Heated Negotiation within the IPO Syndicate and the Quality of Underwriter Services

Jin Q Jeon and Cheolwoo Lee [*]

ABSTRACT

This paper develops new measures for heated negotiation within the IPO syndicate —i) between the lead underwriter and co-managers and ii) among co-managers. We find that the inferior bargaining position for the lead underwriter and superior bargain power for co-managers with initial low compensation for co-managers lead to heated negotiation. Our results indicate that underwriters do not negotiate their shares of compensation based on their pre-commitment and actual provision of key underwriter services. Rather, it appears that heated negotiation materializes as co-managers' resistance against the lead underwriter's initial unfair profit sharing design.

Keywords: Heated Negotiation; Syndicate; IPO; Underwriter; Compensation
JEL Classification: G24

_____

* The first author is from Dongguk Business School, Dongguk University, 3-26 Pil-dong, Chung-gu, Seoul, 100-715, South Korea (jjeon@dongguk.edu). The second author is from Accountancy, Finance, & Info Systems Department, College of Business, Ferris State University, 119 South Street, BUS 366, Big Rapids, MI 49307, U.S.A. (cheolwoolee@ferris.edu).

1. Introduction

An Initial Public Offering (IPO) is one of the most lucrative revenue sources in investment banking (Kuhn, 1990)[1] and, therefore, it is highly plausible that investment banks (underwriters) are sensitive to their individual compensation from arranging IPOs. Consistent with such conjecture, Picker (1998) notes that there is a fiery negotiation within the syndicate over the compensation from the gross spread[2] and Wirth (1997) cites a testimony by an investment banker that every syndicate member ferociously attempts to get the most out of each deal, which can make the members very unfriendly.[3] Kuhn (1990) notes that when a member of the syndicate thinks the gross spread is unduly low, that investment bank might decide to leave the syndicate. Tunick (2004) also indicates that co-manager spots are often declined by investment banks when compensation from the gross spread is not high enough to justify the services they provide. Investment banks will be even more sensitive or require more compensation when they provide valuable, costly underwriter services. It seems that key underwriter services are priced into underwriter compensation. For example, Cliff and Denis (2004) document the existence of compensation from underpricing for analyst coverage and Lee (2012) finds that analyst coverage by lead underwriters is also compensated from the gross spread.[4]

When the firm attempts to go public, it usually forms a syndicate of underwriters that provide key underwriting services such as road show, marketing, due diligence, bookbuilding, information production in relation to IPO pricing, certification, analyst coverage, and market making in the form of aftermarket price support (The Securities Industry Association's 2005 *Capital Markets Handbook*; Cliff and Denis, 2004; Corwin and Schultz, 2005). The players in the syndicate are roughly classified into lead

---

[1] Shack (2005) says "Underwriting initial public offerings has long been a cash cow for Wall Street."

[2] The gross spread is the fee that the underwriting syndicate receives for arranging the IPO. It is typically seven percent of the offer proceeds.

[3] Wirth (1997) cites two testimonies on the increased competition in the underwriting industry: a managing director of DLJ (Donaldson, Lufkin, & Jenrette) says "There's always been competition, but now the elbows are much sharper"; a co-head of PaineWebber's equity capital marketing group says "That old fraternity [gentlemanly atmosphere in the past underwriting industry] is no longer in existence."

[4] It is widely accepted that there are two major sources of compensation in IPOs: gross spread and underpricing (see, e.g., Chen and Ritter, 2000). Kim *et al*. (2010) find that the gross spread and underpricing are complements rather than substitutes, which is consistent with findings by Cliff and Denis (2004) and Lee (2012).

underwriters, co-managers, and syndicate members; the first two groups are named as managing underwriters and they provide most of the services, with typically more extensive work by lead underwriters (Barzel *et al*. 2000; Torstila, 2001). The first step of the syndicate formation is to select the lead underwriter(s) (Chen and Ritter, 2000; Corwin and Schultz, 2005). Chen and Ritter (2000) cite underwriter reputation and quality of analysts as the most important factors in the selection. Once the lead underwriter is selected by the issuer, the lead underwriter invites other syndicate participants. The selection of co-managers is generally based on their abilities to provide key underwriter services such as analyst coverage, market making, certification through reputation, and distribution channel that is complementary to that of the lead underwriter(s) (Corwin and Schultz, 2005). However, membership stability is well recognized in syndicate participation (Barzel *et al.*, 2000; Pichler and Wilhelm, 2001; Corwin and Schultz, 2005; Lungqvist *et al.*, 2009; Lee *et al.*, 2011), which implies that syndicate invitation could be reciprocal based on good relationships built in past syndications. After forming a syndicate, these underwriters provide key underwriter services to make the IPO successful, and underwrite and sell new shares.

Unlike rich literature on IPOs in general, the literature on underwriter compensation—especially the gross spread—is relatively sparse. Chen and Ritter (2000) and Hansen (2001) document the clustering of the gross spread at 7%. Dunbar (1995) finds the use of warrants is negatively associated with the gross spread, suggesting that warrants are a source of underwriter compensation. The gross spread is also negatively correlated to the likelihood of subsequent offerings (Carter, 1992), subsequent issues due to setup costs (James, 1992), and IPO size proxied by offer proceeds (Ritter, 1987; Beatty and Welch, 1996; Lee *et al*., 1996; and Corwin and Harris, 2001). Ellis, Michaely, and O'Hara (2000) report that underwriter compensation comes mostly from the gross spread. Kim *et al*. (2010) find that the gross spread and underpricing—another major indirect underwriter compensation source—are positively correlated. Unlike aforementioned papers, Torstila (2001) shows that a proportion of selling concession— one of the three sub-components of the gross spread—increases as IPO size increases. Lee (2012) finds

that analyst coverage by the lead underwriter is compensated from the gross spread through an underwriter payoff function that builds upon incentives and observable syndicate data.

Competition and negotiation are usually present among syndicate participants (Barbel *et al.*, 2000; Corwin and Schultz, 2005) because the gross spread is split among those underwriters. The gross spread is an explicit form of underwriter compensation and is usually seven percent of the IPO offer proceeds (Chen and Ritter, 2000). The syndicate underwrites IPO shares by paying usually seven percent less the offer proceeds to the issuer. This typical seven percent used to be again split into management fee, underwriting fee, and selling concession before the prevalence of the *fixed economics*[5] and, based on certain rules, the gross spread is distributed among syndicate participants (for more detail, see Lee, 2012).[6] With the fixed economics, each underwriter's compensation from the gross spread is usually the same as their underwriting commitment relative to the total offer proceeds (Garrity and O'Leary, 1999; Keegan, 1999a, 1999b; Critchley, 2001; Tunick and Hahn, 2001; Jenkinson and Jones, 2007; Lee, 2012). Therefore, we can indirectly measure individual underwriter compensation through their underwriting commitment for the fixed economics period, which is public information.

Using underwriting commitment as a proxy for underwriter compensation, we develop three new measures for the heated negotiation because there is no such measure in the prior literature.[7] In our sample, we observe clustering in the relative compensation i) between co-managers as a group and lead underwriter and ii) among co-managers when we construct such ratios. The price clustering literature finds that well rounded prices are more frequently observed than non-conventional fractional prices and notes that well-rounded prices expedite negotiation process and also lower negotiation costs. Building upon three major hypotheses—Aitken et al.'s (1996) attraction hypothesis, Ball *et al.*'s (1985) price resolution hypothesis, and Harris' (1991) costly negotiation hypothesis—several papers find clustering in other areas such as IPO offer prices, bank deposit rates, foreign exchange spot market, gold market,

---

[5] Discussion on fixed economics and fixed economics period is found in section 2.

[6] The portion each underwriter receives from management fee depends on the lead underwriter's discretion; the portion each underwriter receives from underwriting fee (selling concession) depends on the number of shares underwritten (the number of shares credited for sales) by each of them.

[7] More detailed discussion is made on the motivation and construction of those three variables in section 2.2.

futures market, and real estate prices (Bradley *et al.*, 2004; Mola and Loughran, 2004; Kahn *et al.*, 1999; Ashton and Hudson, 2008; Goodhart and Curcio, 1992; Grossman *et al.*, 1997; Sopranzetti and Data, 2002; Mitchell and Izan, 2006; Schwartz *et al.*, 2004; Palmon *et al.*, 2004). We postulate that such clustering also exists in the negotiation process within the IPO syndicate and that the negotiation within the syndicate is heated when we observe unconventional fractional ratios of underwriting commitments between co-managers and the lead underwriter, and among co-managers. We assume that underwriters initially set a well-rounded ratio and they do not attempt to renegotiate unless they are severely dissatisfied with the initial compensation because they do not want to make a bad reputation that they are hard to negotiate with; investment banking is a reputation-sensitive industry. Once negotiation is heated, the split of gross spread will get more unconventional or more fractional.

In this study, based on three new measures for heated negotiation, we investigate the determinants of the heated negotiation over the compensation in the syndicate and how the heated negotiation affects IPOs after positing that underwriters negotiate their shares of compensation based on their key underwriter services. Specifically, we consider three underwriter services: information production, analyst coverage, and market making. On the one hand, we expect enhanced underwriter services when the heated negotiation is observed since each underwriter will presumably negotiate their shares from the gross spread based on their pre-commitment to and actual aftermarket catering of valuable underwriter services (*service-based negotiation hypothesis*). On the other hand, the relationship-intensive nature of investment banking industry might force co-managers to acquiesce the lead underwriter's exploitation of a non-competitive—unfair—profit sharing scheme, which is fairly lower than what they believe they deserve. Pichler and Wilhelm (2001) show that membership stability based on relationships poses a barrier to entry for potential underwriters, letting members enjoy quasi-rents. To maintain such stable membership, co-managers might need to admit an unfair compensation scheme. Under such circumstance, some of the co-managers might attempt to negotiate hard to benefit them as resistance against unfair profit sharing (*unfair-compensation-driven negotiation hypothesis*). As such, the consequence of the heated negotiation is of an empirical issue. If a negotiation between the lead

underwriter and co-managers or among co-managers is based on their capability to provide key underwriting services, we then expect that IPOs with heated negotiation are characterized by improved underwriter services. If a negotiation is heated by the defensive resistance of co-managers due to the lead underwriter's exploitative pressure, we do not expect any improvement from IPOs with the heated negotiation compared to those without it.

First, we examine the determinants of the negotiation heatedness between the lead underwriter and co-managers, and among co-managers. Our results show that the negotiation is more likely to be heated when co-managers receive less underwriter compensation compared to the lead underwriter and the IPO has more co-managers in the syndicate. Negotiation would be more likely to be heated when there are more co-managers to share a smaller amount of gross spread. Negotiation heated IPOs are also more likely to have a lower reputation lead underwriter and a higher number of the all-star analysts[8] on the co-managers' side in the prior year of IPOs, which together would raise a probability of heated negotiation due to a better bargaining position for co-managers and an inferior lead underwriter bargaining power. Co-managers would negotiate hard when they are under-compensated and they have a powerful bargaining tool through all-star analysts.

Second, we examine how the heated negotiation affects IPOs by looking at three important underwriter services: information production, (all-star) analyst coverage, and market making. For these services, we find no or little evidence consistent with the service-based negotiation hypothesis that a negotiation is heated based on a syndicate member's key underwriter services, lending support to the unfair-compensation-driven negotiation hypothesis,. We find significant results for information production in some of the specifications but the signs for heated negotiation variables are all against the service-based negotiation hypothesis. For analyst coverage, IPOs with the heated negotiation between the lead underwriter and co-managers receive less analyst coverage from co-managers in the Poisson regressions, which is against the service-based negotiation hypothesis. We neither find evidence that

---

[8] All-star analysts are those who are nominated to the top three analysts in the *Institutional Investor* All-America Research Team in each industry. *Institutional Investor* releases a list of all-star analysts in the October issue each year.

heated negotiation leads to more market making activities after the IPO. The propensity score matching and Abadie and Imbens (2002) matching analysis used to account for endogeneity issue show the same implications as in our multivariate regression results, adding further support to the unfair-compensation-driven negotiation hypothesis.

Most of the underwriter services we consider in this paper are consistently not positively associated with the heated negotiation within the syndicate. These results suggest that underwriters—lead underwriter and co-managers—do not negotiate their share of compensation based on their pre-commitment and actual provision of key underwriter services. Rather, it is plausible that heated negotiation materializes as co-managers' resistance against the lead underwriter's initial unfair profit sharing design given that the heated negotiation is associated with less compensation for co-managers.

The main contribution of this paper is two-fold. The main contribution of this paper is two-fold. First, this paper develops new measures of heated negotiation within the IPO syndicate, which is the main innovation of the paper. Since information on negotiation heatedness with the syndicate cannot be directly measured or observed, it should be proxied. While our effort to capture the negotiation heatedness is far from being very accurate, our measures could be representative of negotiation heatedness to draw some insightful conclusions. In the strand of research on the negotiation within the syndicate, we hope that our work works as a meaningful first step. Second, we first examine the dynamics of the heated negotiation within the IPO syndicate and show that negotiation is heated due to unfair initial profit sharing design for co-managers.

The rest of the paper proceeds as follows. Section 2 describes sample, data, the construction of key variables, and sample characteristics, and Section 3 provides empirical questions and results. Section 4 summarizes our results.

2. Sample, Data, Construction of Key Variables, and Summary Characteristics

2.1. Sample and Data

So-called "fixed economics" was introduced and became prevalent in the late 1990s (see, e.g., Garrity and O'Leary, 1999; Keegan, 1999a, 1999b; Critchley, 2001; Tunick and Hahn, 2001; Jenkinson and Jones, 2007; Lee, 2012). Under the fixed economics, the traditional compensation scheme—the split of the gross spread into management fee, underwriting fee, and selling concession—is not relevant and an individual investment bank's underwriting commitment relative to the total offer proceeds generally coincides with its compensation from the gross spread.[9] For example, a certain underwriter in the syndicate will receive 20% of the gross spread under the fixed economics if it underwrites 20% of the total shares to be offered. Although each underwriter's compensation in each IPO is not publicly disclosed, the information on how many shares each investment bank underwrites is publicly available. In such manner, each underwriter's compensation from the gross spread can be indirectly captured by their underwriting commitments.

We initially identify 1970 IPOs from 1999 to 2007 using Thomson Financial Securities Data Company (SDC) Platinum Global New Issues database that provides the basic information on IPOs. We begin our sample from 1999 since the fixed economics became prevalent in the late 1990s according to aforementioned papers and industry publications. For example, based on the Quandt-Andrews unknown breakpoint test suggested by Andrews (1993) and Andrews and Ploberger (1994), Lee (2012) finds that the structural break for the fixed economics is around mid 1998. For the pre-fixed economics period, it would be very difficult to construct heated negotiation variables because no information is available for underwriter compensation at the individual underwriter level. Sample daily stock prices and market makers information for NASDAQ IPOs are obtained from the Center for Research in Security Prices (CRSP). We use the Institutional Brokers' Estimation System (I/B/E/S) recommendation database for analyst recommendations. All-star analysts are identified in October issues of *Institutional Investor*.

We exclude IPOs with offer proceeds below $20 million, non-U.S. IPOs, multiple lead underwriters IPOs, financial services firms, penny stock IPOs (share price lower than $5). We require our sample IPOs to be found in both SDC and CRSP. We also drop IPOs with missing information on share

---

[9] See Lee (2012) for more detailed discussions on the fixed economics. According to

allocations to each underwriter because share allocation information is used to construct the negotiation heatedness variables. Share allocation information is obtained from SDC. Such criteria result in a final sample of 966 IPOs.

2.2. Construction of Heated Negotiation Variables

In a theoretical framework of the market, prices are usually assumed to be uniformly distributed. However, we frequently observe clustering in practice. Clustering occurs when a small set of all possible prices are dominantly used. Among several hypotheses that have been proposed to explain such clustering, three hypotheses stand out: attraction, price resolution, and costly negotiation hypothesis.

The attraction hypothesis suggests that people psychologically have a natural attraction or preference for rounded numbers, which is a human habit (Goodhart and Curcio, 1992; Aitken *et al.*, 1996; Aşçıoğlu *et al.*, 2007).[10] Ball *et al.* (1985) suggest that clustering results from the desired degree of price resolution (accuracy) and the use of well-rounded numbers increases as valuation uncertainty increases, labeled as the price resolution hypothesis. Harris (1991) observes that rounded stock prices are more frequently used than fractional prices and prices with fractions smaller than eighths are seldom used. In his costly negotiation hypothesis, Harris argues that price clustering occurs when buyers and sellers need to simplify their negotiation processes, which will further expedite the time to complete negotiations and lower negotiation costs. He also notes that the minimum price variation restrictions on quotes and transaction prices are not necessary for traders who mutually know since they would use discrete prices not to make a reputation that they are difficult to negotiate with.[11]

Building upon these hypotheses, several papers examine price clustering in security issuance resulting from a negotiation between the issuer and underwriters. Bradley *et al.* (2004) hypothesize that the offer price is chosen from several well-rounded prices through negotiations between the issuer and underwriters. They find that IPOs are prevalently priced on integers. Mola and Loughran (2004) find

---

that integer prices are prevalent for IPOs and SEOs (seasoned equity offerings). Chiang and Harikumar (2004) confirm Bradley, Cooney, Jordan, and Singh's result on price clustering using the earlier sample period 1975-1984. Price clustering is also documented in other areas than security issuance, such as stock markets (Christie and Schultz, 1994; Ikenberry and Weston, 2008), bank deposit rates (Kahn *et al.*, 1999; Ashton and Hudson, 2008), foreign exchange spot market (Goodhart and Curcio, 1992; Grossman *et al.*, 1997; Sopranzetti and Datar, 2002), gold market (Ball et al., 1985), futures markets (Schwartz et al., 2004), and real estate prices (Palmon *et al.*, 2004).

[Insert Figure 1 here]

Figure 1 reports the sample distribution of the ratio of the underwriting commitments between co-manager(s) and the lead underwriter (*CMLU Ratio*), which represents the relative ratio of the two groups' compensations from the gross spread under the fixed economics (shares allocated to co-managers divided by shares allocated to the lead underwriter). As immediately recognizable from the figure, the majority of the ratios are clustered at several specific numbers. 239 IPOs out of 966 have the *CMLU Ratio* of 1, which means 50% compensation to each group from the gross spread. The *CMLU Ratio* is also clustered at some ratios other than 1, such as 1.22, 1.5, 0.67, 0.82, 1.86, 0.54, 0, 1.11, 0.43, and so on (these ratios are ordered by the frequency in our sample). The ratio of 1 means that the gross spread is evenly split between co-managers and the lead underwriter, which is one of the split schemes that one might easily come up with in the first place. The ratio 1.22 means 55 % (=1.22/2.22) to co-managers and 45% (=1/2.22) to lead underwriter. The ratios of 0.67 and 0.43 mean 40% to 60% and 30% to 70%, respectively. These clustered numbers are generally well rounded.

Such clustering suggests that investment banks are more likely to use well-rounded split ratios of underwriter compensation. One may question whether price clustering is applicable to the underwriter compensation split ratio but this split ratio is the fraction of two prices; underwriter compensation is analogous to the price for the service an underwriter provides. The clustering in the ratio of two prices is documented in the literature—clustering in foreign exchange rates (Goodhart and Curcio, 1992; Grossman *et al.*, 1997; Sopranzetti and Datar, 2002; Mitchell and Izan, 2006). For example, Grossman *et*

al. found clustering in quotes for trades of Japanese yen for Deutsche marks, US dollars for marks, and yen for dollars. Conventionally, these exchange rates are in units of one currency denomination per the other currency denomination, e.g., yen per dollar. These rates are similar to our measures in that all these are the fraction of two prices. Like foreign exchange rates, our heated negotiation measures are also a ratio of two prices.

These well-rounded split ratios of underwriter compensation are consistent with aforementioned three price clustering hypotheses. It is consistent with the attraction hypothesis in which people habitually prefer well-rounded numbers. It is also consistent with the price resolution hypothesis because the hypothesis asserts that clustering is more likely as valuation uncertainty increases. Pricing underwriter services with accuracy is a complicated job to perform. It would be extremely difficult for some of the services and the presence of a certain underwriter to be accurately priced into underwriter compensation. It is well admitted that underwriter services are hard to quantify into a dollar amount. Furthermore, high uncertainty is also present on the matter of whether the pre-committed underwriter services will lead to their actual provision, especially as much as promised in the pre-IPO stage. With such a high level of valuation difficulty, clustering would be a natural consequence. Harris' (1991) costly negotiation hypothesis asserts that well-rounded prices (ratios in our context) would not only expedite the negotiation process but also reduce negotiation costs. We expect clustering for IPOs without heated negotiation since investment banking industry is characterized by high relationship-intensiveness and, as Harris notes, underwriters will not want to make a bad reputation that they are hard to negotiate with.

In sum, human being has a natural preference for well-rounded numbers; pricing underwriter services in the syndicate involves a substantial valuation uncertainty; and, due to the relationship-intensive nature of the investment banking industry, underwriters have an incentive to quickly finalize the bargaining process of their compensation without any ado; all of which will make the absence of heated negotiation more likely. Therefore we postulate that such clustering also exists in the negotiation process of the profit sharing regarding underwriter compensation from the gross spread in case of the absence of heated negotiation.

As a measure for the heated negotiation, we use an unconventional fractional ratio of the underwriting commitments between the lead underwriter and co-managers, and among co-managers. We assume that underwriters basically attempt to use a well-rounded split scheme for underwriter compensation to lower negotiation costs and speed up its process. Therefore, the split of the gross spread will be made based on a limited set of rounded ratios if the negotiation is not heated. We, however, argue that the heated negotiation could emerge when there is either a strong negotiation initiative from co-managers based on their pre-commitment of key underwriter services or a resistance on the co-managers' side to the lead underwriter's exploitive pressure on the fee split. When a negotiation is heated, it is more likely that the split of the gross spread gets more unconventionally fractional, not admitting initial well-rounded conventional split ratios between the lead underwriter and co-managers.

We develop three new measures to capture the heated negotiation within the syndicate: *CMLU Ratio ≠ 1 Dummy*, *CMLU Ratio Not Clustered Dummy*, and *CM Heated Negotiation Dummy*. The first two dummy variables are a proxy for the heated negotiation between two groups—the lead underwriter and co-manager(s)—and the last variable is a measure for that among co-managers.

- *CMLU Ratio ≠ 1 Dummy*: This dummy variable is one if *CMLU Ratio* is *not* 1 (IPOs with heated negotiation) and otherwise zero (IPOs without heated negotiation). That is, IPOs with heated negotiation will have a value of one. The *CMLU Ratio* of 1 means 50:50 split between a group of co-managers and the lead underwriter, which is not only the most easily conceivable but also the most frequently chosen *CMLU Ratio* in our sample.[12] Our sample has 239 IPOs with the *CMLU Ratio* of 1 (See Figure 1 for the distribution of the frequent *CMLU Ratios*). We think of those IPOs with *CMLU Ratio* of 1 as ones without the heated negotiation.

- *CMLU Ratio Not Clustered Dummy*: As discussed above, IPOs with no heated negotiation are expected to use well-rounded ratios. Other than the 50:50 split, there are other split ratios that

---

[12] One might think that 50:50 could be a Nash bargaining solution between two similar groups. However, such split is more likely an initial bargaining solution with no negotiation rather than a split that is reached after multiple negotiation efforts. For example, it would be rarely likely that it goes from the initial split of 48.87: 51.13 to the final split of 50:50.

underwriters easily come up with in the first place. To incorporate this possibility, as an alternative measure to *CMLU Ratio ≠ 1 Dummy*, we create another dummy variable that includes additional *CMLU Ratios*, in addition to *CMLU Ratio* of 1, that are substantially frequent in our sample. This dummy variable is one if the *CMLU Ratio* is *not* one of the most frequent ratios in our sample and otherwise zero. The *most* frequent *CMLU Ratios* include 1 (239 IPOs), 1.22 (91), 1.5 (59), 0.67 (53), 0.82 (40), 0.54 (18), 1.85 (17).[13] These ratios are mostly well rounded. For this variable, we include *CMLU Ratios* with frequency of 15 or more.

- *CM Heated Negotiation Dummy*: Competition over compensation among co-managers is another interesting dimension that might affect the IPO. Therefore, we construct a dummy variable regarding the negotiation heatedness among co-managers. This dummy variable is one if the share allocation among co-managers is *not* "*typical*" and zero otherwise. We manually identify *typical* share allocation IPOs by looking at share allocations among co-managers IPO by IPO because 446 IPOs have three or more co-managers, with a maximum of 18. For example, the *typical* share allocations among co-managers include 0.5:0.5, 0.6:0.4, 0.67:0.33, 0.7:0.3 for two co-manager IPOs, 0.33:0.33:0.33, 0.7:0.15:0.15, 0.5:0.4:0.1, 0.5:0.3:0.2 for three co-manager IPOs, and so on.[14]

2.3. Descriptive Statistics

Panel A of Table 1 provides summary statistics of our sample. The mean *CMLU Ratio* shows that the share allocation for co-managers collectively is on average 1.16 times that for the lead underwriter.[15] In other words, all co-managers in the syndicate receive slightly more underwriter compensation from the gross spread (53.7%) than the lead underwriter because share allocation usually coincides with the fixed economics split. The average sample lead underwriter has 0.0652 all-star analyst in the prior year of the IPO, provides 0.6304 recommendation, and has a reputation rank of 8.1 while all

---

[13] 0.82 means 45% (0.82/1.82) for CM and 55% (=1/1.82) for LU; 0.54 means 35% for CM and 65% for LU; 1.85 means 65% for CM and 35% for LU. Other less frequent *CMLU Ratios* include 2 (9 IPOs), 1.08 (8), 0.25 (7), 1.67 (7), and 0.33 (5).

[14] Detailed information on "typical" share allocation is available upon request.

[15] All variables used in this paper are defined in the Appendix.

co-managers in the syndicate on average have 0.0828 all-star analyst, provide 1.383 recommendations, and have a reputation rank of 7.9. The average number of co-managers in the syndicate is 2.6646.[16] Panel B shows that approximately half of our sample is concentrated on the first two years of our sample period. The number of IPOs suddenly drops in 2001, peaks in 2004, and again drops thereafter. NASDAQ IPOs comprise 85% of our sample (821 IPOs) as shown in Panel C.

[Insert Table 1 here]

3. Empirical Questions and Results

We use underwriting commitment as a proxy for the magnitude of underwriter compensation from the gross spread and measure the degree of negotiation heatedness by looking at how total shares are relatively allocated among underwriters. Chen and Ritter (2000) note that the number of co-managers in the syndicate increases over time while syndicate size decreases, which suggests that the number of syndicate members has drastically fallen over time. Corwin and Schultz (2005) further indicate that syndicate members—non-managing underwriters in the syndicate—do much less work than managing underwriters—lead underwriters and co-managers—and, therefore, can be included in the syndicate with relatively cheap compensations. For this reason we focus on lead underwriters and co-managers only since majority of underwriter services are done by managing underwriters.

3.1. *Do IPOs with Heated Negotiation Provide Enhanced Underwriter Services?*

In this paper we examine the consequences of the heated negotiation in relation to the key underwriter services following Corwin and Schultz (2005): information production, research coverage, market making.[17] If we find evidence consistent with the premises in this section, we can conclude that negotiation is heated with their key underwriter services as their bargaining tool—*service-based*

---

[16] Jeon and Ligon (2011) find that the average number of co-managers in the SEO syndicate is 2.44 during 1997-2007.

[17] We believe that the heated negotiation within the syndicate has no consequence on the degree of certification through underwriter reputation or any other source in the market. Therefore we drop certification from our tests.

negotiation hypothesis. Otherwise, negotiation would be heated because co-managers are not satisfied with the initial profit sharing design presumably due to the fact that co-managers are associated with low compensation in those syndicates—*unfair-compensation-driven negotiation hypothesis.*

3.1.1. Information Production

Barzel *et al.* (2000) view the syndicate as a coalition for enhancing information development and distribution networks. We hypothesize that IPOs with the heated negotiation are associated with more information production in the form of higher price revision because underwriters will negotiate their shares (compensation) from the gross spread with their pre-commitment to more information production with greater pricing efforts. We use price revision, defined as (offer price-mid price)/mid price where mid price is the midpoint of the original filing price range, as our measure for information production following Ljungqvist and Wilhelm (2002) and Corwin and Schultz (2005) since newly discovered information during the filing period will be at least partially reflected in the pricing process (Hanley, 1993).

3.1.2. Analyst Coverage

Literature indicates that the lead underwriter is usually an active provider of analyst coverage in the aftermarket and analyst coverage is the most important factor along with underwriter reputation when the issuer selects their lead underwriter (Chen and Ritter, 2000). Therefore we expect that, with adequate compensation, they actively provide analyst coverage. Chen and Ritter (2000) note that the uprising trend in the number of co-managers is for issuers to buy additional analyst coverage for the same 7% gross spread, which means that analyst coverage by co-managers is a valuable service to the lead underwriter and the issuer. Hence, co-managers can use their research capability as their bargaining tool in determining their compensation and they are also expected to actively provide recommendations (see, e.g., Loughran and Ritter, 2004; Corwin and Schultz, 2005; Bradley *et al.*, 2008) as long as their compensation is properly arranged.

On the other hand, co-managers might not negotiate based on the pre-commitment on analyst coverage because they can provide coverage for other purposes. We then would not see any meaningful relationship between heated negotiation and analyst coverage by co-managers. For example, Ljungqvist, Marston, and Wilhelm (2009) find that aggressive analyst coverage is conducive to co-manager appointments, which in turn suggests that co-managers could be active in research coverage not for the purpose of compensation. We also consider all-star analyst coverage since such analysts can be used as an effective bargaining tool and its actual coverage provision would be appreciated by the issuer and the lead underwriter.

3.1.3. Market Making

Underwriters can use their pre-commitment to market making as a bargaining tool to get more out of the gross spread because market making usually enhances liquidity and price discovery, which, by making the IPO look successful, would be valued by both the lead underwriter and the issuer. Ellis *et al.* (2000) find that the lead underwriter is typically an active market maker in NASDAQ IPOs while co-managers are not. However, Corwin and Schultz (2005) note that co-managers can also be a market maker and find evidence consistent with their premise. We hypothesize that co-managers can use the pre-commitment to being an active market maker as an effective bargaining tool and test if they actually serve as a market maker.

3.2. Empirical Results

3.2.1. Determinants of the Negotiation Heatedness within the Syndicate

[Insert Table 2 here]

Table 2 presents the mean and median differences of the sample IPO characteristics partitioned by heated negotiation variables. *CMLU Ratio ≠ 1 Dummy* and *CMLU Ratio Not Clustered Dummy* are our measures for the negotiation heatedness between the lead underwriter and co-managers; *CM Heated Negotiation Dummy* is a measure for that among co-managers. Under the fixed economics, *CMLU Ratio*

conveys information on relative underwriter compensation between co-managers and the lead underwriter from the gross spread. Statistical differences of IPO characteristics between two groups are obtained from *t*-tests and Wilcoxon rank-sum tests.

The overall results in Table 2 suggest that our sample IPO characteristics between two groups are generally different. Co-managers' relative compensation, *CM/All Ratio*, is slightly higher for IPOs with negotiation heated between co-managers and the lead underwriter— *CMLU Ratio $\neq$ 1 Dummy* and *CMLU Ratio Not Clustered Dummy*—while the ratio is significantly higher for IPOs with heated negotiation among co-managers—*CM Heated Negotiation Dummy*. Panel C shows that the *CM/All Ratio* is 6.17% higher for negotiation heated IPOs (51.7% vs. 45%). As shown in Panels A, B, and C, negotiation heated IPOs are on average bigger (*Offer Proceeds*), have more gross spreads (*GS in USD*), and have more co-managers (*No. of CMs*). The differences for those three characteristics are all significant at the 1% level in both *t*-tests and Wilcoxon rank-sum tests. Table 2 suggests that underwriters tend to make a negotiation when the IPO is large in size, and it has more gross spread to share and more-co-managers to share the gross spread with. The probability for the presence of heated negotiation is lower when the IPO is backed by venture capital or belongs to the high tech industry. Untabulated analysis shows that VC-backed IPOs are on average smaller in size, have smaller gross spread in dollars, and are less likely to be in the high tech industry, which is in contrast with the properties of heated negotiation IPOs reported in Table 2.

In Panel D, we compare two groups—IPOs with CMLU<1 and CMLU>1—to see whether these two groups behave symmetrically or exhibit non-symmetric aspects because we expect that each group represents a tilted playing field in terms of bargaining power in negotiation. For example, CMLU<1 may represent a relatively more powerful lead underwriter and therefore there could be no much room for negotiation on the side of co-managers, compared to CMLU<1. IPOs with CMLU>1 are all positively related to the characteristics considered in Table 2. IPOs with relatively less compensation for the lead underwriter have a bigger IPO size, a higher gross spread, approximately one more co-manager in the

syndicate, higher lead underwriter and average co-manager reputations, and a higher likelihood of being VC-backed.

[Insert Table 3 here]

Table 3 reports the logit regression results on the determinants of the negotiation heatedness between co-managers and the lead underwriter, and also among co-managers in the syndicate. In multivariate regressions in this paper, we include control variables that have a strong theoretical or empirical justification in relation to IPO and issuer characteristics. We also provide sub-sample regressions after excluding the two years of the dotcom bubble (1999 to 2000). We first discuss the results on the heated negotiation between co-managers and the lead underwriter based on the whole sample analysis. *CM/All Ratio* is negative and significant for *CMLU Ratio ≠ 1 Dummy* and *CMLU Ratio Not Clustered Dummy,* suggesting that the heated negotiation is more likely when co-managers receive relatively less underwriter compensation from the gross spread than does the lead underwriter. Co-managers will probably strive for more compensation when the initial fixed economics split is smaller for them. After multiple negotiation efforts, the revised split will be more fractional or more non-conventional. IPOs with the less prestigious lead underwriter are more likely to have the heated negotiation; *LU Reputation* is negative and significant at the 10% level for *CMLU Ratio ≠ 1 Dummy* and 5% level for *CMLU Ratio Not Clustered Dummy*. Less prestigious investment banks tend to be smaller in size and hence have relatively inferior bargaining power, which would leave more room for co-managers in terms of negotiation and would be more likely to cause co-managers to initiate re-negotiation efforts to revise the split. Such efforts will lead to non-conventional splits. *CM Avg. Reputation* is negative and weakly significant just for *CMLU Ratio ≠ 1 Dummy*.[18] *No. of CMs* is positive and significant at the 1% level. In sum, an inferior bargaining position on both sides seems to make an initial unfair compensation

---

[18] Instead of including *LU Reputation* and *CM Avg. Reputation*, we also estimate the effect of relative reputation between lead underwriters and co-managers on negotiation heatedness, defined as *CM Avg. Reputation* divided by *LU Reputation*. The variable is only positively significant at the 5% level in the *CMLU Ration Not Clustered Dummy* regression, yet is not significant in the other regressions. The results are not reported here, although they are available on request.

design more likely and heated negotiation is triggered when the IPO has a smaller compensation portion for co-managers and there are more co-managers in the syndicate to share the gross spread with.

In the first two specifications using the whole sample, *No. of CM All-star Analysts* is positive and consistently statistically significant in both specifications. Along with underwriter reputation, analyst coverage is one of the most important determinants in underwriter selection (e.g., Chen and Ritter, 2000) and the issuer highly values this service. As such, research capability could be a great bargaining tool and be substantially influential in the determination of underwriter compensation. A stronger bargaining power due to more all-star analysts on the co-managers' side will cause co-managers to negotiate more aggressively. Therefore, one can expect that heated negotiation would be more likely when co-managers possess a powerful bargaining tool, all-star analysts in the prior year of the IPO. Although significant for *CMLU Ratio Not Clustered Dummy* only, *No. of LU All-star Analysts* also has a positive association with heated negotiation.

Unlike the first two specifications based on the whole sample in Table 3, we find no evidence that a negotiation is more likely to be heated when there is less to share among co-managers because *CM/All Ratio* is not significant for *CM Heated Negotiation Dummy* although it has a negative sign. The heated negotiation is more likely when co-managers do not have a better bargaining power (a negative sign for *CM Average Reputation,* significant at the 5% level) and there are more co-managers to share with (a positive sign for *No. of CMs*, significant at the 1% level). The presence of all-star analysts appears not to be associated with the negotiation heatedness among co-managers.

Next to each whole sample regression for each heated negotiation variable, we report sub-sample (2001-2007) regressions after excluding 1999 and 2000 from our sample. *CM/All Ratio* and *LU Reputation* are again negative and now more statistically significant for *CMLU Ratio ≠ 1 Dummy* and *CMLU Ratio Not Clustered Dummy*, suggesting that heated negotiation is more sensitive to the level of compensation and lead underwriter prestige. Given the bearish IPO market after the internet bubble period and increased competition from the commercial banks' inroad into the underwriting business, it is highly plausible that investment banks became more sensitive to their compensation. In a more

competitive IPO market, underwriter reputation will be more effective as a bargaining tool. *No. of CMs* and *No. of CM All-star Analysts* are statistically weaker and significant for just one of the two heated negotiation variables. According to Hu and Ritter (2007), large IPOs are increasingly led by multiple lead underwriters since 2000. Therefore, our sample IPOs—singly led IPOs only—are relatively smaller than those in the 1999-2000 period and would need fewer co-managers and less service from co-managers. In the sub-sample regressions for *CM Heated Negotiation Dummy, CM/All Ratio* remains insignificant while *LU Reputation gains* and *CM Avg. Reputation* loses their statistical significance although they maintain the same signs. *No. of CMs* is again positive and significant at the 1% level.

      To see how the relative compensation between the lead underwriter and co-managers is related to our key variables and control variables, we include *CMLU<1 Dummy* and/or *CMLU>1 Dummy* in the last one or two columns for the remaining tables. In the last column, we examine how two groups— *CMLU<1* and *CMLU>1* —are different in terms of various aspects of the IPO. IPOs with relatively less compensation for co-managers (IPOs with CMLU<1) are more likely to have a lower co-manager reputation and fewer co-managers in the syndicate. These IPOs are likely to have less all-star analysts in the prior year to IPO and less likely to be VC-backed.

3.2.2. How does Heated Negotiation Affect IPOs?

3.2.2.1. Information Production

<div align="center">[Insert Table 4 Here]</div>

      To test the relationship between information production—using price revision as a proxy—and negotiation heatedness, we conduct the OLS regression with price revision as its dependent variable. Table 4 reports the results. In Panel A, we find the effects of our measures for heated negotiation are generally negative and they are significant for *CMLU Ratio ≠ 1 Dummy* and *CM Heated Negotiation Dummy.* The negative sign on these two dependent variables is consistent with the unfair-compensation-driven negotiation hypothesis. Corwin and Schultz (2005) find strong evidence that co-managers significantly contribute to information production with different investor base and distribution channels.

However, co-managers in the negotiation heated IPO would have no strong incentive for information production given that negotiation heated IPOs are associated with lower compensation for co-managers (see Table 3). Therefore, information production mainly by the lead underwriter would be lower than information production jointly by the lead underwriter and co-managers in IPOs with no negotiation, which could provide a possible explanation for the negative sign on *CMLU Ratio ≠ 1 Dummy* and *CMLU Ratio Not Clustered Dummy*.[19] Overall, we find evidence to support the unfair-compensation-driven negotiation hypothesis.

Information production increases with *Offer Price* and IPO size measured by gross spread (*Ln (GS in USD)*) because the gross spread is usually highly correlated with offer proceeds, as supported by the well-recognized 7% clustering in gross spread. *Price Revision* is higher when IPOs are VC-backed, belong to the high tech industry, and are listed in the NASDAQ. In the last two columns, we test how relative compensation between co-managers and the lead underwriter affects information production and find weak support that information production is lower when the lead underwriter is relatively less compensated.

Although price revision is frequently defined in the literature as (offer price-mid price)/mid price where mid price is the midpoint of the original filing price range, one may argue that information production through price revision can be better captured through its absolute value or when we bifurcate it into positive and negative previsions. We believe that the analysis based on positive and negative price revision sub-samples would be more desirable because we may lose some critical information such as underwriters' differential incentives and behavior for pricing or revision when we take the absolute value of it. We believe that pricing incentives are asymmetric for positive and negative price revision, and the analysis based on the bifurcated sub-samples would be better with no information loss. We report sub-sample analysis in Panel B of Table 4.

---

[19] Contrary to Corwin and Schultz (2005), Jay Ritter during the 2011 CAFM conference comments that co-managers typically do not participate in the road show and therefore they might not contribute significantly to the information production.

Similar to the whole sample analysis, all heated negotiation variables are negatively signed for the positive price revision sub-sample with only *CMLU Ratio ≠ 1 Dummy* significant at the 5% level. VC-backed and Tech IPOs are associated with higher price revision. For the negative price revision sample, we find no significant results for the heated negotiation variables. Unlike the positive price revision sub-sample, *CM Avg. Reputation* and *NASDAQ Dummy* are negative and positive, respectively, and significantly related to the negative price revision. The negative sign on *CM Avg. Reputation* and NASDAQ Dummy means that price revision is on average more negative for low average co-manager reputation IPOs and less negative for Nasdaq IPOs.

3.2.2.2. Analyst Coverage

[Insert Table 5 Here]

In this section, we examine if heated negotiation leads to increased analyst coverage. Panels A and B of Table 5 report the Poisson regression results on analyst coverage proxied by the number of recommendations and heated negotiation. Except for the Poisson regression for *CMLU Ratio ≠ 1 Dummy* in Panel A, the coefficients for heated negotiation variables are all negative in Panels A and B. In Panel A, the only significant result is found for *CMLU Ratio Not Clustered Dummy* with a negative sign, which is in support for the unfair-compensation-driven negotiation hypothesis.[20] Analyst coverage by the lead underwriter increases when the lead underwriter has more all-star analysts (significant at the 5% level). Also, we find that IPOs in the NASDAQ market or with highly reputable lead underwriter are more likely to receive recommendations from lead underwriters.

Similar to the regressions for analyst coverage on the lead underwriter's side, we find evidence in Panel B that heated negotiation is associated with the decrease in co-managers' recommendations in the Poisson regressions for *CMLU Ratio ≠ 1 Dummy* and *CMLU Ratio Not Clustered Dummy*. The heated negotiation among co-managers (*CM Heated Negotiation Dummy*) is not significant with a

---

[20] We do not see any connection between the heated negotiation among co-managers and analyst coverage by the lead underwriter and, therefore, do not include *CM Heated Negotiation Dummy* in the *No. of LU Recommendations* regressions.

negative sign. One thing to note in the regressions for *No. of CM Recommendations* is that *CM/All Ratio* is positive and significant at the 1% level in all specifications. A higher *CM/All Ratio* means more compensation for co-managers, suggesting that co-managers provide more coverage when they are better compensated. The actual provision of co-manager analyst coverage is tightly linked to its corresponding compensation from the gross spread, as shown in Cliff and Denis (2004) and Lee (2012). On the other hand, the insignificant coefficients on *CM/All Ratio* for *No. of LU Recommendations* in Panel A suggest that analyst coverage by the lead underwriter seems to be provided independent of the degree of compensation, probably driven by other types of compensations or motives.

In Panels C and D of Table 5, we test how the heated negotiation is related to all-star analyst coverage. We find no significant result for *LU All-star Dummy* and *CM All-star Dummy* in all specifications using logit regressions for all three negotiation heatedness variables. *No. of LU All-star Analysts* is positive and significant at the 1% level in Panel C while *No. of CM All-star Analysts* is significant only marginally at the 10% and 5% levels in Panel D. Taken together with positive and significant signs for *No. of CM All-star Analysts* in Table 3, such results suggest that having all-star analysts leads to actual coverage provision by co-managers much less likely than by the lead underwriter although possessing such analysts can substantially affect co-managers' bargaining process of shaping up the fixed economics split.

In the last two columns of each Panel in Table 5, we examine how relative compensation between co-managers and the lead underwriter affects analyst coverage. A significant result is found in Panel C only. *CMLU>1 Dummy* (*CMLU<1 Dummy*) is positively (negatively) significant for *LU All-star Dummy* at the 1% (5%) level. It appears that the lead underwriter provides more (less) all-star coverage when they are relatively less (more) compensated, which is seemingly counterintuitive. One possible explanation is that IPOs are more likely to be VC-backed when the lead underwriter is less compensated (see Table 3) and *VC-backed Dummy* is negatively significant for *CMLU<1 Dummy*. Bradley *et al.* (2011) find that top VC-backed IPOs are more likely to receive all-star analyst coverage, which suggests that IPOs with less compensation for the lead underwriter are more likely to receive all-star coverage.

3.2.2.3. Market Making

[Insert Table 6 Here]

We examine whether the heated negotiation results in more market makers in the aftermarket in Table 6 using NASDAQ IPOs only. Following Corwin and Schultz (2005), the degree of market making is measured through the initial number of market makers right after IPO. While the coefficients are negative for all three heated negotiation variables, we do not find any significant relationship. Contrary to the serviced-based negotiation hypothesis, we find no evidence on the increased market making in the heated negotiation IPOs. Consistent with Ellis *et al.* (2000) findings, it is possible that co-managers do a trivial role in market making while the lead underwriter is a key player. Another possibility would be that co-managers in the negotiation heated IPOs do not have a strong incentive to serve as an active market maker because the relationship within the syndicate might have gone sour due to heated negotiation, given that heated negotiation arises mostly in the syndicate with relatively lower compensation for co-managers (see Table 3). Results in Table 6 are in favor of the unfair-compensation-driven negotiation hypothesis.

In the last column, *CMLU<1 Dummy* is significant with a negative coefficient, which could be interpreted as that co-managers serve as a market maker less actively when their compensation is relatively smaller because we include *No of CMs* as one of our control variables. The results on some independent variables are consistent with Corwin and Schultz (2005). The number of market makers is positively associated with the degree of underpricing and IPO size. *Underpricing* and *Ln (GS in USD)* are positive and significant at the 1% level, respectively.

3.3. Average Treatment Effects of Negotiation Heatedness

Our previous empirical results, however, would be biased if the negotiation heatedness in the IPO syndicate is determined endogenously. That is, there would be a common factor that affects both negotiation heatedness and key underwriting services. To account for endogeneity, we employ the

propensity score matching (PSM) and Abadie and Imbens matching (AI) analysis. Developed by Rosenbaum and Rubin (1983), the PSM is an appropriate model to control for endogeneity due to its reliance on matching instead of regression. The procedure of PSM analysis is herein briefly described.

In the first step, a probit model is estimated for the determinants of negotiation heatedness as a function of observed control variables. The resulting estimates are employed to create a predicted probability of treatment for each firm, called the propensity score. In the second step, we separate the sample of IPOs into two groups based on the probability of heated negotiation, regardless of whether it actually is. The IPOs with heated negotiation are randomly ordered and the first IPO is matched to all IPOs without heated negotiation based on their propensity scores. This process is repeated for all IPOs with heated negotiation. Finally, using the matched sample, we compare the average of key underwriting services. Two matching methods are used in this paper: nearest neighbor method and kernel method. The nearest neighbor method finds the units for which the propensity score is the closest, while the kernel method smoothes the split into some intervals by taking the weighted average conversely proportional to the distance of the propensity scores between the two groups.

In the PSM, however, each treated unit is matched to a single control, and a control unit which is not matched with a specific treated unit is discarded. Therefore, the numerical results from a typical PSM heavily depend upon the order in which the treated units are matched. On the other hand, Abadie and Imbens (2002) suggests an alternative matching method where each treated unit is matched to the closest control, and then each control to the closest treated unit with replacement.[21] We use both a simple AI matching and a bias-adjusted matching where regression analysis is employed to eliminate remaining bias. The Stata command *nnmatch* is introduced in Abadie, Drukker, Herr, and Imbens (2004).[22]

---

[21] The key assumptions behind matching are unconfoundedness and overlap (Roberts and Whited, 2012). Random assignment is infeasible, while one may assume that treatment assignment is unconfounded conditional on a sufficient set of covariates (Hirano, Imbens, and Ridder, 2003). In order to avoid a lack of overlap and to get an efficient estimate, a researcher needs to increase the number of matches with the increase in the number of sample size. AI matching is useful to have a sufficient overlap.

[22] We use maximum four matches per observation, following Adabie and Imbens (2002) who suggest that using four matches performs well in terms of the mean-squared error.

[Insert Table 7 Here]

Table 7 reports the results of the PSM and AI matching analysis. Panel A reports the PSM estimators, the average treatment effects on treated (ATTs), by employing the nearest neighbor matching method, while the kernel matching method is used in Panel B. The AI estimators, ATTs, by using simple matching and biases adjusted matching are present in Panel C. The outcomes are our measures for key underwriting services. In the probit model, we estimate the determinants for heated negotiation using the independent variables as in Tables 4, 5, and 6.

In Panel A, the ATTs of *CMLU Ratio ≠ 1 Dummy* and *CMLU Ratio Not Clustered Dummy* on price revision are negative and significant, while that of *CM Heated Negotiation Dummy* is not significant. In Panel B, the ATTs of all three measures for heated negotiation are negative, but it is significant only for *CM Heated* Negotiation Dummy. The findings are consistent with those in Table 4 and in line with the unfair-compensation-driven negotiation hypothesis. The ATTs of the heated negotiation measures on analyst coverage are generally negative but insignificant and significant results are found on No. of CM Recommendations for *CMLU Ratio ≠ 1 Dummy* and *CM Heated Negotiation Dummy*. They are all negative, adding support to the unfair-compensation-driven negotiation hypothesis. Taken as a whole, the results on analyst coverage are consistent with our previous findings in Table 5. Finally, the effects of heated negotiation on market making activities are also negative, but generally insignificant. This is consistent with Table 6.

The results of AI matching in Panel C are largely consistent with those of PSM analysis. The ATTs of *CMLU Ratio ≠ 1 Dummy* on price revision is negative in both simple and biases adjusted matching. In the biases adjusted matching. *CMLU Ratio ≠ 1 Dummy* is also weakly negative on analyst coverage by lead underwriters and is negative at the 5 % level on market making. *CM Heated Negotiation Dummy* has a significantly negative ATT on the number of co-manager recommendations in the biased adjusted matching, consistent with Panel A. In short, after endogeneity correction using the PSM model, we find evidence supporting for our previous regression results that underwrites do not negotiate their shares of compensation based on their pre-commitment and actual provision of key

underwriter services. Overall, results on Table 7 again support the unfair-compensation-driven negotiation hypothesis, suggesting that heated negotiation arises as co-managers resist against initial low compensation for them.

4. Summary and Conclusions

We test the determinants of the heated negotiation within the syndicate and how the heated negotiation affects IPOs using 966 IPOs from 1999 to 2007. Building upon Harris' (1991) costly negotiation hypothesis, we develop three new measures for the negotiation heatedness and test our questions.

We find that a negotiation is heated when co-managers receive relatively less compensation compared to the lead underwriter and there are more co-managers in the syndicate. Heated negotiation would be more likely when there are more to share a smaller amount of gross spread with. The heated negotiation is also related to more co-manager all-star analysts in the prior year of the IPO and lower lead underwriter reputation, which strengthens a bargaining position for co-managers and relatively weakens the lead underwriter's bargaining power. Such syndicate properties will be more likely to trigger the heated negotiation.

In the test of the effect of the heated negotiation on IPOs in relation to key underwriter services, we find no support for the service-based negotiation hypothesis in which the negotiation is heated as underwriters negotiate their shares of compensation using key underwriter services as their bargaining tools. Instead, significant results are in support of the unfair-compensation-driven negotiation hypothesis in both base-line regressions and endogeneity correction analysis. Overall, evidence indicates that underwriters in the syndicate do not negotiate their shares of compensation based on their pre-commitment and actual provision of key underwriter services. Rather, it appears that heated negotiation materializes as co-managers' resistance against the lead underwriter's initial unfair profit sharing design given that the heated negotiation is associated with less compensation for co-managers.

References

Abadie, A., and G. Imbens, 2002, Simple and bias-corrected matching estimators for average treatment effects, Technical Report, University of California, Berkeley.

Abadie, A., D. Drukker, J.L. Herr, and G. Imbens, 2004, Implementing matching estimators for average treatment effects in Stata, Stata Journal 4, 290-311.

Aitken, M., P. Brown, C. Buckland, H.Y. Izan, and T. Walter, T., 1996, Price clustering on the Australian Stock Exchange, *Pacific-Basin Finance Journal* 4, 297–314.

Andrews, D.W.K., 1993, Tests for parameter instability and structural change with unknown change point, *Econometrica* 61, 821-856.

Andrews, D.W.K., and W. Ploberger, 1994, Optimal tests when a nuisance parameter is present only under the alternative, *Econometrica* 62, 1383-1414.

Aşçıoğlu, A., C. Comerton-Forde, and T.H. McInish, 2007, Price clustering on the Tokyo stock exchange, *Financial Review* 42, 289-301.

Ashton, J. K., and R.S. Hudson, 2008, Interest rate clustering in UK financial services markets, Journal of Banking and Finance 32, 1393-1403.

Ball, C., W. Torous, and A. Tschoegl, 1985, The degree of price resolution: The case of the gold market, *Journal of Futures Markets* 5, 29–43.

Barzel, Y., M.A. Habib, and D.B. Johnsen, 2000, IPO syndicates, private foreknowledge, and the economics of excess search, George Mason Law & Economics Research Paper No. 00-29.

Beatty, R. and I. Welch, 1996, Issuer expenses and legal liability in initial public offerings," *Journal of Law and Economics* 39, 545-602.

Bradley, D.J., J.W. Cooney, B.D. Jordan, and A.K. Singh, 2004, Negotiation and the IPO offer price: A comparison of integer vs. non-integer IPOs, *Journal of Financial and Quantitative Analysis* 39, 517-540.

Bradley, D.J., and B.D. Jordan, and J.R. Ritter, 2008, Analyst behavior following IPOs: The "Bubble Period" evidence, *Review of Financial Studies* 21, 101-133.

Bradley, D.J., I. Kim, and L. Krigman, 2011, Currying favor with top venture capital firms: The role of IPO underpricing and all-star coverage, Working paper, University of South Florida.

Carter, R.B., 1992, Underwriter reputation and repetitive public offerings, *Journal of Financial Research* 15, 341-354.

Chen, H., and J.R. Ritter, 2000, The seven percent solution, *Journal of Finance* 55, 1105-1132.

Chiang, K.C.H., and T. Harikumar, 2004, Offering price clusters and underpricing in the US primary Market, *Applied Financial Economics* 14, 809-822.

Christie, W., and P. Schultz, 1994, Why do Nasdaq market makers avoid odd-eighths quotes? *Journal of Finance* 49, 1813-1840.

Cliff, M.T., and D.J. Denis, 2004, Do Initial Public Offering firms purchase analyst coverage with underpricing? *Journal of Finance* 59, 2871-2901.

Corwin, S. and J. Harris, 2001, The initial listing decisions of firms that go public, *Financial Management* 30, 35-55.

Corwin, S.A., and P. Schultz, 2005, The role of IPO underwriting syndicate: Pricing, information production, and underwriter competition, *Journal of Finance* 60, 443-486.

Critchley, B., 2001, Pluses and minuses of Domtar deal: got its financing, but missed broader U.S. participation, *National Post*, National Edition, October 3

Dunbar, C.G., 1995, The use of warrants as underwriter compensation in initial public offerings, *Journal of Financial Economics* 38, 59-78.

Ellis, K., R. Michaely, and M. O'Hara, 2000, When the underwriter is the market maker: An examination of trading in the IPO aftermarket, *Journal of Finance* 55, 1039–1074.

Garrity, B., and C. O'Leary, 1999, Relentless forces erode fee structure: megamergers and hyper-competition are slowly eroding underwriting fees, *Investment Dealer's Digest*, February 1.

Goodhart, C., and R. Curcio, 1992, Asset price discovery and price clustering in the foreign exchange market, Working paper, London School of Business.

Grossman, S. J., M.H. Miller, K.R. Cone, and D.R. Fischel, 1997, Clustering and competition in asset markets, *Journal of Law and Economics* 40, 23-60.

Hanley, K. W., 1993, The underpricing of initial public offerings and the partial adjustment phenomenon, *Journal of Financial Economics* 34, 231-250.

Hansen, R.S., and P. Torregrosa, 1992, Underwriter compensation and corporate monitoring, *Journal of Finance* 47, 1537-1555.

Harris, L., 1991, Stock price clustering and discreteness, *Review of Financial Studies* 4, 389-415.

Hirano, K., G. Imbens., and G. Ridder, 2003, Efficient estimation of average treatment effects using the estimated propensity score. *Econometrica* 71, 1161-1189.

Ikenberry, D.L., and J.P. Weston, 2008, Clustering in US stock prices after decimalization, *European Financial Management* 14, 30-54.

James, C., 1992, Relationship-specific assets and the pricing of underwriter services, *Journal of Finance* 47, 1865-1885.

Jenkinson, T., and H. Jones, 2007, The economics of IPO stabilization, syndicates, and naked shorts, *European Financial Management* 13, 616-642.

Jeon, J.Q., and J.A. Ligon, 2011, The role of co-managers in reducing flotation costs: Evidence from seasoned equity offerings, *Journal of Banking and Finance* 35, 1041-1056.

Kahn, C., G. Pennacchi, and B. Sophanzetti, 1999, Bank deposit rate clustering: Theory and empirical evidence, *Journal of Finance* 54, 2185–2214.

Keegan, J., 1999a, Bulge bracket beware: commercial banks now dominates some syndicates, *Investment Dealers' Digest*, February 8.

Keegan, J., 1999b, As details of AT&T issue emerge, tiny Blaylock wins coveted slot, *Investment Dealers' Digest*, March 8.

Kim, D., D. Palia, and A. Saunders, 2010, Are initial returns and underwriting spreads in equity issues complements or substitutes? *Financial Management* 39, 1403-1423.

Kuhn, R. L., 1990, *Investment Banking: The Art and Science of High-Stake Dealmaking*, Harper & Row, New York, NY.

Lee, C., 2012, Does the gross spread compensate lead underwriters for analyst coverage? *Accounting and Finance Research* 1(2), 36-58.

Lee, C., J.Q. Jeon, and B.J. Kim, 2011, Reciprocity in syndicate participation and issuer's welfare: Evidence from initial public offerings, *Asia-Pacific Journal of Financial Studies* 40, 138-198.

Lee, I., S. Lochhead, J. Ritter, and Q. Zhao, 1996, The costs of raising capital, *Journal of Financial Research* 19, 59-74.

Ljungqvist, A.P., F.C. Marston, and W.J. Wilhelm, 2009, Scaling the hierarchy: How and why investment banks compete for syndicate co-management appointments, *Review of Financial Studies* 22, 3977-4007.

Ljungqvist, A.P., and W.J. Wilhelm, 2002, IPO allocations: Discriminatory or discretionary? *Journal of Financial Economics* 65, 167-201.

Loughran, T., and J.R. Ritter, 2004, Why has IPO underpricing changed over time? *Financial Management* 33, 5-31.

Mitchell, J., and H.Y. Izan, 2006, Clustering and psychological barriers in exchange rates, *Journal of International Financial Markets, Institutions and Money* 16, 318-344.

Mola, S., and T. Loughran, 2004, Discounting and clustering in seasoned equity offering prices, *Journal of Financial and Quantitative Analysis* 39, 1-23.

Palmon, O., B.A. Smith, and B.J. Sopranzetti, 2004, Clustering in real estate prices: Determinants and consequences, *Journal of Real Estate Research* 26, 115-136.

Picker, I., 1998, No more sticky fees: Competition may finally bring down the cost of equity offering, *Institutional Investor* 32(9), September, New York, NY.

Pichler, P., and W. Wilhelm, 2001, A theory of the syndicate: Form follows function, *Journal of Finance* 56, 2237-2264.

Ritter, J., 1987, The costs of going public, *Journal of Financial Economics* 19, 269-281.

Roberts, M.R., and T.M. Whited, 2012, Endogeneity in empirical corporate finance, SSRN working paper.

Rosenbaum, P., and D. Rubin, 1983, The central role of the propensity score in observational studies for causal effects, *Biometrika* 70, 41-55.

Schwartz, A.L., B.F. Van Ness, and R.A. Van Ness, 2004, Clustering in the futures market: Evidence from S&P 500 futures contracts, *Journal of Futures Market* 24, 413-428.

Securities Industry Assoication, 2005, *Capital Markets Handbook* 6th edition, edited by John C Burch, Jr. and Bruce S. Foerster, Aspen Publishers, New York, NY.

Shack, J., 2005, Undermining the underwriters, *Institutional Investor*, May.

Shepard, R.N., D.W. Kilpatric, and J.P. Cunningham, 1975, The internal representation of numbers, *Cognitive Psychology 7*, 82-138.

Sopranzetti, B., and V. Datar, 2002, Price clustering in foreign exchange spot markets, *Journal of Financial Markets* 5, 411-417.

Torstila, S., 2001, The distribution of fees within the IPO syndicate, *Financial Management 30*, 35-43

Tunick B.E., 2004, Say goodbye to the syndicate: The new power of CFOs is contributing to vast changes in the underwriting world, *Investment Dealers' Digest*, June 28.

Tunick, B.E., and A.L. Hahn, 2001, Tri books: a bear hug? Merrill, J. P. Morgan and UBS share Sprint deal, *Investment Dealers' Digest*, August 13.

Wirth, G., 1997, Is this the death of the syndicate? *Investment Dealer's Digest* 63, 20-23.

Appendix.
Definitions of Variables

Heated Negotiation Variables

- CMLU Ratio

  Shares allotted to all co-managers ÷ Shares allotted to lead underwriter.

- CMLU Ratio ≠ 1 Dummy

  One if CMLU Ratio is not 1 and otherwise zero. More detailed explanation is found in section 2.2.

- CMLU Ratio Not Clustered Dummy

  One if CMLU Ratio is not one of the most frequent ratios in our samples and otherwise zero. The *most* frequent *CMLU Ratios* include 1 (239 IPOs), 1.22 (91), 1.5 (59), 0.67 (53), 0.82 (40), 0.54 (18), 1.85 (17). More detailed explanation is found in section 2.2.

- CM Heated Negotiation Dummy

  One if the share allocation among co-managers is not "*typical*" and otherwise zero. For example, the *typical* share allocations among co-managers include 0.5:0.5, 0.6:0.4, 0.67:0.33, 0.7:0.3 for two co-manager IPOs, 0.33:0.33:0.33, 0.7:0.15:0.15, 0.5:0.4:0.1, 0.5:0.3:0.2 for three co-manager IPOs, and so on. More detailed explanation is found in section 2.2.

- CMLU>1 Dummy

  One if an IPO's CMLU Ratio is higher than one and zero otherwise.

- CMLU<1 Dummy

  One if an IPO's CMLU Ratio is lower than one and zero otherwise.

Underwriter Services Variables

- Price Revision

  (offer price–mid price) ÷ mid price where mid price is calculated as the midpoint of the original filing price range.

- No. of LU All-star Analysts

  The number of all-star analysts that the lead underwriter possesses in the previous year of IPO.

- No. of CM All-star Analysts

  The number of all-star analysts that co-managers possess in the previous year of IPO.

- LU All-star Dummy

  One if the issuer receives an all-star analyst coverage from the lead underwriter and zero otherwise.

- CM All-star Dummy

  One if the issuer receives an all-star analyst coverage from co-managers and zero otherwise.

- No. of LU Recommendations

  The number of recommendations the issuer received from the lead underwriters for one year after IPO.

- No. of CM Recommendations

  The number of recommendations the issuer received from co-managers for one year after IPO.

- No. of All Recommendations

  The number of all recommendations the issuer received for one year after IPO.

- No. of Market Makers

  The initial number of market makers right after IPO.

IPO Characteristics

- LU Reputation

  The lead underwriter's reputation based on adjusted Carter-Manaster ranks found in Jay Ritter's web-site.

- CM Maximum Reputation

  The maximum reputation of the co-managers in the syndicate.

LV13070

- CM Average Reputation   The average reputation of the co-managers in the syndicate.
- No. of CMs   The number of co-managers in the syndicate.
- Gross Spread (in $M)   The amount of gross spread in million dollars.
- CM/All Ratio   Shares allotted to all co-managers ÷ total shares offered.
- Ln (OP in USD)   Natural logarithm of offer proceeds in U.S. dollars.
- Ln (GS in USD)   Natural logarithm of gross spread in U.S. dollars.
- Close Price   A closing price on the first trading day.
- Underpricing   (first day closing price-offer price) ÷ offer price.
- VC-backed Dummy   One if an IPO is backed by a venture capital and zero otherwise.
- Tech Dummy   One if an IPO is classified into the high tech industry on SDC and zero otherwise.
- NASDAQ Dummy   One if an IPO is listed in the NASDAQ and zero otherwise.

Frequency by CMLU Ratio
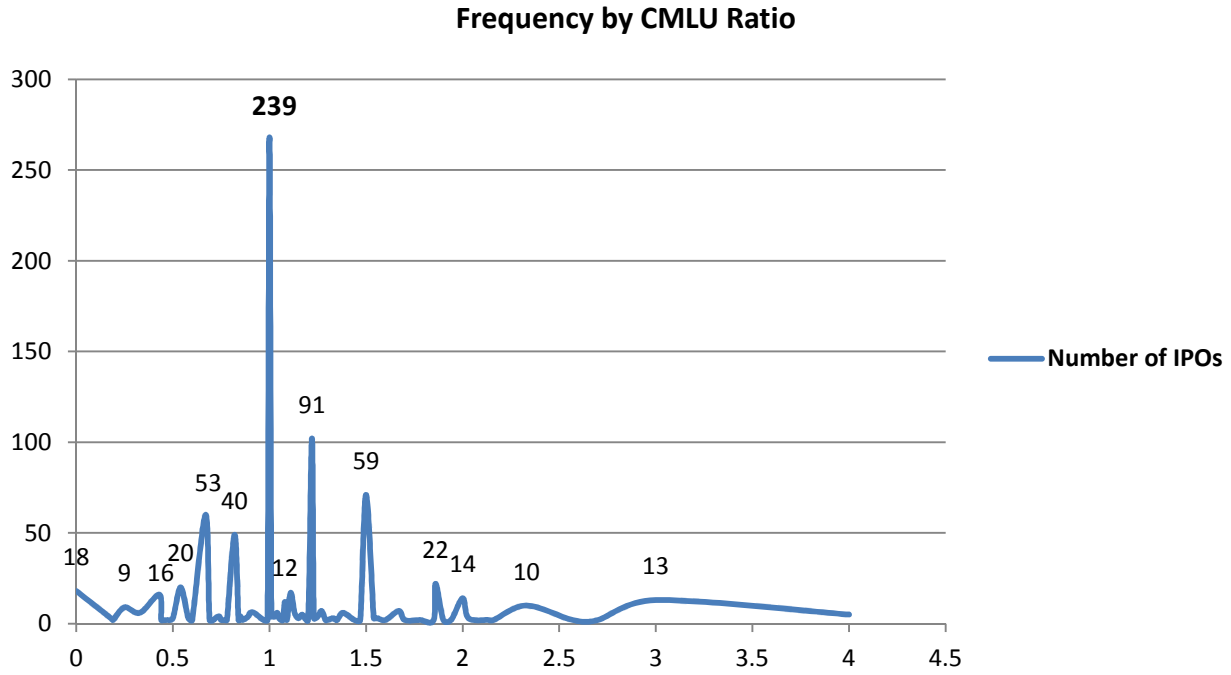
Figure 1. CMLU Ratio Frequency of the Sample IPOs.
The sample consists of 966 IPOs from 1999 to 2007. The *CMLU Ratio* is defined as shares allotted to all co-managers ÷ shares allotted to lead underwriter, which represents a relative compensation ratio between co-manager(s) and lead underwriter.

LV13070

Table 1. Summary Characteristics.

The table summarizes descriptive statistics of our sample. The sample consists of 966 IPOs from 1999 to 2007. We obtain IPO-specific data from SDC, stock prices from CRSP, recommendations data from I/B/E/S. Underwriter reputation is obtained from Jay Ritter's web-site.

Panel A. Sample Statistics			
Variable	N	Mean	Std. Dev.
CMLU Ratio	966	1.1621	0.6301
No. of LU All-star Analysts	966	0.0652	0.3875
No. of CM All-star Analysts	966	0.0828	0.4140
No. of LU Recommendations	966	0.6304	0.9043
No. of CM Recommendations	966	1.3830	1.7889
No. of All Recommendations	966	6.3810	9.8104
LU Reputation	966	8.1066	1.3601
CM Maximum Reputation	966	7.8861	1.3070
CM Average Reputation	966	7.1102	1.2541
No. of CMs	966	2.6646	1.4096
Gross Spread (in $M)	966	7.1673	8.9550
Offer Price	966	14.1947	5.5478
Close Price	945	21.1783	18.0910
Price Revision	966	0.0522	0.3063
Underpricing	966	0.3623	0.7139
Tech Dummy	966	0.7319	0.4432
Percent Gross Spread	966	0.0684	0.0060
Offer Proceeds (in $M)	995	111M	222M
No. of Market Makers	821	25.90	9.86

Panel B. Sample by Year								
1999	2000	2001	2002	2003	2004	2005	2006	2007
288	234	46	39	37	105	76	71	70

Panel C. Sample by Market		
NYSE	AMEX	NASDAQ
104	10	821

35

Table 2. Sample Characteristics by Heated Negotiation Variables.

The table reports sample differences of key variables partitioned by heated negotiation variables. The sample consists of 966 IPOs from 1999 to 2007. Panel A partitions our sample by CMLU Ratio ≠ 1 Dummy; Panel B by CMLU Ratio Not Clustered Dummy; Panel C by CM Heated Negotiation Dummy; and Panel D by CMLU ratio >1 vs. CMLU ratio <1. In Panel D, IPOs with CMLU Ratio of 1 are dropped in order to compare two groups (CMLU<1 vs. >CMLU>1). The definitions for variables are found in the Appendix. *, **, and *** indicate significance levels at the 10%, 5%, and 1%, respectively, for *t*-tests and Wilcoxon rank-sum tests. Wilcoxon represents Wilcoxon rank-sum tests. Offer Proceeds and GS in USD are expressed in million dollars.

		CM/All Ratio	Offer Proceeds	GS in USD	Offer Price	No. of CMs	LU Reputation	CM Avg. Reputation	VC-backed Dummy	Tech Dummy
		Panel A: CMLU Ratio ≠ 1 Dummy								
0	Mean	0.463	61.3	4.787	13.327	2.276	8.135	7.094	0.732	0.833
	Median	0.478	54.0	4.145	13.000	2.000	8.001	7.334	1.000	1.000
	N	239	239	239	239	239	239	239	239	239
1	Mean	0.477	127.0	7.950	14.480	2.792	8.097	7.115	0.535	0.699
	Median	0.492	75.1	5.736	14.000	3.000	9.001	7.334	1.000	1.000
	N	727	727	727	727	727	727	727	727	727
	t-tests		***	***	***	***			***	***
	Wilcoxon	***	***	***	***	***			***	***
		Panel B: CMLU Ratio Not Clustered Dummy								
0	Mean	0.473	86.9	6.321	13.904	2.444	8.128	7.088	0.650	0.772
	Median	0.480	61.7	4.830	13.000	2.000	9.001	7.334	1.000	1.000
	N	592	592	592	592	592	592	592	592	592
1	Mean	0.474	149.0	8.507	14.655	3.013	8.073	7.146	0.479	0.668
	Median	0.505	84.0	6.038	14.000	3.000	9.001	7.501	0.000	1.000
	N	374	374	374	374	374	374	374	374	374
	t-tests		***	***	**	***			***	***
	Wilcoxon	**	***	***		***	**	**	***	***
		Panel C: CM Heated Negotiation Dummy								
0	Mean	0.450	84.4	5.999	13.823	2.226	7.977	7.103	0.598	0.754
	Median	0.468	61.2	4.751	13.000	2.000	9.001	7.334	1.000	1.000
	N	629	629	629	629	629	629	629	629	629
1	Mean	0.517	160	9.348	14.888	3.484	8.348	7.123	0.558	0.691
	Median	0.524	84.0	6.196	14.000	3.000	9.001	7.334	1.000	1.000
	N	337	337	337	337	337	337	337	337	337
	t-tests	***	***	***	***	***	***			**
	Wilcoxon	***	***	***	**	***	***			**
		Panel D: CMLU<1 vs. CMLU>1								
CMLU<1	Mean	0.340	92.5	5.865	13.236	2.011	7.448	6.559	0.461	0.684
	Median	0.365	64.0	4.551	12.500	2.000	8.001	7.001	0.000	1.000
	N	282	282	282	282	282	282	282	282	282
CMLU>1	Mean	0.564	149.0	9.271	15.268	3.288	8.509	7.468	0.582	0.708
	Median	0.552	82.5	6.199	15.000	3.000	9.001	7.501	1.000	1.000
	N	445	445	445	445	445	445	445	445	445
	t-tests	***	**	***	***	***	***	***	***	
	Wilcoxon	***	***	***	***	***	***	***	***	

Table 3. Determinants of Negotiation Heatedness in the Syndicate.

The table reports the logit regression results for the determinants of the negotiation heatedness within the syndicate, using both the whole and 2001-2007 subsample IPOs. The dependent variables are our proxies for negotiation heatedness, which are all binary. In the last column, IPOs with CMLU Ratio of 1 are dropped for analysis in order to compare two groups (CMLU<1 vs. CMLU>1). The definitions for variables are found in the Appendix. Year dummies are included but not reported. z-statistics are reported in parentheses. *, **, and *** indicate significance levels at the 10%, 5%, and 1%, respectively.

	Dependent Variables						
	CMLU Ratio $\neq$ 1 Dummy		CMLU Ratio Not Clustered Dummy		CM Heated Negotiation Dummy		CMLU<1 Dummy
	Whole Sample	Sub-Sample	Whole Sample	Sub-Sample	Whole Sample	Sub-Sample	Whole Sample
CM/All Ratio	-1.199*	-2.885**	-2.202***	-4.790***	-0.436	0.600	
	-(1.76)	-(2.26)	-(3.02)	-(4.37)	-(0.49)	(0.54)	
Ln (GP in USD)	0.041	4.179***	0.252	1.050	0.069	-0.555	0.496*
	(0.29)	(3.12)	(1.57)	(1.35)	(0.41)	-(1.16)	(1.74)
Ln (GS in USD)	0.363*	-3.083**	-0.473**	-1.127	-0.072	0.730	-0.170
	(1.86)	-(2.42)	-(2.28)	-(1.48)	-(0.32)	(1.45)	-(0.47)
LU Reputation	-0.166*	-0.369***	-0.184**	-0.267**	-0.055	-0.213**	-0.094
	-(1.94)	-(2.62)	-(2.39)	-(2.48)	-(0.60)	-(1.97)	-(0.82)
CM Avg. Reputation	-0.152*	-0.134	-0.023	0.065	-0.172**	-0.147	-0.197*
	-(1.85)	-(1.28)	-(0.29)	(0.58)	-(2.14)	-(1.57)	-(1.80)
No. of CMs	0.366***	0.192	0.452***	0.484***	1.243***	0.860***	-1.341***
	(3.13)	(1.07)	(4.39)	(3.58)	(8.61)	(5.68)	-(6.57)
No. of LU All-star Analysts	-0.002	0.017	0.016**	0.022*	0.001	0.006	0.011
	-(0.20)	(1.09)	(2.22)	(1.71)	(0.06)	(0.47)	(1.01)
No. of CM All-star Analysts	0.032***	0.030**	0.018***	0.006	0.003	0.010	-0.030***
	(4.24)	(2.14)	(3.23)	(0.81)	(0.49)	(1.10)	-(3.29)
VC-backed Dummy	-0.423**	-0.669**	-0.36**	-0.071	0.18	0.401	-0.681***
	-(2.16)	-(1.99)	-(2.25)	-(0.29)	(0.96)	(1.53)	-(3.00)
Tech Dummy	-0.261	0.108	-0.144	-0.015	0.154	-0.008	0.202
	-(1.18)	(0.32)	-(0.82)	-(0.06)	(0.69)	-(0.03)	(0.82)
NASDAQ Dummy	-0.447	-0.057	0.037	0.010	0.108	0.147	-0.137
	-(1.35)	-(0.12)	(0.17)	(0.03)	(0.36)	(0.41)	-(0.44)
Constant	2.604	-64.364***	-2.673	-15.134	-3.859	7.700	-1.528
	(1.06)	-(2.91)	-(0.98)	-(1.18)	-(1.32)	(0.96)	-(0.31)
Year Dummy	Included	Included	Included	Included	Included	Included	Included
N	966	444	966	444	966	444	727
Wald test	91.94	62.81	70.99	46.81	158.82	71.29	147.6
P value	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pseudo R^2	0.1059	0.1694	0.0923	0.1147	0.2177	0.1655	0.3547

Table 4. Information Production and Negotiation Heatedness.

The table reports the results from the OLS regressions to test the effect of relation between negotiation heatedness and price revision. Panel A is the estimation results for the whole sample, while Panel B uses the two sub-samples (positive vs. negative price revision). The definitions for variables are found in the Appendix. Year dummies are included but not reported. t- statistics are reported in the parentheses. *, **, and *** indicate significance levels at the 10%, 5%, and 1%, respectively.

Panel A. Whole Sample Analysis

Dependent Variable: Price Revision					
CMLU Ratio ≠ 1 Dummy	-0.035**				
	(-2.01)				
CMLU Ratio Not Clustered Dummy		-0.025			
		(-1.56)			
CM Heated Negotiation Dummy			-0.029*		
			(-1.73)		
CMLU>1 Dummy				-0.036*	
				(-1.92)	
CMLU<1 Dummy					-0.004
					(-0.20)
CM/All Ratio	-0.053	-0.060	-0.049	0.005	-0.059
	(-0.72)	(-0.81)	(-0.67)	(0.07)	(-0.71)
Offer Price	0.030***	0.030***	0.030***	0.030***	0.030***
	(5.02)	(5.05)	(5.03)	(4.99)	(5.03)
LU Reputation	-0.013*	-0.013*	-0.012*	-0.013*	-0.012*
	(-1.94)	(-1.90)	(-1.81)	(-1.96)	(-1.81)
CM Avg. Reputation	-0.014**	-0.014**	-0.015**	-0.013**	-0.014**
	(-2.31)	(-2.19)	(-2.40)	(-2.04)	(-2.29)
No. of CMs	-0.014	-0.013	-0.011	-0.013	-0.015*
	(-1.65)	(-1.53)	(-1.34)	(-1.55)	(-1.78)
Ln (GS in USD)	0.094***	0.091***	0.092***	0.093***	0.091***
	(3.30)	(3.23)	(3.25)	(3.29)	(3.19)
VC-backed Dummy	0.074***	0.074***	0.077***	0.077***	0.076***
	(4.36)	(4.36)	(4.56)	(4.56)	(4.48)
Tech Dummy	0.045***	0.046***	0.047***	0.045***	0.047***
	(2.71)	(2.74)	(2.81)	(2.69)	(2.78)
NASDAQ Dummy	0.073***	0.073***	0.074***	0.073***	0.074***
	(2.81)	(2.84)	(2.86)	(2.82)	(2.87)
Constant	-0.395***	-0.414***	-0.423***	-0.446***	-0.421***
	(-5.26)	(-5.58)	(-5.76)	(-5.90)	(-5.15)
Year Dummy	Included	Included	Included	Included	Included
N	966	966	966	966	966
F / Wald test	21.68	21.71	21.64	21.58	21.44
P value	0.00	0.00	0.00	0.00	0.00
Pseudo R^2	0.453	0.4522	0.4523	0.4528	0.4507

Panel B. Sub-Sample Analysis (Positive vs. Negative Price Revision)

	Positive Price Revision			Negative Price Revision		
CMLU Ratio ≠ 1 Dummy	-0.059 **			0.003		
	-(2.24)			(0.20)		
CMLU Ratio Not Clustered Dummy		-0.021			-0.001	
		-(0.76)			-(0.05)	
CM Heated Negotiation Dummy			-0.037			0.009
			-(1.41)			(0.81)
CM/All Ratio	0.043	0.026	0.038	-0.063	-0.063	-0.063
	(0.40)	(0.24)	(0.36)	-(1.24)	-(1.25)	-(1.23)
Offer Price	0.015 ***	0.015 ***	0.015 ***	0.028 ***	0.028 ***	0.028 ***
	(2.75)	(2.78)	(2.75)	(10.52)	(10.52)	(10.51)
LU Reputation	-0.005	-0.003	-0.002	-0.006	-0.006	-0.006
	-(0.36)	-(0.22)	-(0.18)	-(1.13)	-(1.14)	-(1.17)
CM Avg. Reputation	-0.013	-0.012	-0.013	-0.011 **	-0.011 **	-0.010 **
	-(1.04)	-(0.96)	-(1.06)	-(2.10)	-(2.10)	-(2.08)
No. of CMs	-0.014	-0.013	-0.010	-0.001	-0.001	-0.003
	-(1.51)	-(1.44)	-(1.19)	-(0.35)	-(0.32)	-(0.64)
Ln (GS in USD)	0.056	0.049	0.051	0.013	0.013	0.013
	(1.58)	(1.34)	(1.41)	(0.89)	(0.91)	(0.92)
VC-backed Dummy	0.068 **	0.068 **	0.071 ***	0.003	0.003	0.002
	(2.54)	(2.49)	(2.66)	(0.24)	(0.22)	(0.16)
Tech Dummy	0.068 ***	0.073 ***	0.074 ***	-0.013	-0.014	-0.013
	(2.66)	(2.81)	(2.84)	-(1.04)	-(1.02)	-(1.04)
NASDAQ Dummy	0.036	0.037	0.037	0.043 ***	0.043 ***	0.043 ***
	(0.85)	(0.86)	(0.86)	(2.67)	(2.65)	(2.66)
Constant	0.021	-0.180	-0.196	-0.428 ***	-0.424 ***	-0.424 ***
	(0.15)	-(1.16)	-(1.23)	-(7.86)	-(8.05)	-(8.26)
Year Dummy	Included	Included	Included	Included	Included	Included
N	480	480	480	367	367	367
F / Wald test	7.37	6.64	6.77	13.4	13.44	13.48
P value	0	0	0	0	0	0
Pseudo R^2	0.2390	0.2327	0.2348	0.4131	0.4130	0.4138

Table 5. Analyst Coverage and Negotiation Heatedness.

In Panel A and B, Poisson regressions are estimated for the determinants of LU and CM recommendations. In Panel C and D, logit regressions are used with LU All-star Dummy and CM All-star Dummy as its dependent variable to test the relationship between all-star analyst coverage and negotiation heatedness. The definitions for variables are found in the Appendix. Year dummies are included but not reported. z-statistics are reported in parentheses.*, **, and *** indicate significance levels at the 10%, 5%, and 1%, respectively.

Panel A. Determinants of LU Recommendations

Dependent Variable : the Number of LU Recommendations				
CMLU Ratio ≠ 1 Dummy	0.034			
	(0.32)			
CMLU Ratio Not Clustered Dummy		-0.167*		
		(-1.72)		
CMLU>1 Dummy			-0.081	
			(-0.71)	
CMLU<1 Dummy				0.145
				(1.18)
CM/All Ratio	-0.053	-0.058	0.105	0.217
	(-0.15)	(-0.15)	(0.24)	(0.49)
Underpricing	-0.093	-0.106	-0.099	-0.094
	(-1.26)	(-1.42)	(-1.33)	(-1.27)
LU Reputation	0.092*	0.086*	0.089*	0.092*
	(1.83)	(1.69)	(1.78)	(1.84)
No. of LU All-star	0.009**	0.010**	0.009**	0.009**
Analysts	(2.11)	(2.28)	(2.13)	(2.12)
No. of All	0.012***	0.012***	0.012***	0.012***
Recommendations	(2.91)	(3.01)	(2.93)	(2.92)
Ln (GS in USD)	-0.059	-0.046	-0.045	-0.055
	(-0.70)	(-0.54)	(-0.54)	(-0.67)
VC-backed Dummy	-0.149	-0.169*	-0.152	-0.140
	(-1.49)	(-1.71)	(-1.53)	(-1.40)
Tech Dummy	-0.126	-0.134	-0.129	-0.126
	(-1.07)	(-1.15)	(-1.09)	(-1.08)
NASDAQ Dummy	0.721***	0.713***	0.717***	0.720***
	(3.68)	(3.65)	(3.65)	(3.68)
Constant	-1.719***	-1.578***	-1.730***	-1.891***
	(-4.01)	(-3.67)	(-4.12)	(-4.33)
Year Dummy	Included	Included	Included	Included
N	966	966	966	966
Wald tests	63.43	67.04	63.95	66.62
P value	0.00	0.00	0.00	0.00
Pseudo R^2	0.040	0.042	0.040	0.041

Table 5 continued

Panel B. Determinants of CM Recommendations

Dependent Variable : the Number of CM Recommendations

CMLU Ratio ≠ 1 Dummy	-0.163**				
	(-1.98)				
CMLU Ratio Not Clustered Dummy		-0.136*			
		(-1.66)			
CM Heated Negotiation Dummy			-0.094		
			(-1.03)		
CMLU>1 Dummy				(-0.04)	
				(-0.42)	
CMLU<1 Dummy					(-0.18)
					(-1.60)
CM/All Ratio	1.978***	1.973***	1.980***	2.007***	1.659***
	(5.70)	(5.69)	(5.86)	(5.26)	(4.19)
Underpricing	-0.078	-0.079	-0.074	-0.074	-0.074
	(-1.46)	(-1.47)	(-1.39)	(-1.39)	(-1.41)
CM Avg. Reputation	-0.102***	-0.101***	-0.101***	-0.097***	-0.106***
	(-3.23)	(-3.17)	(-3.22)	(-3.10)	(-3.32)
No. of CMs	0.030	0.034	0.036	0.030	0.026
	(0.97)	(1.08)	(1.11)	(0.96)	(0.82)
No. of CM All-star Analysts	0.004	0.004	0.003	0.003	0.003
	(1.43)	(1.48)	(1.36)	(1.35)	(1.40)
No. of All Recommendations	0.014***	0.014***	0.014***	0.014***	0.014***
	(3.54)	(3.61)	(3.56)	(3.50)	(3.51)
Ln (GS in USD)	0.224***	0.207***	0.216***	0.211***	0.211***
	(3.14)	(2.94)	(3.01)	(2.97)	(2.98)
VC-backed Dummy	-0.019	-0.016	-0.007	-0.006	-0.022
	(-0.21)	(-0.18)	(-0.07)	(-0.07)	(-0.24)
Tech Dummy	-0.034	-0.037	-0.027	-0.033	-0.029
	(-0.33)	(-0.36)	(-0.26)	(-0.32)	(-0.28)
NASDAQ Dummy	0.642***	0.645***	0.643***	0.643***	0.632***
	(3.92)	(3.94)	(3.95)	(3.94)	(3.91)
Constant	-0.844***	-0.908***	-0.955***	-0.984***	-0.682*
	(-2.75)	(-2.99)	(-3.24)	(-3.18)	(-1.95)
Year Dummy	Included	Included	Included	Included	Included
N	966	966	966	966	966
Wald tests	172.6	169.29	170.39	168.19	172.88
P value	0.00	0.00	0.00	0.00	0.00
Pseudo R^2	0.098	0.098	0.097	0.096	0.098

Table 5 continued

Panel C. Determinants of LU All-star Recommendations

Dependent Variable : Dummy for LU All-star Recommendations				
CMLU Ratio ≠ 1 Dummy	0.092			
	(0.21)			
CMLU Ratio Not Clustered Dummy		0.442		
		(1.21)		
CMLU>1 Dummy			1.020**	
			(2.34)	
CMLU<1 Dummy				-1.479**
				(-2.31)
CM/All Ratio	-1.672	-1.636	-3.437*	-3.785*
	(-0.95)	(-0.96)	(-1.76)	(-1.74)
Underpricing	-0.083	-0.056	-0.075	-0.078
	(-0.31)	(-0.21)	(-0.28)	(-0.29)
LU Reputation	0.148	0.138	0.156	0.140
	(0.62)	(0.59)	(0.66)	(0.51)
No. of LU All-star Analysts	0.053***	0.053***	0.053***	0.051***
	(3.43)	(3.42)	(3.38)	(3.33)
No. of All	0.089***	0.091***	0.088***	0.090***
Recommendations	(3.79)	(3.82)	(3.60)	(3.83)
Ln (GS in USD)	0.366	0.342	0.246	0.418
	(1.32)	(1.25)	(0.88)	(1.48)
VC-backed Dummy	-0.582	-0.545	-0.583	-0.705*
	(-1.45)	(-1.38)	(-1.47)	(-1.80)
Tech Dummy	-0.382	-0.372	-0.418	-0.463
	(-0.83)	(-0.81)	(-0.90)	(-0.99)
NASDAQ Dummy	2.988***	3.033***	2.990***	3.074***
	(2.63)	(2.68)	(2.73)	(2.73)
Constant	-7.841***	-7.958***	-7.233***	-6.163**
	(-3.34)	(-3.53)	(-3.16)	(-2.37)
Year Dummy	Included	Included	Included	Included
N	786	786	786	786
Wald tests	79.17	77.17	84.02	80.01
P value	0.00	0.00	0.00	0.00
Pseudo R^2	0.179	0.184	0.196	0.200

Table 5 continued

Panel D. Determinants of CM All-star Recommendations

Dependent Variable : CM All-star Recommendations					
CMLU Ratio ≠ 1 Dummy	-0.122				
	(-0.26)				
CMLU Ratio Not Clustered Dummy		-0.036			
		(-0.08)			
CM Heated Negotiation Dummy			-0.116		
			(-0.27)		
CMLU>1 Dummy				0.244	
				(0.52)	
CMLU<1 Dummy					-0.640
					(-0.93)
CM/All Ratio	1.109	1.073	1.094	0.686	0.457
	(0.76)	(0.73)	(0.72)	(0.46)	(0.28)
Underpricing	0.211	0.208	0.214	0.204	0.203
	(0.90)	(0.89)	(0.91)	(0.88)	(0.87)
CM Avg. Reputation	0.295	0.295	0.291	0.290	0.281
	(0.90)	(0.90)	(0.90)	(0.88)	(0.86)
No. of CMs	-0.060	-0.060	-0.052	-0.067	-0.072
	(-0.53)	(-0.52)	(-0.42)	(-0.57)	(-0.60)
No. of CM All-star Analysts	0.019^*	0.019^*	0.019^*	0.019^*	0.019^*
	(1.75)	(1.74)	(1.76)	(1.73)	(1.74)
No. of All Recommendations	0.061^{***}	0.060^{***}	0.061^{***}	0.059^{***}	0.059^{***}
	(2.95)	(2.94)	(2.94)	(2.76)	(2.83)
Ln (GS in USD)	0.340	0.329	0.333	0.313	0.336
	(1.12)	(1.07)	(1.08)	(1.04)	(1.09)
VC-backed Dummy	0.665	0.674	0.673	0.684	0.634
	(1.27)	(1.28)	(1.30)	(1.31)	(1.24)
Tech Dummy	-0.190	-0.188	-0.187	-0.168	-0.152
	(-0.40)	(-0.40)	(-0.40)	(-0.36)	(-0.31)
NASDAQ Dummy	0.494	0.490	0.492	0.471	0.486
	(0.81)	(0.81)	(0.82)	(0.78)	(0.79)
Constant	-8.483^{***}	-8.533^{***}	-8.503^{***}	-8.383^{***}	-7.896^{***}
	(-2.97)	(-2.98)	(-3.00)	(-2.85)	(-2.63)
Year Dummy	Included	Included	Included	Included	Included
N	788	788	788	788	788
Wald tests	61.85	61.52	62.04	62.19	60.96
P value	0.00	0.00	0.00	0.00	0.00
Pseudo R^2	0.186	0.186	0.186	0.186	0.189

LV13070

Table 6. Market Making and Negotiation Heatedness.

The table reports Poisson regression results using NASDAQ IPOs only to test how negotiation heatedness is related to market making activity. The definitions for variables are found in the Appendix. Year dummies are included but not reported. z-statistics are reported in parentheses.*, **, and *** indicate significance levels at the 10%, 5%, and 1%, respectively.

Dependent Variable : No of Market Makers					
CMLU Ratio ≠ 1 Dummy	-0.040				
	(-1.46)				
CMLU Ratio Not Clustered Dummy		-0.022			
		(-0.83)			
CM Heated Negotiation Dummy			-0.002		
			(-0.08)		
CMLU>1 Dummy				-0.002	
				(-0.08)	
CMLU<1 Dummy					-0.059*
					(-1.82)
CM/All Ratio	-0.043	-0.052	-0.046	-0.042	-0.146
	(-0.39)	(-0.47)	(-0.41)	(-0.34)	(-1.23)
Underpricing	0.056***	0.057***	0.058***	0.058***	0.057***
	(3.79)	(3.83)	(3.86)	(3.85)	(3.85)
LU Reputation	-0.009	-0.008	-0.008	-0.008	-0.007
	(-0.70)	(-0.64)	(-0.61)	(-0.61)	(-0.55)
CM Avg. Reputation	0.001	0.002	0.002	0.002	-0.001
	(0.10)	(0.13)	(0.11)	(0.12)	(-0.08)
No. of CMs	0.004	0.005	0.003	0.003	0.001
	(0.42)	(0.46)	(0.30)	(0.29)	(0.10)
Ln (GS in USD)	0.094***	0.089***	0.089***	0.089***	0.091***
	(3.67)	(3.56)	(3.51)	(3.51)	(3.64)
VC-backed Dummy	-0.011	-0.011	-0.009	-0.009	-0.013
	(-0.37)	(-0.37)	(-0.30)	(-0.30)	(-0.44)
Tech Dummy	0.024	0.026	0.026	0.026	0.024
	(0.74)	(0.77)	(0.78)	(0.78)	(0.73)
Constant	3.014***	2.990***	2.982***	2.981***	3.070***
	(27.89)	(27.73)	(27.54)	(26.69)	(26.76)
Year Dummy	Included	Included	Included	Included	Included
N	821	821	821	821	821
Wald tests	227.54	228.46	223.67	223.83	230.62
P value	0.00	0.00	0.00	0.00	0.00
Pseudo R^2	0.0819	0.0813	0.081	0.081	0.0822

44

Table 7. Average Treatment Effects of Negotiation Heatedness.

The table reports differences in means of key underwriting services between IPOs with and without heated negotiation, using the propensity score matching (PSM) and Abadie and Imbens matching (AI). Two types of matching approaches for PSM—nearest neighbor and kernel methods—are used with a 5% margin. Simple matching and biases adjusted matching are used for AI. ATT represents the average treatment effect on the treated. The definitions for variables are found in the Appendix. *, **, and *** indicate significance levels at the 10%, 5%, and 1%, respectively.

Panel A. Nearest Neighbor Matching

	Measures for Heated Negotiation					
	CMLU Ratio ≠ 1 Dummy		CMLU Ratio Not Clustered Dummy		CM Heated Negotiation Dummy	
Outcomes	1	0	1	0	1	0
	ATT	z-value	ATT	z-value	ATT	z-value
Price Revision	0.047	0.125	0.039	0.083	0.039	0.079
ATT		-0.078		-0.044		-0.040
t-stat		-2.22**		-1.68*		-1.27
No. of LU Recommendations	0.656	0.671	0.588	0.702		
ATT		-0.015		-1.330		
t-stat		-0.15		-0.88		
No. of CM Recommendations	1.344	1.648	1.379	1.549	1.545	2.201
ATT		-0.304		-0.171		-0.656
t-stat		-1.79*		-0.98		-2.92**
No. of Market Makers	25.682	26.199	25.854	27.245	25.526	26.223
ATT		-0.517		-1.391		-0.697
t-stat		-0.43		-1.34		-0.54

Panel B. Kernel Matching

	Measures for Heated Negotiation					
	CMLU Ratio ≠ 1 Dummy		CMLU Ratio Not Clustered Dummy		CM Heated Negotiation Dummy	
Outcomes	1	0	1	0	1	0
	ATT	z-value	ATT	z-value	ATT	z-value
Price Revision	0.048	0.083	0.039	0.069	0.041	0.085
ATT		-0.035		-0.031		-2.020**
t-stat		-1.08		-1.48		-1.61
No. of LU Recommendations	0.640	0.690	0.584	0.678		
ATT		-0.049		-0.094		
t-stat		-0.54		-1.50		
No. of CM Recommendations	1.393	1.507	1.385	1.548	1.545	2.201
ATT		-0.113		-0.163		-0.656
t-stat		-0.58		-1.18		-2.92**
No. of Market Makers	25.730	25.970	25.855	26.480	25.526	25.592
ATT		-0.240		-0.626		-0.066
t-stat		-0.27		-0.78		-0.07

Panel C. AI Matching

Outcomes	Measures for Heated Negotiations							
	CMLU Ratio ≠ 1			CMLU Ratio Not Clustered Dummy		CM Heated Negotiation Dummy		
	1	0		1	0	1	0	
	ATT	z-value		ATT	z-value	ATT	z-value	
Price Revision								
Simple Matching	-0.045	-2.35	**	-0.026	-1.49	-0.017	-0.97	
Biases Adjusted	-0.072	-3.69	***	-0.005	-0.29	-0.002	-0.10	
No. of LU Recommendations								
Simple Matching	-0.017	-0.97		-0.046	-0.64			
Biases Adjusted	-0.126	-1.65	*	-0.059	-0.84			
No. of CM Recommendations								
Simple Matching	-0.014	-1.00		-0.089	-0.68	-0.098	-1.13	
Biases Adjusted	-0.228	-1.51		-0.249	-1.63	-0.354	-2.13	**
No. of Market Makers								
Simple Matching	-1.188	-1.22		-0.425	-0.51	-0.830	-0.99	
Biases Adjusted	-0.787	-0.82	**	0.035	0.04	-0.010	-0.01	