Conflicts of interest in IPO pricing

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Abstract

We study how IPO pricing is affected by the conflicts of interest arising from the affiliations between underwriters, venture capitalists, and institutional investors. Using a sample of 2,026 IPOs from the US market between 1997 and 2010, we find that all types of conflicts of interest strongly and positively affect the primary market price, suggesting the engagement of dumping ground behavior. However, by introducing a new method for disentangling the effects of these conflicts on secondary market from those on primary market, we find additional results: when an institutional investor is affiliated with a lead manager or with a venture capitalist, we observe a lower underpricing in cold IPOs but a higher underpricing in hot IPOs. These results confirm the dumping ground behavior in cold IPOs, whereas they suggest the occurrence of nepotistic behavior in hot IPOs in the setting of the offer price.

JEL Classification: G24, G31, G23

Keywords: initial public offerings; affiliations; conflicts of interests; pricing; primary market; secondary market.

The presence of affiliations between players in financial operations and the consequential conflicts of interest that may arise are widespread in the financial field (Berger et al. (1999; Crockett et al., 2004). Indeed, the structure of this industry has been shaped by consolidation (merger and acquisition activity) and the implementation of differentiation strategies brought into play by the major investment banks, but also by regulations (specifically, the Financial Services Modernization Act of 1999) that have progressively reduced the barriers to the cross-ownership of financial companies.

The impact of affiliations involving investment banks has mostly been studied in the literature in relation to equity research activity. The findings of such studies have consistently shown that the conflict of interest leads financial analysts to bias stock recommendations upward when they are affiliated with the underwriter (Malmendier and Shanthikumar, 2007, and Cliff, 2007), and to assign more frequent and favorable ratings to stocks owned by an affiliated mutual fund (Mola and Guidolin, 2009).

Quite surprisingly, much fewer contributions in the literature have analyzed the affiliations between players in IPO deals, a field in which conflicts of interest can easily occur due to the industry shape, as above mentioned, and to the progressive relaxation of SEC regulations on the participation of affiliated funds investing in IPOs which has increased the number of deals with the presence of affiliated players. Originally, the 'spirit' of the rules[1] was to prevent the underwriter from using funds under its control as a dumping ground for unmarketable

[1] The Investment Company Act of 1940 and Rule 10(f)-3 adopted by the SEC in 1958 imposed restrictions on mutual funds buying any of the shares in a security offering during the existence of the syndicate if the fund was in any way related to any syndicate members. In the following years, the SEC amended Rule 10(f)-3 several times. In 1979 a limit was introduced to allow an affiliated fund to buy up to 4% or $500,000 of an offering, whichever was the greater, although in no circumstances could the purchase be more than a maximum percentage limit of 10% of the offering. In 1997 the SEC amended the rule again, raising the maximum percentage limit to 25%, and the dollar amount limit was dropped. The SEC further amended the rule in 2003 to apply the percentage limit only when the affiliated underwriter was the principal underwriter.

securities. Despite regulators having tried for years to protect investors from conflicts of interest among financial players, they repeatedly relaxed the limitations imposed on deals between investment banks and their affiliated funds, due to pressure from the financial industry. A gap in the regulators' knowledge about how conflicts of interest may affect IPO pricing may also have facilitated the introduction of such relaxations.

In fact, most mainstream literature focuses on asymmetric information as the potential basis for underpricing, whereas only a few studies have focused on affiliations between IPO main players, namely underwriters, institutional investors (usually mutual funds), and venture capitalists to explain IPO performances. In this paper, we aim to complete the picture forming in the literature on the conflicts of interest between these three types of players, mainly in two directions: first, we introduce a new framework with new measures of IPO pricing with which we aim to understand better when and how IPO pricing is affected by affiliations; second, we first study the effects of affiliation between venture capitalists and mutual funds.

By making use of a large number of IPOs (2026) sampled across a long time frame (1997-2010), we reveal new and robust evidence on the impact that each type of conflict of interest has on IPO pricing, including the previously unexplored affiliation between venture capitalists and mutual funds. We also deepen our knowledge of IPO pricing by setting apart the effects that any one of the potential conflicts of interest might produce on the primary market price (measured by the price adjustment) and the secondary market price (measured by the underpricing). Indeed, most of the previous literature on the topic only considers the effects that conflicts of interest produce on the secondary market price (underpricing). Moreover, even when both of the two market prices are investigated, they are assimilated by considering the primary market price as an expression of the expected underpricing (Ritter and Zhang, 2007). On the contrary, by analyzing the two steps of the IPO process separately, we are able to reveal new and interesting information about the effects that affiliations

produce in terms of the price that is set in the primary market (where only main IPO players are involved) and in the secondary market (where both institutional and retail investors buy and sell). Finally, we are interested in understanding where the larger price effect is produced when the affiliations influence both the primary and secondary market price.

The following research questions are addressed in this study. First, how do affiliations between the players involved in an IPO influence the primary market price? Second, what further impact, if any, does the presence of a conflict in interest have on the secondary market price? Finally, when conflicts of interest produce effects on both the primary and secondary market prices, is one generally affected to a greater degree than the other?

The following sections of the paper are organized as follows: in section I, we review the literature; section II we present our models and hypotheses; section III reports the data and methodology of the analyses performed, while a discussion of the key findings is presented in section IV. Section V concludes.

I. Framework and literature review

According to the traditional business model, the lead manager in an IPO deal interacts between the seller (whose interest is that of maximizing the selling price for the shares) and potential investors (whose interests are that of minimizing the buying price for the shares) in order to fix a price for the shares which is compatible with both counterparties' preferences. By doing so, the lead manager will also build and strengthen its own reputation on the IPO market both for prospective issuers and investors (Ljungqvist et al., 2003, and Rock, 1986). As such, the traditional business model could be influenced by the presence of conflicts of interest. In particular, we could expect the pricing of an IPO to be affected if the lead manager and the seller (i.e. venture capitalist or private equity shareholder) or the lead manager and one of the buyers (an investment fund) or even the seller and the buyer were

affiliated. The following three examples help demonstrate these potential issues:

In November 2009, Dollar General Corp. went public through an IPO in which part of the shares sold to the public originated from a selling shareholders group, which included KKR Management LLC that was also a member of the joint book runners group[2]. We wonder whether the pricing of the shares could have been influenced by the double role, i.e. bookrunner and seller, played by KKR.

In August 2010, the Indian company Make My Trip concluded an IPO in the US market with Morgan Stanley as one of its main bookrunners. At the same time, one of the hedge funds managed by Morgan Stanley Investment Management subscribed a portion of the IPO. We are interested to know whether the double role played by Morgan Stanley, i.e. bookrunner and buyer, affected the IPO results.

In December 2010, Aegerion Pharmaceuticals became listed on Nasdaq following an IPO in which some of the existing principal shareholders and their affiliated entities purchased shares at the initial public offering price. Under such circumstances, we might expect that the offer would not be "very expensive".

In the present study, in order to fully understand how the presence of conflicts of interest might affect the IPO pricing process, we first identify the individual interests of each player with respect to the IPO pricing.

The *lead underwriters* (or *lead managers*, hereafter LM) [3] face conflicting interests that they

[2] Public offerings of securities in which a member with a conflict of interest participates are regulated by NASD rule 2720, which requires the intervention of a Qualified Independent Underwriter to minimize such conflicts. Nevertheless, Dempere (2009) found that Rule 2720 is not effective in mitigating the conflicts of interest between issuer and underwriter. On September 14th 2009, FINRA Rule 5110 replaced NASD Rule 2720 in order to simplify and modernize the treatment of public offerings of securities in which a participating FINRA member has a conflict of interest. The effectiveness of this regulation improvement has not been tested yet.

[3] We will only consider lead underwriters, which are usually more than one for every IPO.

have to trade off: on the one hand, they have incentives to maximize the offer price both because they have a fiduciary responsibility to get the best price for the listing firm and because their compensation is proportional to the total offering value. On the other hand, a lower offer price could provide a bigger payout to institutional investors (Ritter, 1987; TiniÇ, 1988), leading to higher customer loyalty and more brokerage fees paid to the lead underwriters in future deals (Reuter, 2006). A lower IPO price will also reduce the risk of under-subscription (which would force the lead underwriter to purchase unsold securities in a firm commitment deal; Liu and Ritter, 2011), decrease the need to provide price stabilization in the aftermarket (Logue et al., 2002), and, finally, increase the gains from the exercise of the overallotment option, given a lower strike price (Ljungqvist et al., 2003).

In contrast, the stance of *institutional investors (*or *mutual funds*, hereafter *F)* is more straightforward; they are interested in paying the lowest possible price for the shares in order to maximize the performance of the funds they manage and consequently increase the management and performance fees they earn from their clients. Indeed, previous literature has indicated that many institutional investors are primarily interested in the short term gains associated with underpricing in IPO investments (Ljungqvist et al., 2003, and Rock, 1986).

Finally, *venture capitalists* (hereafter VCs) tend to have their interests aligned with those of the firm since they are interested (being insiders) in obtaining the highest possible price for the shares in the IPO. Because underpricing "*leaves money on the table*", VCs want to minimize this effect. Nevertheless, when conditioned by a lockup obligation,[4] VCs may not only be concerned about the price at the time of the IPO, but also the price at the end of the lockup period. If this is true, they might wish to accept a lower offer price at the IPO if they believe the price will rise in the subsequent months.

Despite the distinct interests of the individual players, if two are affiliated, one could favor

[4] In a lock-up obligation, venture capitalists cannot sell their shares prior to a certain date, usually 6 months.

the other's interests in spite of their own. Until now, the literature has only focused on scenarios involving two of the possible affiliations, namely between lead underwriters and mutual funds (LM-F) and between venture capitalists and lead underwriters (VC-LM). No study has yet addressed potential venture capitalist-mutual fund (VC-F) affiliations.

With reference to the first type of conflict of interest (LM-F), the situation remains unclear, since studies have considered different measures of return that can only partially be linked to IPO pricing. The work by Ritter and Zhang (2007) constitutes the only contribution which empirically studies the direct relationship between the first day initial return (underpricing) and the reported holding of funds (if any) affiliated to the lead underwriter in the six months following the offer. They studied the US market for the period spanning 1990-2001 and found that this form of conflict of interest was only associated with an increase in underpricing during the internet bubble sub-period (1999-2000), characterized by a hot issue market. The occurrence of such relationship is consistent with the nepotism hypothesis, whereby lead underwriters allocate hot IPOs (with greater underpricing) to their affiliated funds so as to boost their performance.

A different analysis is proposed by Johnson and Marietta-Westberg (2009), which takes into account the returns realized by institutional investors affiliated to IPO lead underwriters in the IPO subsequent quarter, which is only indirectly linked with the IPO underpricing. Although this work cannot be directly compared to that of Ritter and Zhang (2007), they provide evidence indicating that the returns realized by affiliated funds are lower than those realized by independent asset managers free from any conflicts of interest with the underwriter. Similarly, Hao and Yan (2012) compared the performance of a sample of lead underwriter affiliated and non-affiliated funds in the quarter following the IPO issue date and find strong evidence that affiliated funds significantly under-perform unaffiliated funds.

Findings concerning the second type of affiliation (VC-LM) are limited and not always

consistent. In particular, Gompers and Lerner, 1999, analyzing the US market, were the first to find a positive effect of affiliations on underpricing. The authors explain their result with the "*rational expectation hypothesis*", as investors require a higher discount at the offering to compensate for potential adverse selection. Hamao et al. (2000) for the same US market, although after controlling for the long-run performance they found no differences between affiliated and non-affiliated venture backed IPOs. Opposite results were obtained by Li and Masulis (2004) and Arikawa and Imad'eddine (2010) for the US and Japanese market respectively; where these affiliations were present they found a decrease in underpricing, which would be explained in the Gompers and Lerner's framework with the "*naïve investors hypothesis*". Similar results are also obtained by Chahine and Filatotchev (2008) for the French market, who also found that the first-year performances was positively related to the affiliation, suggesting that in the long run both the VC and the LM are interested in having satisfied investors in order to build and maintain their reputation in the IPO market.

II. IPO pricing and affiliations

A. Performance measurements

Past literature primarily focuses on underpricing as the most common measure of IPO performance (for a review see Ljungqvist, 2007). Nonetheless, underpricing tells us only a part of the story, as it measures the performance of the secondary market only, i.e. the difference between the price at the end of the first day of trading and the IPO offer price.

Very few studies addressing primary market performance are present in the literature, mainly due to the lack of disclosure on book-building activity (one of the few available studies is by Cornelli et al., 2006). Nonetheless, negotiations between IPO key players are performed during the primary market, when the investment bank builds up the demand schedule of institutional investors through book-building and matches it to the issuer's preferences in

order to settle the offer price. At this point, the offer price is set as a consequence of the negotiations that occur between the IPO players. In contrast, underpricing occurs as a consequence of the information that secondary market investors (both retail and institutional) receive from the primary market. Given this framework, the existence of conflicts of interest between IPO players is likely to change the primary market outcome and then eventually influence the signals received by the secondary market investors, which in turn will ultimately determine the level of underpricing.

Here, we argue that the conflicting interests unfold their effects first on the primary market's price and then possibly on the secondary market's price. The two studies most directly related to this paper were designed to analyze the secondary market price only (underpricing)[5] (Ritter and Zhang, 2007, which analyzed the LM-F affiliation; and Gompers and Lerner, 1999, which analyzed the LM-VC affiliation), A key difference in the present work compared to the previous two cited studies is that here we use the price adjustment (percentage difference between the final offer price and the midpoint of the filing price range) as a measure of IPO primary market performance, and underpricing (percentage difference between the closing price at the end of the first trading day and the IPO offer price) as a measure of IPO secondary market performance.

Here, we propose a method to effectively disentangle the primary and secondary market pricing behaviors in the presence of conflicts of interests. We know from the literature (Hanley, 1993) that underpricing is strongly related to the price adjustment, since the LM typically set an offer price that at the same time should satisfy the issuer and reward institutional investors (according to Benveniste and Spindt, 1989). Here, we investigate if and how this relationship changes when conflicts of interest exist between the IPO players.

[5] Even though the former also eventually analyze the price adjustment, but only as the proxy for the expected underpricing (following Hanley, 1993).

In their 2007 paper, Ritter and Zhang investigated whether the level of underpricing changes when affiliations are present and they controlled for the price adjustment term without considering an interaction term between the two. In such an approach, the relationship between underpricing and price adjustment is assumed as given. In contrast, here we show that in cases of affiliation, both the price adjustment and the underpricing are higher and that the relationship between the two terms does actually change. Moreover, we distinguish between cold and hot IPOs irrespective of the time period (unlike Ritter and Zhang, 2007, who do take the time period into consideration), since it is possible that the players involved in hot and cold IPOs may respectively have more and less interest in the game, thus pricing behaviors could also differ accordingly.

Formally, we test the effects of different types of affiliation on the following two measures of IPO performance: i) *price adjustment*, *PA* (equation [1]); ii) *underpricing*, UP (equation [2]).

$$PA = \frac{OP - MFP}{MFP} \qquad [1]$$

$$UP = \frac{MP - OP}{OP} \qquad [2]$$

where: PA is the price adjustment; OP is the final offer price of the IPO; MFP is the midpoint of the initial filing price range [i.e. (higher price + lower price) / 2]; UP is the underpricing; MP is the first day closing market price.

B. Hypotheses on the impact of affiliations

When a conflict of interest exists in an IPO, one player could favor the affiliated interest at the expense of their own in order to achieve a better overall result as a group. As a

consequence the PA and UP, as previously defined, might be influenced by conflicts of interest. Such an influence will also depend on market conditions, as previously suggested by Ritter and Zhang (2007). In particular, under hot market conditions, the lead manager will have to exercise less effort to conclude the deal and will be more willing to favor the interest of the affiliated counterparty. In contrast, cold IPOs will require more involvement of the lead manager to guarantee the completion of the offer, leading the investment bank to a lower propensity to favor affiliated interests at the expense of their owns. For this reason, we subsample hot and cold IPOs in our analysis. Our hypotheses are as follows:

- *H1: when LM and F are affiliated, the LM's interest prevails.*
- *H1-bis: when LM and F are affiliated, the LM's interest prevails in cold IPOs, whereas in hot IPOs the F's interest could be favored.*

Generally, the presence of F affiliated with the LM should enable the latter to increase the offer price, all other things being equal, since the LM can count on a secured group of affiliated buyers to sell the shares. As a consequence, we expect the PA to be positively related to the presence of the LM-F affiliation.

However, in cold IPOs, the LM is more motivated to take advantage of the presence of affiliated funds as he can sell them shares at a higher offer price in order to complete the offer (dumping ground behavior). In contrast, in hot IPOs, the LM is less concerned about the completion of the offer and has the possibility to give preferential treatment to affiliated funds; this could result in a PA that is higher in absolute terms, but lower than it would be in the absence of an affiliation[6] (so we should interpret this as evidence of nepotism instead of

[6] As we anticipated, this could still mean that the price adjustment is higher with LM-F affiliations, but not as high as we could have expected, leaving even more room for underpricing, as we will see.

dumping ground behavior).

It should be noted that the affiliation between LM and F is not visible to most of the secondary market players[7], so the UP is mainly the result of the primary market book-building and the pricing behavior of the LM[8]. For this reason, we do not expect to observe any additional effect of affiliation on UP beyond that already present in the PA.

- *H2: when LM and VC are affiliated, their common interest will increase the offer price.*
- *H2-bis: when LM and VC are affiliated, and hold common interests, the offer price will increase more in hot IPOs than in cold ones.*

It is worth noticing that the VC-LM affiliation is the only conflict of interest that is fully disclosed before the offer price is set, being detailed in the deal prospectus. Generally speaking, it is in the common interest of both VC and LM to set the offer price at the highest possible level, whilst taking into account that the secondary market investors are aware of the conflict of interest. As a consequence, we suppose that their behavior could change depending on the kind of IPO they are arranging. In particular, they will be able to exploit their common interest to a greater extent in hot IPOs, being sure that they will complete the offer, than in cold IPOs where an increase in the offer price would be limited due to the risk of not completing the offer. As a consequence, we expect the PA to be positively related to the presence of a LM-VC affiliation, although to a greater degree in hot than in cold IPOs.

[7] Official disclosure on eventual subscription of shares by funds affiliated with LM and/or VC is not available before or immediately after the deal. Usually, compliance with SEC regulation on filings of funds (Form N30D) or shareholder holdings (Form 13F) will only permit outsiders to know about share allocations one quarter after the IPO.

[8] It would also be possible that the affiliated F, if rationed in the primary market allocations because of the regulatory limit (also see footnote 1), might actively buy in the secondary market (or sell) because thay have been informed of the affiliated F allocations.

With reference to the secondary market pricing, we expect the affiliation to have no significant effect on underpricing, since all information about the deal, including the LM-VC affiliation, are openly available in the primary market when the offer price is set. Gompers and Lerner (1999) found that a higher (or lower) offer price corresponded to a lower (or higher) level of underpricing; they compared the *naïve investor* hypothesis with the *rational discounting* hypothesis in the presence of a LM-VC affiliation. They found that investors are not naïve and ask for a discount in terms of higher underpricing when they spot LM-VC affiliations. Different results were revealed in present study (see Table III); although we also find higher levels of underpricing in the presence of LM-VC affiliations, we do not find that this correlates with a discount in terms of a lower offer price and PA, but indeed that the opposite is true – i.e. the PA is also higher. These findings will be discussed in more depth in the results section concerning LM-VC affiliations, where we propose that it would be more appropriate to interpret these findings in terms of lower levels of information asymmetry, instead of with the Rational Discounting hypothesis as proposed by Gompers and Lerner (1999).

- *H3: when VC and F are affiliated, the VC's interest prevails.*
- *H3-bis: when VC and F are affiliated, the VC's interest prevails in cold IPOs, whereas in hot IPOs the F's interest could be favored.*

Similar to the LM-F situation, the VC-F affiliation should help the VC by increasing the offer price, all other things being equal. As a consequence we expect the PA to be positively related to the presence of the VC-F affiliation.

As was the case for the LM in the LM-F affiliation, in cold IPOs the VC is more interested in selling shares to affiliated funds at a higher offer price in order to complete the offer

(dumping ground behavior). In contrast, in hot IPOs, the VC might assign the shares to affiliated funds without maximizing the offer price as it is less concerned about the completion of the offer (nepotism). It should be noted that an affiliation between VC and F would not be visible to most of the secondary market players[9], so the UP is mainly the result of primary market book-building and the pricing behavior of the LM in agreement with the VC[10].

As a consequence, we expect the PA to be positively related to the presence of a VC-F affiliation. However, while this could effectively result in the VC exhibiting dumping ground behavior for cold IPOs, in hot IPOs this could cause nepotism, bringing the PA to a level lower than what it would reach in the absence of any affiliation.

III. Data and methodology

A. Data

We searched the Thomson One Deals (TOD) database for all the IPOs occurring on the Amex, NYSE, and NASDAQ exchanges from January 1997 to December 2010. Similarly to Ritter and Zhang (2007), we excluded from our search: financial firms, ADRs, REITs, closed-end funds, non common share and shares with an offer price below 5$. We found 3,017 IPOs matching these criteria.

[9] Official disclosure on eventual subscription of shares by funds affiliated with LM and or VC is not available before or immediately after the deal. Usually, compliance with SEC regulation on filings of funds (Form N30D) or shareholder holdings (Form 13F) will only enable outsiders to know about share allocations one quarter after the IPO. Nevertheless, in some cases the prospectus explicitly reports the intentions of funds affiliated with existing shareholders to take part to the offer as buyers.

[10] As in the LM-F case, it would also be possible that other funds, who are informed of the affiliated F allocations, make investment decisions accordingly in the secondary market. We do not think that the possibility that F would be rationed in the primary market is applicable here, because in such a case they could have bought shares before the IPO, maybe with a dedicated issue.

We then retrieved ownership data on the institutional investors from either the SEC filings of funds (Form N30D) or shareholder holdings (Form 13F) from the Thomson One Ownership (TOO) database. We used the first reported holdings within the first two quarters after the offer for each IPO as our proxy for the initial IPO allocations, because the actual allocations are not publicly available. Searching the database, we eventually ended up with 2,026 matching IPO observations with ownership data.

From the TOD database, we also obtained lead manager (LM) and venture capitalist (VC) names, while the names of funds (F) were retrieved from the TOO database. Following Gompers and Lerner (1999), we determined the affiliation between players by manually matching their names, based on the presumption that a prestigious investment bank would protect its brand name and only allow its affiliated VC or funds to use it. Later we cross-checked these affiliations by gathering further information (especially past histories) on banking groups from their websites and balance sheets.

Since the main goal of this paper is to understand the behavior of players with conflicts of interest in the IPO pricing process by using a wider approach with respect to previous studies in the literature, we did not exclude from our sample either non-venture backed IPOs (as in Gompers and Lerner, 1999) or IPOs with lead managers without affiliated funds (as in Ritter and Zhang 2007).

B. Descriptive Statistics

Our sample covers a relatively long time period (1997-2010); one that is characterized by an initial hot IPO wave (1997-2000), mainly due to the listing of dot com companies. Indeed, as reported in Table I, 57% of all deals included in the database, equivalent to 40% of funds collected, were concluded before 2001. Following the market crash that occurred with the burst of the internet bubble, a new positive period for IPOs started in 2004, which lasted

another 4 years before the drop occurred with the financial crisis of 2008. The average first day underpricing declined from the high double digit figure of the late 90s to the single digit figure of more recent years (the highest average level was 77% in 1999, while the lowest average was 7% in 2010).

As for the industry distribution (reported in Table II), 32% of IPOs were in the high-tech industry, followed by 15% in healthcare and 11% in consumer products. More than 52% of the deals were Venture Capital backed.

Insert Table I approximately here

Insert Table II approximately here

Table III reports the details of the affiliations between the players in our sample. Note that to retrieve affiliations involving lead managers, we considered any of the mandated lead managers (in contrast with Ritter and Zhang, 2007, who only considered the first lead manager). The most frequent affiliation (61.7% of cases) emerges between lead managers and funds. Affiliations between venture capitalists and funds emerges in 31.1% of cases, while affiliations between venture capitalists who appointed an affiliated investment bank as lead manager of the IPO only emerges in 5.2% of cases. Finally, affiliations were completely absent in only 29.1% of deals. The above-mentioned percentages are quite similar when considering the two subsamples of hot and cold IPOs.

Insert Table III approximately here

By comparing the mean values, it already emerges that both UP and PA are higher in the presence of affiliations, as is the total return, calculated as the total variation of the price from

the midpoint of the initial filing price range to the market price at the end of the first trading day. Surprisingly, we note that all three types of affiliation have a much higher PA and an even higher UP compared to IPOs with no affiliation, and this occurs to the greatest extent in hot IPOs. This evidence does not, however, shed light on which player profits the most from the deal: although in hot IPOs, the presence of a conflict of interest would seem to make everyone happy.

As reported in Figure I, the frequency of affiliations between players can be seen to change with time. In particular, relationships between lead managers and funds increased across the whole period, while the frequency of other types of affiliation fluctuated with time without a clear trend toward an overall increase or decrease. This evidence could be explained by an effective greater use of affiliation relationships to facilitate the conclusion of deals, and by the consolidation of the involvement of investment banks and institutional investors in the financial industry.

Insert Figure I approximately here

C. Methodology

To test the impact of an affiliation on IPO pricing in the primary market, where lead managers collect the orders from institutional investors (book-building) to determine the offer price, we estimate the regression reported in equation(s) [3]:

$$PA = \alpha + \beta_1 D_{ALMF} + \gamma Controls + \varepsilon$$

$$PA = \alpha + \beta_2 D_{ALMVC} + \gamma Controls + \varepsilon \qquad [3]$$

$$PA = \alpha + \beta_3 D_{AVCF} + \gamma Controls + \varepsilon$$

The dependent variable is the price adjustment (PA), which measures (as shown in Equation [1]) the percentage difference between the final offer price and the midpoint of the price range initially filed to the SEC.

Independent variables were divided into two groups. The first group contains the core explanatory variables for this study, which are those capturing the conflicts of interest between the financial players involved in the deal. More specifically: D_{ALMF} is a dummy variable equal to 1 if lead managers and at least one of the funds buying IPO shares are affiliated, and zero otherwise; D_{ALMVC} is a dummy variable equal to 1 if lead managers and venture capitalists selling the shares are affiliated, and zero otherwise; D_{AVCF} is a dummy variable equal to 1 if venture capitalists selling the shares and at least one of the funds buying the shares are affiliated, and zero otherwise.

The second group (*controls*) includes the control variables commonly used in the literature as determinants of IPO pricing (see Ritter and Zhang, 2007, and Gompers and Lerner, 1999). In particular, $D_{VC\ backed}$ is a dummy variable equal to 1 in cases where the company is backed by a venture capital company, and zero otherwise. $D_{lock\text{-}up}$ is a dummy variable equal to 1 when the VC have a lockup obligation (which forces them to wait until a certain lockup expiration date before liquidating their stake), and zero otherwise. LM_{rank} is the reputation (ranking) of the lead manager of the IPO according to the publicly available database provided by Ritter[11]. SIZE is the natural logarithm of the total assets of the company at the IPO. D_{tech} is a dummy variable equal to 1 if the company is in a high tech industry (such as software, semiconductors, IT, etc.), and zero otherwise. D_{year} is a dummy used to capture the structural break which happened when the internet bubble burst and is equal to 1 after that event and zero before.

[11] See http://bear.warrington.ufl.edu/ritter/ipodata.htm

We then went on to study the secondary market by running a second regression (Equation [4]) whose dependent variable is the underpricing (UP), as measured by the percentage difference between the closing price at the end of the first trading day and the IPO offer price, net of the market performance of the same day. Equation [4] should provide evidence about the effect that the different conflicts of interests are likely to produce in the secondary market. The set of explanatory variables is that already used in Equation [3] with the addition of PA in order to net out the underpricing of the primary market effects, as is standard in the literature and as used by Ritter and Zhang (2007).

$$UP = \alpha + \beta_1 D_{ALMF} + \beta_{PA} PA + \gamma Controls + \varepsilon$$
$$UP = \alpha + \beta_2 D_{ALMVC} + \beta_{PA} PA + \gamma Controls + \varepsilon \qquad [4]$$
$$UP = \alpha + \beta_3 D_{AVCF} + \beta_{PA} PA + \gamma Controls + \varepsilon$$

Insert Figure II approximately here

The partial adjustment behavior (Hanley, 1993) is represented in Equation 4 by the coefficient β_{PA}, which captures the relationship between UP and PA. Unfortunately this model only tells us if the level of underpricing is higher in the presence of an affiliation after controlling for PA, and does not tell us if and how the price adjustment behavior (β_{PA}) changes when conflicts of interest are in play. We already know from Table III that in the presence of an affiliation both PA and UP are substantially higher, but the important question of which interest prevailed remains unanswered. Figure II provides a graphical representation of Equation [4] (solid line); if we suppose that the relationship between UP and PA does indeed change in the presence of an affiliation, we will observe an increase or a decrease in the slope that, as we will explain below, correlates with nepotism or dumping ground

behavior, respectively.

To estimate the relationship in Figure II, we modified Equation [4] into Equation [5] by introducing the interaction term between PA and the affiliation dummies in order to understand how the relationship between PA and UP changes in the presence of a conflict of interest. Basically, when we test Equation [3] and [4], we observe the effect of an affiliation on the level of PA and UP, but we need Equation [5] to understand whether any given percentage point of PA will produce more or less UP and whether an affiliation produces a stronger or weaker price adjustment to the demand received in the book-building by the LM:

$$UP = \alpha + \beta_1 D_{ALMF} + \beta_{DPA,1} D_{ALMF} PA + \beta_{PA} PA + \gamma Controls + \varepsilon$$

$$UP = \alpha + \beta_2 D_{ALMVC} + \beta_{DPA,2} D_{ALMVC} PA + \beta_{PA} PA + \gamma Controls + \varepsilon \quad [5]$$

$$UP = \alpha + \beta_3 D_{AVCF} + \beta_{DPA,3} D_{AVCF} PA + \beta_{PA} PA + \gamma Controls + \varepsilon$$

The methodological approach is considerably different to those of previous studies studying the possible effects of affiliations on IPO pricing. Here, not only are we able to capture the difference in the level of UP in the presence of an affiliation, but through the use of the interaction term we can also capture how the relationship with the PA changes (the coefficients $\beta_{DPA,1-2-3}$ in Equation 5 represent the change in the slope, represented by β_{PA}, of the lines in Figure II), being the change in the partial adjustment phenomenon in the presence of a conflict of interest – which is actually the main issue being investigated. With Equation 5 we can answer the key question: whose interest really prevails? Indeed, a stronger (or weaker) price adjustment, that corresponds to a higher (or lower) slope in Figure II, in the presence of an affiliation means that for any level of PA there is more (or less) UP, which in turn results in the F being better (or worse) off; thus the pricing behavior in the primary

market is consistent with both the nepotism and dumping ground hypotheses (for stronger and weaker price adjustments, respectively).

Finally, as discussed in Section III, differences in the results may arise in relation to cold vs. hot IPOs; the basis for this is that in the cold IPOs, LM and VC have more incentives encouraging them to dump the IPOs on affiliated funds, whereas in the in hot IPOs, LM and VC can set a higher PA, but not as high as they could do in the absence of affiliations. In order to test this further hypothesis, we split the sample into cold and hot deals (simply defined as having lower or higher underpricing than the median level, respectively) and re-run each of the above regressions for the two subsamples.

IV. Empirical results

A. The LM-F Affiliation

After controlling for a set of variables typically used to explain IPO pricing, we find that the D_{ALMF} is positively and significantly related to the price adjustment (column 1 of Table IV). This relationship still holds when the sample is split into hot and cold IPOs (columns 1 and 2 of Table V). So far, as expected, when an affiliation between LM and F exists, the LM sets a higher offer price (higher PA).

In the case of cold IPOs, this result is likely to refer to the dumping ground behavior of LM. On the contrary, in the case of hot IPOs, it could reflect nepotism as discussed in paragraph II.B: in particular, despite an increase in the PA, LM does not fully adjust the offer price to the demand from the book-building by leaving a bigger part of the adjustment in the form of underpricing in order to compensate affiliated F.

Insert Table IV approximately here

Insert Table V approximately here

As far as the secondary market is concerned, after controlling for the PA, the influence of the D_{ALMF} on the underpricing is not significant, as expected (column 2 of Table IV). Nevertheless, by splitting the sample into cold and hot IPOs, a positive effect of D_{ALMF} emerges on the Underpricing in the hot IPOs subsample (columns 3 and 4 of Table V). This evidence suggests the possibility of nepotism in hot IPOs. The results from columns 4 and 5 of Table IV and columns 5 to 8 of Table V confirm this suspicion and our hypotheses. The apparent dumping ground behavior one can observe by looking at the PA turns into nepotism for hot IPOs because the coefficient of the interaction term is positive (columns 6 and 8 of Table V) (see paragraph III.C for the discussion on the coefficient interpretation). As far as the cold IPOs subsample is concerned, the apparent dumping ground behavior is confirmed by the negative coefficient of the interaction term (columns 5 and 7 of Table V).

B. The LM – VC Affiliation

After controlling for the same set of variables mentioned above, we find that the D_{ALMVC} is positively and significantly related to the price adjustment (column 1 of Table VI). The same result still holds when the sample is split into hot and cold IPOs (columns 1 and 2 of Table VII), but it is only statistically significant for the hot IPOs subsample. This evidence confirms our hypothesis about the naïve investors in the case of hot IPOs, whereby the two players increase the offer price being sure that they will still complete the offer. On the contrary, no significant relationship is identified supporting the rational discounting hypothesis in relation to the cold IPOs.

Insert Table VI approximately here

Insert Table VII approximately here

As far as the secondary market is concerned, after controlling for the PA, the influence of the D_{ALMVC} on the underpricing is non-significant, as expected (column 2 of Table VI). Even when we split the sample into cold and hot IPOs, no significant effect emerges for the underpricing as a result of D_{ALMVC} or the interaction variable (columns 5 and 6 of Table VII). As a consequence, we conclude that the presence of a conflict of interest between the LM and the VC exerts all of its effects in the primary market, where the offer price is set, in accordance with the naïve investors hypothesis in the case of hot IPOs as proposed Gompers and Lerner (1999). However, the higher price adjustment could also be interpreted as the result of a lower level of information asymmetries between LM and VC; in this case, we would not necessarily have to conclude that investors are naïve. This evidence contrasts with the findings of Gompers and Lerner (1999), who stand in favor of the rational discounting hypothesis; although, their study can only be partially compared to the present one as they only take into account the UP without disentangling the primary and secondary market effects.

C. The VC-F Affiliation

We find that the D_{ALMVC} is positively and significantly related to the price adjustment (column 1 of Table VIII). The same effect still works when splitting the sample into hot and cold IPOs (columns 1 and 2 of Table IX). So far, as expected and similar to the LM-F affiliation, when a conflict of interest between VC and F exists, the LM set a higher offer price (higher PA), favoring the VC.

Insert Table VIII approximately here

Insert Table IX approximately here

As for the LM-F affiliation, in the case of cold IPOs, this result is likely to refer to the dumping ground behavior of VC. On the contrary, in the case of hot IPOs, it could be nepotism as we argue in paragraph II.B: in particular, despite an increase in the PA, VC does not fully adjust the offer price to the demand of the book-building, leaving a bigger part of the adjustment in the form of underpricing in order to compensate affiliated F.

As far as the secondary market is concerned, after controlling for the PA, the influence of the affiliation between VC and F (D_{AVCF}) on underpricing is positive and significant (column 2 of Table VIII) especially for the hot IPO subsample (column 4 of Table IX). This evidence prompted us to further the analysis by taking into account the effect that the interaction between the PA and D_{AVCF} produces on the underpricing. Columns 6 and 8 of Table IX show that the interaction term has a positive effect on the secondary market price in the hot IPOs. As already discussed for the LM-F case, this result confirms the nepotism hypothesis in hot IPOs.

As far as the cold IPOs are concerned, a negative effect of the interaction term emerges. This last piece of evidence seems to suggest a dumping ground behavior, which would confirm our hypotheses, but the coefficient is not statistically significant.

D. Control variables

As far as the control variables are concerned, our results confirm those of previous studies in the literature. In particular, all other things being equal, the IPO of a high tech company (D_{tech}), especially when made during the internet bubble (D_{year}), results in higher price adjustments, which means higher offer prices. Similarly, in most of our models, higher ranking lead underwriters and venture backed deals have a significant positive impact on

price adjustment, while the company size is never significant on the PA. Instead, the presence of a lockup agreement reduces the PA.

With reference to the UP, the same results are confirmed with the exception of the size, which is always significant and negatively related to the underpricing.

E. Impact of affiliation on longer-term IPO performance

To check the robustness of our results, we performed a final analysis aiming to ascertain whether affiliations between players are positively or negatively related to the "longer-horizon performance" of IPO shares in the secondary market; this can tell us whether the institutional investors (F) buying in the primary market got a good or a bad stock, which can provide evidence of nepotism or a dumping ground pricing behavior in the primary market, respectively. By "longer-horizon performance" we are referring to the IPO return 180 days after the initial listing day.

Indeed, 6 months after the initial public offering is the ideal horizon for checking the effect of the conflicts of interest on the primary and secondary markets for the following reasons: first, after 6 months the market price for the shares should provide a true reflection of a company's value, as analysts have had the time and the opportunity to perform in depth company evaluations; second, at that time, the price is no longer influenced by stabilization policies usually adopted by lead managers during the first month of trading; third, and of most importance to our study, after 2 quarters the disclosure on institutional investor ownership (and therefore any affiliations between funds with lead manager and venture capitalist, if any) is publicly available to all investors due to the SEC filing obligations.

Using Equation [6], the IPO return after 180 days (calculated as the performance of the closing price on the 180^{th} trading day with respect to the IPO offer price net of the market performance) was regressed on the control variables and affiliation dummies used in the

previous regressions, as well as the underpricing variable. The results are reported in Tables 4, 6, and 8.

$$R_{6M} = \alpha + \beta_1 D_{ALMF} + \beta_{UP} UP + \gamma Controls + \varepsilon$$
$$R_{6M} = \alpha + \beta_2 D_{ALMVC} + \beta_{UP} UP + \gamma Controls + \varepsilon \quad [6]$$
$$R_{6M} = \alpha + \beta_3 D_{AVCF} + \beta_{UP} UP + \gamma Controls + \varepsilon$$

The value of the first day underpricing plays a relevant role in explaining the six month performance, as was expected since the former is a component of the latter. The effects of the control variables replicate those observed for the underpricing with the exception of the venture backed dummy, which is not significant here. As for the affiliation dummies, the only statistically significant influence arises from the affiliation between the LM and F. This affiliation has a positive impact on the 6 month performance, especially in the hot IPOs (the final column of Tables 5, 7, and 9), confirming the nepotism hypothesis since the funds affiliated to lead managers obtain better IPOs.

It is also interesting to note that the 6 month performance is inversely related to the UP in the hot IPOs, suggesting that in such deals the underpricing is to some extent the result of an initial overshooting.

V. Conclusions

Over the last 15 years, affiliations between financial players in IPO deals have become a widespread phenomenon; indeed, more than 70% of the IPOs considered in the present study show at least one type of affiliation. We investigated the impact of such affiliations on the pricing of IPOs, in order to understand the primary and secondary market behavior in relation to potential conflicts of interest.

Since the scientific literature lacks consistent empirical data on the effects of such affiliations, we were interested in revealing new and more robust evidence regarding the impact that each type of conflict of interest has on IPO prices; including VC-F affiliations, which had not been studied until now. In contrast to the conclusions drawn in past studies, which have mainly focused on the effects on underpricing, we believe that most of the effect arising from any of the forms of conflict of interest actually takes place in the primary market, where the negotiations between lead managers, venture capitalists, and funds take place, determining the offer price and, in turn, the PA. When the PA has been analyzed in previous studies, it has just been used as a measure of the expected underpricing (Ritter and Zhang, 2007). On the contrary, we are particularly interested in disentangling the primary and secondary market effects of all of the three different types of affiliations, and more importantly the relationship between PA and UP.

The methodology used here allows us to distinguish between the effects on the primary and secondary market. Specifically, we show that both the price adjustment and the underpricing are higher when an affiliation of any kind is present; moreover, by introducing the interaction term between PA and the affiliation dummies, we are able to understand how the relationship between PA and UP (i.e. the partial adjustment) changes in the presence of a conflict of interest. In other words, we are able to show if any given level of PA will produce more or less UP for any of the conflicts of interest analyzed.

Our results show that all types of affiliation result in a positive impact on the price adjustment. Affiliations between financial players mainly seems to influence the IPO pricing through the primary market, as the effects on underpricing seem to be almost totally absorbed by the price adjustment (the impact of the PA on the underpricing is always extremely significant and positive, and once the effect of the PA is controlled for, the effect of the affiliations are no longer significant, with the exception of the VC-F affiliation).

Nevertheless, when the sample is split into hot and cold IPOs, some interesting new evidence emerges adding new results to the literature.

In particular, by studying the LM-F affiliation we confirm the findings of Ritter and Zhang (2007) in that we find a nepotism behavior for the hot IPOs; and we further the results proposed by the two authors by providing evidence of dumping ground behavior in the case of cold IPOs. As far as the LM-VC conflict of interest is concerned, we demonstrate that the offer price does not follow the rational discounting hypothesis as argued by Gompers and Lerner (1999), but we instead reveal evidence supporting the naïve investors hypothesis in the hot IPOs subsample, whereby the offer price increases in the presence of a conflict of interest. Regarding the secondary market, no significant effect on underpricing was found; since all conflicts of interest are made visible to the secondary market participants, affiliations are solely exploited in the primary market where the offer price is set. As far as the VC-F affiliation is concerned, we reveal the presence of a nepotistic behavior of the VC toward its affiliated funds in the hot IPOs, while no significant evidence of such a behavior is found in the cold IPOs subsample.

Finally, we studied the effects of affiliations on longer-horizon performance. In this case, only the affiliation between lead managers and funds revealed a positive influence on the IPO six month returns, especially for the hot IPOs subsample, thus signaling that funds benefited in such deals from the nepotistic behavior of the affiliated lead manager.

The evidence provided by this paper is relevant because it demonstrates that conflicts of interests between market players do influence the pricing of IPOs. Moreover, affiliations tend to produce greater effects in the primary market, where the offer price is set. In general, when an affiliation exists, the deal tends to be more expensive for investors. Furthermore, investors receive different treatment depending on whether affiliations exist; in particular, unaffiliated investors are less likely to receive the best deals, as opposed to affiliated investors, especially

under hot market conditions.

Our results support the growing criticisms directed at book-building procedures[12] and the need to improve transparency in the primary market for IPOs. Nevertheless, we expect the presence of affiliations in deals to continue to grow in the future, as a consequence of the consolidation (e.g. mergers) occurring both in the investment banking and asset management industries.

We are also aware of some possible extensions that could be made to this work. In particular, we are aware that ownership linkages constitute just a part of the effective relationships that might influence the outcome of IPOs. In particular, the well-known practice of cross invitations in IPO syndication, laddering (in general, we are referring to the *embeddedness* concept), and the fact that the majority of major deals are all dealt with by just a few lead underwriters, all require further investigation in order to fully understand the impact of these informal relationships on IPO pricing.

[12] In June 2012, a House of Representatives committee suggested to the Securities and Exchange Commission some changes to the Securities Act of 1933, as it allows lead underwriters to "exercise substantial discretion" in establishing the IPO price.

Table I: Temporal distribution of sample IPOs

Issue year	Number of deals (n)	Number of deals (% of total)	Total proceeds	Total funds (% distribution)	First day underpricing (Average)	Average offer (mln $)
1997	326	16%	24,811	8%	15%	76.1
1998	194	10%	26,828	8%	28%	138.3
1999	353	17%	42,112	13%	77%	119.3
2000	280	14%	34,179	11%	59%	122.1
2001	63	3%	23,251	7%	14%	369.1
2002	58	3%	11,300	4%	10%	194.8
2003	54	3%	8,917	3%	10%	165.1
2004	159	8%	27,731	9%	11%	174.4
2005	130	6%	25,398	8%	11%	195.4
2006	129	6%	24,220	8%	12%	187.7
2007	132	7%	24,622	8%	15%	186.5
2008	21	1%	4,702	1%	4%	223.9
2009	43	2%	13,577	4%	9%	315.7
2010	84	4%	27,609	9%	7%	328.7
Total	2026	100%	319,256	100%	32%	157.6
			Median		11.2%	75.0
			Minimum		-86.7%	4.35
			Maximum		636.4%	15,774.0
			Standard deviation		65.6%	478.86

Table II: Industry distribution of sample IPOs

Sectors	Number of deals (n)	Number of deals (% weight)	First-day underpricing (Average)	Venture Backed
Consumer Products and Services	214	11%	32%	98
Consumer Staples	56	3%	14%	9
Energy and Power	92	5%	12%	23
Government and Agencies	1	0%	32%	1
Healthcare	309	15%	12%	238
High Technology	658	32%	56%	441
Industrials	178	9%	13%	44
Materials	73	4%	8%	16
Media and Entertainment	94	5%	24%	37
Real Estate	97	5%	4%	4
Retail	120	6%	24%	57
Telecommunications	134	7%	45%	90
Total	2026	100%	32%	1058

Table III: Affiliations between players in IPOs (1997-2010)

The table presents the mean values of the relevant variables. VCB are the venture capitalist backed IPOs; UP is the underpricing; PA is the price adjustment; TR is the total return from the midpoint of the filing price range to the market price and is given by (1+PA)(1+UP)-1.

	N	N %	% Hot	%VCB	UP	PA	TR	6M Perf.
FULL SAMPLE								
LM-F	1250	61.7%	51.0%	54.1%	34.4%	5.8%	57.5%	2.8%
LM-VC	105	5.2%	59.0%	100.0%	47.1%	11.3%	90.7%	-10.3%
VC-F	630	31.1%	58.9%	100.0%	47.6%	8.1%	81.5%	-0.1%
No Affiliation	589	29.1%	44.3%	32.4%	21.9%	-2.1%	24.8%	-10.5%
Full Sample	2026	100.0%	50.0%	52.0%	31.7%	3.4%	48.3%	-2.8%
COLD								
LM-F	613	60.5%	0.0%	45.2%	0.0%	-9.8%	-9.8%	4.0%
LM-VC	43	4.2%	0.0%	100.0%	0.9%	-11.5%	-10.9%	3.0%
VC-F	259	25.6%	0.0%	100.0%	-0.3%	-13.7%	-14.2%	4.3%
No Affiliation	328	32.4%	0.0%	27.1%	0.1%	-10.2%	-9.8%	-7.4%
All COLD IPOs	1013	50.0%	0.0%	43.2%	0.1%	-10.3%	-10.2%	-0.3%
HOT								
LM-F	637	62.9%	100.0%	62.6%	67.4%	19.9%	117.7%	1.6%
LM-VC	62	6.1%	100.0%	100.0%	79.2%	25.6%	154.8%	-19.7%
VC-F	371	36.6%	100.0%	100.0%	81.0%	22.2%	143.8%	-3.2%
No Affiliation	261	25.8%	100.0%	39.1%	49.2%	7.8%	67.3%	-14.4%
All HOT IPOs	1013	50.0%	100.0%	60.8%	63.3%	16.4%	103.9%	-5.3%

Table IV – H1: The effects of affiliations between lead managers and funds (LM-F) on price adjustment, underpricing, and 6 month post-IPO performance.

*PA is the Price Adjustment. UP is the underpricing. 6M Perf. is the performance of the share six months after listing. D_{ALMF} is a dummy variable equal to 1 if lead managers and at least one of the funds buying IPO shares are affiliated, and zero otherwise; D_{ALMF} * PA is the interaction term between PA and affiliation. $D_{VC\ backed}$ is a dummy variable equal to 1 in cases where the company is backed by a venture capital company, and zero otherwise; D_{lockup} is a dummy variable equal to 1 when the VC have a lockup obligation, and zero otherwise; LM_{rank} is the ranking of the lead manager of the IPO according to the publicly available database provided by Ritter; SIZE is the natural logarithm of total assets of the company at the IPO; D_{tech} is a dummy variable equal to 1 if the company is in a high tech industry, and zero otherwise; D_{year} is a dummy used to capture the structural break that happened when the internet bubble burst and is equal to 1 for IPOs occurring after that event, and zero for those occurring beforehand.*

	(1) PA	(2) UP	(3) UP	(4) UP	(5) UP	(6) 6M Perf.
D_{ALMF}	0.062***	0.116***	0.046	0.035		0.188***
	0.000	0.001	0.152	0.279		0.002
D_{ALMF} * PA				0.372***	0.381***	
				0.000	0.000	
PA			1.183***	0.947***	0.946***	
			0.000	0.000	0.000	
UP						-0.576***
						0.000
$D_{VC\ backed}$	0.030**	0.127***	0.101***	0.098***	0.096***	0.0421
	0.026	0.000	0.000	0.000	0.000	0.420
D_{lockup}	-0.102***	-0.229***	-0.109***	-0.092***	-0.096***	-0.145**
	0.000	0.000	0.001	0.004	0.002	0.016
LM_{rank}	0.003	0.024**	0.020*	0.023**	0.028***	0.033*
	0.547	0.034	0.051	0.028	0.003	0.099
Size	0.004	-0.042***	-0.047***	-0.046***	-0.045***	-0.040**
	0.412	0.000	0.000	0.000	0.000	0.016
D_{tech}	0.121***	0.239***	0.104***	0.106***	0.106***	0.250***
	0.000	0.000	0.000	0.000	0.000	0.000
D_{year}	-0.121***	-0.253***	-0.101***	-0.101***	-0.092***	-0.147***
	0.000	0.000	0.000	0.000	0.001	0.008
Constant	0.027	0.383***	0.341***	0.302***	0.278***	0.009
	0.501	0.000	0.000	0.000	0.001	0.953
Observations	1,768	1,925	1,768	1,768	1,768	1,905
R-squared	0.176	0.192	0.394	0.399	0.399	0.105

Table V – H1 in Hot and Cold IPOs: The effects of affiliations between lead managers and funds (LM-F) on price adjustment, underpricing, relative price adjustment, and 6 months post-IPO performance

*PA is the Price Adjustment. UP is the underpricing. 6M Perf. is the performance of the share six months after listing. D_{ALMF} is a dummy variable equal to 1 if lead managers and at least one of the funds buying IPO shares are affiliated, and zero otherwise; D_{ALMF} * PA is the interaction term between PA and affiliation. $D_{VC\ backed}$ is a dummy variable equal to 1 in cases where the company is backed by a venture capital company, and zero otherwise; D_{lockup} is a dummy variable equal to 1 when the VC have a lockup obligation, and zero otherwise; LM_{rank} is the ranking of the lead manager of the IPO according to the publicly available database provided by Ritter; SIZE is the natural logarithm of total assets of the company at the IPO; D_{tech} is a dummy variable equal to 1 if the company is in a high tech industry, and zero otherwise; D_{year} is a dummy used to capture the structural break that happened when the internet bubble burst and is equal to 1 for IPOs occurring after that event, and zero for those occurring beforehand.*

	1	2	3	4	5	6	7	8	9	10
	COLD	**HOT**	**COLD**	**HOT**	**COLD**	**HOT**	**COLD**	**HOT**	**COLD**	**HOT**
	PA	**PA**	**UP**	**UP**	**UP**	**UP**	**UP**	**UP**	**6M Perf.**	**6M Perf.**
D_{ALMF}	0.030*	0.076***	0.000	0.096*	-0.004	0.055			0.0305	0.328***
	0.068	0.001	0.982	0.083	0.660	0.362			0.514	0.003
D_{ALMF} * PA					-0.033	0.272*	-0.027	0.332**		
					0.289	0.094	0.335	0.026		
PA			0.014	1.227***	0.030	1.042***	0.027	1.009***		
			0.367	0.000	0.167	0.000	0.190	0.000		
UP									0.3291	-0.741***
									0.125	0.000
$D_{VC\ backed}$	-0.041***	0.054***	-0.010	0.104**	-0.010	0.105**	-0.010	0.102**	0.0095	0.065
	0.003	0.007	0.104	0.032	0.116	0.030	0.117	0.034	0.806	0.497
D_{lockup}	-0.024	-0.076***	0.021***	-0.131**	0.021***	-0.118**	0.021***	-0.122**	-0.0365	-0.187*
	0.172	0.000	0.007	0.012	0.008	0.024	0.007	0.019	0.461	0.069
LM_{rank}	-0.014***	0.014	0.004*	-0.008	0.004**	-0.004	0.004**	0.004	0.0278**	0.027
	0.003	0.107	0.050	0.720	0.046	0.844	0.045	0.848	0.042	0.530
Size	0.015***	0.008	-0.001	-0.061***	-0.001	-0.059***	-0.001	-0.058***	-0.0025	-0.075**
	0.000	0.228	0.527	0.000	0.593	0.000	0.540	0.000	0.831	0.019
D_{tech}	0.041***	0.095***	-0.033***	0.134***	-0.033***	0.138***	-0.033***	0.139***	0.0983**	0.332***
	0.004	0.000	0.000	0.005	0.000	0.004	0.000	0.003	0.016	0.000
D_{year}	-0.043***	-0.154***	-0.014**	-0.165***	-0.014**	-0.166***	-0.015**	-0.155***	0.0534	-0.329***
	0.002	0.000	0.033	0.001	0.031	0.001	0.019	0.002	0.194	0.001
Constant	-0.028	-0.001	-0.022	0.721***	-0.021	0.697***	-0.019	0.655***	-0.2641**	0.360
	0.457	0.988	0.204	0.000	0.217	0.000	0.245	0.000	0.014	0.300
Observations	854	914	854	914	854	914	854	914	944	961
R-squared	0.066	0.187	0.050	0.342	0.051	0.344	0.051	0.344	0.025	0.149

Table VI – H2: The effects of affiliations between lead managers and venture capitalists (LM-VC) on price adjustment, underpricing, and 6 months post-IPO performance.

*PA is the Price Adjustment. UP is the underpricing. 6M Perf. is the performance of the share six months after listing. D_{ALMVC} is a dummy variable equal to 1 if lead managers and venture capitalists selling the shares are affiliated, and zero otherwise. D_{ALMVC} * PA is the interaction term between PA and affiliation. $D_{VC\ backed}$ is a dummy variable equal to 1 in cases where the company is backed by a venture capital company, and zero otherwise; D_{lockup} is a dummy variable equal to 1 when the VC have a lockup obligation, and zero otherwise; LM_{rank} is the ranking of the lead manager of the IPO according to the publicly available database provided by Ritter; SIZE is the natural logarithm of total assets of the company at the IPO; D_{tech} is a dummy variable equal to 1 if the company is in a high tech industry, and zero otherwise; D_{year} is a dummy used to capture the structural break that happened when the internet bubble burst and is equal to 1 for IPOs occurring after that event, and zero for those occurring beforehand.*

	(1)	(2)	(3)	(4)	(5)	(6)
	PA	**UP**	**UP**	**UP**	**UP**	**6M Perf.**
D_{ALMVC}	0.079***	0.161***	0.078	0.063		-0.006
	0.006	0.009	0.181	0.299		0.955
D_{ALMVC} * PA				0.140	0.180	
				0.338	0.202	
PA			1.185***	1.170***	1.169***	
			0.000	0.000	0.000	
UP						-0.566***
						0.000
$D_{VC\ backed}$	0.019	0.103***	0.090***	0.091***	0.097***	0.034
	0.184	0.001	0.001	0.001	0.000	0.527
D_{lockup}	-0.110***	-0.244***	-0.115***	-0.115***	-0.115***	-0.169***
	0.000	0.000	0.000	0.000	0.000	0.005
LM_{rank}	0.012***	0.042***	0.027***	0.027***	0.027***	0.061***
	0.009	0.000	0.004	0.004	0.004	0.001
Size	0.004	-0.041***	-0.047***	-0.047***	-0.046***	-0.033**
	0.296	0.000	0.000	0.000	0.000	0.045
D_{tech}	0.124***	0.244***	0.106***	0.108***	0.107***	0.250***
	0.000	0.000	0.000	0.000	0.000	0.000
D_{year}	-0.108***	-0.228***	-0.092***	-0.091***	-0.090***	-0.100*
	0.000	0.000	0.001	0.001	0.001	0.061
Constant	-0.012	0.310***	0.313***	0.311***	0.308***	-0.129
	0.770	0.000	0.000	0.000	0.000	0.403
Observations	1,768	1,925	1,768	1,768	1,768	1,905
R-squared	0.172	0.190	0.394	0.394	0.394	0.100

Table VII – H2 in Hot and Cold IPOs: The effects of affiliations between lead managers and venture capitalists (LM-VC) on price adjustment, underpricing, relative price adjustment, and 6 month post-IPO performance

*PA is the Price Adjustment. UP is the underpricing. 6M Perf. is the performance of the share six months after listing. D_{ALMVC} is a dummy variable equal to 1 if lead managers and venture capitalists selling the shares are affiliated, and zero otherwise. D_{ALMVC} * PA is the interaction term between PA and affiliation. $D_{VC\ backed}$ is a dummy variable equal to 1 in cases where the company is backed by a venture capital company, and zero otherwise; D_{lockup} is a dummy variable equal to 1 when the VC have a lockup obligation and zero otherwise; LM_{rank} is the ranking of the lead manager of the IPO according to the publicly available database provided by Ritter; SIZE is the natural logarithm of total assets of the company at the IPO; D_{tech} is a dummy variable equal to 1 if the company is in a high tech industry, and zero otherwise; D_{year} is a dummy used to capture the structural break that happened when the internet bubble burst and is equal to 1 for IPOs occurring after that event and zero for those occurring beforehand.*

	1	2	3	4	5	6	7	8	9	10
	COLD	HOT	COLD	HOT	COLD	HOT	COLD	HOT	COLD	HOT
	PA	PA	UP	UP	UP	UP	UP	UP	6M Perf.	6M Perf.
D_{ALMVC}	0.010	0.076**	0.004	0.065	0.002	0.066			0.015	-0.053
	0.766	0.047	0.818	0.481	0.933	0.539			0.870	0.771
D_{ALMVC} * PA					-0.015	-0.004	-0.019	0.065		
					0.874	0.985	0.790	0.732		
PA			0.014	1.239***	0.015	1.239***	0.015	1.232***		
			0.367	0.000	0.360	0.000	0.351	0.000		
UP									0.329	-0.723***
									0.125	0.000
$D_{VC\ backed}$	-0.043***	0.041**	-0.011	0.091*	-0.011	0.091*	-0.011*	0.096**	0.007	0.049
	0.003	0.042	0.102	0.066	0.104	0.066	0.099	0.048	0.862	0.617
D_{lockup}	-0.026	-0.088***	0.021***	-0.146***	0.021***	-0.146***	0.021***	-0.146***	-0.039	-0.237**
	0.126	0.000	0.007	0.005	0.007	0.005	0.007	0.004	0.429	0.020
LM_{rank}	-0.010**	0.027***	0.004**	0.008	0.004**	0.008	0.004**	0.008	0.032***	0.081**
	0.016	0.001	0.026	0.701	0.026	0.702	0.026	0.701	0.008	0.039
Size	0.016***	0.009	-0.001	-0.059***	-0.001	-0.059***	-0.001	-0.059***	-0.002	-0.064**
	0.000	0.163	0.511	0.000	0.514	0.000	0.517	0.000	0.890	0.047
D_{tech}	0.042***	0.098***	-0.033***	0.136***	-0.033***	0.136***	-0.033***	0.136***	0.099**	0.331***
	0.003	0.000	0.000	0.004	0.000	0.005	0.000	0.004	0.016	0.000
D_{year}	-0.036***	-0.139***	-0.014**	-0.144***	-0.014**	-0.144***	-0.014**	-0.142***	0.061	-0.250**
	0.008	0.000	0.026	0.004	0.026	0.004	0.026	0.004	0.123	0.010
Constant	-0.047	-0.059	-0.022	0.647***	-0.022	0.647***	-0.022	0.644***	-0.285***	0.073
	0.188	0.395	0.186	0.000	0.187	0.000	0.185	0.000	0.005	0.828
Observations	854	914	854	914	854	914	854	914	944	961
R-squared	0.062	0.180	0.050	0.340	0.050	0.340	0.050	0.340	0.024	0.141

Table VIII – H3: The effects of affiliations between venture capitalists and funds (VC-F) on price adjustment, underpricing, and 6 month post-IPO performance.

PA is the Price Adjustment. UP is the underpricing. 6M Perf. is the performance of the share six months after listing. D_{AVCF} *is a dummy variable equal to 1 if venture capitalists selling the shares and at least one of the funds buying the shares are affiliated, and zero otherwise.* D_{AVCF} ** PA is the interaction term between PA and affiliation.* $D_{VC\ backed}$ *is a dummy variable equal to 1 in cases where the company is backed by a venture capital company, and zero otherwise.* D_{lockup} *is a dummy variable equal to 1 when the VC have a lockup obligation, and zero otherwise;* LM_{rank} *is the ranking of the lead manager of the IPO according to the publicly available database provided by Ritter; SIZE is the natural logarithm of total assets of the company at the IPO;* D_{tech} *is a dummy variable equal to 1 if the company is in a high tech industry, and zero otherwise;* D_{year} *is a dummy used to capture the structural break that happened when the internet bubble burst and is equal to 1 for IPOs occurring after that event, and zero for those occurring beforehand.*

	(1)	(2)	(3)	(4)	(5)	(6)
	PA	**UP**	**UP**	**UP**	**UP**	**6M Perf.**
D_{AVCF}	0.050***	0.160***	0.106***	0.081**		0.091
	0.004	0.000	0.003	0.022		0.174
D_{AVCF} * PA				0.370***	0.404***	
				0.000	0.000	
PA			1.180***	1.000***	0.991***	
			0.000	0.000	0.000	
UP						-0.572***
						0.000
$D_{VC\ backed}$	-0.001	0.030	0.039	0.043	0.088***	-0.020
	0.939	0.420	0.250	0.205	0.001	0.761
D_{lockup}	-0.110***	-0.243***	-0.115***	-0.112***	-0.112***	-0.169***
	0.000	0.000	0.000	0.000	0.000	0.005
LM_{rank}	0.011**	0.039***	0.025***	0.027***	0.029***	0.060***
	0.018	0.000	0.008	0.004	0.002	0.001
Size	0.005	-0.040***	-0.047***	-0.048***	-0.048***	-0.034**
	0.230	0.000	0.000	0.000	0.000	0.038
D_{tech}	0.120***	0.237***	0.101***	0.100***	0.102***	0.249***
	0.000	0.000	0.000	0.000	0.000	0.000
D_{year}	-0.111***	-0.237***	-0.099***	-0.092***	-0.085***	-0.108**
	0.000	0.000	0.000	0.001	0.002	0.044
Constant	-0.004	0.331***	0.331***	0.318***	0.301***	-0.110
	0.916	0.000	0.000	0.000	0.000	0.475
Observations	1,768	1,925	1,768	1,768	1,768	1,905
R-squared	0.173	0.195	0.396	0.402	0.401	0.101

Table IX – H3 in Hot and Cold IPOs: The effects of affiliations between venture capitalists and funds on price adjustment, underpricing, relative price adjustment, and 6 month post-IPO performance.

*PA is the Price Adjustment. UP is the underpricing. 6M Perf. is the performance of the share six months after listing. D_{AVCF} is a dummy variable equal to 1 if venture capitalists selling the shares and at least one of the funds buying the shares are affiliated, and zero otherwise. D_{AVCF} * PA is the interaction term between PA and affiliation. $D_{VC\ backed}$ is a dummy variable equal to 1 in cases where the company is backed by a venture capital company, and zero otherwise. D_{lockup} is a dummy variable equal to 1 when the VC have a lockup obligation, and zero otherwise; LM_{rank} is the ranking of the lead manager of the IPO according to the publicly available database provided by Ritter; SIZE is the natural logarithm of total assets of the company at the IPO; D_{tech} is a dummy variable equal to 1 if the company is in a high tech industry, and zero otherwise; D_{year} is a dummy used to capture the structural break that happened when the internet bubble burst and is equal to 1 for IPOs occurring after that event and zero for those occurring beforehand.*

	1	2	3	4	5	6	7	8	9	10
	COLD	**HOT**	**COLD**	**HOT**	**COLD**	**HOT**	**COLD**	**HOT**	**COLD**	**HOT**
	PA	**PA**	**UP**	**UP**	**UP**	**UP**	**UP**	**UP**	**6M Perf.**	**6M Perf.**
D_{AVCF}	0.011	0.050**	0.007	0.139**	-0.004	0.093			0.009	0.134
	0.569	0.034	0.404	0.015	0.710	0.149			0.864	0.237
D_{AVCF} * PA					-0.083**	0.234	-0.077**	0.334**		
					0.019	0.120	0.013	0.013		
PA			0.014	1.229***	0.036*	1.093***	0.034*	1.043***		
			0.374	0.000	0.051	0.000	0.055	0.000		
UP									0.329	-0.731***
									0.126	0.000
$D_{VC\ backed}$	-0.048***	0.021	-0.015*	0.019	-0.013	0.023	-0.015**	0.066	0.003	-0.034
	0.006	0.380	0.072	0.741	0.108	0.691	0.026	0.185	0.949	0.767
D_{lockup}	-0.026	-0.088***	0.021***	-0.146***	0.021***	-0.146***	0.021***	-0.146***	-0.039	-0.238**
	0.127	0.000	0.007	0.004	0.008	0.004	0.008	0.004	0.432	0.020
LM_{rank}	-0.010**	0.025***	0.004**	0.004	0.004**	0.007	0.004**	0.010	0.032***	0.078**
	0.014	0.002	0.031	0.850	0.034	0.733	0.035	0.611	0.008	0.049
Size	0.016***	0.010	-0.001	-0.060***	-0.001	-0.061***	-0.001	-0.060***	-0.001	-0.067**
	0.000	0.151	0.518	0.000	0.634	0.000	0.621	0.000	0.905	0.036
D_{tech}	0.042***	0.092***	-0.033***	0.125***	-0.032***	0.130***	-0.032***	0.137***	0.099**	0.325***
	0.003	0.000	0.000	0.009	0.000	0.006	0.000	0.004	0.016	0.000
D_{year}	-0.037***	-0.140***	-0.015**	-0.152***	-0.015**	-0.150***	-0.016**	-0.144***	0.060	-0.260***
	0.007	0.000	0.021	0.002	0.016	0.002	0.014	0.003	0.131	0.008
Constant	-0.046	-0.046	-0.021	0.691***	-0.020	0.682***	-0.019	0.654***	-0.285***	0.126
	0.201	0.514	0.208	0.000	0.232	0.000	0.240	0.000	0.005	0.710
Observations	854	914	854	914	854	914	854	914	944	961
R-squared	0.062	0.181	0.051	0.344	0.057	0.346	0.057	0.345	0.024	0.142

Figure I: IPOs with affiliations between players between 1997-2010

Affiliations are presented as percentage of the overall sample referred to a particular year.

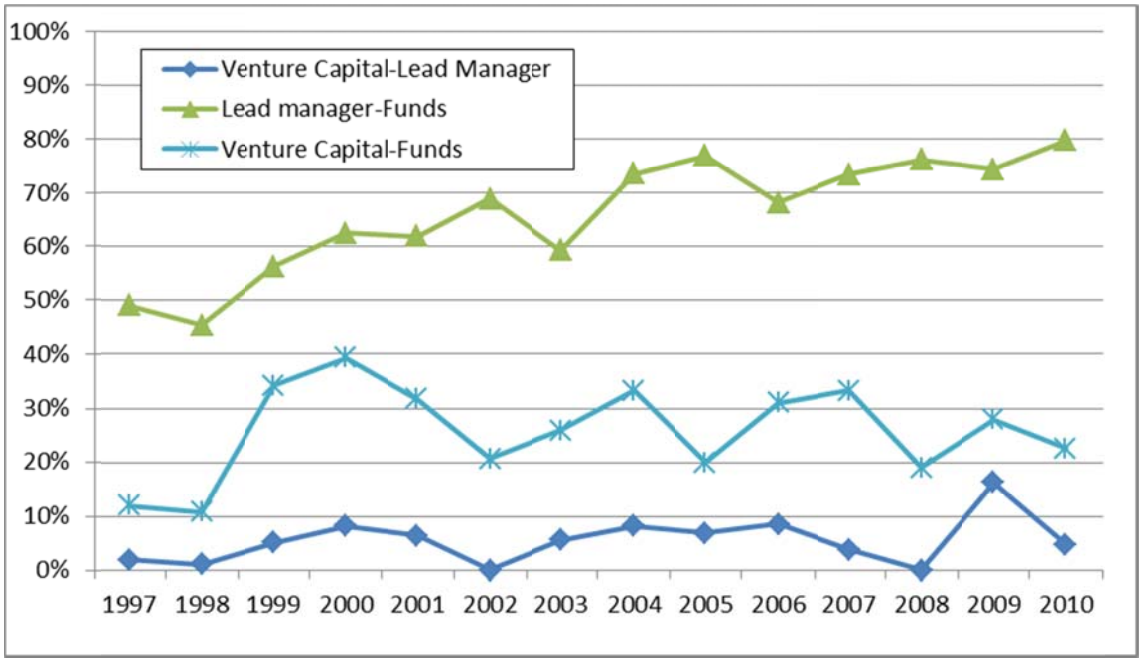
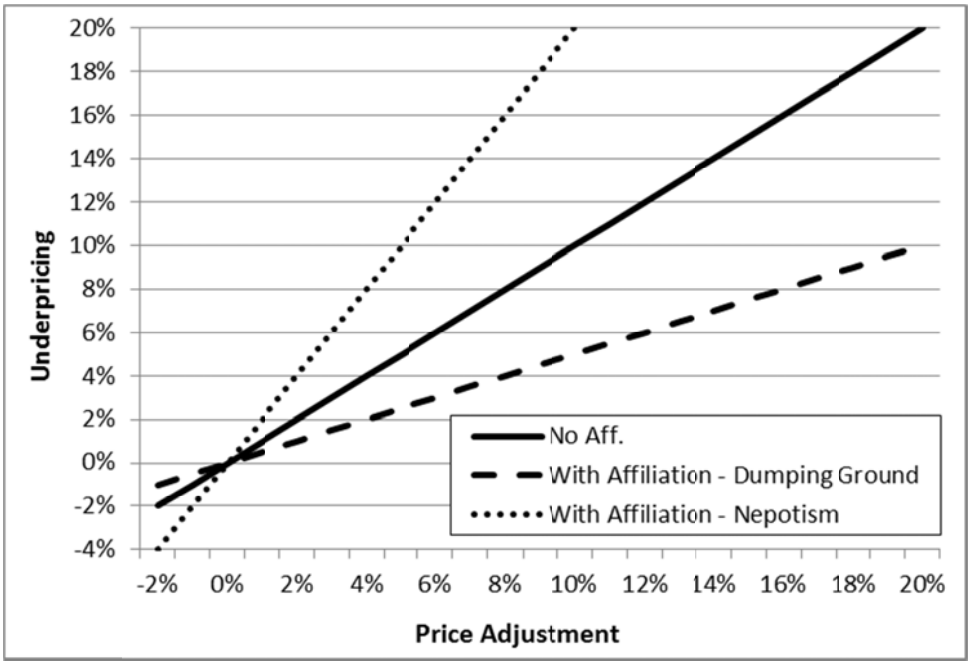


Figure II: Relationship between the underpricing and the price adjustment in the presence or absence of affiliations and with dumping ground or nepotism pricing behaviors.

The positive relationship between underpricing and price adjustment is always confirmed, but with nepotism (steeper line) the underpricing reacts more to a given level of price adjustment, whereas with dumping ground behavior (flatter line) it reacts less.



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