Reciprocity in Syndicate Participation and Issuer's Welfare: Evidence from Initial Public Offerings

Cheolwoo Lee [a,*], Jin Q. Jeon [b], Bum J. Kim [c]

[a] *Accountancy, Finance, and Information Systems Department, College of Business, Ferris State University, Big Rapids, MI 49307-2284, USA*
[b] *Department of Economics, Finance and Legal Studies, Culverhouse College of Commerce & Business Administration, University of Alabama, Tuscaloosa, AL 35486-0224, USA*
[c] ~~*Department of Business Administration,*~~ *College of Business Administration~~Business~~, Soongsil University, Seoul, 156-743, Korea*

[*] Corresponding author: Accountancy, Finance, & Info Systems Department, College of Business, Ferris State University, 119 South Street, BUS 353, Big Rapids, MI 49307. Tel.: +1 231 592 2432. Fax: +1 231 591 2284.
Email addresses: cheolwoolee@ferris.edu (C. Lee), jjeon@cba.ua.edu (J. Q. Jeon), bumkim@ssu.ac.kr (B. J. Kim).

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ABSTRACT

We examine whether syndicate participation is reciprocal and also whether such reciprocity is beneficial to issuers using 1043 IPOs from January 1997 to June 2002. Reciprocal syndicates appear to make a lower level of price revision (lower information production), which lowers the amount of capital to be raised through going public, and to provide less analyst coverage by the lead underwriter. We interpret the lower price revision level as an intention to exert less marketing efforts and such intention is in part embodied in the form of less analyst coverage by the lead underwriter in the aftermarket. Also, reciprocal syndicates do not provide greater certification services in order to reduce underpricing. In addition, we find that reciprocal syndicates charge higher, or at least not lower, underwriting spreads than non-reciprocal syndicates. Evidence overall shows that reciprocity is not beneficial to issuers but rather it appears to be established and maintained for the benefit of underwriters.

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1. Introduction

"The custom of reciprocity in the investment banking business is so firmly ingrained"

– Busby (1941, Yale Law Journal)

Recently, Corwin and Schultz (2005) show that prior relationship is the most critical determinant for syndicate participation. It has long been recognized that membership is fairly stable in syndicate participation (e.g., Howell, 1953; Eccles and Crane, 1988; Benveniste et al., 2002; Ljungqvist et al., 2005). Barzel et al. (2000) mention that such stability is still a puzzling phenomenon of IPOs although reciprocal participations are noticeably pronounced in consecutive offerings. Although a couple of papers empirically address the reciprocity issue in syndicate participation, reciprocity is addressed neither explicitly nor thoroughly. Furthermore, no paper deals with the detailed nature of reciprocity exclusively on underwriting syndicates.

"Historically, syndicate relationships were built on reciprocity: Banks included others in their syndicates in expectation that the favor would be returned" (Ljungqvist et al., 2005)). Reciprocity in underwriting business is a common practice between underwriters to "regularly" invite each other to the syndicate to share the tasks and profits in their offerings (Barzel et al., 2006).[1] Such cooperative atmosphere is not likely to establish immediately before one invites another. Common in the reciprocity literature is the use of reward and punishment. A punishment mechanism is feasible only when one can monitor and identify shirkers and,

[1] Although the definition of reciprocity varies from discipline to discipline, the main idea is to exchange favors while to punish unkind behavior. Falk and Fischbacher (2006) say "people are reciprocal if they reward kind actions and punish unkind ones….reciprocity is a behavioral response to perceived kindness and unkindness…reciprocity is a powerful determinant of human behavior." Falk and Fischbacher also distinguish reciprocity from 'reciprocal altruism' where one is willing to provide kind actions without expecting any future compensation. Bowles and Gintis (2004) argue that a high level of cooperation (reciprocity) is sustained by punishment which takes the form of 'ostracism,' which is in our context to lose membership in future syndication participation. Gouldner (1960) defines it as "a mutually *contingent* exchange of benefits between two or more units."

therefore, it will take at least several syndications until a certain level of reciprocity is established. Gachter and Falk (2002) theoretically find that repeated game effects (reputation or a good track record in our context) strengthen reciprocity levels each other and they both together appear to enhance effort levels.

Reciprocity is closely related to building good relationships and high reputations. Addressing the issue of moral hazard in team production with reduced emphasis on the classic risk-sharing role of the syndicate, Pichler and Wilhelm (2001) claim that the unique syndicate structure reflects an institutional reaction to the investment banking industry, which is fairly *relationship-intensive*. Syndicate managers usually monitor other syndicate members' behavior and, when necessary, penalize those who shirk or violate the agreements among them. Corwin and Schultz (2005) find evidence consistent with Pichler and Wilhelm (2001) and argue that ongoing relationships or reciprocity alleviate agency problems within the syndicate such as free riding or moral hazard problems. The importance of reciprocity is also empirically confirmed by Ljungqvist et al. (2005).

We raise two questions in this paper: 1) Is syndicate participation really reciprocal? 2) What are the consequences of reciprocity to issuers? In other words, is reciprocity beneficial or detrimental to issuers? Over and above these two questions, we also provide stylized facts of reciprocal syndicates. For the first question, we investigate whether underwriters' syndicates are formed by reciprocal relationship through a series of cross- or re-invitations over time. We hypothesize that the requiting form of underwriting syndicates won't be formulated by chance but will be forged over time until they become established underwriting syndicates. In the short run, reciprocity would not exist because it requires persistent mutual favoritism that is possible in

the long run.[2] In the midterm, some investment banks (IBs) with double-crossing behavior will be eliminated from the invitation list of advent syndications. Those self-interested IBs will be thrown out of the future syndication in the form of penalization. In the long run, therefore, reciprocity from repetitive (or recurrent) syndicate participation will be formed. In other words, strong reciprocal relationship in syndicates should be established through the test of time. By ostracizing shirkers, the reciprocal relationship in surviving syndicate members can be solidified in the long run.

For the second question, we examine whether reciprocal syndicates in IPOs provide better underwriter services to issuers compared to non-reciprocal ones. If the reciprocal syndicate is a product of pursuing efficient contracts to facilitate the offerings, then it at least should not harm issuers; otherwise, it would be an indication that cross-invitation is a practice of exchanging favors in underwriting business for the good of underwriters. Therefore, reciprocity may not be necessarily beneficial to issuers in some cases. If reciprocity is established for syndicate efficiency as well as better services to issuers, we should observe that reciprocal IPOs are positively associated with enhanced underwriter services and other profitable aspects of IPOs for the issuers. If reciprocity is established for other reasons such as adding rivals to a syndicate for reduced competition as in Barzel et al. (2006), syndicates will be passive on providing services and, under such circumstances, reciprocity might be detrimental to issuers, at least not beneficial.

We find evidence that syndicates are formed by reciprocity. The current lead underwriter's appearance in the previous IPOs led by the current co-managers (CM_i: "cross-invitation or counter-invitation" in which their roles in the posterior syndicate are switched) is

[2] Pichler and Wilhelm (2001) note that stable position in a syndicate is not easy to secure in the short run and this difficulty enables those stable syndicate member to enjoy quasi-rents.

positively associated with the current co-managers' appearance in the previous IPOs led by the current lead underwriter (LU_i: "re-invitation" where their positions in subsequent syndicates remains unaffected) for all syndication horizons we consider in this study except the syndication horizon of 1.[3] Just looking at the most recent syndication is more likely to fail to properly capture the level of reciprocity since incidental one-time invitation might count as reciprocity. Apart from the syndication horizon at i=1, our findings provide fairly consistent and strong evidence for the reciprocity in syndicate participation.

To address the issue of whether reciprocity is good for issuers, we consider several aspects that affect both issuers and underwriters: pricing and certification efforts, analyst coverage in the aftermarket, and underwriting spreads. The reason that we consider these aspects affecting both issuers and syndicate is that syndicates would always do things beneficial to issuers if doing so does not affect underwriters' wealth or utility, probably to secure mandates in future offerings. Our evidence suggests that reciprocal syndicates are not beneficial to issuers when it comes to pricing and certification efforts, analyst coverage, and underwriting spreads. Reciprocal syndicates are less likely to make the upward price revision or to reduce underpricing. Also, IPO issuers hiring reciprocal syndicates tend to have substantially less analyst coverage by the lead underwriter. The lower level of the upward price revision will lead to the decreased amount of capital raised through IPOs and less analyst coverage will not generally benefit issuers. Our interpretation is that the lower level of offer price revision comes from an intention to make less promotional efforts and such intention is somehow visualized by the less analyst coverage

[3] Syndication horizon is the number of syndications we consider to construct variables LU_i and CM_i where i represents the syndication horizon. For discussions and definitions on reciprocity variables and syndication horizon, see Section 2.2.1.

by the lead underwriter in the aftermarket.[4] Finally, reciprocal syndicates charge more, at least no less, higher underwriting spreads to issuers. All these properties of reciprocal syndicates will not be beneficial to issuers. Our empirical results are in opposition to Gachter and Falk (2002) where reciprocity is shown to increase the effort levels.

As stylized facts, reciprocal syndicates are more likely to underwrite IPOs with high offer proceeds and more established firms (older firm age). More established firms are generally informationally less opaque (less risky) and are likely to have higher offer proceeds compared to less established firms. In other words, reciprocal syndicates underwrite big, less risky IPOs. We can infer based on these results that lead underwriters form reciprocal syndicates when they take public firms with less risk and more proceeds to share with reciprocal underwriters.[5]

The rest of this paper is organized as follows. In Section 2 we review prior literature and provide detailed empirical questions. Section 3 discusses our data and descriptive statistics and Section 4 and 5 describes our main empirical results. Finally, concluding remarks are offered in Section 6.

2. Related Literature and Empirical Questions

2.1. Related literature

Empirical evidence on reciprocity in public offerings is extremely limited. Corwin and Schultz (2005) find prior relationships the most powerful factor to determine whether an underwriter is invited to a syndicate. It appears to be very important whether the current lead

[4] Habib and Ljungqvist (2001) find that underpricing decreases in the promotional costs and Hanley (1993) find underpricing is positively associated with price revisions. Based on these results, we can infer the positive association between price revisions and promotional efforts.

[5] Chen and Ritter (2000) show that the underwriting spread is intensely clustered at 7%, which suggests that there is an extremely high correlation between the underwriting spread and offer proceeds. Our data confirm such relation with a correlation coefficient of 0.97. Therefore, greater offer proceeds provide more to be distributed to underwriters.

underwriter (co-managers) included current co-managers (lead underwriter) as co-managers in recent syndicates led by the current lead underwriter (current co-managers). They interpret their results as evidence that prior relationship attenuates agency problems such as free-riding and moral hazard problems within the syndicate.

Using a broader set of sample including debt offerings, Ljungqvist et al. (2005) find that candidate banks enhance the likelihood of being a co-manager in a syndicate when the lead underwriter (candidate banks) has participated in previous syndicates led by the co-manager candidates (lead underwriter). Such higher likelihood of the co-manager mandates might reflect well-maintained reciprocity. It is notable that Ljungqvist et al. (2005) use the bank-level relationship measure whereas Corwin and Schultz (2005) and we use the IPO-level relationship measure. Furthermore, Ljungqvist et al. (2005) consider just prior-calendar-year syndicates to construct relationship measures while Corwin and Schultz (2005) and we base variable constructions on the unit of IPOs (syndication horizon).

In contrast to little empirical evidence in the literature, theoretical literature is relatively abundant although not intended solely for the underwriting syndicate. Majority document the positive aspect of reciprocal behavior. For example, Fehr et al. (1997), in the spirit of Rabin (1993), develop a model on reciprocal behavior using relationship between workers and firms. Fehr et al. (1997) theoretically find that reciprocity can improve contract enforcements when workers and firms are both reciprocal and they also provide experimental evidence.[6] Their findings imply that reciprocal participation can be an efficient arrangement in forming a syndicate, not just an economically inefficient favor exchange. Fehr and Gachter (2000) show

[6] The laboratory experiments designed in their paper show that reciprocity achieves substantial efficiency gains in enforcing contracts and that when contracts are based on sufficiently strong reciprocity (in their paper it is named SRT (strong reciprocity treatment-both sides of the contract are reciprocal)), contract enforcements are fulfilled irrespective of pecuniary incentive details while under WRT (weak RT; one side of the contract is reciprocal) contract enforcements are vastly affected by the details.

that there are some cases in which the self-interest theory is obviously rejected.[7] For example, when there is an incentive to free ride, using rewards and punishments, reciprocity can bring cooperation since one may punish free riders even with costly punishment whereas cooperation is not possible under the self-interest theory. Gachter and Falk (2002) theoretically find the positive association between reciprocity and the enhancement of effort levels. The upshot of reciprocity is that it can provide enhanced social norms and collective actions.

2.2. Empirical questions

2.2.1. Is syndicate participation really reciprocal?

As mentioned earlier, reciprocity in syndicate participation has not been rigorously examined. To measure reciprocity, we simultaneously consider both LU_i and CM_i where LU_i (CM_i) is the proportion of the current co-managers' (current lead underwriter's) appearances in previous *i* IPOs led by the current lead underwriter (current co-managers). Because we evaluate reciprocity at the IPO level, not the individual underwriter level, for example, LU_{10} just reflects the degree to which how often current co-managers are invited to the current lead underwriter led IPOs. Reciprocity can be measured by the degree of counter-invitation by current co-managers to previous, say for equivalence, 10 IPOs led by current co-managers (CM_{10}). Therefore, reciprocity can be appropriately measured by using LU_{10} and CM_{10} together, not individually. If we measure reciprocity with either LU_{10} or CM_{10} separately, half of the information sources on reciprocity will be lost, which consequently will be misleading or incomplete.[8] For this reason,

[7] As seen in introduction by Fehr et al. (1997), a traditional view towards human beings is to treat them as self-interested and, therefore, reciprocity is not incorporated into the analysis. Reciprocity literature provides arguments and evidence against the traditional portrayal of individual behavior.

[8] Corwin and Schultz (2005) and Ljungqvist et al. (2005) document the results for reciprocal participations in such way. Therefore, we argue that the empirical design we put forth in this section is a proper way to investigate the issue of reciprocity.

we regress one measure on the other with the same syndication horizon to investigate the existence of reciprocity in syndicate participation. If reciprocity sufficiently exists then we should have a significant positive association between LU_i and CM_i.

We also examine reciprocity by several syndication horizons: specifically i = 1, 5, 10, 20, and 50. We expect no significant reciprocity when i = 1 because it takes time to establish a certain level of reciprocity and the syndication horizon of 1 might suffer the higher risk of counting a non-reciprocal one-time invitation as a reciprocal invitation. As i increases, we expect reciprocity to be more properly reflected in our measures with less noisy counting. We also expect a drop in reciprocity level in the mid-term horizon as some underwriters are dropped out of the stable syndication as a penalization for bad behavior. The reciprocity will be stabilized after the mid-term relational reorganization among underwriters

2.2.3. The consequences of reciprocity to issuers: beneficial or detrimental?

In order to examine whether reciprocal syndicates are beneficial to issuers, we consider several well-known aspects that might critically affect both issuers' and underwriters: pricing and certification efforts, analyst coverage, and underwriter compensation.

2.2.3.1. Pricing and certification efforts

Pricing is one of the fundamental duties for underwriters in public offerings. IPO pricing involves information production that can presumably be quite costly and information asymmetry is deemed to be severest, with no prior record in public markets. On the other hand, pricing directly affects the amount of capital that the issuer raises in the offering. To measure pricing and information production efforts by underwriters in reciprocal syndicates we use the offer

price revision, defined as the difference between offer price and mid-point of the original filing price range divided by the mid-point of the original filing price range.

Underwriters collect information from investors through the bookbuilding procedure (Cornelli and Goldreich, 2001) and price revision is indicative of the amount of information produced during this period as a reward for truthful revelation (Hanley, 1993). Similar to Ljungqvist and Wilhelm (2003), Schenone (2004), and Corwin and Schultz (2005), we argue that price revision reflects the degree of pricing efforts or information production. We argue that upward price revision will probably be beneficial to issuers while being costly to underwriters since such revision and pricing entail more pricing efforts. Therefore, we interpret that reciprocity is good for issuers if reciprocal syndicates are associated with higher positive revisions.

In addition, we also examine whether reciprocity of syndicate participation affects IPO underpricing. The literature documents that underpricing is shaped up by various reasons such as litigation avoidance (Tinic, 1998), substitute for promotional efforts (Habib and Ljungqvist, 2001), information rent for pricing accuracy (Sherman and Titman, 2002), and information momentum for more publicity (Aggarwal et al., 2002). However, according to a survey by Ljungqvist (2007), IPO underpricing mainly results from information frictions among key participants, which includes winner's curse (Rock, 1986), information revelation (Benveniste and Spindt, 1989), and agency problems.

This implies that the certification role of underwriters may lower underpricing by certifying the value of securities. Accordingly, we ask whether reciprocal syndicates play an additional certification role in reducing underpricing after controlling for its pricing and information production efforts. The negative (positive) relationship between underwriter

reciprocity and underpricing may suggest that reciprocal syndicates tend to provide a more (less) effective certification role and reduce (do not reduce) information asymmetries among key parties in the IPO market.

2.2.3.2. Analyst coverage in the aftermarket

Analyst coverage is one of the most important aspects that the issuer considers in underwriter selection (e.g., Chen and Ritter, 2000) and it is also a fairly important factor for the underwriter switching decision from IPOs to Seasoned Equity Offerings (SEOs) (e.g., Krigman et al., 2001; Cliff and Denis, 2004). Working as a booster shot, it drives stock prices up (Womack, 1996) and also expands the investor base (Merton, 1987). Such findings suggest that analyst coverage is one of the underwriter services that issuers highly value.

More analyst coverage would be beneficial to issuers given that majority of recommendations are optimistic and analyst coverage is related to the positive price movement. Using stocks featured on the Morning Call or Midday Call segment on CNBC, Busse and Green (2002) find that positive (negative) investment reports are immediately followed by positive (negative) price reactions and increased (decreased) trading volumes and that such price response is similar in pattern to that for traditional recommendations such as Womack (1996). Such increased trading volumes will provide more liquidity to the issue. Therefore, if reciprocal syndicates are associated with more analyst coverage, we argue that it benefits the issuer.

2.2.3.3. Underwriting spreads

Underwriter compensation is a major burden to issuers who want to maximize the expected net proceeds of IPOs. Chen and Ritter (2000) find that after excluding very large and

small issues, IPO underwriting spreads significantly cluster at 7 %. They argue that such evidence supports the hypothesis of implicit collusion among investment bankers in the IPO market. Revisiting this issue including large and small issues, Hansen (2001) finds that the 7 % underwriting spread is a competitive price, consistent with competition among investment bankers. Corwin and Schulz (2005) document that lead underwriters may charge higher fees when additional co-managers are included in the IPO syndicate because the spreads are shared with all the syndicate members.

In this study, we expect the significant relationship between the reciprocity of syndicate participation and underwriting spreads. On the one hand, underwriter preferences for reciprocity may facilitate collusion among investment banks by having an on-going relationship only with members who act favorably each other. If it is the case, we predict a positive or nonnegative correlation between syndicate reciprocity and underwriting compensation. On the other hand, a reciprocal syndicate may be a product of efficient contracts to facilitate IPO procedure by alleviating free riding or moral hazard problems. This predicts that IPOs underwritten by the reciprocal syndicate would bear lower (or not greater) underwriting fees than other IPOs, consistent with a notion that underwriter reciprocity is not detrimental to issuers.

3. Data and Descriptive Statistics

We initially identify 2192 IPOs from Thomson Financial Securities Data Company (SDC) Platinum Global New Issues from January 1997 and June 2002. First, we eliminate singly led IPOs because those IPOs do not provide any information on reciprocity. We also exclude foreign firms, closed-end funds, units, financial services firms, non-common shares, penny stocks (offer price <$5). Due to difficulties for constructing prior relationship variables, multiple

lead underwriter IPOs are excluded as well. We also require that sample IPOs appear in Center for Research in Security Prices (CRSP) and the Institutional Brokers Estimates System (I/B/E/S). Applying such criteria results in a sample of 1043 IPOs.

Majority of our data are constructed based on SDC. We collect Recommendations data from I/B/E/S and stock prices data from CRSP. To match recommendations and their underwriters, we use the Recommendation Broker Translation file provided by I/B/E/S.[9] Of underwriter types on SDC, we group joint lead underwriters and co-managers as co-managers. Underwriter reputation ranks are obtained from Jay R. Ritter's web-page (http://bear.cba.ufl.edu /ritter/ipodata.htm). Founding dates are also collected from Jay R. Ritter's web-page with missing dates complemented by SDC database and their prospectuses on EDGAR company filings.

[Insert Table 1 about here]

Table 1 provides summary statistics for our IPO sample characteristics. Our sample IPOs on average raise approximately $96 million and their underwriting spread is 6.86 %. Of 1043 IPOs, 897 IPOs (86%) have the exactly 7% underwriting spread, which is in line with Chen and Ritter's (2000) findings. At the time of going public, an average firm is 12.18 years old, hires the lead underwriter with the reputation rank of 7.89, and has 2.29 co-managers. Underpricing is 44%, which is approximately 5% higher than Corwin and Schultz (2005) whose sample period coincides with ours. The positive average price revision suggests that the revision is made upward on average for our sample IPOs.

[Insert Table 2 about here]

Panel A in Table 2 reports summary statistics of reciprocity variables. The reciprocity level is fairly stable over reciprocity horizon although it shows an infinitesimal, gradual decrease

[9] We thank I/B/E/S for providing this file. It shows the full names for broker codes.

as the horizon increases.[10] As a preliminary investigation of reciprocity in syndicate participation, we estimate the pair-wise Pearson, Spearman rank, and Kendall's tau rank correlation coefficients. Panel B in Table 2 shows correlations between reciprocity measures. The Pearson correlation coefficients are all significant at 1% level except the correlation for LU_1 and CM_1. The Spearman and Kendall's tau results are quite similar each other; the correlation is insignificant for LU_1 and CM_1, becomes significant at 5% level for LU_3 and CM_3, and becomes significant at 1% level from LU_5 and CM_5. The correlation level overall strengthens as the syndication horizon grows longer. Such correlation transitions over the syndication period suggest that it takes time for reciprocity to be established but it takes just a few syndications.

4. Is It Really Reciprocal?

In this section we first analyze whether syndicate participation is really reciprocal for various syndication horizons. For each syndication horizon, we have two reciprocity measures—LU_i and CM_i—which are in the form of fractions. We use LU_i as a dependent variable and CM_i as one of the independent variables. We use the fractional logit regression using the quasi-maximum likelihood method suggested by Papke and Wooldridge (1996) since our dependent variable of interest is in the form of fractions that range from zero to one.[11] Issue and issuer characteristics such as issue size (offer proceeds), firm age, lead underwriter reputation, VC backing, tech IPOs, underpricing, and aftermarket standard deviation are controlled for in the fractional logit estimations. We also add managing group size (lead underwriter and co-

[10] Means of LU_i and CM_i stay around 4 or 5%, which might look fairly low; however, if we include syndicate members when constructing reciprocity variables, it might exhibit a different figure. Given that the average number of co-managers is 2.29, 4 or 5% is definitely higher than a random chance to be in a syndicate by a certain lead underwriter because there are about 200 active underwriters out there each point in time.

[11] For fractional dependent variables, the ordinary least square (OLS) estimation is problematic since it tends to predict outside zero to one range. See Papke and Wooldridge (1996) and Wooldridge (2002, pp.661-663) for alternative estimation methods and the advantages of using the fractional logit estimation over others when we have fractional dependent variables.

managers) and overall syndicate size as control variables since we believe that a bigger size usually has more room for inviting the same underwriter to the syndicate.

[Insert Table 3 about here]

In Table 3, we report the results of our tests on whether syndicate participation is reciprocal. In order for syndicates to have reciprocity in our estimations, we should have a significant positive coefficient on CM_i, which suggests that underwriters exchange invitations each other over time. The significance in our results varies along with syndicate horizon. For syndication horizon at i=1, we find no evidence of reciprocity but it should be interpreted with caveat as noted earlier. Reciprocity may begin at any point in time. Just looking at one previous syndicate might sometimes be misleading to judge whether syndicate participation is truly reciprocal since some of the invitations might be made based on something else other than reciprocity; e.g., just one-time invitation because a certain underwriter had a lending relationship with the issuer. Furthermore, it will take time to establish reciprocity, therefore it is not surprising to have an insignificant result for the syndicate horizon of 1 and it should not be referred as evidence against the existence of reciprocity in syndication. For i=3 to 10, coefficients are strongly significant and positive. Such results suggest that syndicate participation is reciprocal. They exchange favors in syndicate formation based on their prior history in syndication. The coefficients for CM_i are just marginally significant for the syndication horizons longer than 10. The untabulated results for other syndicate horizons such as 15, 30, and 40 are similar in significance to syndication horizons of 20 and 50.

With the decreased significance for the longer syndication horizon, reciprocity stays strong in rather limited number of syndications and then fades away probably because some of the reciprocal underwriters are penalized due to the opportunistic behavior they have shown in

the past syndication. Overall, results suggest that syndicate participation is reciprocal although its strength somewhat fades away in the long run probably due to the penalization for the bad behavior.

5. Is It Beneficial to Issuers?

In this section, we examine whether reciprocal syndicates are beneficial to issuers or whether reciprocity is established and maintained mostly for the interest of underwriters. We also provide other stylized facts of reciprocal syndicates.

5.1. Determinants of reciprocal syndicates

[Insert Table 4 about here]

Before analyzing the impact of reciprocal syndicates on issuers' welfare, we examine what determines underwriter reciprocity. The results are shown in Table 4, where logit regressions are used to examine the determinants of the reciprocity in Panel A and Tobit regressions are employed to examine the determinants of the level of reciprocity in Panel B. In logit regressions, the dependent variables ($LUCM_iD$) are a dummy variable that is one if both LU_i and CM_i are non-zero and zero otherwise. In other words, $LUCM_iD$ takes the value of one if there is a mutual exchange of syndicate invitation for a given syndication horizon and we label those IPOs as reciprocal syndicates. In Tobit regressions, the dependent variables ($LUCM_i$) are an interactive variable of LU_i and CM_i.[12]

[12] The use of the censored Tobit model is best suited for those occasions when the dependent variable is limited (or censored) from above or below. However, more often in econometrics, Tobit regression is applied when the data is partly continuous but has positive point probability at one or more points, i.e., a corner solution outcome. Our dependent variable, $LUCM_i$, takes on the value of zero with positive probability (i.e., in some IPOs, syndicates do not employ the reciprocal structure) but is continuous over positive values. Therefore, Tobit specification is appropriate in this analysis.

The table shows that reciprocal syndicates are more likely to underwrite IPOs with high offer proceeds and of established firms. More established firms tend to be less risky and raise more capital (offer proceeds) and such IPOs probably need more underwriters because there is more work that needs to be done. Given the well-known underwriting spread clustering, higher offer proceeds mean more underwriting revenues to underwriters. Such results suggest that reciprocal syndicates are formed when there are more to share for reciprocal underwriters and firms are somewhat less risky to take public. Results overall suggest that reciprocity is established and maintained not for the benefit of issuers, but rather for underwriters. The coefficients on lead underwriter reputation are positive but are only significant for the time period of 10, 20, and 50. We believe that lead-underwriting 10 to 50 offerings or more might be possible only for several top-notch underwriters such as Goldman Sachs or Merrill Lynch. Such firms are supposed to have a fairly high reputation and significant results for $LUCM_{10}D$, $LUCM_{20}D$ and $LUCM_{50}D$ only might not properly reflect the overall sample attribute.

In addition, we introduce two instrumental variables in order to ensure identification in our instrumental variable analysis; *Industry Average* $LUCM_i$ is defined as the issuer industry-average (based on the 1-digit issuer SIC code) of $LUCM_i$ and *Quarter Average* $LUCM_i$ as the mean of $LUCM_i$ of all IPOs during the same quarter. The results show that these two variables are significantly correlated with underwriter reciprocity, which confirms the validity of our instrumental variables.[13]

5.2. Effects of reciprocal syndicates on price revision and underpricing

[13] The identification condition additional requires that instruments are not correlated with the error terms of issuers' welfare equations. Though not reported, we perform the Sargan test, one of the over-identifying restriction tests, and ensure that our analysis is free of the weak instrumental variable problem.

In this section, we investigate whether reciprocal syndicates exert more or less pricing efforts. We conduct OLS regressions as a base line model where the dependent variable is price revision, defined as the difference between the offer price and mid-point of the original filing price range divided by the mid-point of the original filing price range. We, then, allow reciprocal syndicates to be endogenously determined by the unobserved characteristics of an issuer or lead underwriter. In order to account for the endogenous choice of reciprocal syndicates, we perform the treatment effect model (Heckman, 1978) that jointly estimates the following two equations, using the maximum likelihood estimator (MLE):

$$Price\ Revision_i = \beta x_i + \delta LUCM_iD + u_i$$

$$LUCM_iD = 1[\gamma x_i + \sigma z_i + v_i > 0]$$

where x is the set of explanatory variables and z is the set of instrumental variables.

[Insert Table 5 about here]

Table 5 reports the estimation results of both OLS regressions in Panel A and treatment effect regressions in Panel B.[14] The results show that the *LUCM* dummies ($LUCM_iD$) are negatively correlated with price revision. We obtain significant negative coefficients for all syndication horizons except $LUCM_1D$ in the logit regressions, while $LUCM_1D$, $LUCM_{10}D$, $LUCM_{20}D$, *and* $LUCM_{50}D$ lose their significance in the treatment effect analysis. The negative coefficients on the price revision suggest that reciprocal syndicates are more likely to make downward price revisions than upward ones.

In each estimation reported in the table, several control variables are significantly correlated with price revision. The coefficients on offer size, VC-backed dummy, and Tech

[14] Throughout the paper, we report the coefficients of $LUCM_iD$ and test statistics only for the results of endogeneity correction models in order to save the space.

dummy are positively correlated with price revision, while more established firms tend to experience lower price revision. The number of managing underwriters and syndicate size has a negative effect on price revisions. The possible interpretation is that since larger syndicates tend to allocate more shares to retail investors (Aggarwal et al., 2002), less price discovery is added during the book-building period due to higher retail allocation.

[Insert Table 6 about here]

In Table 6, we examine whether reciprocal syndicate have an additional impact on underpricing after controlling for its inferior pricing efforts. Underpricing increases by about 12% if the IPO has upward price revisions, consistent with the partial adjustment phenomena suggested by Hanley (1993). After controlling for the effect of upward price revisions, syndicate reciprocity in any level of time period is not significantly correlated with underpricing. Given that the main source of underpricing is information frictions among key parties in the IPO market (Ljungqvist, 2007), the results are consistent with a notion that reciprocal syndicates do not provide greater certification services than non-reciprocal syndicates.

5.2. Effects of reciprocal syndicates on analyst coverage

In this section, we test whether reciprocal syndicates exhibit any difference in providing recommendations in the aftermarket. We use logit regressions as a base line model to estimate the probability of the positive analyst coverage by the lead underwriter or co-managers during the post IPO period. Then, we account for the possible endogenous feature of syndicate reciprocity by considering the case where the probit model includes a binary endogenous variable;

$$Positive\ Analyst\ Coverage_i = 1[\ \beta\ x_i + \delta\ LUCM_i D + u_i > 0]$$

$$LUCM_iD = 1[\gamma x_i + \theta z_i + v_i > 0]$$

where x is the set of explanatory variables, z is the set of instrumental variables, and $Cov\ (u, v) = \rho$.

Since both the dependent variable and the endogenous regressor are binary, the usual two-step procedure produces biased estimators, so-called forbidden regression bias (Wooldridge, 2002). In this case, we follow the interesting arguments by Greene (2003, pp.715-716) that the likelihood function of the probit model with a binary endogenous regressor is the same as the likelihood function of bivariate probit models. In both models, the joint probabilities are defined as;

$$Prob\ [y_1=1, y_2=1] = \Phi_2(\beta x_i+\delta, \gamma x_i+ \theta z_i, \rho)$$
$$Prob\ [y_1=0, y_2=1] = \Phi_2(-\beta x_i - \delta, \gamma x_i+ \theta z_i, -\rho)$$
$$Prob\ [y_1=1, y_2=0] = \Phi_2(\beta x_i+\delta, -\gamma x_i- \theta z_i, -\rho)$$
and,
$$Prob\ [y_1=0, y_2=0] = \Phi_2(-\beta x_i - \delta, \gamma x_i+ \theta z_i, \rho)$$

where y_1 and y_2 represent the positive analyst coverage and $LUCM_iD$, respectively, and ρ is the covariance of the error terms.[15]

[Insert Table 7 about here]

Table 7 reports the regression results on the probability of receiving analyst coverage from the lead underwriter or co-managers. The dependent variable is a dummy variable equal to one if the lead underwriter or co-managers make any recommendation after IPOs. Panel A and Panel B show that reciprocal syndicates are likely to provide less analyst coverage from the lead underwriter. In Panel A, the *LUCM* dummies are negatively correlated with the probability of

[15] Wooldridge (2002) provides the likelihood function for the case where the probit model includes a binary and endogenous regressor. We show that the likelihood function by Wooldridge is the same as that of a bivariate probit model. The authors will provide further details upon request.

positive coverage by the lead underwriter for all syndication horizons except $LUCM_1D$, while $LUCM_{20}D$ and $LUCM_{50}D$ lose their significance in the bivariate probit regressions in Panel B. Given prevalent positive (buy or strong buy) recommendations, less analyst coverage will not be beneficial to issuers but can save efforts and costs for lead underwriters. Therefore, when it comes to analyst coverage in the aftermarket, reciprocal syndicates are not beneficial to issuers. In Panel C and D, however, we do not find any evidence that co-managers in reciprocal syndicates provide significantly lower coverage than co-managers in non-reciprocal syndicates.

5.3. Effects of reciprocal syndicates on underwriting spreads

In this section, we test whether issuers hiring the reciprocal syndicates benefit from lower underwriting fees. We conduct OLS regressions as our base-line model and estimate treatment effect models in order to correct for endogeneity of the choice of reciprocal syndicates.[16]

[Insert Table 8 about here]

Table 8 reports the results of multiple regressions on underwriting spreads. In Panel A, where we estimate OLS models, the coefficients of $LUCM_iD$ are negative but insignificant in all time horizons. However, the estimation results of treatment effect models in Panel B shows that $LUCM_7D$, $LUCM_{10}D$, $LUCM_{20}D$ and $LUCM_{50}D$ are positively and significantly correlated with the underwriting spreads. The magnitude of marginal effects is 0.004-0.005, suggesting that IPOs hiring the reciprocal syndicate pay 0.4%-0.5% higher underwriting fees than IPOs underwritten by non-reciprocal syndicates. The overall results indicate that reciprocal syndicates charge more, or at least no less, underwriting fees than non-reciprocal syndicates. Therefore, when it comes to underwriting compensation, reciprocal syndicates are not beneficial to issuers.

[16] The model specification is provided in *Section 5.2*.

The negative coefficient on offer size is due to an underwriting economy of scale effect because a large portion of spreads is fixed costs (e.g., Altinkilic and Hansen, 2000). Also, the spreads increase with the number of managing underwriters and syndicate size, consistent with a notion that a lead underwriter charge higher fees for additional syndicate members (Corwin and Schultz, 2005). The positive coefficients on tech dummy and aftermarket standard deviations support that the spreads are the increasing function of a security's total risk. Consistent with the findings by Livingston and Miller (2000), more prestigious underwriters charge lower spreads because they strive to increase market share.

5.4. Summary

In our empirical analysis, we address several issues in connection with issuers' welfare and find evidence against enhanced issuers' welfare. Putting less effort on information production—setting price revision at the lower level—can be interpreted as an intention to make less marketing efforts based on Hanley's (1993) and Habib and Ljungqvist's (2001) findings. Consistent with this interpretation, we find evidence of significantly less analyst coverage by the lead underwriter. Corwin and Schultz (2005) find that analyst coverage is positively related to offer proceeds. Results show that reciprocal syndicates are likely to provide less analyst coverage after controlling for the positive effect of offer proceeds on analyst coverage. Finally, higher (or at least not lower) underwriting spreads charged by underwriters in reciprocal syndicates would be evidence against the hypothesis that the reciprocal syndicate structure is a product of efficient contracts to facilitate IPO procedure and, thus, charges lower fees. Such results are in contrast to Gachter and Falk (2002)'s theoretical representation that reciprocity and

reputation concerns reinforce the level of reciprocity, which ultimately leads to the enhanced effort levels.

6. Conclusions

Syndicate participations are characterized with stability in membership over time. In other words, the same set of investment banks appears in consecutive syndicates over time. In this paper we investigate whether syndicate participations are really reciprocal and whether reciprocity is good for issuers using 1043 IPOs from January 1997 to June 2002. In some stances, certain aspects of reciprocal syndicates might beneficially affect underwriters rather than issuers. We also consider the stylized facts of reciprocal syndicates.

Our empirical results indicate that syndicate participations are reciprocal. We consider various syndication horizons from 1 to 50 previous syndications to examine reciprocity. Except the syndication horizon of 1, we find evidence consistent with the reciprocity in syndicate participation. Given that just looking at the most recent syndication only could be not enough to properly judge reciprocity, our results are fairly strong and consistent over syndication horizon.

Second, reciprocal syndicates appear to rather negatively affect issuers' wealth or utility. Results show that reciprocal syndicates are more likely to make the lower level of offer price revision and less analyst coverage by the lead underwriter. The lower level of price revision will generally entail the smaller amount of capital raised through IPOs and no firm will prefer less analyst coverage in any case. Such results are in contrast to Gachter and Falk's (2002) theoretical work that associates reciprocity positively with effort levels. Based on Hanley's (1993) and Habib and Ljungqvist's (2001) findings, we interpret the lower level of offer price revision as an intention to exert less marketing efforts and such intention is somehow

materialized in the form of less analyst coverage by the lead underwriter in the aftermarket. Finally, issuers with reciprocal syndicates are charged more or no less underwriting spreads, which negatively affects issuers' wealth. Overall, reciprocity appears to be detrimental to issuers.

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Table 1. Descriptive Statistics for Sample Characteristics

The sample covers 1043 IPOs between January 1997 and June 2002, excluding singly led IPOs, foreign firms, closed-end funds, units, financial services firms, non-common shares, and penny stocks (offer price <$5). Offer Proceeds are the total proceeds of the IPO net of proceeds from the overallotment option exercise. Firm Age is defined as the difference between the founding date and the IPO date where founding dates are collected from Jay Ritter's web-page. LU Reputation is the lead underwriter rank found in Jay Ritter's web-page. No. of Co-managers is the number of underwriters in the syndicate that are classified either joint lead underwriter or co-manager in SDC. Syndicate Size the number of underwriters in the syndicate classified as lead underwriter, joint lead underwriter, co-manager, or syndicate member in SDC. Underpricing is the initial return measured by the percentage change from the offer price in SDC to the first-day closing price in CRSP. Aftermarket Standard Deviation is the standard deviation of daily returns from 21st to 125th trading days as in Corwin and Schultz (2005). Price Revision is defined as (offer price – mid price) ÷ mid price where mid price is calculated as the midpoint of the original filing price range. First-day Trading Volume is expressed as a fraction, no. of shares traded in the 1st day ÷ no of shares issued net of the overallotment shares.

Variable	Observations	Mean	Std. Dev.	Median
Offer Proceeds ($ millions)	1043	96.46	223.94	54.00
Underwriting Spread ($ millions)	1043	6.47	9.91	4.11
Underwriting Spread (%)	1043	6.86%	0.50	7.00
Firm Age (years)	1043	12.18	18.05	6.00
LU Reputation	1043	7.89	1.30	8.00
No. of Co-managers	1043	2.29	1.36	3.00
Syndicate Size	1043	17.23	8.36	16.00
Underpricing	1043	0.44	0.74	0.19
Aftermarket Standard Deviation	1043	0.08	0.06	0.07
Price Revision	1043	0.09	0.30	0.07
First-day Trading Volume (%)	1042	9.23%	0.3273	1.84%
No of Institutional Investors	1021	31.00	20.56	26.00

Table 2 Descriptive Statistics on Reciprocity Variables

Panel A reports descriptive statistics for reciprocity variables constructed based on the information of IPO syndicates from January 1993 to June 2002. We add four preceding years (1993-96) only when constructing reciprocity variables in order not to lose any observation from January 1997 to June 2002. For example, if we want to construct LU_{10} for the IPO with the offer date of January 7 1997, then we need to look at pervious 10 IPOs led by the current lead underwriter. With 1997-2002 syndication information only, this variable can not be constructed. Without adding syndication information in preceding years, we are forced to lose substantial observations in our sample period. LU_i (CM_i) is the proportion of the current co-managers' (lead underwriter's) appearances in previous i IPOs led by the current lead underwriter (co-managers). Panel B reports correlation coefficients from the Pearson, Spearman rank, and Kendall's tau rank estimations. *P*-values are inside the parentheses.

Panel A: Summary Statistics of Reciprocity Variables

Variable	Obs.	Mean	S.D.	Min	25th	Median	75th	Max
LU_1	1043	5.37%	14.96%	0%	0%	0%	0%	100%
CM_1	1043	5.16%	18.41%	0%	0%	0%	0%	100%
LU_3	1043	5.28%	9.97%	0%	0%	0%	8.33%	100%
CM_3	1043	5.53%	11.78%	0%	0%	0%	0%	100%
LU_5	1043	4.95%	8.60%	0%	0%	2.22%	6.67%	100%
CM_5	1043	5.27%	9.67%	0%	0%	0%	10.00%	100%
LU_7	1043	4.74%	7.87%	0%	0%	3.18%	7.14%	100%
CM_7	1043	5.21%	9.01%	0%	0%	0%	7.69%	100%
LU_{10}	1043	4.56%	7.60%	0%	0%	2.50%	6.67%	100%
CM_{10}	1043	4.95%	8.15%	0%	0%	0%	9.52%	100%
LU_{15}	1043	4.34%	7.27%	0%	0%	2.92%	6.67%	100%
CM_{15}	1043	4.73%	7.61%	0%	0%	0%	6.67%	100%
LU_{20}	1043	4.13%	7.09%	0%	0%	2.50%	5.31%	100%
CM_{20}	1043	4.56%	7.19%	0%	0%	1.72%	7.14%	100%
LU_{30}	1043	3.84%	6.94%	0%	0%	2.50%	5.00%	100%
CM_{30}	1043	4.40%	6.76%	0%	0%	2.33%	6.67%	100%
LU_{40}	1043	3.60%	6.79%	0%	0%	2.27%	4.76%	100%
CM_{40}	1043	4.27%	6.55%	0%	0%	2.33%	6.41%	100%
LU_{50}	1043	3.45%	6.74%	0%	0%	2.00%	4.50%	100%
CM_{50}	1043	4.26%	6.51%	0%	0%	2.00%	6.67%	100%

Panel B: Correlation Coefficient Between Reciprocity Measures

Correlation Between			Pearson		Spearman		Kendall's Tau	
LU_1	and	CM_1	0.0538	(0.082)	0.0284	(0.360)	0.0270	(0.355)
LU_3	and	CM_3	0.1111	(0.000)	0.0724	(0.019)	0.0646	(0.016)
LU_5	and	CM_5	0.0957	(0.002)	0.0980	(0.002)	0.0840	(0.001)
LU_7	and	CM_7	0.1024	(0.001)	0.1378	(0.000)	0.1134	(0.000)
LU_{10}	and	CM_{10}	0.0915	(0.003)	0.1364	(0.000)	0.1089	(0.000)
LU_{15}	and	CM_{15}	0.0880	(0.005)	0.1714	(0.000)	0.1319	(0.000)
LU_{20}	and	CM_{20}	0.0867	(0.005)	0.1871	(0.000)	0.1413	(0.000)
LU_{30}	and	CM_{30}	0.0812	(0.009)	0.2318	(0.000)	0.1696	(0.000)
LU_{40}	and	CM_{40}	0.0887	(0.004)	0.2577	(0.000)	0.1878	(0.000)
LU_{50}	and	CM_{50}	0.0986	(0.001)	0.2844	(0.000)	0.2056	(0.000)

Table 3. Reciprocity of Syndicate Participation

The table reports the results from the fractional logit regressions that use the quasi-maximum likelihood estimation (QMLE) suggested by Papke and Wooldridge (1996). The sample covers 1043 IPOs between January 1997 and June 2002, excluding singly led IPOs, foreign firms, closed-end funds, units, financial services firms, non-common shares, and penny stocks (offer price <$5). LU_i (CM_i) is the proportion of the current co-managers' (lead underwriter's) appearances in previous *i* IPOs led by the current lead underwriter (co-managers). Offer Proceeds are the total proceeds of the IPO net of proceeds from the overallotment option exercise. Firm Age is defined as the difference between the founding date and the IPO date where founding dates are collected from Jay Ritter's web-page. LU Reputation is the lead underwriter rank found in Jay Ritter's web-page. No. of Managing Underwriters is the sum of the lead underwriter and co-managers in the syndicate. Syndicate Size the number of underwriters classified as lead underwriter, joint lead underwriter, co-manager, or syndicate member in the syndicate. VC-backed Dummy is one if an IPO is backed by a VC and zero otherwise. Tech Dummy is one if an IPO is classified as a tech stock based on SIC codes in Loughran and Ritter (2004) and zero otherwise. Underpricing is the initial return measured by the percentage change from the offer price in SDC to the first-day closing price in CRSP. Aftermarket Standard Deviation is the standard deviation of daily returns from 21st to 125th trading days as in Corwin and Schultz (2005). Industry and year dummies are included in each estimation. *z*-statistics are obtained based on the Huber/White/sandwich robust estimator and are reported in parentheses. *, **, and *** indicate significance levels at the 10%, 5%, and 1%, respectively.

	Dependent Variable						
	LU_1	LU_3	LU_5	LU_7	LU_{10}	LU_{20}	LU_{50}
CM_1	0.722 (1.50)						
CM_3		1.423*** (2.59)					
CM_5			1.498*** (2.68)				
CM_7				1.599*** (2.64)			
CM_{10}					1.474** (2.26)		
CM_{20}						1.420* (1.79)	
CM_{50}							1.734* (1.73)
Ln (Offer Proceeds)	0.212 (1.13)	-0.001 (-0.01)	0.004 (0.03)	-0.005 (-0.05)	0.063 (0.53)	0.118 (0.96)	0.241* (1.78)
Ln (1+FirmAge)	0.060 (0.58)	-0.011 (-0.18)	0.023 (0.40)	0.033 (0.60)	0.033 (0.59)	-0.003 (-0.05)	0.016 (0.26)
LU Reputation	0.118 (1.10)	0.231*** (4.00)	0.220*** (4.32)	0.217*** (4.95)	0.227*** (5.41)	0.201*** (4.91)	0.139*** (3.36)
No of Managing Underwriters	-0.525*** (-3.94)	-0.438*** (-4.86)	-0.419*** (-4.75)	-0.401*** (-4.59)	-0.445*** (-4.97)	-0.503*** (-5.32)	-0.599*** (-5.51)
Syndicate Size	-0.009 (-0.68)	-0.002 (-0.19)	-0.002 (-0.23)	-0.005 (-0.65)	-0.004 (-0.51)	-0.001 (-0.13)	-0.004 (-0.6)
VC-backed Dummy	0.181 (0.85)	-0.053 (-0.38)	0.088 (0.68)	0.080 (0.66)	0.095 (0.78)	0.069 (0.58)	0.080 (0.61)
Tech Dummy	0.128 (0.46)	0.056 (0.29)	-0.045 (-0.25)	-0.029 (-0.16)	0.011 (0.06)	-0.037 (-0.19)	-0.040 (-0.17)
Underpricing	0.200 (0.41)	-0.292 (-0.84)	-0.324 (-0.96)	-0.335 (-0.99)	-0.344 (-0.98)	-0.394 (-1.05)	-0.470 (-1.08)
Aftermarket Standard Deviation	-2.005 (-0.30)	3.998 (0.84)	4.305 (0.92)	4.559 (0.98)	4.250 (0.87)	5.066 (0.97)	6.304 (1.04)
Intercept	-7.095** (-2.03)	-3.545 (-1.45)	-3.839* (-1.66)	-3.564 (-1.56)	-4.418** (-1.98)	-4.948** (-2.17)	-6.437** (-2.56)
Industry and year dummies are included in each specification							
Observations	1023	1023	1023	1023	1023	1023	1023
$LR\ \chi^2$ statistic	48.44	49.82	52.58	54.92	57.00	61.49	70.08
(*p*-value)	(0.0022)	(0.0014)	(0.0006)	(0.0003)	(0.0002)	(0.0000)	(0.0000)

Table 4. Determinants of Reciprocal Syndicates

Panel A reports the results from the logit regressions. The sample covers 1043 IPOs between January 1997 and June 2002, excluding singly led IPOs, foreign firms, closed-end funds, units, financial services firms, non-common shares, and penny stocks (offer price <$5). The dependent variable is $LUCM_iD$, which is a a dummy variable that takes the value of one if both LU_i and CM_i are non-zero and zero otherwise. LU_i (CM_i) is the proportion of the current co-managers' (lead underwriter's) appearances in previous i IPOs led by the current lead underwriter (co-managers). Offer Proceeds are the total proceeds of the IPO net of proceeds from the overallotment option exercise. Firm Age is defined as the difference between the founding date and the IPO date where founding dates are collected from Jay Ritter's web-page. LU Reputation is the lead underwriter rank found in Jay Ritter's web-page. No. of Managing Underwriters is the sum of the lead underwriter and co-managers in the syndicate. Syndicate Size the number of underwriters classified as lead underwriter, joint lead underwriter, co-manager, or syndicate member in the syndicate. VC-backed Dummy is one if an IPO is backed by a VC and zero otherwise. Tech Dummy is one if an IPO is classified as a tech stock based on SIC codes in Loughran and Ritter (2004) and zero otherwise. Industry Average $LUCM_i$ is the issuer industry-average $LUCM_i$ based on the 1-digit issuer SIC code and Quarter Average $LUCM_i$ is the mean of $LUCM_i$ of all IPOs during the same quarter where $LUCM_i$ is an interactive variable of LU_i and CM_i. Panel B reports the Tobit regression results with $LUCM_i$ as a dependent variable. z-statistics are obtained based on the Huber/White/sandwich robust estimator and are reported in parentheses. *, **, and *** indicate significance levels at the 10%, 5%, and 1%, respectively.

Panel A: Determinants of the Presence of Reciprocity

	Logit Regressions						
Dependent Variable	$LUCM_1D$	$LUCM_3D$	$LUCM_5D$	$LUCM_7D$	$LUCM_{10}D$	$LUCM_{20}D$	$LUCM_{50}D$
Ln(Offer Proceeds)	0.737***	0.522***	0.507***	0.658***	0.602***	0.587***	0.604***
	(2.65)	(3.22)	(2.87)	(4.10)	(4.59)	(4.55)	(4.56)
Ln(1+FirmAge)	-0.167	0.083	0.163**	0.147**	0.154**	0.051	-0.020
	(-0.92)	(0.84)	(2.06)	(2.05)	(2.17)	(0.73)	(-0.28)
LU Reputation	-0.056	0.084	0.010	0.000	0.085	0.160***	0.287***
	(-0.36)	(1.01)	(0.15)	(0.00)	(1.46)	(2.88)	(5.11)
No of Managing	0.095	0.206**	0.307**	0.299**	0.395***	0.348***	0.333***
Underwriters	(1.04)	(2.36)	(2.16)	(2.22)	(4.02)	(3.67)	(3.29)
Syndicate Size	-0.014	-0.009	-0.012	-0.013	-0.007	0.004	0.001
	(-0.65)	(-0.83)	(-1.27)	(-1.42)	(-0.84)	(0.44)	(0.12)
VC-backed Dummy	0.195	0.295	0.261	0.322*	0.215	0.240	0.058
	(0.44)	(1.33)	(1.38)	(1.88)	(1.35)	(1.58)	(0.38)
Tech Dummy	0.222	-0.196	-0.047	-0.392	-0.218	-0.336**	-0.451***
	(0.45)	(-0.78)	(-0.23)	(-2.08)	(-1.24)	(-2.00)	(-2.68)
Industry Average	207.299	151.078***	127.130**	90.871	206.814**	304.343***	262.614**
$LUCM_i$	(1.45)	(2.78)	(2.26)	(1.21)	(2.35)	(2.96)	(2.12)
Quarter Average	23.458	36.850	78.360**	105.130**	136.392***	82.380	83.874
$LUCM_i$	(0.87)	(1.59)	(1.96)	(2.14)	(2.62)	(1.53)	(1.41)
Intercept	-17.636***	-13.689***	-12.499***	-14.526***	-14.684***	-14.223***	-14.572***
	(-3.72)	(-5.07)	(-4.40)	(-5.60)	(-6.66)	(-6.62)	(-6.64)
Observations	1023	1023	1023	1023	1023	1023	1023
$LR\ \chi^2$ statistic	28.06	63.68	76.29	92.72	111.24	114.42	128.4
(p-value)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Panel B: Determinants of the Level of Reciprocity

	Tobit Regressions						
Dependent Variable	$LUCM_1$	$LUCM_3$	$LUCM_5$	$LUCM_7$	$LUCM_{10}$	$LUCM_{20}$	$LUCM_{50}$
Ln(Offer Proceeds)	0.160**	0.022***	0.009***	0.008***	0.005***	0.003***	0.003***
	(2.30)	(2.98)	(3.14)	(4.02)	(3.90)	(3.48)	(3.54)
Ln(1+FirmAge)	-0.033	0.006	0.004**	0.003**	0.002**	0.001	0.000
	(-0.68)	(1.26)	(2.24)	(2.27)	(2.19)	(1.12)	(0.32)
LU Reputation	-0.017	0.004	0.001	0.001	0.001*	0.001***	0.002***
	(-0.45)	(1.07)	(0.80)	(0.67)	(1.92)	(2.84)	(4.12)
No of Managing Underwriters	0.015	0.003	0.001	0.000	0.000	0.000	0.000
	(0.51)	(0.91)	(1.01)	(0.26)	(0.11)	(-0.71)	(-1.25)
Syndicate Size	-0.004	0.000	0.000	0.000	0.000	0.000	0.000
	(-0.76)	(-0.53)	(-1.53)	(-1.77)	(-1.10)	(-0.08)	(-0.05)
VC-backed Dummy	0.034	0.014	0.004	0.004	0.002	0.001	0.000
	(0.33)	(1.29)	(1.09)	(1.59)	(1.27)	(1.11)	(0.37)
Tech Dummy	0.021	-0.004	0.001	-0.003	-0.001	-0.001	-0.001
	(0.20)	(-0.34)	(0.27)	(-1.15)	(-0.60)	(-0.91)	(-1.21)
Industry Average $LUCM_i$	45.193	6.896***	3.239***	2.169*	2.771**	2.681***	2.094**
	(1.55)	(2.67)	(2.60)	(1.65)	(2.44)	(2.89)	(2.42)
Quarter Average $LUCM_i$	11.469*	3.712***	2.897***	2.696***	2.582***	1.828***	1.636***
	(1.76)	(2.92)	(3.16)	(3.35)	(4.04)	(4.04)	(4.09)
Intercept	-3.962***	-0.602***	-0.230***	-0.181***	-0.140***	-0.088***	-0.074***
	(-3.10)	(-4.67)	(-4.80)	(-5.48)	(-5.81)	(-5.43)	(-5.51)
Observations	1023	1023	1023	1023	1023	1023	1023
LR χ^2 statistic	15.38	43.12	51.4	53.84	65.53	62.94	68.98
(*p*-value)	(0.081)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Table 5. Effect of Reciprocal Syndicates on Price Revision

Panel A reports the OLS estimation results. The sample covers 1043 IPOs between January 1997 and June 2002, excluding singly led IPOs, foreign firms, closed-end funds, units, financial services firms, non-common shares, and penny stocks (offer price <$5). The dependent variable is Price Revision that is defined as (offer price – mid price) ÷ mid price where mid price is calculated as the midpoint of the original filing price range. $LUCM_iD$ is a a dummy variable that takes the value of one if both LU_i and CM_i are non-zero and zero otherwise. LU_i (CM_i) is the proportion of the current co-managers' (lead underwriter's) appearances in previous *i* IPOs led by the current lead underwriter (co-managers). Offer Proceeds are the total proceeds of the IPO net of proceeds from the overallotment option exercise. Firm Age is defined as the difference between the founding date and the IPO date where founding dates are collected from Jay Ritter's web-page. LU Reputation is the lead underwriter rank found in Jay Ritter's web-page. No. of Managing Underwriters is the sum of the lead underwriter and co-managers in the syndicate. Syndicate Size the number of underwriters classified as lead underwriter, joint lead underwriter, co-manager, or syndicate member in the syndicate. VC-backed Dummy is one if an IPO is backed by a VC and zero otherwise. Tech Dummy is one if an IPO is classified as a tech stock based on SIC codes in Loughran and Ritter (2004) and zero otherwise. The treatment effect models are estimated in Panel B where only the coefficients for $LUCM_iDs$ are reported. *t- and z*-statistics are obtained based on the Huber/White/sandwich robust estimator and are reported in parentheses.. *, **, and *** indicate significance levels at the 10%, 5%, and 1%, respectively.

Panel A: OLS Analysis

	OLS regressions						
	Dependent Variable : Price Revision						
$LUCM_1D$	-0.063						
	(-0.96)						
$LUCM_3D$		-0.075***					
		(-3.09)					
$LUCM_5D$			-0.061***				
			(-2.83)				
$LUCM_7D$				-0.058***			
				(-3.00)			
$LUCM_{10}D$					-0.038**		
					(-2.08)		
$LUCM_{20}D$						-0.063***	
						(-3.63)	
$LUCM_{50}D$							-0.040**
							(-2.31)
Ln(Offer Proceeds)	0.187***	0.190***	0.192***	0.194***	0.191***	0.195***	0.191***
	(9.99)	(10.14)	(10.24)	(10.22)	(10.07)	(10.21)	(10.05)
Ln(1+FirmAge)	-0.021***	-0.020***	-0.019***	-0.019***	-0.020***	-0.020***	-0.021***
	(-2.93)	(-2.81)	(-2.69)	(-2.68)	(-2.75)	(-2.84)	(-2.95)
LU Reputation	0.000	0.001	0.000	0.000	0.001	0.003	0.003
	(0.01)	(0.10)	(0.06)	(0.06)	(0.18)	(0.50)	(0.51)
No of Managing	-0.027***	-0.025***	-0.025***	-0.025***	-0.025***	-0.025***	-0.026***
Underwriters	(-3.54)	(-3.39)	(-3.42)	(-3.46)	(-3.31)	(-3.23)	(-3.38)
Syndicate Size	-0.006***	-0.006***	-0.006***	-0.006***	-0.006***	-0.006***	-0.006***
	(-6.05)	(-6.05)	(-6.15)	(-6.21)	(-6.15)	(-6.08)	(-6.09)
VC-backed Dummy	0.052***	0.053***	0.054***	0.054***	0.053***	0.056***	0.052***
	(3.15)	(3.25)	(3.26)	(3.31)	(3.23)	(3.40)	(3.20)
Tech Dummy	0.159***	0.158***	0.157***	0.154***	0.157***	0.155***	0.155***
	(6.06)	(6.04)	(6.00)	(5.85)	(5.99)	(5.90)	(5.90)
Intercept	-3.489***	-3.542***	-3.575***	-3.608***	-3.560***	-3.624***	-3.560***
	(-10.46)	(-10.60)	(-10.71)	(-10.68)	(-10.56)	(-10.71)	(-10.55)
	Industry and year dummies are included in each specification						

Observations	1023	1023	1023	1023	1023	1023	1023
F statistics	14.71	15.02	15.43	15.16	15.11	15.32	14.84
(*p*-value)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Panel B: Treatment Effect Analysis

	Treatment effect regressions (MLE)						
	Dependent Variable : Price Revision						
$LUCM_1D$	-0.059						
	(-0.57)						
$LUCM_3D$		-0.136**					
		(-2.21)					
$LUCM_5D$			-0.127**				
			(-2.10)				
$LUCM_7D$				-0.129*			
				(-1.94)			
$LUCM_{10}D$					-0.102		
					(-1.28)		
$LUCM_{20}D$						-0.044	
						(-0.38)	
$LUCM_{50}D$							0.123
							(1.51)
Observations	1023	1023	1023	1023	1023	1023	1023
Wald χ^2 statistic	431.78	436.222	436.64	434.73	430.13	399.21	404.07
(p-value)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Table 6. Effect of Reciprocal Syndicates on Underpricing

Panel A reports the OLS estimation results. The sample covers 1043 IPOs between January 1997 and June 2002, excluding singly led IPOs, foreign firms, closed-end funds, units, financial services firms, non-common shares, and penny stocks (offer price <$5). The dependent variable is Underpricing where underpricing is the initial return measured by the percentage change from the offer price in SDC to the first-day closing price in CRSP. Positive Price Revision Dummy is one if price revision is made upward and zero otherwise. Price Revision is defined as (offer price – mid price) ÷ mid price where mid price is calculated as the midpoint of the original filing price range. $LUCM_iD$ is a a dummy variable that takes the value of one if both LU_i and CM_i are non-zero and zero otherwise. LU_i (CM_i) is the proportion of the current co-managers' (lead underwriter's) appearances in previous *i* IPOs led by the current lead underwriter (co-managers). Offer Proceeds are the total proceeds of the IPO net of proceeds from the overallotment option exercise. Firm Age is defined as the difference between the founding date and the IPO date where founding dates are collected from Jay Ritter's web-page. LU Reputation is the lead underwriter rank found in Jay Ritter's web-page. No. of Managing Underwriters is the sum of the lead underwriter and co-managers in the syndicate. Syndicate Size the number of underwriters classified as lead underwriter, joint lead underwriter, co-manager, or syndicate member in the syndicate. VC-backed Dummy is one if an IPO is backed by a VC and zero otherwise. Tech Dummy is one if an IPO is classified as a tech stock based on SIC codes in Loughran and Ritter (2004) and zero otherwise. Integer Dummy is one if an offer price is an integer and zero otherwise. Aftermarket Standard Deviation is the standard deviation of daily returns from 21st to 125th trading days as in Corwin and Schultz (2005). The treatment effect models are estimated in Panel B where only the coefficients for $LUCM_iDs$ are reported. *t- and z*-statistics are obtained based on the Huber/White/sandwich robust estimator and are reported in parentheses.. *, **, and *** indicate significance levels at the 10%, 5%, and 1%, respectively.

Panel A: OLS Analysis

	OLS regressions						
	Dependent Variable : Underpricing						
$LUCM_1D$	-0.025						
	(0.05)						
$LUCM_3D$		0.001					
		(0.05)					
$LUCM_5D$			-0.017				
			(-0.82)				
$LUCM_7D$				-0.005			
				(-0.28)			
$LUCM_{10}D$					-0.007		
					(-0.38)		
$LUCM_{20}D$						-0.021	
						(-1.24)	
$LUCM_{50}D$							-0.013
							(-0.78)
Positive Price Revision Dummy	0.119***	0.119***	0.118***	0.119***	0.119***	0.117***	0.118***
	(0.02)	(6.60)	(6.58)	(6.61)	(6.56)	(6.50)	(6.57)
Ln(Offer Proceeds)	0.078***	0.077***	0.079***	0.078***	0.078***	0.081***	0.079***
	(0.01)	(5.38)	(5.44)	(5.25)	(5.25)	(5.78)	(5.67)
Ln(1+FirmAge)	0.004	0.004	0.005	0.005	0.005	0.005	0.004
	(0.01)	(0.61)	(0.67)	(0.64)	(0.65)	(0.64)	(0.60)
LU Reputation	0.010	0.010	0.011	0.011	0.011	0.011*	0.011*
	(0.01)	(1.60)	(1.60)	(1.60)	(1.62)	(1.71)	(1.68)
No of Managing Underwriters	-0.016**	-0.016**	-0.015**	-0.016**	-0.015**	-0.015**	-0.015**
	(0.01)	(-2.31)	(-2.15)	(-2.25)	(-2.25)	(-2.23)	(-2.27)
Syndicate Size	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.00)	(-0.96)	(-1.00)	(-0.97)	(-0.98)	(-1.00)	(-0.99)
VC-backed Dummy	-0.041**	-0.042**	-0.041**	-0.041**	-0.041**	-0.040**	-0.041**
	(0.02)	(-2.32)	(-2.29)	(-2.31)	(-2.30)	(-2.22)	(-2.30)

Tech Dummy	-0.075 ***	-0.075 ***	-0.075 ***	-0.075 ***	-0.075 ***	-0.076 ***	-0.076 ***
	(0.03)	(-2.92)	(-2.92)	(-2.92)	(-2.92)	(-2.94)	(-2.93)
Integer Dummy	-0.041 *	-0.041 *	-0.040 *	-0.040 *	-0.040 *	-0.040 *	-0.040 *
	(0.02)	(-1.76)	(-1.72)	(-1.75)	(-1.76)	(-1.74)	(-1.74)
Aftermarket	12.140 ***	12.143 ***	12.140 ***	12.141 ***	12.142 ***	12.135 ***	12.139 ***
Standard Deviation	(0.17)	(70.57)	(70.41)	(70.55)	(70.40)	(69.97)	(70.11)
Intercept	-1.865 ***	-1.852 ***	-1.891 ***	-1.869 ***	-1.874 ***	-1.916 ***	-1.889 ***
	(0.25)	(-7.37)	(-7.38)	(-7.17)	(-7.15)	(-7.79)	(-7.70)
	Industry and year dummies are included in each specification						
Observations	1023	1023	1023	1023	1023	1023	1023
F statistics	343.36	343.22	345.46	346.53	351.63	349.81	345.17
(*p*-value)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Panel B: Treatment Effect Analysis

	Treatment effect regression (MLE)						
	Dependent Variable : Underpricing						
$LUCM_1D$	-0.211						
	-[0.77]						
$LUCM_3D$		-0.146					
		-[0.80]					
$LUCM_5D$			-0.100				
			-[0.55]				
$LUCM_7D$				-0.162			
				-[0.93]			
$LUCM_{10}D$					-0.114		
					-[0.65]		
$LUCM_{20}D$						-0.169	
						-[0.51]	
$LUCM_{50}D$							-0.704 *
							-[1.57]
Observations	1023	1023	1023	1023	1023	1023	1023
Wald χ^2 statistic	436.83	436.7	436.16	434.47	434.02	434.38	402.27
(*p*-value)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Table 7. Effects of Reciprocity on Analyst Coverage

The table reports the results of logit (Panels A and C) and bivariate probit regressions (Panels B and D). The sample covers 1043 IPOs between January 1997 and June 2002, excluding singly led IPOs, foreign firms, closed-end funds, units, financial services firms, non-common shares, and penny stocks (offer price <$5). The dependent variable is a dummy variable that take the value of one if an issuer receives any recommendation from the lead underwriter and zero otherwise. Positive Price Revision Dummy is one if price revision is made upward and zero otherwise. Price Revision is defined as (offer price – mid price) ÷ mid price where mid price is calculated as the midpoint of the original filing price range. $LUCM_iD$ is a a dummy variable that takes the value of one if both LU_i and CM_i are non-zero and zero otherwise. LU_i (CM_i) is the proportion of the current co-managers' (lead underwriter's) appearances in previous *i* IPOs led by the current lead underwriter (co-managers). Offer Proceeds are the total proceeds of the IPO net of proceeds from the overallotment option exercise. Firm Age is defined as the difference between the founding date and the IPO date where founding dates are collected from Jay Ritter's web-page. LU Reputation is the lead underwriter rank found in Jay Ritter's web-page. No. of Managing Underwriters is the sum of the lead underwriter and co-managers in the syndicate. Syndicate Size the number of underwriters classified as lead underwriter, joint lead underwriter, co-manager, or syndicate member in the syndicate. VC-backed Dummy is one if an IPO is backed by a VC and zero otherwise. Tech Dummy is one if an IPO is classified as a tech stock based on SIC codes in Loughran and Ritter (2004) and zero otherwise. Integer Dummy is one if an offer price is an integer and zero otherwise. Aftermarket Standard Deviation is the standard deviation of daily returns from 21st to 125th trading days as in Corwin and Schultz (2005). The bivariate probit models are estimated in Panels B and D where only the coefficients for $LUCM_iDs$ are reported. *z*-statistics are obtained based on the Huber/White/sandwich robust estimator and are reported in parentheses.. *, **, and *** indicate significance levels at the 10%, 5%, and 1%, respectively.

Panel A: Lead Underwriter Coverage, Logit Analysis

	Logit Regressions						
	Dependent Variable : Dummy=1 if Positive Coverage from LU(s)						
$LUCM_1D$	-1.708						
	(-1.21)						
$LUCM_3D$		-16.203**					
		(-2.52)					
$LUCM_5D$			-21.307***				
			(-2.79)				
$LUCM_7D$				-33.815***			
				(-3.10)			
$LUCM_{10}D$					-33.021***		
					(-2.71)		
$LUCM_{20}D$						-54.358***	
						(-2.87)	
$LUCM_{50}D$							-53.546**
							(-2.39)
Positive Price Revision Dummy	-0.152	-0.146	-0.146	-0.149	-0.152	-0.152	-0.146
	(-0.99)	(-0.95)	(-0.94)	(-0.96)	(-0.98)	(-0.98)	(-0.95)
Ln(Offer Proceeds)	-0.023	0.000	-0.008	0.002	-0.001	0.005	0.012
	(-0.18)	(0.00)	(-0.06)	(0.02)	(-0.01)	(0.04)	(0.09)
Ln(1+FirmAge)	-0.009	0.001	0.007	0.010	0.006	0.003	-0.003
	(-0.13)	(0.01)	(0.10)	(0.14)	(0.09)	(0.04)	(-0.04)
LU Reputation	0.257***	0.265***	0.266***	0.265***	0.269***	0.276***	0.276***
	(4.04)	(4.13)	(4.16)	(4.16)	(4.22)	(4.34)	(4.31)
No of Managing Underwriters	-0.190***	-0.212***	-0.210***	-0.219***	-0.218***	-0.225***	-0.224***
	(-2.77)	(-2.94)		(-3.00)	(-2.99)	(-3.05)	(-3.02)
Syndicate Size	0.047***	0.046***	0.046***	0.046***	0.046***	0.047***	0.047***
	(4.86)	(4.81)	(4.75)	(4.73)	(4.82)	(4.87)	(4.89)
VC-backed Dummy	-0.290*	-0.280*	-0.287*	-0.279*	-0.277*	-0.281*	-0.285*
	(-1.83)	(-1.77)	(-1.80)	(-1.76)	(-1.74)	(-1.77)	(-1.79)

Tech Dummy	0.262	0.275	0.269	0.255	0.259	0.264	0.253
	(1.33)	(1.39)	(1.36)	(1.29)	(1.31)	(1.33)	(1.28)
Integer Dummy	-0.147	-0.160	-0.173	-0.175	-0.170	-0.186	-0.179
	(-0.56)	(-0.61)	(-0.66)	(-0.66)	(-0.64)	(-0.70)	(-0.67)
Aftermarket	1.973	1.944	2.130	2.080	1.998	2.222	2.213
Standard Deviation	(0.57)	(0.56)	(0.61)	(0.60)	(0.58)	(0.63)	(0.63)
Intercept	-1.226	-1.568	-1.406	-1.504	-1.515	-1.604	-1.721
	(-0.51)	(-0.65)	(-0.58)	(-0.63)	(-0.63)	(-0.67)	(-0.71)
Industry and year dummies are included in each specification							
Observations	1021	1021	1021	1021	1021	1021	1021
Wald χ^2 statistic	69.41	75.1	76.38	78.29	75.38	76.51	73.8
(*p*-value)	(0.081)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Panel B: Lead Underwriter Coverage, Bivariate Probit Analysis

	Bivariate Probit Regression						
	Dependent Variable : A Dummy for LU's Coverage						
$LUCM_1D$	-0.782						
	-[0.81]						
$LUCM_3D$		-7.987*					
		-[1.95]					
$LUCM_5D$			-9.794**				
			-[2.35]				
$LUCM_7D$				-9.865**			
				-[2.17]			
$LUCM_{10}D$					-7.138*		
					-[1.83]		
$LUCM_{20}D$						-17.334	
						-[1.58]	
$LUCM_{50}D$							-18.132
							-[1.28]
Observations	1023	1023	1023	1023	1023	1023	1023
Wald χ^2 statistic	2860.7	3132.23	3171.6	3341.111	3690.62	3311.25	3367.74
(*p*-value)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Panel C: Co-manager Coverage, Logit Analysis

	Logit Regressions						
	Dependent Variable : Dummy=1 if Co-manager Coverage						
$LUCM_1D$	-2.319 -[1.90]						
$LUCM_3D$		1.528 [0.58]					
$LUCM_5D$			-2.122 -[0.49]				
$LUCM_7D$				-4.078 -[0.83]			
$LUCM_{10}D$					-5.640 -[1.08]		
$LUCM_{20}D$						-13.379 -[1.64]	
$LUCM_{50}D$							-11.516 -[1.71]
Observations	1021	1021	1021	1021	1021	1021	1021
Wald χ^2 statistic	59.2	55.05	55.74	56.47	57.33	58.64	59.74
(*p*-value)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Panel D: Co-manager Coverage, Bivariate Probit Analysis

	Bivariate Probit Regression						
	Dependent Variable : A Dummy for CM's Coverage						
$LUCM_1D$	-4.264 ** -[2.00]						
$LUCM_3D$		1.172 [0.60]					
$LUCM_5D$			-1.411 -[0.45]				
$LUCM_7D$				-1.597 -[0.46]			
$LUCM_{10}D$					-1.402 -[0.39]		
$LUCM_{20}D$						-7.073 * -[1.74]	
$LUCM_{50}D$							-7.354 ** -[1.99]
Observations	1023	1023	1023	1023	1023	1023	1023
Wald χ^2 statistic	3142.3	2652.34	2643.08	2533.1	2633.41	2709.04	2480.18
(*p*-value)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Table 8. Effects of Reciprocity on Underwriting Spreads

Panel A reports the OLS estimation results. The sample covers 1043 IPOs between January 1997 and June 2002, excluding singly led IPOs, foreign firms, closed-end funds, units, financial services firms, non-common shares, and penny stocks (offer price <$5). The dependent variable is Underwriting Spreads. Positive Price Revision Dummy is one if price revision is made upward and zero otherwise. Price Revision is defined as (offer price – mid price) ÷ mid price where mid price is calculated as the midpoint of the original filing price range. $LUCM_iD$ is a a dummy variable that takes the value of one if both LU_i and CM_i are non-zero and zero otherwise. LU_i (CM_i) is the proportion of the current co-managers' (lead underwriter's) appearances in previous i IPOs led by the current lead underwriter (co-managers). Offer Proceeds are the total proceeds of the IPO net of proceeds from the overallotment option exercise. Firm Age is defined as the difference between the founding date and the IPO date where founding dates are collected from Jay Ritter's web-page. LU Reputation is the lead underwriter rank found in Jay Ritter's web-page. No. of Managing Underwriters is the sum of the lead underwriter and co-managers in the syndicate. Syndicate Size the number of underwriters classified as lead underwriter, joint lead underwriter, co-manager, or syndicate member in the syndicate. VC-backed Dummy is one if an IPO is backed by a VC and zero otherwise. Tech Dummy is one if an IPO is classified as a tech stock based on SIC codes in Loughran and Ritter (2004) and zero otherwise. Aftermarket Standard Deviation is the standard deviation of daily returns from 21st to 125th trading days as in Corwin and Schultz (2005). The treatment effect models are estimated in Panel B where only the coefficients for $LUCM_iD$ are reported. t- and z-statistics are obtained based on the Huber/White/sandwich robust estimator and are reported in parentheses.*, **, and *** indicate significance levels at the 10%, 5%, and 1%, respectively.

Panel A: OLS Analysis

	OLS Regressions						
	Dependent Variable : Underwriting Spreads						
$LUCM_1D$	-0.165						
	(-1.48)						
$LUCM_3D$		-0.015					
		(-0.35)					
$LUCM_5D$			-0.024				
			(-0.76)				
$LUCM_7D$				-0.032			
				(-1.28)			
$LUCM_{10}D$					-0.037		
					(-1.58)		
$LUCM_{20}D$						-0.012	
						(-0.59)	
$LUCM_{50}D$							0.004
							(0.20)
Positive Price Revision Dummy	-0.436***	-0.440***	-0.438***	-0.435***	-0.435***	-0.439***	-0.441***
	(-10.72)	(-10.96)	(-10.88)	(-10.79)	(-10.67)	(-10.63)	(-10.67)
Ln(Offer Proceeds)	-0.047***	-0.046***	-0.046***	-0.046***	-0.045***	-0.046***	-0.047***
	(-3.79)	(-3.74)	(-3.76)	(-3.72)	(-3.70)	(-3.75)	(-3.74)
Ln(1+FirmAge)	0.016	0.016	0.016	0.016	0.017	0.017	0.016
	(1.50)	(1.55)	(1.54)	(1.55)	(1.61)	(1.59)	(1.50)
LU Reputation	-0.043***	-0.044***	-0.043***	-0.043***	-0.042***	-0.044***	-0.044***
	(-3.61)	(-3.58)	(-3.56)	(-3.58)	(-3.50)	(-3.62)	(-3.69)
No of Managing Underwriters	0.003*	0.003*	0.003*	0.003*	0.003*	0.003*	0.004*
	(1.73)	(1.77)	(1.76)	(1.72)	(1.72)	(1.76)	(1.77)
Syndicate Size	0.055**	0.054**	0.054**	0.055**	0.055**	0.055**	0.053**
	(2.40)	(2.36)	(2.39)	(2.42)	(2.42)	(2.37)	(2.35)
VC-backed Dummy	0.007	0.004	0.004	0.002	0.004	0.004	0.004
	(0.21)	(0.13)	(0.12)	(0.07)	(0.12)	(0.11)	(0.13)
Tech Dummy	0.146***	0.147***	0.146***	0.146***	0.145***	0.147***	0.148***

	(4.98)	(5.06)	(5.04)	(4.99)	(4.92)	(4.95)	(5.00)
Aftermarket	0.503 **	0.520 **	0.521 **	0.517 **	0.522 **	0.521 **	0.527 **
Standard Deviation	(2.02)	(2.07)	(2.07)	(2.05)	(2.07)	(2.08)	(2.11)
Intercept	14.847 ***	14.904 ***	14.873 ***	14.834 ***	14.818 ***	14.887 ***	14.934 ***
	(20.03)	(20.38)	(20.33)	(20.24)	(20.00)	(19.86)	(19.83)
Observations	1023	1023	1023	1023	1023	1023	1023
F statistics	12.07	11.84	11.79	11.85	11.74	11.62	11.69
(*p*-value)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Panel B: Treatment Effect Analysis

	Treatment Effect Model						
	Dependent Variable : Underwriting Spreads						
$LUCM_1D$	-0.195						
	-[1.41]						
$LUCM_3D$		-0.118					
		-[1.00]					
$LUCM_5D$			-0.198				
			-[1.25]				
$LUCM_7D$				0.405 ***			
				[8.61]			
$LUCM_{10}D$					0.475 ***		
					[13.87]		
$LUCM_{20}D$						0.505 ***	
						[16.93]	
$LUCM_{50}D$							0.511 ***
							[18.09]
Observations	1023	1023	1023	1023	1023	1023	1023
Wald χ^2 statistic	992.96	979.52	954	868.61	902.03	949.9	994.53
(*p*-value)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)