the CRSP tape following Nasdaq IPOs. For tests of analyst coverage, we obtain the number of analysts listed on I/B/E/S that issued reports on the issuer within 3 months of the offer date. We then regress these variables on the number of underwriters or co-managers in the syndicate and several control variables, including offer proceeds, the natural log of proceeds, industry and date dummy variables, underpricing, and aftermarket standard deviation.

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Table V

IPO Underpricing and Syndicate Size

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The table lists coefficient estimates from 2SLS regressions of the natural log of $1 +$ underpricing on syndicate characteristics and a set of control variables. The sample includes 1,638 U.S. IPOs issued between 1997 and June 2002, excluding units, rights, investment funds, and REITs. The number of co-managers used in the second-stage regression is estimated in the first stage. The first-stage regression includes all control variables from the second stage regression, as well as a dummy variable for NYSE/AMEX listing, the number of co-managers from the most recent IPO led by the same book manager, and the number of co-mangers from the previous IPO multiplied by the ratio of the current and previous IPO offering proceeds. Control variables include expected offer proceeds, the natural log of expected proceeds, aftermarket standard deviation, the book manager's Carter–Manaster rank, a dummy variable for venture capital backing, a dummy for Internet stocks, and dummy variables for two-digit SIC codes 28, 35, 36, 38, 48, 60, 73, and 87. Adjusted Carter–Manaster Ranks for underwriters as well as identities of Internet stocks are taken from Jay Ritter's web page at http://bear.cba.ufl.edu/ritter/rank.htm. All other variables are defined as in Table I. The t-statistics based on White's heteroskedasticity consistent standard errors are listed in parentheses below the coefficients.

	First Stage	Second Stage	First Stage	Second Stage
	Number of Co-managers	Log(1 + Underpricing)	Herfindahl Index	Log(1 + Underpricing)
Intercept	−1.376	0.024		0.044
	(−7.91)	(0.19)		(0.43)
Expected proceeds × .01	0.001	0.000	0.003	0.000
	(9.02)	(−0.08)	(2.25)	(0.08)
Log of expected proceeds	0.668	−0.014	−0.052	−0.014
	(14.84)	(−0.27)	(−10.67)	(−0.78)
Aftermarket σ	−0.755	1.703	0.145	1.703
	(−0.50)	(3.92)	(0.89)	(3.89)
Book manager ranked ≥ 8	0.364	0.069	−0.019	0.068
	(4.57)	(2.03)	(−2.23)	(3.11)
Venture capital backing	0.135	0.043	−0.007	0.043
	(2.17)	(2.16)	(−1.06)	(2.40)
Price adjustment	0.296	0.584	−0.015	0.584
	(3.46)	(10.19)	(−1.65)	(9.86)
Number of co-managers	–	0.005	–	–
		(0.08)		
Herfindahl Index	–	–	–	−0.048
				(−0.39)
Previous syndicate no. of co-managers	0.0322	–	–	–
	(1.30)			
Previous syndicate Herfindahl Index	–	–	0.439	–
			(21.07)	
Previous syndicate measure × (current proceeds/previous proceeds)	−0.0177	–	−0.002	–
	(−1.49)		(−1.69)	
NYSE/AMEX listing	0.2618	–	0.015	–
	(2.93)		(1.59)	
Industry and date dummies	Yes	Yes	Yes	Yes
R^2	0.5879	0.4924	0.5248	0.4935

<div align="center">

Table VI

Aftermarket Services and Syndicate Size

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The table lists coefficient estimates from 2SLS regressions of the number of analysts and number of market makers on measures of syndicate size and a set of control variables. Results are shown based on both 2SLS and Poisson regressions. The sample includes 1,638 U.S. IPOs issued between 1997 and June 2002, excluding units, rights, investment funds, and REITs. The initial number of market makers is obtained from CRSP and is defined only for the 1,338 IPOs listed on Nasdaq. The number of analysts is obtained from I/B/E/S and is defined as the number of unique analysts who issued reports on the company during the first three months of trading. Aftermarket standard deviation is estimated using continuously compounded daily returns from days 21 through 125 after the IPO and is missing for 3 IPOs. Underpricing is the return from the offer price to the closing price on the first day of trading. The model also includes dummy variables for each offer year and for industries defined by two-digit SIC codes 28, 35, 36, 38, 48, 60, 73, and 87. In the 2SLS regressions, the number of underwriters (co-managers) is estimated in a first-stage regression (not shown) using the dependent variables from the second stage, as well as a dummy variable that equals one for book managers with Carter–Manaster rankings greater than or equal to eight, the number of underwriters (co-managers) in the most recent IPO led by the same book manager, and the previous number of underwriters (co-managers) multiplied by the ratio of expected offer proceeds in the current and previous offers. The first-stage regression for the number of analysts also includes a dummy variable for NYSE/AMEX listing. For OLS regressions, heteroskedasticity-consistent t-statistics are reported in parentheses below the coefficients. For the Poisson regressions, z-statistics are reported.

| | Number of Market Makers | | | | Number of Analysts | | | |
	2SLS Regressions		Poisson Regressions		2SLS Regressions		Poisson Regressions	
Intercept	0.576	1.413	1.797	1.825	−1.146	−0.236	−0.954	−0.820
	(0.68)	(1.48)	(42.29)	(44.59)	(−4.25)	(−0.67)	(−10.57)	(−7.95)
Log of proceeds	2.750	2.024	0.167	0.143	0.882	0.285	0.416	0.354
	(11.95)	(4.98)	(16.38)	(12.78)	(10.83)	(1.90)	(20.66)	(12.94)
.01 × proceeds	0.532	0.452	0.003	−0.001	0.147	0.036	−0.001	−0.014
	(5.52)	(3.16)	(1.14)	(−0.13)	(4.72)	(0.89)	(−0.39)	(−1.76)
Aftermarket	24.901	26.555	1.119	1.184	1.357	1.935	−0.185	−0.533
std. dev.	(3.84)	(4.14)	(3.57)	(3.85)	(0.58)	(0.83)	(−0.23)	(−0.67)
Underpricing	2.444	2.554	0.087	0.090	0.211	0.297	0.049	0.057
	(14.40)	(15.11)	(12.71)	(13.25)	(3.58)	(5.04)	(3.20)	(3.78)
No. of underwriters	−0.022	–	−0.000	–	−0.006	–	0.002	–
	(−0.85)		(−0.47)		(−0.54)		(1.03)	
No. of co-managers	–	1.056	–	0.038	–	0.843	–	0.096
		(1.97)		(4.42)		(4.51)		(4.17)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	1,177	1,177	1,338	1,338	1,425	1,425	1,634	1,634
R^2 (pseudo-R^2)	0.7771	0.7833	0.3077	0.3097	0.4320	0.4964	0.1565	0.1693

Results for two types of regressions are shown in Table VI. First, we report 2SLS regressions, where the first-stage regression is similar to that used for the underpricing regression. We also report Poisson regression estimates. These regressions do not adjust for endogeneity, but do explicitly incorporate the

discrete nature of the dependent variables as well as the higher residual variance that accompanies a higher predicted number of market makers.

The market-making regressions are shown in the first four columns of Table VI. In both types of regressions, the number of market makers increases with the size of the offer, the amount of underpricing, and aftermarket standard deviation. After controlling for these effects, the total number of underwriters in a syndicate does not appear to affect the number of market makers. However, the number of co-managers is significantly related to the number of market makers. The 2SLS estimates suggest that the number of market makers increases approximately one for one with co-managers.

Results for analyst coverage are shown in the last four columns of Table VI. The number of analysts, like the number of market makers, is unaffected by the total number of syndicate members, but increases significantly with the number of co-managers. The 2SLS estimates suggest that each co-manager increases the number of analysts by 0.8. The coefficient on the number of co-managers is highly significant in both regressions.

Overall, the results in Table VI provide strong support for the hypothesis that including co-managers in a syndicate increases aftermarket analyst coverage and market making. This finding is also consistent with our probit model results, which suggest that high-quality analyst coverage is an important determinant of syndicate participation.

VI. Should Issuers Demand Large Syndicates?

From the standpoint of the issuing firm, our results suggest that a large underwriting syndicate, and particularly more co-managers, provide several benefits. Additional co-managers lead to increased analyst coverage and more market makers. In addition, employing more co-managers results in more accurate offer prices and possibly less underpricing if the initial filing price is set too low. Should issuers demand as many co-managers as possible? A partner in the law firm of Goodwin Proctor tells us that he advises clients that it is better to "have more banks on your cover than fewer" because the total fees are the same regardless of the number of co-managers, while adding managers increases analyst coverage.

But while it appears that issuers should include as many co-managers as possible, their ability to do so may be limited by several factors. On the one hand, issuers themselves may benefit from limited syndicate size if fees increase with the number of underwriters in the syndicate. Specifically, lead managers may be unwilling to increase the number of co-managers without increasing the fees they charge. On the other hand, underwriters may exert pressure to limit syndicate size for reasons that benefit the underwriter but impose potential costs on the issuer. First, high-quality underwriters will require a substantial share allocation in order to participate in a syndicate. Second, lead managers may seek to limit the number of co-managers in order to diminish competition for future underwriting business and reduce the number of underwriters talking to the issuer during the IPO process. Third, lead managers may only be willing

to work with underwriters with whom they have an ongoing relationship, and may refuse to work with some co-managers altogether. We discuss each of these factors in more detail below.

A. Underwriter Spreads

While underwriting fees are almost always set at 7% for U.S. IPOs (see Chen and Ritter (2000)), it may not always be costless for the issuer to include additional co-managers in the IPO syndicate.[14] Because underwriting fees must be shared with syndicate members, book managers may be unwilling to add additional co-managers without charging higher fees. To address this issue, we provide both OLS and 2SLS regressions of underwriter gross spreads on a set of control variables and the number of co-managers in the IPO syndicate. In the 2SLS regressions, the number of co-managers is estimated in a first-stage regression including the control variables from the second-stage, as well as dummy variables for venture capital backing and NYSE/AMEX listing. We report separate results for the full sample of IPOs and for the smallest and largest offer size quintiles, where spreads are most likely to deviate from the standard 7%. The results are presented in Table VII.

As expected, underwriter spreads are generally negatively related to offer size and positively related to aftermarket standard deviation. In the full sample and the large offer subsample, spreads are also negatively related to lead underwriter rank. After controlling for these effects, the full sample results show that underwriter spreads are increasing in the number of co-managers. This suggests that it is not always costless to add additional co-managers to the IPO syndicate. Comparing the small and large IPO subsamples, we see that the positive relation between underwriter spreads and the number of co-managers is driven by the spreads on small IPOs. One possible explanation for this finding is that co-managers are more difficult to attract for small IPOs, while underwriters compete more aggressively for positions in large IPO syndicates. Based on the 2SLS coefficient estimates for the full sample, each additional co-manager results in a 40 basis point increase in the gross spread.

B. Allocation Requirements

Underwriters, especially high-quality underwriters, will refuse to participate as book managers or co-managers without a sufficiently large allocation. In our sample, the average dollar allocation to underwriters with a Carter–Manaster rank of eight (nine) is $24.2 million ($58.1 million), and these underwriters obtain allocations of at least $3 million ($2.9 million) 99% of the time. Similarly, book managers with Carter–Manaster ranks of nine underwrite an average of $58.5 million per IPO and retain allocations of at least $7.8 million 99% of the time. For comparison, the median offer size in our sample is $52.3 million.

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[14] Underwriter gross spreads are exactly 7% in 76.7% of the sample IPOs. For the smallest and largest offer size quintiles, the percentage is 52.3 and 49.4, respectively.

Table VII
Underwriter Spreads and Syndicate Size

The table lists coefficient estimates from 2SLS regressions of underwriter gross spreads on the number of co-managers in the IPO syndicate and a set of control variables. The sample includes 1,638 U.S. IPOs issued between 1997 and June 2002, excluding units, rights, investment funds, and REITs. The number of co-managers is estimated in a first-stage regression (not shown) using the independent variables from the second-stage regression, as well as dummy variables for NYSE/AMEX listing and venture capital backing. Expected offer proceeds equals offered shares times the midpoint of the initial filing price range. Aftermarket standard deviation is estimated using continuously compounded daily returns from days 21 through 125 after the IPO. Lead underwriters ranked greater than eight are defined based on adjusted Carter–Manaster ranks. For OLS regressions, heteroskedasticity-consistent t-statistics are reported in parentheses below the coefficients.

	All IPOs		Small IPOs		Large IPOs	
	OLS	2SLS	OLS	2SLS	OLS	2SLS
Intercept	9.166	9.639	11.710	11.949	10.426	10.988
	(70.04)	(35.18)	(31.43)	(28.31)	(39.63)	(13.89)
1998 dummy	−0.066	−0.094	−0.139	−0.149	−0.027	−0.033
	(−1.28)	(−1.66)	(−0.76)	(−0.80)	(−0.39)	(−0.39)
1999 dummy	−0.064	−0.216	−0.218	−0.449	0.056	−0.018
	(−1.35)	(−2.59)	(−1.33)	(−1.79)	(0.92)	(−0.17)
2000 dummy	0.045	−0.086	0.078	−0.009	0.275	0.190
	(0.86)	(−1.06)	(0.47)	(−0.05)	(3.46)	(1.36)
2001–2002 dummy	0.290	0.032	0.053	0.013	0.308	−0.022
	(3.93)	(0.24)	(0.20)	(0.05)	(2.01)	(−0.05)
Exp. offer proceeds × .01	−0.012	−0.051	1.600	0.900	−0.005	−0.016
	(−2.02)	(−1.79)	(3.31)	(1.35)	(−0.73)	(−0.85)
Log (exp. proceeds)	−0.589	−0.834	−1.706	−1.884	−0.749	−0.928
	(−18.07)	(−6.90)	(−11.42)	(−9.59)	(−12.68)	(−3.82)
Aftermarket std. dev.	4.229	3.665	7.562	7.257	2.00	1.506
	(5.63)	(4.05)	(2.94)	(2.96)	(1.73)	(0.86)
Lead rank ≥ 8	−0.063	−0.260	−0.034	−0.393	−0.184	−0.304
	(−1.82)	(−2.69)	(−0.35)	(−1.32)	(−1.66)	(−1.73)
No. of co-managers	0.010	0.403	0.196	0.758	−0.022	0.166
	(0.62)	(2.35)	(3.53)	(1.83)	(−1.30)	(0.74)
N	1,634	1,634	325	325	323	323
Adj. R^2	0.5735	0.3725	0.5987	0.4961	0.8016	0.6720

To control for offer size and changes over time, we regressed dollar underwriting allocations for managers and co-managers on IPO proceeds, dummy variables for Carter–Manaster rankings, and year dummy variables. We estimate that a co-manager ranked five or lower typically receives an allocation of $4.2 million plus 5.4% of offer proceeds. The coefficients on dummy variables for Carter–Manaster ranks of eight and nine are $7.9 million and $26.6 million, respectively, and reflect the additional allocation required by highly ranked underwriters. We estimate that a book manager that is ranked five or lower typically receives an allocation of $4.8 million plus 17.6% of proceeds.

The incremental allocation for a book manager who is ranked nine is $7.7 million. Thus, while issuers may benefit from including additional co-managers in their IPO syndicates, syndicate size may be limited by the amount of stock they intend to issue and their choice of book manager.

C. Underwriter Competition

As noted in Section II, competition among underwriters may continue throughout the IPO process as underwriters work to capture the lead position in future underwriting business. Although our results suggest that this can result in more accurate pricing, it can also lead to disruptions in the IPO process because the various investment banks work in their own interests. As a result, book managers often seek to limit the number of co-managers on an issue. One underwriter we talked to joked that he spends most of his time trying to keep additional co-managers off the cover.

To examine the importance of underwriter competition more closely, we analyze the likelihood that co-managers in the IPO syndicate are given the lead role in the issuer's follow-on offerings. If co-managers provide a significant source of competition for the book manager, we would expect their position as co-managers to have a positive impact on their likelihood of being selected to lead future offerings. For each IPO firm, we use SDC's Global New Issues database from January 1997 through June 2003 to identify the first seasoned equity offer (SEO) following the IPO. This search resulted in seasoned offers for 414 IPO firms. Using this sample, we then estimate a probit model for the likelihood of being selected as the book manager in the follow-on offer. The model includes one observation per SEO per eligible underwriter, where eligible underwriters are defined as all underwriters who were in business at the time of the SEO and managed at least one IPO or SEO during our sample period. As in the syndicate participation probit model, standard errors are adjusted to allow for IPO-specific effects. Results are reported in Table VIII.

The first column reports estimates based only on offer and underwriter characteristics. The results are similar to our IPO probit model. An underwriter is more likely to be an SEO's book manager if it has a high Carter–Manaster rank, is located in the issuer's state, and has a top-ranked analyst in the issuer's industry. The second probit model incorporates dummy variables for whether an underwriter was the book manager or a co-manager of the firm's IPO. The inclusion of these two variables more than doubles the pseudo-R^2 of the probit model. Of particular interest is that even after adjusting for underwriter ranking, location, and analyst quality, an underwriter is much more likely to be a book manager if it was a co-manager in the IPO. To account for joint SEO book managers, the third probit model includes an interaction between an underwriter's status as an IPO co-manager and a dummy variable that equals one if the IPO book manager is not selected as a book manager of the SEO. The coefficients on the co-manager variable and interaction term indicate that

Table VIII
Probit Model for Follow-on Offer Book Manager Selection

The table lists coefficient estimates from probit models of SEO book manager choice. The sample includes 414 follow-on offers between January 1997 and June 2003 that involve firms in the IPO sample. The IPO sample includes 1,638 U.S. IPOs issued between January 1997 and June 2002, excluding units, rights, investment funds, and REITs. The models include one observation for each underwriter that was in business at the time of the SEO and who managed at least one IPO or SEO during the sample period. The set of eligible underwriters is adjusted for mergers and acquisitions among underwriters. The dependent variable equals one if the underwriter is selected as a book manager in the follow-on offering. Dependent variables are defined as follows. Aftermarket standard deviation is estimated using continuously compounded daily returns from days 21 through 125 after the IPO. Adjusted Carter–Manaster ranks for underwriters range from one to nine and are taken from Jay Ritter's web page at http://bear.cba.ufl.edu/ritter/Rank.HTM. Top 3 analyst is a dummy variable equal to one if the underwriter employs one of the top three analysts in the IPO's industry, as ranked by *II*. Issuer state is a dummy variable that equals one if the underwriter is in the same state as the issuer. Dummy variables are also included to identify underwriters who were either book managers or co-managers in the IPO syndicate and SEOs for which the IPO book manager is not selected as a book manager in the SEO. Standard errors are adjusted to allow for IPO-specific effects and are listed in parentheses below the coefficients.

Probit Model Coefficients for SEO Book Manager Selection			
Intercept	−2.685	−2.770	−2.798
	(0.078)	(0.125)	(0.128)
Ln(SEO offer proceeds)	−0.015	−0.087	−0.081
	(0.010)	(0.021)	(0.022)
Standard deviation	−1.699	−1.398	−1.551
	(0.390)	(0.779)	(0.806)
Carter–Manaster rank ≥ 8	0.904	0.700	0.713
	(0.061)	(0.080)	(0.080)
Regional underwriter	−0.454	−0.375	−0.366
	(0.065)	(0.082)	(0.082)
Top 3 analyst	0.580	0.320	0.325
	(0.050)	(0.074)	(0.074)
Located in issuer state	0.178	0.027	0.040
	(0.050)	(0.067)	(0.069)
Book manager in IPO	–	3.180	3.177
		(0.092)	(0.092)
Co-manager in IPO	–	1.163	0.987
		(0.077)	(0.087)
Co-manager in IPO $\times$ lead change	–	–	0.626
			(0.129)
Year dummy variables	Yes	Yes	Yes
N	80,362	80,362	80,362
Pseudo-R^2	0.2690	0.5905	0.6281

a co-manager is particularly likely to become a book manager of an SEO if the IPO book manager is dropped. These findings demonstrate that competition between underwriters does not end when one is named book manager. Underwriters may continue to compete during the IPO process in order to earn the lead position on the more lucrative follow-on offerings.

To better understand the economic importance of the variables, we examined the estimated probability of being selected book manager of an SEO based on the probit model coefficients and median offer characteristics (not shown). A national underwriter located in the same state as the issuer, with a Carter–Manaster rank of eight or greater, and a top-ranked analyst, has a 2.3% chance of being selected as the SEO book manager. If, in addition, the underwriter was a co-manager of the IPO, the chance of being selected as a book manager jumps to 15.6%. Further, if we condition on the IPO book manager being dropped, the probability that the co-manager is selected to lead the follow-on offer increases to nearly 35%. Being a co-manager in the IPO puts an underwriter in a good position to compete for future underwriting business. As a result, book managers may have an incentive to limit the number of co-managers in the IPO. In addition to its effects on IPO pricing, this reduction in competition may lead to higher future underwriting costs for the issuer.

D. Underwriter Relationships

Another factor that may limit the size of IPO syndicates is the importance of underwriter relationships. Book managers may balk at including an underwriter in a syndicate if they do not have a working relationship. Our probit regressions in Table III show that prior relationships are a critical determinant of inclusion in an underwriting syndicate. In this section, we take a closer look at the role of relationships by examining how often specific pairs of underwriters work together.

Table IX reports the percentage of time that each of the ten underwriters that managed the most IPOs included each of the other nine in their syndicates. Each column corresponds to a book manager and each row corresponds to a syndicate member. So, for example, in the DLJ (fifth) column and the Goldman Sachs (first) row, we see 53.41. This means that Goldman Sachs was included in 53.41% of the IPO syndicates led by DLJ. For comparison, the last column gives the percentage of all IPOs that included the underwriter as a syndicate member. As an example, Goldman Sachs is included in 17.87% of all syndicates during the sample period.

For each book manager–syndicate member pair, we test whether the frequency of syndicate participation differs between offers led by the listed book manager and offers led by all other book managers. The large number of book manager–syndicate member pairs that occur significantly more or less frequently than expected confirms the importance of relationships. Specific examples are illuminating. Goldman Sachs appears in 53.4% of DLJ's syndicates but in less than 9% of Hambrecht and Quist's and none of Fleet Robertson's syndicates. CS First Boston appears in 26.8% of Goldman's IPO syndicates and in 51.1% of Citigroup Salomon Smith Barney's syndicates. For Hambrecht and Quist the pattern is just the opposite. They are included in 46.9% of Goldman's IPO syndicates, but only in 29.4% of Citigroup Salomon's.

These results confirm the importance of relationships in syndicate formation. Book managers appear with the same syndicate members again and again.

Table IX
Book Manager–Syndicate Member Frequencies

The table lists frequencies of book manager–syndicate member combinations involving the top 10 book managers in the sample (based on the number of IPOs underwritten). Frequencies are shown for the top 10 underwriters and are stated as a percentage of IPOs taken public by the listed book manager. The last column lists the percentage (number) of all IPO syndicates in which the underwriter participated. Proportions are adjusted to account for underwriters that were not eligible for all IPO syndicates due to mergers and acquisitions. ***, **, and * indicate that the frequency of syndicate participation for a particular underwriter differs significantly between the listed book manager and all other book managers at the 1, 5, and 10% levels, respectively. The sample includes 1,638 U.S. IPOs issued between January 1997 and June 2002, excluding units, rights, investment funds, and REITs.

Syndicate Member	Institutional Book Managers				Mixed Book Managers			Retail Book Managers			% of Eligible (Total Syndicates)
	Goldman Sachs	CS First Boston	Lehman	Fleet Robertson	DLJ	Bear Stearns	Hambrecht	Morgan Stanley DW	Merrill Lynch	Citigroup Salomon Smith Barney	
Goldman Sachs	–	11.59**	30.56***	0.00***	53.41***	33.93***	8.89	33.04***	24.71*	31.91**	17.87 (406)
CS First Boston	26.81***	–	31.94***	0.00***	37.50***	37.50***	0.00***	27.83***	30.59***	51.06***	17.00 (393)
Lehman	18.84*	21.01	–	6.25***	56.82***	44.64***	28.89	33.04*	28.24	36.17*	25.61 (473)
Fleet Robertson	31.40	44.66***	34.69	–	40.91	32.26	28.57	40.00	22.81	47.50**	31.81 (278)
DLJ	37.82	30.70	47.46**	15.56***	–	64.71***	51.11**	39.22	42.65	41.67	34.35 (574)
Bear Stearns	21.01*	23.19	44.44***	20.83	67.05***	–	42.22**	30.43	31.76	42.55**	28.07 (500)
Hambrecht	46.91**	45.71**	43.59	41.18	50.00***	54.76***	–	42.11	23.91	29.41	34.61 (433)
Morgan Stanley DW	26.52	13.64***	29.58	2.08***	48.19***	38.46***	19.51	–	25.61	42.55***	22.58 (427)
Merrill Lynch	42.03***	28.99	56.94***	2.08***	75.00***	55.36***	13.33**	48.70***	–	46.81***	27.95 (519)
Citigroup Salomon Smith Barney	46.00***	28.45	36.36	6.25***	82.46***	43.59*	45.83	35.44	38.46	–	31.47 (329)
Total offers by book manager	(138)	(138)	(72)	(48)	(88)	(56)	(45)	(115)	(85)	(47)	

Continuing relationships may serve to limit opportunistic behavior on the part of the book manager. For example, syndicate members may avoid participation in a book manager's future offers if the book manager cuts back on selling credits after the syndicate members have expended time and effort to sell the offer. Likewise, a syndicate member who talks to the issuer behind the book manager's back or fails to provide market making or analyst coverage following an IPO may not be included in the book manager's future syndicates. Of course, relationships in some cases reflect other business linkages between underwriters. For example, both Wainright and Cruttenden Roth cleared through Montgomery Securities and appeared in over 90% of its IPO syndicates during the sample period.

VII. Conclusions

In this paper, we use data on more than 1,600 IPOs from 1997 to 2002 to test hypotheses about the role of IPO syndicates. We find strong evidence of information production by syndicate members. In IPOs underwritten by large syndicates, and particularly by syndicates with a lot of co-managers, the offer price is more likely to be revised away from the midpoint of the filing price range in response to information. An obvious explanation for this is that syndicate members produce useful information about the market demand for an IPO and convey it to the book manager. Indeed, some underwriters have told us that they speak to the book manager regularly about demand for an IPO when they are in the syndicate. However, information from co-managers may also be transferred indirectly through conversations with the issuer. Practitioners tell us that underwriters continue to compete with each other even after the syndicate has been established. If the book manager prices the offering too low, co-managers will be sure to tell the issuer "we could have gotten a higher price." Thus, even if the book manager ignores the co-managers, their information may be passed along through the issuer.

In forming syndicates, relationships are critical. An underwriter is much more likely to be included in a syndicate if it has appeared in past syndicates led by the same book manager. In fact, some underwriters appear in virtually every IPO syndicate led by a particular underwriter. An underwriter is also more likely to be included in a syndicate if the book manager received shares in the underwriter's recent deals. While some relationships appear to reflect business ties between underwriters, we argue that these ongoing relationships serve to minimize free-riding and moral hazard problems in syndicates when members are expected to actively participate in information production and in marketing the IPO.

Another reason for including underwriters in syndicates is that they perform aftermarket services. We find that adding co-managers to an IPO syndicate increases both the number of market makers and the number of analysts issuing reports in the aftermarket. In contrast, syndicate members other than co-managers seem to have little effect on either analyst coverage or market

making after controlling for offer characteristics. For large IPOs, we also find that underwriters who can provide coverage by a top-ranked analyst are more likely to be included in the syndicate.

Our results suggest that issuers benefit from increasing the number of syndicate members and especially the number of co-managers who underwrite their IPO. However, several factors may limit syndicate size. First, prestigious book managers and co-managers demand sizeable allocations to participate in syndicates, so that syndicate size is limited by the amount offered and the choice of book manager. In addition, we find that co-managers compete with the book manager for future underwriting business, giving book managers an additional incentive to limit the number of co-managers. Our results also suggest that the set of potential syndicate members may be limited to those with existing relationships with the book manager. Finally, at least for small IPOs, underwriting spreads appear to increase with the number of co-managers.

Even over our relatively short sample period, syndicates have changed dramatically. While IPO proceeds increased from 1997 to 2002, syndicates grew smaller. At the same time, the number of co-managers increased. One explanation for this change is that the importance of co-managers in producing information or providing aftermarket services has increased over time. Alternatively, underwriters have told us that issuers have become more sophisticated and now demand more co-managers. The changes in syndicate structure over time provide an interesting area for future research.

Appendix. Underwriter Name Adjustments Related to Mergers and Acquisitions

The table lists merger and acquisition events involving sample underwriters and associated name adjustments applied in the data. The sample includes 1,638 IPOs from January 1997 through June 2002. Merger and acquisition events are identified using the *Securities Industry Yearbook* list of mergers and acquisitions for SIA firms and the publication *Mergers & Acquisitions*. Announcement and event dates are identified using Lexis/Nexis and the Securities Data Company's Merger and Acquisition database. Events are listed in chronological order, except where multiple events involving the same firm are grouped together. A more detailed description of the name adjustments applied to the data is available from the authors at www.nd.edu/~ scorwin.

Ann. Date	Eff. Date	Target Name	Acquirer Name	New Name Applied after Effective Date
19970220	19970502	Equity Securities Trading Co.	Southwest Securities Group, Inc.	Southwest Securities Group
19970205	19970531	Morgan Stanley Group, Inc.	Dean Witter Discover & Co.	Morgan Stanley Dean Witter
19970612	19970731	First of Michigan Capital Corp.	Fahnestock Viner Holdings, Inc.	Fahnestock
–	20010918	Josephthal Lyon & Ross	Fahnestock & Co.	Fahnestock
20011017	20011112	Grand Charter Group, Inc.	Fahnestock & Co.	Fahnestock
19970407	19970902	Alex Brown, Inc.	Bankers Trust New York Corp.	BT Alex Brown
19981130	19990604	Bankers Trust New York Corp.	Deutsche Bank AG	Deutsche Alex Brown
19970515	19970902	Dillon Read & Co.	SBC Warburg (Swiss Bank Corp.)	Warburg Dillon Read
19971208	19980629	Swiss Bank Corp. (SBC)	Union Bank of Switzerland (UBS)	UBS Warburg (includes Warburg Dillon Read)
–	19980828	SBC Warburg Premier Sec (Thailand)	Union Bank of Switzerland (UBS)	UBS Warburg
20000428	20000612	JC Bradford & Co.	PaineWebber Group, Inc.	PaineWebber
20000712	20001103	PaineWebber Group, Inc.	UBS AG	UBS PaineWebber
19970501	19971001	Craigie, Inc.	Southern Natl, Winston-Salem, NC	Southern National not in sample after Eff. Date
–	19971002	Craigie, Inc.	BB&T Corp., Winston-Salem, NC	BB&T Corp.
19970630	19971001	Montgomery Securities, CA	NationsBank Corp., Charlotte, NC	NationsBank Montgomery Securities
19970609	19971001	Robertson Stephens & Co.	BankAmerica Corp.	BA Robertson Stephens
19970916	19980202	Quick & Reilly Group, Inc.	Fleet Financial Group Inc., MA	Fleet Financial
19980529	19980901	Robertson Stephens & Co.	BankBoston Corp., Boston, MA	Bank Boston Robertson Stephens
19980413	19980930	BankAmerica Corp.	NationsBank Corp., Charlotte, NC	Bank of America
19990314	19991001	BankBoston Corp., Boston, MA	Fleet Financial Group Inc., MA	Fleet Robertson Stephens
19970828	19971008	Furman Selz LLC	ING Barings (ING Groep NV)	ING Barings Furman Selz
20010130	20010430	ING Baring-US Operations	ABN-AMRO Holding NV	ABN-AMRO
19970722	19971103	Oppenheimer (Oppenheimer Group)	CIBC Wood Gundy Securities, Inc.	CIBC World Markets
19971119	19971120	Hampshire Securities Corp.	Gruntal & Co., Inc.	Gruntal & Co., Inc.
19970924	19971128	Salomon, Inc.	Travelers Group, Inc.	Salomon Smith Barney
19980406	19981008	Citicorp	Travelers Group, Inc.	Salomon Smith Barney
20000118	20000501	Schroders—Worldwide Investment	Salomon Smith Barney Holdings	Salomon Smith Barney
19970925	19980102	Equitable Securities Corp.	SunTrust Banks Inc., Atlanta, GA	Sun Trust Equitable Securities
20010514	20010727	Robinson-Humphrey (from Citigroup)	SunTrust Banks Inc., Atlanta, GA	SunTrust Robinson-Humphrey

Ann. Date	Eff. Date	Target Name	Acquirer Name	New Name Applied after Effective Date
19971112	19980105	Ernst & Co. (Investec Bank Ltd.)	Investec Bank (Investec Hldgs)	Investec Ernst & Co.
–	20010410	PMG Group	Investec USA Holdings	Investec Ernst & Co.
–	19991101	Royce Investment Group	Investec Ernst & Co.	Investec Ernst & Co.
20010109	20010208	Herzog Heine Geduld-Retail	Investec Ernst & Co.	Investec Ernst & Co.
19971212	19980109	Principal Financial Securities	Everen Capital Corp.	Everen Capital
19970819	19980202	Wheat First Butcher Singer	First Union Corp., Charlotte, NC	First Union
19990426	19991001	Everen Capital Corp.	First Union Corp., Charlotte, NC	First Union
20010416	20010904	First Union	Wachovia	Wachovia Corp.
–	19980102	Rauscher Pierce Refsnes	Dain Bosworth	Dain Rauscher
19980209	19980406	Wessels Arnold & Henderson LLC	Dain Rauscher Corp.	Dain Rauscher Wessels
20000928	20010110	Dain Rauscher Corp.	Royal Bank of Canada	Dain Rauscher Wessels
19971218	19980121	Barclays de Zoete Wedd AU Ltd.	ABN-AMRO Holding NV	ABN-AMRO
–	19980217	Jensen Securities Co.	DA Davidson & Co (DADCO Inc.)	DA Davidson
19971215	19980501	Piper Jaffray Companies	US Bancorp, Minneapolis, MN	US Bancorp Piper Jaffrey
19980903	19990104	Libra Investments, Inc.	US Bancorp, Minneapolis, MN	US Bancorp Piper Jaffrey
19971117	19980511	Roney & Co., Detroit, MI	First Chicago NBD Corp.	First Chicago
19980413	19981002	First Chicago NBD Corp.	BANC ONE Corp., Columbus, OH	Roney Capital Markets (Banc One)
19990414	19990614	Roney & Co., Detroit, MI	Raymond James Financial, Inc.	Raymond James
19971223	19980612	Ohio Co.	Fifth Third Bancorp, Cincinnati	Fifth Third Bancorp
19980223	19980630	Cowen & Co.	Societe Generale Securities	SG Cowen
19980622	19980827	Midland Walwyn, Inc.	Merrill Lynch & Co., Inc.	Merrill Lynch
19980629	19980908	Essex Capital Markets, Inc.	McDonald & Co Investments, Inc.	McDonald & Co.
19980612	19981026	McDonald & Co Investments, Inc.	KeyCorp, Cleveland, OH	KeyCorp
19980923	19990216	Van Kasper & Co.	First Security Corp., Utah	First Security Van Kasper
20000125	20000428	Black & Co., Inc.	First Security Van Kasper & Co.	First Security Van Kasper
20000410	20001026	First Security Corp., Utah	Wells Fargo & Co., California	Wells Fargo
19980810	19990326	Scott & Stringfellow Financial	BB&T Corp., Winston-Salem, NC	BB&T
19981027	19990401	Interstate/Johnson Lane, Inc.	Wachovia Corp., Winston-Salem, NC	Wachovia
19990609	19990731	Vector Securities Intl, Inc.	Prudential Securities, Inc.	Prudential Vector Healthcare
–	19991213	Volpe Brown Whelan & Co.	Prudential Securities, Inc.	Prudential Volpe
19990416	19990813	Butler Wick Corp.	United Community Financial Corp.	United Community Financial Corp.

19990325	19990830	Fechtor, Detwiler & Co., Inc.	JMC Group	JMC Group
19990928	19991210	Hambrecht & Quist Group, Inc.	Chase Manhattan Corp., NY	Chase H&Q
20000913	20001231	JP Morgan & Co., Inc.	Chase Manhattan Corp., NY	JP Morgan Chase
19991214	20000112	Hanifen Imhoff Holding, Inc.	Stifel Financial Corp.	Stifel Financial Corp.
19991101	20000131	Soundview Technology Group	Wit Capital Group, Inc.	Wit Soundview
19991013	20000131	Sanders Morris Mundy	Harris Webb & Garrison, Inc.	Sanders Morris Harris
20000627	20000630	Blackford Securities	Pinnacle Global Group, Inc.	Sanders Morris Harris
19991110	20000201	Paribas SA (BNP)	BNP	BNP Paribas
19990928	20000316	Ragen MacKenzie Group, Inc.	Wells Fargo & Co., California	Wells Fargo
20000605	20000712	Herzog Heine Geduld	Merrill Lynch & Co., Inc.	Merrill Lynch
20000914	20001003	Branch Cabell & Co., Inc.	Tucker Anthony Sutro	Tucker Anthony (Tucker Anthony Sutro after 6/1/01)
20010801	20011101	Tucker Anthony Sutro	Royal Bank of Canada	RBC Capital Markets
20000830	20001103	Donaldson Lufkin & Jenrette	Credit Suisse First Boston	Credit Suisse First Boston
20000926	20001115	Edgar M Norris & Co., Inc.	BB&T Corp., Winston-Salem, NC	BB&T Corp.
20000918	20010105	Wasserstein Perella Group, Inc.	Dresdner Bank AG	Dresdner
–	20010321	Quarterdeck Investment	Jefferies & Co. (Jefferies Group)	Jefferies
20011009	20011203	Lebenthal & Co., Inc.	MONY Group, Inc.	MONY Group
20020422	20020429	GMS Group (from Gruntal & Co.)	Ryan Beck & Co.	Ryan Beck
20020208	20020619	Putnam Lovell Group, Inc.	National Bank Financial Inc. (a unit of National Bank of Canada)	National Bank of Canada
19970321	19970321	Volpe Brown Whelan & Co.	Credit Suisse First Boston Ltd.	Volpe Brown & Whelan (still a separate unit)

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