Wanna Dance? How Firms and Underwriters Choose Each Other

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Abstract

We develop a theoretical model founded on the idea that issuers and underwriters associate by mutual choice, an approach that contrasts with the conventional view in the literature of firms picking their underwriters. Underwriters look to the quality of the issuers who may wish to employ their services and issuers look to the abilities of the underwriters they consider employing. We derive several new results. First, our model predicts and our empirical tests confirm that the association of issuers and underwriters is transactional and that switching is bi-directional. Thus, whether firms switch or stay with the same underwriter for a secondary offering is determined by the relative change in quality of the firm and the relative change in reputation of the underwriter from IPO to SEO. After controlling for the change in underwriter reputation between IPO and SEO, we find that the change in the firm's relative quality is highly significant in explaining the switch throughout our sample period. In particular, we find that issuers who experience a relative reduction in quality from IPO to SEO switch to lower reputation underwriters for SEO offerings. Second, while existing studies link underwriter market share to past performance, we derive new implications about underwriter market share based on current market conditions, showing that the market share of high reputation underwriters is negatively related and the quality of issues they underwrite is positively related to overall issue activity, causing high reputation underwriters to earn a more stable revenue stream than their less reputed counterparts. Third, we show that many underwriting spread patterns are consistent with equilibrium in our model, including a uniform flat percentage fee charged by all underwriters. Additionally, the model predicts (and our empirical results show) that for SEOs, the percentage spread will be negatively related to the reputation of the underwriter. Nonetheless, our model also predicts that high reputation underwriters will earn higher dollar revenues from their client firms through security issues that are both larger and more frequent, which we also confirm through our empirical tests.

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ABSTRACT

We develop a theoretical model founded on the idea that issuers and underwriters associate by mutual choice, an approach that contrasts with the conventional view in the literature of firms picking their underwriters. Underwriters look to the quality of the issuers who may wish to employ their services and issuers look to the abilities of the underwriters they consider employing. We derive several new results. First, our model predicts and our empirical tests confirm that the association of issuers and underwriters is transactional and that switching is bi-directional. Thus, whether firms switch or stay with the same underwriter for a secondary offering is determined by the relative change in quality of the firm and the relative change in reputation of the underwriter from IPO to SEO. After controlling for the change in underwriter reputation between IPO and SEO, we find that the change in the firm's relative quality is highly significant in explaining the switch throughout our sample period. In particular, we find that issuers who experience a relative reduction in quality from IPO to SEO switch to lower reputation underwriters for SEO offerings. Second, while existing studies link underwriter market share to past performance, we derive new implications about underwriter market share based on current market conditions, showing that the market share of high reputation underwriters is negatively related and the quality of issues they underwrite is positively related to overall issue activity, causing high reputation underwriters to earn a more stable revenue stream than their less reputed counterparts. Third, we show that many underwriting spread patterns are consistent with equilibrium in our model, including a uniform flat percentage fee charged by all underwriters. Additionally, the model predicts (and our empirical results show) that for SEOs, the percentage spread will be negatively related to the reputation of the underwriter. Nonetheless, our model also predicts that high reputation underwriters will earn higher dollar revenues from their client firms through security issues that are both larger and more frequent, which we also confirm through our empirical tests.

Once a firm decides to issue equity in the public market, it must next decide which underwriter to employ for the offering. And underwriters, faced with a variety of opportunities to provide their services, must decide which issuers to serve. In this paper, we develop a theory that explains the equilibrium association of issuing firms and underwriters and produces a rich set of testable empirical implications. Examining the empirical evidence, we find strong support for our theory.

Our theoretical setup is based on the idea that issuing firms and underwriters associate by mutual choice. This approach is new to the literature. Existing theoretical literature has focused on the issuer's choice of underwriter (e.g., Titman and Trueman, (1986), Habib and Ljungqvist (2001)), and has provided the basis for empirical studies by Benveniste, Ljungqvist, Wilhelm, and Yu (2003), and Ljungqvist, Marston, and Wilhelm (2003), for example. This approach represents the association of issuers and underwriters as a one-sided "beauty pageant" mechanism in which a chooser (the issuer) chooses from a collection of possible associates (underwriters) whose characteristics are predetermined and fixed with respect to the choice.[1]

Mutual choice is a more natural model for the association of issuers and underwriters than a one-sided mechanism because it more accurately reflects the actual institutional situation. Underwriting contracts are mutual agreements. In the "bake-off" meetings leading up to a contract, issuers look to the abilities of prospective underwriters to certify, promote, place and support the offering,[2] and underwriters look to the issuer's characteristics, such as the issue

[1] An exception is the model developed by Chemmanur and Fulghieri (1994a) in which underwriters exercise choice over the firms that they select, with more reputed underwriters having priority in the selection process.

[2] For a more detailed analysis of the different functions performed by the lead underwriter see, for example, Hayes, Spence, and Mark (1983), Booth and Smith (1986), Carter and Manaster (1990), Hansen and Torregrosa (1992), Chemmanur and Fulghieri (1994a), Galant (1995), Carter, Dark, and Singh (1998), Stoughton and Zechner (1998), McGough (1999), Ellis, Michaely, and O'Hara (2000), Krigman, Shaw, and Womack (2001), Ljungqvist and Wilhelm (2002), Logue et al. (2002), Ritter and Welch (2002), and Benveniste et al. (2003).

size, the likelihood that the offer will be completed, the probability that the issuer will remain in business and issue again in the future (generically, we call these characteristics firm "quality"), relative to other possible issuers, that will affect underwriters' short- and long-term profits.[3] Underwriting contracts are executed between those issuers and underwriters who mutually agree that their interests coincide.

In the standard economic model, pricing solves the association problem; that is, issuing firms compete for underwriting services, underwriters compete for deals, and firms associate with underwriters on the basis of value/price of services delivered. But economic theory also indicates that when agent characteristics -- in this case, firm quality and underwriter ability -- are indivisible, the allocation problem can be solved efficiently as a matching problem of who transacts with whom, apart from pricing, with the pricing issue left to bargaining between the matched parties.[4] The model we develop in this paper builds on this foundation. Moreover, when agents' characteristics are complementary -- as we argue they are in this case[5] -- then matching is positive assortative; that is, higher quality firms associate with higher ability underwriters and lower quality firms associate with lower ability underwriters.

Positive assortative matching of issuers and underwriters is the most elementary prediction of our model, though the association of high (low) reputation underwriters with high (low) quality firms is consistent with some one-sided choice models as well, such as Titman and Trueman (1986) and Chemmanur and Fulghieri (1994a). But the model we develop here

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[3] Our idea of quality has nothing to do with conventional notions of "good" and "bad." In our definition, a high quality firm displays characteristics that positively affect an underwriter's short or long-term expected profits and complement the underwriter's "ability," or reputation characteristic.

[4] See, for example, Gale and Shapley (1962), Roth (1984), Roth and Sotomayor (1989), Sattinger (1993), and Legros and Newman (2002).

[5] For the existence of complementarities between underwriter ability and firm quality when firm managers are better informed than investors see Booth and Smith (1986), Titman and Trueman (1986), Carter and Manaster (1990). Complementarities between firm and underwriter characteristics, however, need not be restricted only to the certification role of the underwriter. Other dimensions include the underwriter abilities discussed in the references in footnote 2.

generates a rich set of empirically testable propositions beyond positive assortative matching that are not predicted by one-sided choice models. First, our model implies that the association of issuers and underwriters is transactional rather than relationship based. This means, for example, that if an issuer improves (declines) sufficiently in quality from its IPO to a later SEO, then it will switch to a higher (lower) ability underwriter. Since SEO issuers are, on average, of better quality (due to survivorship and seasoning) than IPO firms, the average tendency is for issuers to "graduate" to higher reputation underwriters as in Krigman, Shaw, and Womack (2001). But our model suggests that some "down-switching" should also occur since some firms deteriorate in quality between their IPO and a subsequent SEO. Moreover, if firm characteristics and underwriter abilities are relatively stable over time, then many issuer/underwriter associations formed for IPOs will rematch for SEOs. If higher quality issuers tend to remain higher quality and higher ability underwriters tend to remain higher ability, then our model predicts that higher ability underwriters will earn long-term streams of revenues from the issuers they take public in an IPO by also underwriting subsequent SEOs. This is not, in our model, because issuers become loyal to underwriters (or *vice versa*), or that issuers and underwriters invest in relationship-specific capital; rather it is because high quality issuers (who tend to remain high quality) associate with high ability underwriters (who tend to remain high ability) in each transaction.

Second, our model generates interesting new implications about underwriter market share that are not predicted by existing models. For example, our model implies that more able underwriters underwrite more issues, by both new and existing issuers, giving them a larger market share than less able underwriters. But the model also predicts that, as the number of issuers in the market increases, the market share of less able underwriters will increase. Moreover, while more able underwriters gain market share in shrinking markets, the average quality of the issuers they underwrite declines. Still, in our model, more able underwriters have less volatile underwriting business per unit of expected underwritten proceeds than their less able counterparts. These findings complement the results of Beatty and Ritter (1986), Beatty, Bunsis, and Hand (1998), and Dunbar (2000) by providing factors that, independently of underwriter historic performance, have a differential impact on the market share of underwriters.

Third, unlike existing models in which issuers choose underwriters, our mutual choice model implies that the underwriting spread is the result of bargaining between matched issuers and underwriters and does not determine the association of issuers and underwriters.[6] In our model, many spread patterns are consistent with equilibrium, including a uniform flat percentage fee charged by all underwriters. However, the model does predict that, for SEOs, the percentage spread will be negatively related to the reputation of the underwriter. It also predicts that high reputation underwriters will earn higher dollar revenues from their client firms both at the IPO stage (by underwriting larger issues) and in the longer term (by underwriting a larger volume of secondary issues). To our knowledge, no other published model produces this set of empirical implications regarding the pricing patterns of equity issues, especially underwriting spreads that are flat or declining with underwriter reputation.

We test these predictions on a sample of 13,059 issues, of which 5,764 are IPOs and 7,295 are SEOs. In our empirical work, we use the relative market share of an underwriter (Megginson and Weiss (1991), Aggarwal, Krigman and Womack (2002)) measure of underwriter reputation to index underwriter ability, though using the relative position of an underwriter on tombstone announcements (Carter and Manaster (1990) and Carter, Dark and

[6] Krigman, Shaw, and Womack (2001) observe that the underwriter fee is of less importance to issuers than the reputation of the underwriter and its analysts, which is supported by the evidence provided by Chen and Ritter (2000). Also, as noted by Uttal (1986) in his description of the Microsoft IPO, Microsoft and its underwriter, Goldman Sachs, agreed to work together well before Goldman's fee was set. In fact, the underwriting spread was the *last* aspect to be negotiated before the deal was signed.

Singh (1998)) produces similar results. Because the notion of issuer quality is multidimensional, we use a variety of empirical proxies to measure quality, including the probability the issuer is delisted due to financial distress in the five years subsequent to an IPO, the issuer's age since founding, whether or not the issuer is venture-backed, whether or not the issuer has positive earnings in the year of its IPO, and analyst coverage.

We find strong evidence of positive assortative matching in IPOs and SEOs. This is consistent with our mutual choice theory, but is also consistent with some one-sided choice theories. When we examine the specific predictions unique to our model, we first find strong evidence that the association of issuers and underwriters is transactional. Specifically, we find that issuers and underwriters who experience greater (lesser) divergence in relative rankings from IPO to SEO are more (less) likely to rematch with different partners for their SEO. Moreover, we find that issuers who experience an increase (decrease) in quality (relative to other issuers) from IPO to SEO are more likely to match up for their SEO with a higher (lower) reputation underwriter than they employed for their IPO. While Krigman, Shaw and Womack's (2001) findings suggest that firms will switch only if they can graduate to better underwriters, we find that the change in the firm's relative quality is highly significant in explaining the switch even after we control for the change in underwriter reputation between IPO and SEO, and the elapsed time between IPO and SEO. Finally, when we study the sub-sample of "down-switchers," (issuers who rematched for their SEO with a lower reputation underwriter than the underwriter they had matched with for their IPO), we find that these firms have significantly smaller increases in issue size from IPO to SEO, lower average returns from IPO to SEO, and pay higher percentage spreads for their SEO than other issuers.

When we examine the data on underwriter market share, we find evidence consistent with the predictions of our model. Specifically, we find that the market share of high-reputation underwriters is inversely related to the number of issues being brought to market. We also find that the average quality of issues underwritten by top reputation underwriters in any year is positively related to the average quality of all issues brought to market in that year, and is also positively related to the dispersion of issuer quality for that year.

When we examine the data on pricing patterns, we again find evidence consistent with the predictions of our model. We find that higher reputation underwriters earn higher future spread revenues from subsequent offerings by their IPO firms. This is not, however, because higher reputation underwriters charge higher percentage spreads on SEOs. Instead, we find that, consistent with our model's prediction, higher reputation underwriters charge significantly lower percentage fees on SEOs. Higher reputation underwriters earn greater spread revenues because they continue to match with higher quality firms who, subsequent to their IPO, raise larger amounts of capital more frequently than the lower quality firms that match with lower reputation underwriters.

Overall, we interpret our empirical evidence as providing strong confirmation of our mutual choice model. The rest of the paper is organized as follows. Section I develops the analytical framework that we use in examining the matching market of firms and underwriters, and extracts the empirical implications. Section II describes the data. Section III reports the results from the empirical tests. Section IV concludes.

I. Firm-Underwriter Choice

A. Model Setup

We consider an economy in which firms sell their equity to public investors in offerings underwritten by investment banks. We examine the selection problem between *I* firms and *J* potential underwriters. We assume that each issuing firm could hire a single underwriter while each investment bank could simultaneously underwrite multiple issues subject to exogenously fixed capacity constraints. Throughout our analysis we take the decision of the firm to issue equity to the public as given and we assume that the available underwriting capacity in the market is predetermined at a level sufficient to accommodate all the issues entering the market.

Each individual issue $i = 1,...,I$ is characterized by a quality parameter, q_i. Similarly, each underwriter $j = 1,...,J$ is characterized by an ability parameter, a_j.[7] Firm quality is indivisible in the sense that it cannot be traded in partial units or parceled off. Underwriter ability is indivisible in the sense that it may not be parceled out differentially across the underwriter's clients. We let $q_1 > q_2 > ... > q_I$ and $a_1 > a_2 > ... > a_J$.[8]

If firm i is matched with underwriter j then a joint surplus of $H_{i,j} = H\left(q_i, a_j\right)$ is produced. This surplus is equal to the value created in the issue process net of all direct and indirect costs incurred by the issuer and the investment bank.[9] As noted before, we take the decision of the firm to issue equity as given, so that $H_{i,j} > 0$ for any $\{i, j\}$ pair. If a firm or an underwriter is unmatched then no surplus is produced ($H_{i,0} = H_{0,j} = 0$.) The above definition of the joint surplus necessarily assumes that the surplus produced by any issuer-underwriter pair is independent of the rest of the matching arrangements.

We assume that firm quality and underwriter ability are complementary in the sense that the returns (measured in terms of joint surplus) to firm quality are increasing in underwriter

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[7] In general, q_i and a_j could represent aggregate measures of quality and ability vectors, $\left\{q_{i,1}, q_{i,2}, ..., q_{i,N}\right\}$ and $\left\{a_{j,1}, a_{j,2}, ..., a_{j,M}\right\}$. Underwriter reputation is an example of such a measure.

[8] Allowing for the existence of firms and underwriters with identical characteristics does not change the results qualitatively.

[9] In this setting the gross spread that the firm pays to the underwriter for the services provided does not have an impact on the surplus. Underpricing, on the other hand, could affect the surplus produced by the match while also constituting a transfer to the underwriter. We thank a referee for drawing our attention to this point.

ability, and the returns to underwriter ability are increasing in firm quality. This notion fits the firm-underwriter matching market particularly well since it is reasonable to expect that high quality firms will be able to make better use of the numerous services provided by high ability underwriters than low quality firms can, while high ability underwriters will be able to better identify, capitalize on and promote the superior characteristics of high quality firms than their less able competitors. We can state the above notion more formally in terms of our notation as $H_{i,j} - H_{i,j+l} > H_{i+k,j} - H_{i+k,j+l}$ for any i, j and any $k > 0, l > 0$, or equivalently, as $H_{i,j} - H_{i+k,j} > H_{i,j+l} - H_{i+k,j+l}$.[10]

Issuers and underwriters are perfectly informed about each other's characteristics and about the properties of the surplus function. The two sides maximize the joint surplus arising from a match. We allow for the possibility of transfer payments between any firm and any underwriter.[11] We assume that there are no prior contractual obligations that would prevent any firm from matching with any underwriter, should the two sides find it optimal to do so.[12]

B. Matching Firms and Underwriters: Theoretical and Empirical Implications

In this section we examine the equilibrium matching of issuers and underwriters given our setup. In our first proposition, we establish the conditions under which matching is positive assortative, i.e. the quality of issuing firms is positively correlated with the ability of their underwriters in equilibrium. All proofs are provided in the Appendix.

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[10] When the surplus is monotonically increasing in both arguments this condition is also known as the "supermodularity condition." In such cases, the inequality is also equivalent to a positive cross partial derivative for a differentiable surplus function. See, for example, Legros and Newman (2002). We thank Tom Noe for his insights on this point.

[11] In equilibrium no transfer payments need to be made between parties that are not matched with each other. However, this fact emerges endogenously from the matching framework. See, for example, Roth and Sotomayor (1989) for further exposition on this point.

[12] Roth and Sotomayor (1989) prove the existence of a stable outcome for such a matching market using the Duality Theorem.

PROPOSITION 1 (Positive Assortative Matching): *If* $H_{i,j} - H_{i,j+l} > H_{i+k,j} - H_{i+k,j+l}$ *for any* i, j *and any* $k > 0$, $l > 0$, *then the competitive equilibrium outcome is characterized by positive assortative matching, i.e. issuers and underwriters will match such that firm quality and underwriter ability are positively correlated.*

Proposition 1 provides the basic matching result underlying our theoretical framework. It supports the notion that issuing firms and underwriters associate by mutual choice, in contrast to the traditional notions of unidirectional choice.

Proposition 1 gives rise to several empirical hypotheses. First, it implies that firms of higher quality will match with more reputable underwriters.[13] Second, if a firm chooses the most reputable lead underwriter from the set of available underwriters, our theory also suggests that co-managers (i.e., investment banks that have demonstrated their desire to associate with the issuer) will be of lower reputation than lead managers.[14] Third, to the extent that higher quality firms are more likely to issue public securities, as argued by Chemmanur and Fulghieri (1994b) and Krishnaswami, Spindt, and Subramaniam (1999), Proposition 1 also suggests that more reputable underwriters would match with IPO firms that are more likely to have subsequent issues of public securities. We test all our empirical hypotheses in Section III.

We next examine specific implications of our matching framework. First, we study how differences in ability across underwriters can give rise to differences in their market shares. When underwriter ability is valuable (that is, underwriters of higher ability give rise to a larger joint surplus), more able underwriters would always find a match as long as their less

[13] Since underwriter reputation is the standard empirical measure of underwriter ability, we will refer to "underwriter ability" directly as "underwriter reputation" in the empirical part of the paper.

[14] We thank a referee for providing this insight.

able counterparts are also matched, suggesting that more able underwriters will command a larger market share. This notion is formalized in our second proposition.

PROPOSITION 2 (Underwriter Market Share): *If the surplus is increasing in the ability of the underwriter and if in equilibrium an underwriter with a given ability is matched, then it must be the case that any underwriter with a higher ability is also matched.*

From an empirical standpoint, Proposition 2 suggests that in more active markets less reputable underwriters will have a higher probability of matching with an issuer, providing a link between underwriter market share and the level of issue activity in the market. Specifically, the market share of more reputable underwriters will be negatively related to the level of activity in the equity issue market.

Given mutual association, differences in underwriter ability also create differences in the quality of issuers that different underwriters are able to pair with. As stipulated in Proposition 3, if underwriter ability is positively related to the joint surplus and positive assortative matching occurs, then the most able underwriter will always match with the highest quality firm, regardless of what this firm's characteristics might be in absolute terms.

PROPOSITION 3 (Relative Matching): *If the surplus is increasing in the ability of the underwriter and if* $H_{i,j} - H_{i,j+l} > H_{i+k,j} - H_{i+k,j+l}$ *for any* i, j *and any* $k > 0$, $l > 0$, *then in equilibrium the highest quality firm is matched with the most able underwriter, the second highest quality firm is matched with the most able underwriter if it still has underwriting capacity available and if not, with the second most able underwriter, and so on.*

Proposition 3 suggests that underwriters match with issuers based on their relative quality, and gives rise to the joint empirical hypothesis that the average quality of issues underwritten by more reputable underwriters is positively related to the average quality of all issuing firms in the market, positively related the market-wide variation in issue quality, and positively related to the number of issues in the market.

The existing literature widely recognizes that many firms go public with the intent to revisit the public equity markets in the near future. Such firms use the IPO stage, in part, as an introductory step for a larger secondary equity offering. While the empirical implications derived hitherto apply to both IPOs and SEOs, our theoretical framework also permits us to derive additional empirical implications that link the IPO and SEO stages. The first of these is based on the insight that a change in the quality of the firm between the IPO and SEO would lead to a change in the reputation of the underwriter it matches with, and a change in the reputation of an underwriter would lead to a change in the quality of firms it matches with. Thus, a change in underwriter reputation between a firm's IPO and SEO is positively related to a change in the firm's quality between the IPO and the SEO.

Second, a change in the firm's quality from the IPO to the SEO that is not offset by a corresponding change in the reputation of its IPO underwriter could lead to a switch of underwriter. Since secondary issues are in general of higher quality than initial issues, the argument in the previous paragraph would imply that on average firms would switch to more reputable underwriters from IPO to SEO, i.e. manifest a "graduation" effect between the two stages.

However, clients of more reputable underwriters would find fewer opportunities to improve underwriter reputation and therefore, they would be less likely to switch underwriters. Additionally, more reputable underwriters would match with higher quality firms that are less likely to experience significant changes in quality and thus would be less likely to switch them if and when such firms have subsequent issues.

Finally, since it is more likely that clients of more reputable underwriters will undertake secondary offerings, and less likely that they will switch to a new underwriter when they do so, more reputable underwriters should generate significantly more future underwriting business from the firms they bring public. Thus, we would expect the amount of future business that underwriters receive from their IPO clients to be positively related to the reputation of the underwriter.

The mutual association through optimal matching also has implications for the pricing of underwriter services. Given a specific level of joint surplus created by the match, underwriter fees are determined by the distribution of this surplus between firms and underwriters. This distribution is determined in a bargaining framework and depends on the relative bargaining power of the parties involved. It is especially significant that the equilibrium allocation of the surplus need not be unique. In Proposition 4 we identify the firm optimal and underwriter optimal surplus allocations that would occur in equilibrium. We present Proposition 4 under two additional assumptions: (a) that each underwriter underwrites only one firm and (b) firm quality and surplus are positively related. Although these assumptions are not necessary to obtain our results, they greatly simplify the exposition.

PROPOSITION 4 (Surplus Allocation): *Suppose that the surplus is increasing in the ability of the underwriter and in the quality of the firm and that* $H_{i,j} - H_{i,j+l} > H_{i+k,j} - H_{i+k,j+l}$ *for any firm* i*, underwriter* j*, and any* $k > 0,\ l > 0$*. Positive assortative matching implies that in equilibrium underwriter* j *will match with firm* $i = j$*. The firm optimal (lower) and underwriter optimal (upper) allocations to the* j^{th} *underwriter* $(j < J)$ *are equal to:*

$$U_{j,j}^{lower} = \sum_{n=j}^{J-1}\left(H_{n+1,n} - H_{n+1,n+1}\right) \textit{ and}$$

$$U_{j,j}^{upper} = H_{j,j} - \sum_{n=j}^{J-1}\left(H_{n,n+1} - H_{n+1,n+1}\right).$$

When $j = J$ *then* $U_{J,J}^{lower} = 0$ *and* $U_{J,J}^{upper} = H_{J,J}$.

The dollar bounds in Proposition 4 are nonnegative numbers less than or equal to $H_{j,j}$.[15] Additionally, both bounds are increasing in the ability rank of the underwriter. Moreover, it can be easily shown that any equilibrium dollar allocation to the underwriter will be non-decreasing in the ability of the underwriter. The interpretation of the two bounds is straightforward. Note that the lower bound for underwriter j is equal to the lower bound for underwriter $j+1$ plus the increase in surplus achieved if underwriter j matches with firm $j+1$, *i.e.* $U_{j,j}^{lower} = U_{j+1,j+1}^{lower} + \left(H_{j+1,j} - H_{j+1,j+1}\right)$. In other words, if underwriter j replaces underwriter $j+1$ in the match with firm $j+1$ then it can expect to get at least what underwriter $j+1$ gets plus the additional surplus being created due to underwriter j. The upper bound for underwriter j can be viewed as the surplus produced by its match with firm j minus the lower bound that firm j should get from that surplus.

Using the dollar bounds derived above, we can also analyze the allocation received by the j^{th} underwriter in proportion to the created surplus. The proportionate allocation that is obtained at the firm optimal distribution of the surplus is equal to

[15] For simplicity, we disregard moral hazard problems of the type discussed by Pichler and Wilhelm (2001), who argue that in order to ensure high underwriter effort, it might be rational for issuers to share surplus with syndicate members. However, it is not possible to rule out such behavior in our framework. We thank a referee for this point.

$\alpha_{j,j}^{lower} = \sum_{n=j}^{J-1} \left(H_{n+1,n} - H_{n+1,n+1} \right) \Big/ H_{j,j}$ while the proportionate allocation obtained at the underwriter optimal surplus distribution is $\alpha_{j,j}^{upper} = \left[H_{j,j} - \sum_{n=j}^{J-1} \left(H_{n,n+1} - H_{n+1,n+1} \right) \right] \Big/ H_{j,j}$. These proportionate bounds are not necessarily a monotone function of the ability of the underwriter. However, if the marginal contribution of underwriter ability to the joint surplus is declining, and sufficiently small relative to the marginal contribution of firm quality, then the numerator in $\alpha_{j,j}^{lower}$ will increase at lower rates than the denominator and the proportion received by underwriters in the firm optimal allocation of the surplus would decline as underwriter ability rises. Finally, for an underwriter of given ability rank j, as the number of underwriters, J, increases, $\alpha_{j,j}^{lower}$ would increase while $\alpha_{j,j}^{upper}$ would decrease so that the two proportionate bounds would get closer to each other.

The allocations identified above are not necessarily the only equilibrium ones. For example, any flat proportional allocation that lies within the identified bounds and any fixed linear combination of the two bounds would also support the equilibrium matching. One important fact should be emphasized, however -- the exact surplus allocation results from the bargaining stage are independent of the firm-underwriter pairing that occurs at the matching stage.

Proposition 4 yields our final empirical hypothesis. We argued above that when the marginal contribution of underwriter reputation to the joint surplus is small relative to the marginal contribution of firm quality, the percentage allocation of the surplus to the underwriter could be a declining function of the reputation of the underwriter. These conditions are more likely to hold in SEOs rather than in IPOs since the ability of the underwriter is likely to be less critical (and the underwriter's relative bargaining power likely to be lower) for seasoned offerings. Thus we would expect to find that in SEOs, the percentage spread declines with the reputation of the underwriter.

We now turn to our empirical analysis. We describe our data in the next section, after which we present the results of our empirical tests.

II. Data

We collect our data from the New Issues Database of the Securities Data Company (SDC), the Center for Research in Security Prices (CRSP) monthly and daily files, the COMPUSTAT annual files, and the Institutional Brokers Estimate System (I/B/E/S) database. Additionally, I/B/E/S kindly provided us with the analysts and brokers data necessary to identify the brokerage houses associated with analysts providing earnings forecasts.[16]

A. General Sample

From SDC we include only issues marketed in the US by US firms between 1970-2000. Similar to Chen and Ritter (2000), we exclude all offerings of closed-end funds, American Depositary Receipts (ADRs), real estate investment trusts (REITs), and unit offerings. However, we do not exclude penny stocks from our analysis since both high and low reputation underwriters are allowed to compete for such offerings.[17] Following Hansen (2001) and Altinkilic and Hansen (2000), among others, we use only industrial firms in our tests, where we classify a firm as industrial if its Standard Industrial Classification (SIC) code is not between 4000-4999 (utilities) or between 6000-6999 (financials). SIC codes are provided by

[16] I/B/E/S is a service of Thompson Financial. This data has been provided as part of a broad academic program to encourage earnings expectations research.

[17] Nonetheless, we have verified that our results are not driven by penny stocks. We have replicated all our tests while excluding stocks with IPO/SEO offer price below $5 per share, without observing any significant change in the results.

the SDC database. The actual sample size used in the different analyses is dictated by data availability and is indicated in the relevant tables.

For part of the analysis we require only available information on the proceeds from the offering so that we use all available public issues of common equity without further restrictions on data availability. All proceeds used in the tests exclude overallotment options. We express all dollar amounts in 1996 US dollars using the GDP implicit price deflator. The total number of issues is 13,059 with 5,764 issues classified as IPOs and 7,295 issues as SEOs. On average there are 421 issues per year. This sample is used to compute the main underwriter reputation measure based on Megginson and Weiss (1991), and calculated as in Aggarwal, Krigman, and Womack (2002).[18] This measure of underwriter quality is market-share based and is a continuous variable on [0,100].[19] When more than one lead underwriter underwrites an issue then we split the proceeds equally between all lead banks. We perform some of our analysis using the lead underwriter's percentile reputation rank based on the Megginson-Weiss lead underwriter reputation measure.

B. IPO Data

For our IPO sample we select only public offerings of common equity that SDC defines as "Original IPOs", i.e. the common stock has never traded publicly in any market and the firm

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[18] For a set of underwriters *I* and for every year *t*, we define the three-year moving average (*t-2*, *t-1*, *t*) of IPO and SEO proceeds lead underwritten by underwriter *j* as x_{jt}. Then the lead underwriter rank (LUR) for underwriter *j* is:

$$LUR_{jt} = \frac{\ln x_{jt}}{\max_{i \in I} \left[\ln x_{it} \right]} \times 100$$

Under this measure, the underwriter with the highest three-year moving average of IPO and SEO proceeds for year *t* would have a lead underwriter rank of 100.

[19] The Carter-Manaster reputation measure (Carter and Manaster (1990), and Carter, Dark and Singh (1998)) gives qualitatively similar results in our analysis. The annual cross-sectional correlation between the two measures is high, ranging between 0.70 and 0.90. However, the Carter-Manaster reputation is unavailable for many underwriters. Furthermore, the Carter-Manaster reputation measure tends to cluster on 9 for higher quality SEOs and this lack of dispersion makes it impossible to perform some of our analysis. For these reasons we report the results using the Megginson-Weiss reputation measure.

offers it for the first time to the US public market. The SDC database contains only firm-commitment IPOs, and therefore our sample has only such IPOs. Also, the sample of IPOs contains only negotiated offers. We further require that firms have a single lead underwriter for the issue, unless noted otherwise.[20] Additional data requirements dictate the actual sample size in our analysis.

Data on firm earnings is obtained from the COMPUSTAT annual files. We create a dummy variable to indicate whether a firm has positive earnings for the fiscal year that ends closest to the IPO date. Data on earnings forecasts is obtained from the I/B/E/S database. We obtain the number of analysts that made annual forecasts three months before the end of the fiscal year that ends at most one year after the IPO. A firm is viable if in five years after the IPO the firm still trades on the New York Stock Exchange (NYSE), on the American Stock Exchange (AMEX), or on Nasdaq or has been delisted due to a merger or an exchange offer.[21] Otherwise it is non-viable. Firm delisting data is obtained from the CRSP monthly files. We also use a dummy that measures whether the issue is venture-backed or not. The market capitalization of the firm after the IPO is computed using the first available CRSP data for shares outstanding and share price.

We observe that for IPOs average dollar spreads have increased over time. This increase is especially noticeable in the 1999-2000 period. The increase in dollar spreads is due to the significant increase in issue size. Percentage spreads have actually declined from around eight percent in the 1970s to around seven percent by the end of the 1990s due to the clustering

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[20] During our sample period, only 52 issues (less than 2% of all equity issues included in the SDC database) had more than one lead underwriter.

[21] It is possible that by including firms delisted due to a merger or an exchange offer in our count of viable firms, this measure would include as viable those distressed firms that would eventually have been delisted if not for a prior acquisition. We thank Jay Ritter for this observation.

phenomenon documented by Chen and Ritter (2000). Underwriter reputation for the average issuer has increased.

Underpricing has increased for the second part of the 1990s and especially for 1999-2000 as noted by Ritter and Welch (2002). At the same time, the variability in IPO underpricing has also increased for 1999-2000. The proportion of IPOs with positive EPS has declined from around 80 percent for the 1980s to around 20 percent for 1999-2000 (see also Ritter and Welch (2002)). The age of the average IPO firm has declined from around 12 years in the 1970s, 1980s and early 1990s, to around six years in 1999-2000 (see also Loughran and Ritter (2003)). The decline in average age is also accompanied by a decline in age dispersion. The proportion of viable IPOs has marginally declined from 89 percent in the 1970s to 86 percent for 1995. The proportion of venture backed IPOs has increased from 22 percent in the 1970s to 69 percent in 1999-2000. The average number of analysts providing earnings forecasts for IPO firms has increased from 2.5 in the early 1980s to 3.7 in 1999-2000.

C. SEO Data

For the SEO sample we select all issues of seasoned equity offerings of common stock between 1970 and 2000. We again require that the issue has a single lead underwriter, unless noted otherwise.

Data on firm earnings and dividends is obtained from the COMPUSTAT annual files while data on earnings forecasts is obtained from the I/B/E/S database. A firm is viable if in five years from the SEO the firm still trades on the New York Stock Exchange (NYSE), on the American Stock Exchange (AMEX), or on Nasdaq or has been delisted due to a merger or an exchange offer. Otherwise it is non-viable. Firm delisting data is obtained from the CRSP monthly files. Standard deviation of daily returns is computed using data from the CRSP daily files. We compute the market capitalization of the firm in the month prior to the SEO using data for shares outstanding and share price from the CRSP monthly files.

For SEOs, the dollar spreads have also increased over time. Percentage spreads, however, have declined from around six percent in the 1970s to around five percent by the end of the 1990s. Similar to the IPO sample, underwriter reputation for the average issuer has also increased.

For SEOs, the proportion of firms with positive EPS has declined from more than 90 percent in the 1970s and 1980s to approximately 50% in 1999-2000 while the average number of years from IPO to SEO has declined from around ten in the 1970s to around six in the latter part of the 1990s. The proportion of viable SEOs has declined from 96 percent in the 1970s to 90 percent in 1995. The average number of analysts providing earnings forecasts has declined from 8.7 in the early 1980s to 5.0 in the early 1990s and has then increased to 5.5 in 1999-2000. The proportion of SEOs paying dividends has declined from 56 percent in the 1970s to ten percent in 1999-2000 while the standard deviation of daily stock return for the average SEO has increased from 2.6 percent in the 1970s to around 3.6 percent in the 1990s and up to six percent in 1999-2000.

D. IPOs and Subsequent Issues Data

We classify a firm as making a subsequent offering if it has at least one subsequent issue in the five-year period after the IPO, and that data is available as necessary. A part of the analysis uses any type of security that the firm has issued during the period, while the rest of the analysis uses only subsequent issues of equity.

We measure the subsequent spreads as the sum of all spreads that the IPO underwriter collects from the firm that it brought public, excluding the IPO. We also employ an alternative measure of subsequent spreads. We discount the future spreads using the average market rate of return to bring them back to the IPO date. After summing these values, we use the 1996 GDP implicit price deflator to represent the sum in 1996 dollars.

III. Empirical Results

A. Firm-Underwriter Matching at the IPO and SEO Stages

We divide our sample into IPOs and SEOs to avoid misspecifications that may result from omitted variables related to the differences between firms performing IPOs and firms performing SEOs. We first test for positive assortative matching in the IPO market and then we repeat the analysis for the SEO market.

By creating five portfolios based on underwriter reputation and five portfolios based on the filing proceeds of the issue we are able to graphically examine the association of underwriter reputation and issuer quality as proxied by filing proceeds. Panel A of Figure I shows that underwriters in the highest (lowest) reputation quintile are most likely to associate with firms in the highest (lowest) quality quintiles. We find a similar pattern of matching frequencies for the intermediate portfolios.

[Place Figure I about here]

In Panel B of Figure I we examine the issue of complementarity between firm quality and underwriter reputation. For that purpose, we construct a measure that positively correlates with the value created by the match and at the same time is uncorrelated with *ex ante* issuer size. We first compute (in millions of 1996 US dollars) the combined value, V_i, received by the existing owners and the underwriters of each IPO firm, i, as:

$$V_i = N_0 P_1 - N_{0,s}\left(P_1 - P_0\right) + N_n P_0 f\ ,$$

where N_0 is the number of shares outstanding before the offer, $N_{0,s}$ is the number of shares sold by existing owners, N_n is the number of new shares issued by the firm, P_0 is the offer price, P_1 is the first trading price after the IPO, and f is the percentage spread paid to the underwriter. The expression for V_i consists of the post-IPO value of the pre-IPO shares minus the cost of underpricing to existing owners plus the fee received by the underwriter from the sale of new shares. The underwriter's fee arising from shares sold by existing owners simply represents a transfer from such owners to the underwriter. Lower offer prices, and thus higher underpricing, lead to lower values received by both the firm and the underwriter.[22]

All else equal, larger firms should result in larger values for V_i. To control for the effect of firm size on the total value resulting from the match, we next estimate the following regression model (both coefficients are significant at the 1% level):

$$V_i = \alpha + \beta_1 B_i + \varepsilon_i = 149.72 + 1.81 \times B_i,$$

where B_i is the book value of common equity (in millions of 1996 US dollars) before the offering for firm *i*. We use the estimated model for each firm *i* to construct our proxy for the value created, h_i, that is not related to the size of the firm: $h_i = \alpha + \varepsilon_i$. In Panel B of Figure I we present the average h_i for each of the 25 portfolios. The values are largest for the highest quality firms and the highest reputation underwriters, and decrease progressively as quality and reputation decline. The association of high quality firms and high reputation underwriters observed in Panel A is therefore consistent with the two sides maximizing the total value obtained by the match. Furthermore, the evidence that low quality firms are more likely to match with low rather than high reputation underwriters, even though total value increases with underwriter reputation, is consistent with the notion that only high quality firms have an unconstrained choice of underwriters.

[22] Using a sample of U.K. IPOs, Ljungqvist (2003) documents that underpricing is inversely related to the sensitivity of bank compensation to the valuation of issuers.

Table I examines the relation between firm quality and underwriter reputation while controlling for the market capitalization of the firm and the amount of the IPO proceeds. We find that more reputable underwriters associate with larger firms and firms with larger IPO proceeds than their less reputable counterparts.[23] The positive link between underwriter reputation and issue size is consistent with the better ability of more reputable underwriters to market the issue to public investors. As in Seguin and Smoller (1997) and Fernando, Krishnamurthy and Spindt (2003) we use the likelihood of delisting due to financial distress in the five-year period following the IPO as a proxy for a firm's risk. We find that more reputable underwriters associate with firms that have a lower risk of distress delisting. Furthermore, clients of more reputable underwriters are more likely to have a follow-on security offering in the five years after the IPO, in line with the evidence presented by Carter (1992). As in Brav and Gompers (1997) and Megginson and Weiss (1991), we employ the venture-backed dummy as another proxy for the firm's risk. Barry, Muscarella, Peavy and Vetsuypens (1990) find evidence that venture capitalists provide intensive monitoring services. Therefore, venture-backed IPOs would result in lower monitoring costs for the lead underwriter. We document that venture-backed IPOs match with underwriters of a higher reputation than do IPOs with no venture backing.[24] We use an earnings dummy as another proxy for a firm's quality. Consistent with Kim and Ritter (1999) and Benveniste et al. (2003), firms with positive earnings may be easier to value since one can use earnings multiples. We can also view firms with negative earnings and short records as being subject to greater uncertainty about their future performance and profitability. We also expect the age of

[23] Benveniste et al. (2003) also find a positive link between IPO proceeds and underwriter reputation.

[24] However, it is possible that a pre-existing relationship between a venture capitalist and an investment bank may influence this result. We thank Donghang Zhang for this observation. Benveniste et al. (2003) also find a positive link between IPO venture backing and underwriter reputation.

the firm to be negatively related to the uncertainty and asymmetric information that accompany an issue (see also Loughran and Ritter (2003)). We find that lead underwriter reputation is significantly and positively related to both the earnings dummy and the age of the firm. The results in the last column of Table I show that firms brought public by more reputable underwriters have more analysts making three-month earnings forecasts in the first year after the IPO.[25]

[Place Table I about here]

We have also separately examined the association of firms and underwriters for the 1999-2000 sub-period.[26] While the results for size, proceeds, venture-backing, and number of forecasts are consistent with the results for the full sample period, the results for the age of the firm and the profitability dummy are not significant in our regressions. The weaker results for this sub-period could be due in part to the bundling phenomenon hypothesized by Benveniste, Busaba and Wilhelm (2002) and empirically verified by Benveniste, Ljungqvist, Wilhelm and Yu (2003).

Next we examine the relation between underwriter reputation and different proxies of firm quality at the SEO stage while controlling for the size of the firm and the issue. The results presented in Table II are consistent with the notion that more reputable underwriters underwrite seasoned issues of higher quality firms. More reputable underwriters underwrite SEOs of firms with a longer record on the CRSP files. The viability dummy is also significantly and positively related to the reputation of the underwriter. Additionally, firms with positive earnings immediately after the SEO and firms that pay dividends hire more

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[25] We also used the number of one-month and six-month analyst forecasts with similar results. Additionally, in unreported tests we found evidence that firms that are brought public by more reputable underwriters have more precise analyst earnings forecasts after the IPO. These results, however, are likely to suffer from endogeneity problems and we do not report them in the paper. We thank a referee for this helpful insight.

[26] We thank a referee for suggesting this analysis. The results are available on request.

reputable underwriters. Finally, firms that have a greater analyst following and a lower standard deviation of returns before the SEO are matched with underwriters of higher reputation. The number of years on CRSP is significant at the 5% level while all other variables are significant at the 1% level.

[Place Table II about here]

In summary, the results presented in this section strongly support positive assortative matching at the IPO and the SEO stages.

B. Issue Activity vs. Market Share and Client Quality of Reputable Underwriters

In this section we first analyze the relation between the market share of the seven highest reputation underwriters in our sample in a given year and the level of activity in the equity issue market in that year. Proposition 2 implies that the market share of the high reputation underwriters should decline as the number of issues rises, and *vice versa*. The results in Table III are consistent with this implication. The coefficient on issue activity is negative and significant at the 5% level.

[Place Table III about here]

In Table IV we report the results of our test of several hypotheses based on Proposition 3. We use the proceeds of an issue as a measure of the firm's quality, under the assumption that larger issues are of higher quality. We find that the average firm quality for the top seven underwriters in a given year is positively related to the average quality of all the issues for that year. Furthermore, as the dispersion of firm quality rises, so does the average quality of firms underwritten by the top seven underwriters. Finally, the number of issues is positively related to the average quality of the firms underwritten by the top seven underwriters. All three relations are significant at the 1% level.

[Place Table IV about here]

C. Lead Underwriter Reputation and the Reputation of Co-Managing Banks

In this section we focus our attention on the choice that a firm exercises over underwriters willing to underwrite it. If a firm chooses the most reputable lead underwriter from the set of available underwriters, Proposition 1 also suggests that co-managers will be of lower reputation than lead managers. We compare the reputation of the lead underwriter to the reputation of co-managers.[27] The results are presented in Panel A of Table V. Consistent with our hypothesis, we find that on average lead underwriters have significantly higher reputation than co-managers. The results hold for the whole sample as well as for the IPO and SEO sub-samples. In addition, when we bifurcate our sample into two sub-samples: (a) issues where the lead underwriter has above median reputation and (b) issues where the lead underwriter has below median reputation, we find that the results hold for both sub-samples.

[Place Table V about here]

It is possible that lead underwriters, rather than firms, are actively involved in the selection of co-managers of an issue, in which case our results in Panel A may be mostly driven by the preferences of the lead underwriters. To verify the robustness of our results, we compare the reputation of the lead underwriter with the reputation of the investment banks whose analysts provide earnings forecasts for the firm after the issue. The results are presented in Panel B of Table V. We again find that on average lead underwriters have higher reputation than the investment banks whose analysts provide forecasts for the firm. As before, our results hold for the whole sample, for the IPO and SEO sub-samples, and for the above-median and below-median underwriter reputation sub-samples. Since the lead underwriter is unlikely to exert significant direct influence on third-party analyst coverage subsequent to the issue, these results provide further support for our previous findings.

[27] We thank a referee for suggesting this analysis.

D. The Transactional Nature of Firm-Underwriter Matching

Our next objective is to examine whether a switch in underwriters from IPO to SEO is related to a change in a firm's quality relative to the current reputation of its IPO underwriter, which is also suggested by Proposition 3. A relationship between the probability of switching and the relative change in firm quality would lend support to the notion that firm-underwriter choice is transactional rather than the outcome of a prior relationship. Our theory predicts that the probability of a switch would increase as the divergence between firm quality and underwriter reputation increases relative to the association predicted by positive assortative matching. We use the absolute difference between the issue's proceeds percentile rank and the reputation percentile rank of the underwriter as our measure of the divergence between firm quality and underwriter reputation. Proceeds percentile ranks are constructed on an annual basis using all IPO and SEO issues for a given year. Similarly, underwriter percentile ranks are constructed annually using the Megginson-Weiss reputation measure discussed above.

Table VI reports the results from a logistic regression that relates the probability of switching to the absolute difference between the firm's quality rank and its IPO underwriter's reputation rank. Consistent with our theory, we find that firms and underwriters with higher differences in relative ranking are more likely to switch each other than firms and underwriters that have similar ranks. These results are new to the literature and are not predicted by a relationship theory of firm-underwriter association. We provide our estimates for the entire 1970-2000 sample period as well as for the 1970-1990 and 1991-2000 subperiods to check for any differences in the 1990s. For the entire sample period, firms are more likely to switch the higher the change of IPO underwriter reputation percentile rank from IPO to SEO, the higher the absolute difference between the IPO underwriter reputation percentile rank and the firm's SEO proceeds percentile, and the higher the time elapsed since the IPO, and less likely to switch the higher the IPO underwriter's reputation percentile rank at the SEO. While Krigman, Shaw and Womack (2001) also examine switching and document a graduation to higher reputation underwriters at the SEO stage, their findings suggest that firms switch in order to graduate to better underwriters. However, even after we control for the change in underwriter reputation between IPO and SEO, and the elapsed time between IPO and SEO, we find that the change in the firm's relative quality is highly significant in explaining the switch. Thus, we attribute switching to a change in relative ranking between the IPO and SEO, suggesting that the graduation effect will occur only if the firm's relative quality also improves. Indeed, for the 1991-2000 period, our results show that after controlling for the change in the firm's quality and the time elapsed since the IPO, the change in underwriter reputation from IPO to SEO is no longer statistically significant in explaining the switch.

Additionally, in contrast to Krigman, Shaw and Womack (2001), our findings also suggest the possibility (examined in detail below) of downward switching. Nonetheless, we do find that switchers usually switch to higher reputation underwriters (at least in the early part of our sample period) and that the length of the period between the IPO and the SEO is positively related to the probability of a switch. A one standard deviation (0.72) increase in the log number of days from IPO to SEO leads to an increase in the probability of a switch from around 32% to around 49%. While the previous literature (e.g. James (1992)) has attributed the significance of the IPO-SEO period length to the declining value of the relationship-specific asset over time, our theory provides an alternative explanation for this result since firm quality is more likely to change as the elapsed time increases, thus increasing the likelihood of a switch. We also find that underwriters with higher reputation are less likely to be switched, possibly because switching in the case of high reputation underwriters would occur only if their clients exhibit significant decreases in their relative qualities. A one standard deviation (0.27) increase in the percentile rank of the IPO lead underwriter reduces the probability of a switch from 32% to 22%.

[Place Table VI about here]

It has been argued that the investment banking industry has experienced a change from a relationship orientation towards a transactional orientation.[28] To control for this possibility we bifurcate our sample into two sub-periods of equal length (1970-1985 and 1986-2000) and include time dummies in our regression to encompass several sub-periods that span the 1986-2000 period. All of these dummies are significantly positive, suggesting that the firm-underwriter switching rates have indeed been higher in the second half of the 1970-2000 period. In particular, the results show that the probability of a switch during 1986-1990 is significantly higher (at the 1% level) relative to the pre-1986 period. Similarly, the switching rates are significantly higher (at the 1% level) for 1999-2000. For the 1991-1995 and 1996-1998 sub-periods, however, the probability of a switch is only marginally higher (at the 10% level) relative to the pre-1986 period.

Our finding of a higher propensity to switch in the later years, and especially in the 1986-1990 and 1999-2000 sub-periods, lends support to the notion that the investment banking industry has become more transactional in recent times. Nonetheless, our analysis clearly shows that the overriding determinant of an underwriter switch from an IPO to an SEO is the difference in relative ranks of issuer quality and underwriter reputation, a result which persists throughout our sample period and during each of the sub-periods.

Our theory also suggests that firms experiencing a relative increase in their quality would be more likely to switch up while firms experiencing a relative decline in quality are more likely to switch down. We test this implication in Table VII using an ordered logistic

[28]See, for example, Hayes (1979), and Eccles and Crane (1988). We thank a referee for drawing our attention to this point.

regression where issuers are categorized into three groups: down-switchers, non-switchers, and up-switchers. As a control variable we include the reputation percentile rank of the IPO underwriter. The results show that issuers with high reputation IPO underwriters are less likely to improve the reputation of their underwriter for the SEO while the opposite is true for issuers with less reputable IPO underwriters. As our measure of issue quality we use the proceeds percentile rank. We then compute the difference between the proceeds percentile rank of the issuer at the SEO and at the IPO. Issuers that have increased their relative proceeds rank from IPO to SEO are viewed as having improved their relative quality. As hypothesized, we find that issuers that experience a relative increase in quality are more likely to switch up while issuers that experience a relative decline in quality are more likely to switch down. The coefficient for the change in issue proceeds rank is highly significant at the 1% level. These results complement the findings presented in Table VI by providing further evidence consistent with our hypotheses of positive assortative matching and of the transactional nature of firm-underwriter association.

[Place Table VII about here]

The final part of our analysis in this section focuses on the sub-sample of firms that experience a downward switch in underwriter reputation.[29] These firms constitute an interesting sample for special attention since they go against the common trend of switching to higher reputation underwriters at the SEO stage. Indeed, it seems unintuitive that firms would voluntarily switch to lower reputation underwriters. We first compare the down-switchers to all other issuers that either do not switch or that switch up. The results are provided in Table VIII. The results suggest that firms that switch down have an IPO underwriter reputation that is similar to firms that do not switch down. We use underpricing at

[29] We thank a referee for suggesting this analysis.

the IPO to measure the level of positive new information provided by the market about the quality of the issue. We find that down-switchers are significantly less underpriced at their IPO. Down-switchers also have lower market capitalization and issue lower amounts at the IPO stage. Furthermore, firms switching down have a significantly smaller increase in the issue size from IPO to SEO, have lower average returns from IPO to SEO, have smaller SEO issues, and pay higher percentage SEO spreads.

[Place Table VIII about here]

To establish the robustness of these findings, we also use the matched sample approach to compare issuers that switch down to issuers that do not switch down. These results are also reported in Table VIII. For each firm that switches down we find a matching firm that does not switch down, performs the SEO in the same year, has the closest SEO proceeds, and has an IPO lead underwriter in the same reputation quartile as the down-switching firm. In keeping with our previous results, the difference between the IPO proceeds of the two samples is insignificant but the underpricing at the IPO stage and the subsequent market capitalization are significantly lower for the down-switchers. The sample of firms switching down also has a significantly lower change in the proportion of firms with positive earnings, lower average daily returns between the IPO and the SEO, and lower SEO proceeds. In the matched sample approach we do not find a significant difference in the percentage spreads that firms pay to the SEO underwriter.

Our overall conclusion from the separate analysis of down-switchers is that firms that experience a decline in relative quality at the SEO stage switch to lower reputation investment banks to underwrite their SEOs. It is difficult to justify why firms would voluntarily switch to lower reputation underwriters, especially given our finding later in the paper that higher reputation underwriters charge lower spreads on SEOs. Down-switching is consistent with the notion that lower quality firms are “forced” to switch to lower reputation underwriters because their higher reputation IPO underwriters decline the opportunity to underwrite their secondary issues. Underwriters do indeed seem to exercise choice over the firms they underwrite in the same way that firms do over underwriters, further reinforcing the concept of mutual choice that we advance in this paper.

E. Subsequent Security Issues, Underwriter Reputation, and Long Term Underwriter Revenue

In this section we turn to the insights provided by our theory concerning the relation between underwriter reputation, and both subsequent security issues and long term underwriting revenue.

1,761 (44%) of the 3,970 firms in our sample that went public between 1970 and 1995 had subsequent issues of securities in the five-year period after the IPO, while the remaining 2,209 (56%) of these firms did not engage in any subsequent security offering. Of the firms making subsequent offerings, 913 used a different lead underwriter in their subsequent security offering, while the remaining 848 firms used their IPO lead underwriter.

In Table I we found that firms that hire more reputable underwriters at the IPO stage are more likely to issue securities in the five-year period following the IPO. This relation persists after controlling for post-IPO market capitalization and provides further support for Proposition 1.

In Table IX we use a Tobit regression to examine the relationship between underwriter reputation and subsequent fees. Our estimates suggest that a one standard deviation increase in underwriter reputation from the mean leads to an increase in the probability of a subsequent issue with the same underwriter from 19% to 35%. We also find that underwriters with higher reputation receive higher future dollar proceeds from the spreads that they charge on subsequent issues. Given that the IPO investment bank underwrites at least one subsequent issue, we find that a one standard deviation increase in IPO underwriter reputation leads to an increase of more than $3.9 million, in the total amount of spreads that it receives for underwriting follow-on security offerings in the five-year period after the IPO. The positive relation between subsequent revenues and underwriter reputation persists even after we control for the market capitalization of the firm after the IPO. The final Poisson regression in Table IX provides strong evidence that higher reputation underwriters underwrite a higher number of subsequent issues of their IPO clients. A one standard deviation increase in the reputation of the underwriter leads to an expected increase of 0.69 subsequent offerings. Overall, the results presented in this section are consistent with the notion that the amount of future business that underwriters receive from their IPO clients is positively related to the reputation of the underwriter.

[Place Table IX about here]

It is possible that the larger dollar spreads on subsequent issues earned by higher-reputation underwriters may be due in part to higher percentage underwriting spreads. In contrast, our empirical hypothesis derived from Proposition 4 suggests that the percentage spread declines with underwriter reputation. We turn to this issue next, noting at the outset that there is no significant clustering of SEO spreads on a single number (as observed for IPOs by Chen and Ritter (2000)) to complicate our analysis. Table X examines the relation between the spreads charged on SEOs and the reputation of the lead underwriter. We include only firms that issue equity at most five years after the IPO, using the same lead underwriter. We control for market capitalization of the issuer and the amount of the seasoned offering. The results indicate that more reputable underwriters charge significantly lower fees for underwriting SEOs. An increase of one standard deviation in SEO lead underwriter reputation is associated with a decrease (significant at the 1% level) of approximately 2.0 basis points in the percentage spread. The other coefficients are consistent with Altinkilic and Hansen

(2000). As in Nanda and Warther (1998), firms that were more underpriced at the IPO stage are charged higher fees for their SEOs. This evidence shows that more reputable underwriters receive larger future spreads not because they charge higher percentage fees but because they pair with firms that raise larger amounts of capital through more frequent subsequent offerings.

[Place Table X about here]

IV. Conclusion

In this paper we develop and test a theory of firm-underwriter selection founded on the institutionally accurate premise that issuers and underwriters associate by mutual choice. Underwriters look to the quality of the issuers who wish to employ their services and issuers look to the abilities of the underwriters who offer their services. This contrasts both with the conventional representation of issuer/underwriter associations as one-sided choices (with either issuers or underwriters doing the choosing), and the classical economics representation of a market in which prices clear the market. Our approach has implications for empirical studies examining the effect of underwriter reputation and/or issuer quality on IPO characteristics such as its level of underpricing, its probability of being withdrawn, and other variables that are important to either the issuer or the underwriter. Our findings suggest that issuers and underwriters will associate with different partners for subsequent offerings if changes in issuer quality and/or underwriter reputation are large enough. These findings support the view that the association of issuers and underwriters is transactional rather than relationship-based.

Our research also has implications for future work on underwriter market share and compensation. We provide fresh insights about how the level of market activity affects the market share of high ability underwriters as well as the quality of issues they underwrite. While more able underwriters enjoy a higher and less volatile market share, we show that they achieve this in cold markets by associating with lower quality issuers than in hot markets. While the flat IPO underwriting fees documented by Chen and Ritter (2000) are consistent with our model, we also argue that many other fee structures are possible. Indeed, we show that percentage fees for subsequent offerings decline with underwriter reputation. Significantly, our model implies that the underwriting spread is determined through bargaining between the matched issuers and underwriters and does not determine which underwriters associate with which issuers. Moreover, notwithstanding flat percentage IPO fees and declining SEO fees, we show that high reputation underwriters reap ample rewards for maintaining their reputation assets. Nonetheless, it would be interesting to use the mutual choice model developed here to examine how and why the industry converged on flat underwriting fees.

Although our model does not lead naturally, as far as we can tell, to a structural econometric model in which issuers take their own quality as given and choose the best underwriter they can (one equation block) while, simultaneously, underwriters take their own ability as given (at least in the short run), and choose the best issuers they can (another equation block), the possibility that issuers' and underwriters' joint choice of one another might be modeled as a structural system of simultaneous equations is an interesting path for future research.

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Appendix

Proof of Proposition 1: $\mathrm{M}(j)$ denotes the set of firms matched to underwriter j. If firm i is matched to underwriter j we write $i \in \mathrm{M}(j)$. The underwriter that is matched to firm i is denoted as $\mu(i)$. If firm i is matched to underwriter j we write $j = \mu(i)$. We need to show that if $i < i+k$ then in equilibrium $\mu(i) < \mu(i+k)$. Any stable matching should maximize the aggregate surplus produced by the matched pairs. If this were not the case the outcome would be dominated by another matching with a higher aggregate surplus where all participants receive the same amounts as in the original matching plus a nonnegative portion of the additional value created. Suppose that there exists an equilibrium matching where $i+k \in \mathrm{M}(j)$ and where $\mu(i) = j+l$ for some $k > 0$ and $l > 0$. Since we know that $H_{i,j} - H_{i,j+l} > H_{i+k,j} - H_{i+k,j+l}$, by re-matching firm i with underwriter j and firm $i+k$ with underwriter $j+l$ the sum of surpluses is increased and the hypothesized matching is not stable. ■

Proof of Proposition 2: Suppose that there exists an equilibrium matching where for some $l > 0$ we have $i \in \mathrm{M}(j+l)$ and the capacity of underwriter j is not filled, which we denote as $0 \in \mathrm{M}(j)$. Since we know that $H_{i,j} > H_{i,j+l}$ and $H_{0,j} = H_{0,j+l} = 0$, it is true that $H_{i,j} + H_{0,j+l} > H_{0,j} + H_{i,j+l}$. By re-matching firm i with underwriter j and leaving underwriter $j+l$ with one less match, the sum of surpluses can be increased and the hypothesized matching is not stable. ■

Proof of Proposition 3: Suppose that $i' \in \mathrm{M}(j=1)$ so that $i' > 1$ and $\mu(i=1) = j', j' > 1$. Since we know that $H_{1,1} + H_{i',j'} > H_{1,j'} + H_{i',1}$, by matching firm $i=1$ with underwriter $j=1$ and firm i' with underwriter j' the sum of surpluses can be increased, and the hypothesized matching is not stable. Situations in which underwriter $j=1$ is not matched are ruled out by the fact that firm $i=1$ is matched to $j' > 1$ and by Proposition 2. We apply the same reasoning to the new market created by eliminating firm $i=1$ and decreasing the available capacity of underwriter $j=1$ by one to get the desired result. ■

Proof of Proposition 4: The allocations to underwriter j and firm i, when matched together, are respectively $U_{i,j}$ and $F_{i,j}$ so that $U_{i,j}+F_{i,j}=H_{i,j}$. We will prove the validity of the lower bound of underwriter allocations. The proof for the upper bound of underwriter allocation is a proof for the lower bound of firm allocation and as such is analogous. First, we prove that an underwriter allocation that is less than the identified lower bound is not supported in equilibrium. In equilibrium underwriter j is matched with firm j. Similarly, underwriter $j-1$ is matched with firm $j-1$. We will prove that if underwriter j gets at least $U_{j,j}^{lower}$, then underwriter $j-1$ should get at least $U_{j-1,j-1}^{lower}$. Since $U_{j,j}\geq U_{j,j}^{lower}$ then $F_{j,j}\leq H_{j,j}-\sum_{n=j}^{J-1}\left(H_{n+1,n}-H_{n+1,n+1}\right)$. Suppose that $U_{j-1,j-1}<\sum_{n=j-1}^{J-1}\left(H_{n+1,n}-H_{n+1,n+1}\right)$ so that $F_{j,j}+U_{j-1,j-1}<H_{j,j}+H_{j,j-1}-H_{j,j}$. As a result, $F_{j,j}+U_{j-1,j-1}<H_{j,j-1}$, and underwriter $j-1$ and firm j will block the hypothesized matching. So it must be the case that in equilibrium $U_{j-1,j-1}\geq\sum_{n=j-1}^{J-1}\left(H_{n+1,n}-H_{n+1,n+1}\right)$. Since the lowest ability underwriter, J, would not get less than its lower bound $\left(U_{J,J}^{lower}=0\right)$ this completes the first part of the proof. Second, we prove that the given lower bound of underwriter allocation is indeed an equilibrium allocation. For that purpose we need to show that, given this allocation, no firm-underwriter pair could do strictly better by blocking the equilibrium matching. In equilibrium, underwriter j is matched with firm j while underwriter j' is matched with firm j'. Without loss of generality, we need to show that firm j and underwriter j' cannot do better by matching with each other or equivalently that $\left(H_{j,j}-U_{j,j}^{lower}\right)+U_{j',j'}^{lower}\geq H_{j,j'}$. This translates to $H_{j,j}-\sum_{n=j}^{J-1}\left(H_{n+1,n}-H_{n+1,n+1}\right)+\sum_{n=j'}^{J-1}\left(H_{n+1,n}-H_{n+1,n+1}\right)\geq H_{j,j'}$. If $j'<j$ then the previous expression can be rewritten as $\sum_{n=j'}^{j-1}\left(H_{n+1,n}-H_{n+1,n+1}\right)\geq\sum_{n=j'}^{j-1}\left(H_{j,n}-H_{j,n+1}\right)$, which is true since $H_{n+1,n}-H_{n+1,n+1}\geq H_{j,n}-H_{j,n+1}$ for any $n\in\left[j',j-1\right]$. If $j'>j$ then we need to show that $\sum_{n=j}^{j'-1}\left(H_{n+1,n}-H_{n+1,n+1}\right)\leq\sum_{n=j}^{j'-1}\left(H_{j,n}-H_{j,n+1}\right)$, which is true since $H_{n+1,n}-H_{n+1,n+1}\leq H_{j,n}-H_{j,n+1}$ for any $n\in\left[j,j'-1\right]$. ■

Table I
Firm Quality and Underwriter Reputation at the IPO Stage

The sample of common stock IPOs of industrial firms (SIC codes not in the 4000's and 6000's) between 1970 and 2000 is obtained from the SDC New Issue Database. This table presents the results from multivariate OLS regressions of IPO Megginson-Weiss underwriter reputation on IPO proceeds (excluding the overallotment option), the market capitalization of the equity of the firm immediately after the IPO (but at most 60 days after the IPO), and additional proxies of firm quality. Dollar amounts are expressed in 1996 US dollars using the GDP implicit price deflator. The title of each regression gives the firm quality measure used in that regression. We use the founding date of the firm from SDC to calculate the number of years from foundation to IPO. The viability dummy is equal to 1.0 if in five years after the IPO the firm is traded on NYSE/AMEX/Nasdaq or if it was delisted due to a merger or an exchange offer. Otherwise this variable is equal to 0.0. Delisting data are obtained from CRSP. Using data from SDC, we construct a dummy equal to 1.0 if the firm has a subsequent issue in the five years after the IPO and to 0.0 otherwise. The Venture-Backed dummy is equal to 1.0 if SDC reports that the IPO is venture backed and to 0.0 otherwise. We set the earnings dummy equal to 1.0 if the firm has positive earnings for the fiscal year that ends closest to the IPO date, before or after, and to 0.0 otherwise. Data on earnings are obtained from the COMPUSTAT annual files. We use the I/B/E/S database to get the number of analysts that made annual forecasts three months before the end of the fiscal year ending within one year of the IPO. P-values from a two-tailed t-test are given in parenthesis under the respective coefficients. We use an asymptotically efficient estimate of the variance-covariance matrix to calculate the t-statistics.

Dependent Variable: IPO Underwriter Megginson-Weiss Reputation						
	Log of Years Since Founded	Viability Dummy	Subsequent Issue Dummy	Venture Backed Dummy	Earnings Dummy	Log Number of Forecasts
Intercept	– 27.50[a]	– 27.07[a]	– 27.44[a]	– 21.96[a]	– 25.08[a]	– 1.99
	(< 0.0001)	(< 0.0001)	(< 0.0001)	(< 0.0001)	(< 0.0001)	(0.4557)
Log of IPO Proceeds	4.87[a]	4.53[a]	4.57[a]	5.02[a]	4.43[a]	2.89[a]
	(< 0.0001)	(< 0.0001)	(< 0.0001)	(< 0.0001)	(< 0.0001)	(< 0.0001)
Log of Market Capitalization	1.67[a]	1.96[a]	2.02[a]	1.23[a]	1.96[a]	2.21[a]
	(< 0.0001)	(< 0.0001)	(< 0.0001)	(< 0.0001)	(< 0.0001)	(< 0.0001)
Firm Quality Measure	0.35[b]	1.84[a]	0.61[a]	2.60[a]	1.38[a]	0.14[b]
	(0.0188)	(< 0.0001)	(0.0044)	(< 0.0001)	(< 0.0001)	(0.0291)
Number of Observations	1,399	4,030	4,030	5,759	4,567	3,027
Adjusted R^2	49.57%	55.13%	54.82%	56.72%	53.19%	36.93%

[a, b, c] significant at the 1% 5%, and 10% levels respectively from a two-tailed t-test

Table II
Firm Quality and Underwriter Reputation at the SEO stage

The sample of common stock SEOs of industrial firms (SIC codes not in the 4000's and 6000's) between 1970 and 2000 is obtained from the SDC New Issue Database. This table presents the results from multivariate OLS regressions of SEO Megginson-Weiss underwriter reputation on SEO proceeds (excluding the overallotment option), the market capitalization of the equity of the firm in the month prior to the SEO, and additional proxies of firm quality. Dollar amounts are expressed in 1996 US dollars using the GDP implicit price deflator. The title of each regression gives the firm quality measure used in that regression. The viability dummy is equal to 1.0 if in five years after the SEO the firm is traded on NYSE/AMEX/Nasdaq or if it was delisted due to a merger or an exchange offer. Otherwise it this variable is equal to 0.0. The earnings dummy is equal to 1.0 if the firm has positive earnings in the fiscal year ending after the offering to 0.0 otherwise. The dividend dummy is equal to 1.0 if the firm pays a dividend in the fiscal year ending just before the offering and to 0.0 otherwise. Earnings and dividend data are obtained from the COMPUSTAT annual files. We use the I/B/E/S database to get the number of analysts that made annual forecasts three months before the end of the fiscal year prior to the SEO. We use daily returns from CRSP for the period that starts one year before and ends 40 days before to the SEO to calculate the standard error of daily returns. P-values from a two-tailed t-test are given in parenthesis under the respective coefficients. We use an asymptotically efficient estimate of the variance-covariance matrix to calculate the t-statistics.

Dependent Variable: SEO Underwriter Megginson-Weiss Reputation						
	Log of Years on CRSP	Viability Dummy	Earnings Dummy	Dividend Dummy	Log Number of Forecasts	Standard Error of Daily Returns
Intercept	19.42[a]	18.68[a]	20.19[a]	21.14[a]	44.98[a]	23.58[a]
	(< 0.0001)	(< 0.0001)	(< 0.0001)	(< 0.0001)	(< 0.0001)	(< 0.0001)
Log of SEO Proceeds	1.63[a]	1.81[a]	1.66[a]	1.80[a]	0.96[a]	1.84[a]
	(< 0.0001)	(< 0.0001)	(< 0.0001)	(< 0.0001)	(< 0.0001)	(< 0.0001)
Log of Market Capitalization	2.21[a]	2.00[a]	2.11[a]	1.96[a]	1.48[a]	1.90[a]
	(< 0.0001)	(< 0.0001)	(< 0.0001)	(< 0.0001)	(< 0.0001)	(< 0.0001)
Firm Quality Measure	0.12[b]	2.16[a]	0.94[a]	0.73[a]	0.92[a]	– 49.69[a]
	(0.0490)	(< 0.0001)	(< 0.0001)	(< 0.0001)	(< 0.0001)	(< 0.0001)
Number of Observations	5,756	4,514	5,438	5,508	2,533	5,883
Adjusted R^2	35.94%	35.83%	36.26%	35.97%	25.44%	36.92%

[a, b, c] significant at the 1%, 5%, and 10% levels respectively from a two-tailed t-test

Table III
Issue Activity and the Market Share of Reputable Underwriters

The sample of industrial (SIC codes not in the 4000's and 6000's) public offerings of common stock is obtained from the SDC New Issues database. The sample includes 13,059 issues between 1970 and 2000. As a dependent variable we use the market share of the top seven underwriters in the equity issue market in every year *t*. As an independent variable we use the total number of issues for a given year *t*. P-values from a two-tailed t-test are given in parenthesis under the respective coefficients. We use an asymptotically efficient estimate of the variance-covariance matrix to calculate the t-statistics.

Dependent Variable: Market Share of the Top Seven Underwriters in Year *t*	
Intercept	0.8529[a]
	(< 0.0001)
Log of Total Number of Issues in Year *t*	– 0.0543[b]
	(0.0413)
Number of Years	31
Adjusted R^2	9.74%

[a, b, c] significant at the 1%, 5%, and 10% levels respectively from a two-tailed t-test

Table IV
Quality of Firms Underwritten by High Reputation Underwriters

The sample of industrial (SIC codes not in the 4000's and 6000's) public offerings of common stock is obtained from the SDC New Issues database. The sample includes 13,059 issues between 1970 and 2000. All dollar values are expressed in millions of 1996 US dollars using the GDP implicit price deflator. The dependent variable is the average log proceeds underwritten by the top seven underwriters in year *t*. For every year *t*, as independent variables we use the average and the standard deviation of log proceeds and the natural log of total number of issues for that year. P-values from a two-tailed t-test are given in parenthesis under the respective coefficients. We use an asymptotically efficient estimate of the variance-covariance matrix to calculate the t-statistics.

Dependent Variable: Average Log Proceeds Underwritten by the Top Seven Underwriters in Year *t*	
Intercept	1.2066
	(0.4138)
Average of Log Proceeds for Year *t*	0.8337[a]
	(< 0.0001)
Standard Deviation of Log Proceeds for Year *t*	1.3540[a]
	(< 0.0001)
Log of Total Number of Issues in Year *t*	0.1506[a]
	(< 0.0001)
Number of Years	31
Adjusted R^2	87.05%

[a, b, c] significant at the 1%, 5%, and 10% levels respectively from a two-tailed t-test

Table V

Reputation of Lead Underwriters, Co-Managers, and Analysts Providing Earnings Forecasts

From SDC we collect issues of common stock by industrial firms (SIC codes not in the 4000's and 6000's). The table compares the reputation of the lead underwriter to the reputation of co-managers (Panel A) and the reputation of analysts providing post-issue earnings forecasts (Panel B). The lead reputation, when there is more than one lead underwriter, is equal to the maximum reputation of all lead underwriters. For Panel A we identify 7,099 issues, 3,389 IPOs and 3,710 SEOs between 1970 and 2000 that have at least one co-manager with available Megginson-Weiss reputation. The co-manager reputation, when there is more than one co-manager, is equal to the maximum Megginson-Weiss reputation of all co-managers. For Panel B we identify 3,966 issues, 820 IPOs and 3,146 SEOs between 1982 and 2000 that have at least one analyst associated with a broker different from the firm's lead underwriter(s) and for which the Megginson-Weiss reputation measure is available. We collect the analysts providing earnings forecasts in the year following the issue, and their broker houses from the I/B/E/S database. The reputation of the analyst is equal to the Megginson-Weiss reputation of the investment bank the analyst is associated with, as long as this bank is not the lead underwriter(s). When there is more than one investment bank providing analyst coverage, analyst reputation is equal to the maximum reputation of all analysts providing coverage. Co-managers and analysts with missing reputation are not included in the analysis. Assigning a reputation rank of 0.0 to such co-managers and analysts dramatically changes the results in favor of our hypotheses. The table reports the average difference in reputation between lead underwriters and co-managers (Panel A) and the average difference in reputation between lead underwriters and analysts. We perform the same analysis for the whole sample and for two equally sized sub-samples formed on the reputation of the lead underwriter. The respective p-values are presented in parenthesis.

	Whole Sample	IPOs	SEOs
Panel A: Average Difference in Reputation between Lead and Co-Managers			
Whole Sample			
	2.95[a]	3.04[a]	2.86[a]
	(< 0.0001)	(< 0.0001)	(< 0.0001)
Lead Below Median Reputation			
	0.51[a]	0.66[a]	0.35[c]
	(< 0.0001)	(0.0002)	(0.0545)
Lead Above Median Reputation			
	5.39[a]	5.43[a]	5.38[a]
	(< 0.0001)	(< 0.0001)	(< 0.0001)

	Whole Sample	IPOs	SEOs
Panel B: Average Difference in Reputation between Lead Underwriters and Analysts			
Whole Sample			
	4.63[a]	5.66[a]	4.36[a]
	(< 0.0001)	(< 0.0001)	(< 0.0001)
Lead Below Median Reputation			
	2.27[a]	3.27[a]	2.01[a]
	(< 0.0001)	(< 0.0001)	(< 0.0001)
Lead Above Median Reputation			
	6.98[a]	8.01[a]	6.75[a]
	(< 0.0001)	(< 0.0001)	(< 0.0001)

[a, b, c] significant at the 1%, 5%, and 10% levels respectively from a two-tailed t-test

Table VI
Changes in Firm and Underwriter Relative Qualities and SEO Switching

From SDC we collect SEOs of common stock by industrial firms (SIC codes not in the 4000's and 6000's) between 1970 and 2000 so that the IPO of the firm is at most five years before the SEO date. We keep only the first SEO after the IPO. In this table we estimate a logistic regression to predict the probability of a switch. Every year we construct issue percentile ranks based on the proceeds of the issue from SDC using all industrial equity issues (IPOs and SEOs) for that year. Every year we also create percentile ranks of underwriters based on their three-year total proceeds. In this ranking each underwriter appears as many times as it is a lead of any IPO or SEO during the year. We use these percentile ranks to create the absolute difference between the firm proceeds rank and the IPO underwriter reputation rank in the SEO year and we use this variable to explain the probability of a switch. As additional explanatory variables we use the percentile rank of the IPO underwriter calculated above, the change in underwriter reputation that the firm experiences from IPO to SEO, and the number of days from IPO to SEO. For 271 issues we do not have information on the reputation of the IPO lead underwriter in the year of the SEO so we exclude these observations from our analysis. The regression also includes several time dummies as explanatory variables. P-values from a two-tailed t-test are given in parenthesis under the respective coefficients.

Dependent Variable: Probability of Switch

	All SEOs	1970-1990	1991-2000
Intercept	– 6.22[a]	– 4.26[a]	– 6.65[a]
	(< 0.0001)	(0.0002)	(< 0.0001)
IPO Underwriter Reputation Percentile Rank at SEO	– 1.86[a]	– 1.87[a]	– 1.92[a]
	(< 0.0001)	(< 0.0001)	(< 0.0001)
Change of Underwriter Reputation Percentile Rank from IPO to SEO	1.25[a]	3.05[a]	0.42
	(< 0.0001)	(< 0.0001)	(0.2627)
Log of Days from IPO to SEO	0.96[a]	0.62[a]	1.09[a]
	(< 0.0001)	(0.0004)	(< 0.0001)
Absolute Difference in IPO Lead Reputation Percentile at SEO and Proceeds Percentile of SEO	1.49[a]	1.46[b]	1.54[a]
	(< 0.0001)	(0.0405)	(0.0005)
1986 - 1990 Dummy	0.57[a]	0.67[a]	
	(0.0081)	(0.0024)	
1991 - 1995 Dummy	0.30[c]		
	(0.0905)		
1996 - 1998 Dummy	0.35[c]		0.07
	(0.0655)		(0.6874)
1999 - 2000 Dummy	0.86[a]		0.60[a]
	(0.0005)		(0.0090)
Switch	473	159	314
Do Not Switch	991	305	686

[a, b, c] significant at the 1%, 5%, and 10% levels respectively from a two-tailed t-test

Table VII
Ordered Logistic Regression of How Firms Switch

From SDC we collect SEOs of common stock by industrial firms (SIC codes not in the 4000's and 6000's) between 1970 and 2000 so that the IPO of the firm is at most five years before the SEO date. We keep only the first SEO after the IPO. In this table we estimate an ordered logistic regression to predict the probability of a firm switching up. We construct the dependent variable as an ordered variable indicating whether the firm switches to a lower reputation underwriter, does not switch, or switches to a higher reputation underwriter for the SEO. Every year we construct issue percentile ranks based on the proceeds of the issue from SDC using all industrial equity issues (IPOs and SEOs) for that year. Every year we also create percentile ranks of underwriters based on their three-year total proceeds. In this ranking each underwriter appears as many times as it is a lead of any IPO or SEO during the year. As explanatory variables we use the reputation rank of the IPO underwriter at the SEO discussed above and the change in the percentile rank of proceeds from IPO to SEO. P-values from a two-tailed t-test are given in parenthesis under the respective coefficients.

Dependent Variable: Probability of Switching Up	
Intercept 1	0.16
	(0.2341)
Intercept 2	4.07[a]
	(< 0.0001)
Reputation Percentile Rank of IPO Underwriter at SEO	– 3.23[a]
	(< 0.0001)
Change in Firm Proceeds Percentile Rank from IPO to SEO	1.32[a]
	(< 0.0001)
Number of Firms Switching Up	302
Number of Firms Not Switching	991
Number of Firms Switching Down	171

[a, b, c] significant at the 1%, 5%, and 10% levels respectively from a two-tailed t-test

Table VIII
Separate Analysis for Firms Switching Down

From SDC we collect SEOs of common stock by industrial firms (SIC codes not in the 4000's and 6000's) between 1970 and 2000 so that the IPO of the firm is at most five years before the SEO date. Offer prices, issued dates, issue proceeds, and SEO gross spreads are obtained from SDC. Firm market capitalization, post-IPO market price used to calculate underpricing, and daily returns are obtained from CRSP. Information of earnings is obtained from COMPUSTAT. We calculate the Megginson-Weiss reputation of the lead underwriter as in Aggarwal, Krigman, and Womack (2002). All underwriters are allocated in four portfolios, for IPOs and for SEOs, based on their Megginson-Weiss reputation. The cut-off points for the IPO reputation quartiles are 80.7, 90.4, and 95.2. The cut-off points for the SEO reputation quartiles are 85.6, 91.6, and 95.8. The sample for the first column contains all firms whose IPO underwriter is in the top two quartiles. Firms switching to a SEO reputation quartile lower than their IPO quartile are classified as switching down (129 firms). The rest of the firms are classified as not switching down (556 firms). The table reports the difference in the average variables for the two sub-samples (not switching down minus switching down) and their p-values in parenthesis. The results in the second column use a matching sample. For each firm that starts with a given IPO underwriter reputation quartile and switches to an underwriter in a lower SEO reputation quartile (174 firms) we find a matching firm that performs the SEO in the same year, has the closest SEO proceeds, starts in the same IPO underwriter reputation quartile, but does not switch to a lower SEO reputation quartile. The table reports the average differences in the variables under interest for the two sub-samples (not switching down minus switching down) and their p-values in parenthesis. Using z-scores provides us with similar results in both columns.

	Difference in Averages between Firms that Do Not Switch Down and Firms that Switch Down	Average Difference between a Matched Sample of Firms that Do Not Switch Down and Firms that Switch Down
Log of SEO Proceeds	0.36[a]	0.05[b]
	(< 0.0001)	(0.0332)
Number of Days from IPO to SEO	– 307[a]	– 258[a]
	(< 0.0001)	(< 0.0001)
IPO Reputation	– 0.33	– 0.08
	(0.2598)	(0.5984)
Log of IPO Market Capitalization	0.27[a]	0.15[b]
	(0.0006)	(0.0226)
Change in Log of Market Capitalization from IPO to SEO	0.07	– 0.06
	(0.1729)	(0.2572)
Log of IPO Proceeds	0.20[a]	0.05
	(0.0047)	(0.3974)
Change in Log of Proceeds from IPO to SEO	0.16[b]	0.01
	(0.0322)	(0.8864)
IPO Underpricing	0.08[a]	0.09[a]
	(0.0004)	(0.0003)
Change in Earnings Dummy from IPO to SEO	0.05	0.09[c]
	(0.2535)	(0.0864)
Average Daily Return Minus Equally-Weighted CRSP between IPO and SEO (%)	0.08[a]	0.05[b]
	(< 0.0001)	(0.0151)
SEO Gross Spread	– 0.24[a]	– 0.05
	(0.0037)	(0.5412)

[a, b, c] significant at the 1%, 5%, and 10% levels respectively from a two-tailed t-test

Table IX
Underwriter Reputation and Subsequent Underwriting Revenues

The sample consists of 3,970 industrial IPOs (SIC codes not in the 4000's and 6000's) between 1970 and 1995 with available data. As dependent variables we use the total amount of subsequent spreads and the number of subsequent issues that the IPO lead underwriter has with the firm at most five years after the IPO. There are 848 IPO firms with at least one subsequent issue underwritten by the IPO lead bank and 3,122 firms that either did not have a subsequent issue or employed the services of different lead underwriter(s). When the dependent variable is total subsequent spreads we estimate a Tobit regression. When the dependent variable is the number of subsequent issues, we estimate a Poisson regression. We compute the market capitalization using the first available CRSP data on share price and shares outstanding as long as this information is available with 60 days of the IPO. We calculate the Megginson-Weiss reputation of the lead underwriter as in Aggarwal, Krigman, and Womack (2002). The total amount of subsequent spreads is calculated as the sum of all spreads that the firm paid for issues that the firm made at most five years after the IPO and that were underwritten by the IPO lead underwriter. We also discount the subsequent spreads to the IPO date using the average market return for the period of 1970-2000. We present all dollar values in millions on 1996 US dollars using the GDP implicit price deflator. P-values from a two-tailed t-test are given in parenthesis under the respective coefficients.

Dependent Variable						
	Total Amount of Subsequent Spreads in 1996 US Dollars (Mill)		Total Amount of Subsequent Spreads Discounted to the Day of the IPO in 1996 US Dollars (Mill)		Number of Subsequent Issues	
Intercept	– 41.86[a]	– 35.66[a]	– 35.04[a]	– 7.79[a]	– 7.47[a]	– 7.00[a]
	(< 0.0001)	(< 0.0001)	(< 0.0001)	(< 0.0001)	(< 0.0001)	(< 0.0001)
Megginson-Weiss Underwriter Reputation	0.4017[a]	0.3257[a]	0.3365[a]	0.2726[a]	0.0712[a]	0.0650[a]
	(< 0.0001)	(< 0.0001)	(< 0.0001)	(< 0.0001)	(< 0.0001)	(< 0.0001)
Market Capitalization at IPO (Mill 1996 $)		0.048[a]		0.0041[a]		0.0004[a]
		(< 0.0001)		(< 0.0001)		(< 0.0001)

[a, b, c] significant at the 1%, 5%, and 10% levels respectively from a two-tailed t-test

Table X
Underwriter Reputation and Percentage Spreads of Follow-on SEOs

From SDC we collect SEOs of common stock by industrial firms (SIC codes not in the 4000's and 6000's) between 1970 and 2000 where the IPO of the firm is at most five years before the SEO and where there is no switch of lead underwriter from IPO to SEO. As a dependent variable we use the percentage spread of the subsequent issues. As explanatory variables we use the Megginson-Weiss reputation of the lead underwriter, the market capitalization of the firm after the IPO, and the proceeds of the SEO. We compute market capitalization using the first available CRSP data on share price and shares outstanding as long as this information is available with 60 days of the IPO. We calculate the Megginson-Weiss reputation of the lead underwriter as in Aggarwal, Krigman, and Womack (2002). We use the SDC New Issues database to obtain the proceeds amount of the issue. We present all dollar values in 1996 US dollars using the GDP implicit price deflator. Underpricing is measured as the percentage difference of the first available CRSP price and the offer price. The estimated model is an OLS regression. P-values from a two-tailed t-test are given in parenthesis under the respective coefficients. We use an asymptotically efficient estimate of the variance-covariance matrix to calculate the t-statistics.

Dependent Variable: Percentage Spread of Follow-on SEOs		
Intercept	16.56[a] (< 0.0001)	17.79[a] (< 0.0001)
Megginson-Weiss Reputation of Underwriter	– 0.0325[a] (< 0.0001)	– 0.0314[a] (< 0.0001)
Log of Market Capitalization After the IPO in 1996 US Dollars	– 0.39[a] (< 0.0001)	– 0.47[a] (< 0.0001)
Log of Issue Proceeds in 1996 US Dollars	– 0.32[a] (< 0.0001)	– 0.24[a] (< 0.0061)
IPO Underpricing in Percent		0.30[b] (0.0235)
Number of Observations	964	964
Adjusted R^2	42.80%	43.00%

[a, b, c] significant at the 1%, 5%, and 10% levels respectively from a two-tailed t-test

Figure I
Matching Firm Quality and Underwriter Reputation

The sample consists of 3,933 IPOs between 1970 and 2000. We obtain all data from the SDC New Issues database. We exclude IPOs with offering price below \$3 per share, IPOs with gross proceeds below 5 million or above 200 million 1996 US dollars. Additionally, we eliminate all issues with book value of equity below the 0.25th percentile and above the 99.75th percentile. We then create five portfolios based on the filing proceeds in 1996 US dollars of the company using the 20th, 40th, 60th, and 80th percentiles of the variable. Similarly, we create five portfolios based on the Megginson-Weiss reputation of the lead underwriter. Panel A presents the proportion of the sample that falls in each of the 25 portfolios. In Panel B for every IPO we first calculate the combined value received by existing owners in the firm and the underwriters as:

$$V_i = N_o P_1 + N_{o,s}\left(P_o - P_1\right) + N_n P_o f,$$

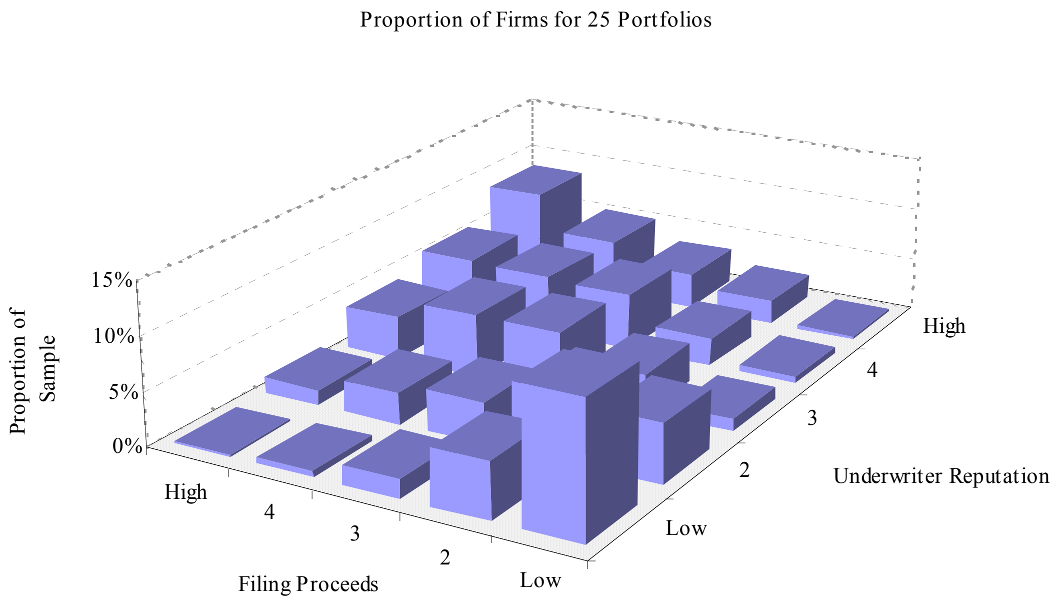
where N_o is the number of shares outstanding before the offer, $N_{o,s}$ is the number of shares sold by existing owners, N_n is the number of new shares issued by the firm, P_o is the offer price, P_1 is the first trading price after the IPO from CRSP, and f is the percentage spread paid to the underwriter.

We then estimate the following model (both coefficients are significant at the 1% level):

$$V_i = \alpha + \beta B_i + \varepsilon_i = 149.72 + 1.81 \times B_i,$$

where B_i is the book value of common equity before the offering for firm i. We use the above estimated model for each firm i to calculate the residual value created by the match that is not due to the size of the firm, $h_i = \alpha + \varepsilon_i$. In Panel B we present the average of this amount for each of the 25 portfolios discussed above.

Panel A



Panel B