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ABSTRACT

The introduction of deal types for issues of seasoned equity in which the offer follows quickly after its announcement highlights the role of underwriter certification in the performance of SEOs. Controlling for the matching between underwriters and issuers, underwriter quality is positively related to the announcement effect in rapidly completed SEOs. For these deal types, we also find that the discount is significantly negatively related to underwriter quality. For fully marketed deals we are unable to detect any significant relation between SEO performance and underwriter quality. Issuers pay for the value provided by high-quality underwriters with higher fees.

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1 Introduction

An interesting contrast exists between studies of initial public offerings of equity (IPOs) and those of follow on, or seasoned equity offerings (SEOs). In most examinations of the pricing or outcomes of IPOs the quality or reputation of the underwriter is a prominent part of the discussion. For example, the certification hypothesis (e.g., Beatty and Ritter, 1986; Booth and Smith, 1986; Carter and Manaster, 1990) proposes that asymmetric information between the issuing firm and investors implies that a high-quality or highly reputable underwriter would add value by certifying the value of the new issue to investors. Huang et al. (2008) argue that higher quality underwriters have access to a superior quality network of investors which is important for an IPO as the underwriter is charged not only with selling the issue but also with establishing a liquid market in the new asset. Despite a significant body of literature discussing the impact of asymmetric information between public firms and external investors on financial decision making, with a few exceptions (e.g., Altınkılıç and Hansen, 2003; Gao and Ritter, 2010; Fernando et al., 2015), the importance of the underwriter in mitigating this prominent imperfection does not play a central role in the literature on SEOs.[1] Prior studies have instead emphasized how differences in SEO performance relate to the attributes of the issuer or the circumstances of the issuance, rather than to the differences in the quality of the underwriter. These studies consider, for example, the degree to which information about issuers' prospects is more or less clear, the firm's size, its Tobin's Q, whether its managers are maintaining large stakes in its equity, etc. (e.g., Korajczyk et al., 1991; Hansen and Torregrosa, 1992; Denis, 1994). While there is clearly a greater scope for underwriter quality to affect the performance of an IPO it seems unlikely that the quality of the underwriter has no influence on the performance of an SEO.

This paper examines the extent to which, controlling for the matching between issuing firms and underwriters, high-quality underwriters provide greater value to public firms as they sell seasoned equity. The heterogeneity in the types of deals by which SEOs are now accomplished allows us to provide empirical evidence regarding the differential importance of the quality of the underwriter on the performance of different types of SEOs. There are currently three primary deal types for

[1] For example, the well documented negative average price impact associated with public firms announcing SEOs has commonly been interpreted as a market response to asymmetric information (Mikkelson and Partch, 1986). Korajczyk et al. (1991) show that public firms tend cluster new security issues after significant release of information and avoid issuing securities prior to such events. They interpret this behavior as rational behavior for firms anticipating the response investors will have to the announcement of an issue of equity given that investors believe the firm may have superior information. The documentation of abnormal profits to insiders' trades (e.g., Seyhun, 1986) indicates that public firm insiders do possess material information that is not possessed by external investors. Theoretically, in two highly influential papers, Myers and Majluf (1984) and Myers (1984) develop the Pecking Order Theory of incremental financing in which the primary friction is asymmetric information between a public firm and external investors. Easterbrook (1984) hypothesizes that one possible explanation for the use of dividends by public firms is that dividend payout makes it more likely firms will need to seek additional equity financing. Easterbrook argues that the added scrutiny of the market when firms issue securities represents a benefit to counter the costs associated with the distribution of dividends by public firms; such scrutiny is only valuable if there is important information that the firm does not routinely release to investors.

performing an SEO. *Fully marketed* deals closely follow the familiar format of US IPOs in that after the deal is announced there is a period (a few weeks to several months) during which the underwriter exchanges information with investors (the road show) and gathers indications of investor interest in the offering (builds a book). At the offer date the issue is sold to external investors. This was the dominant deal type in the U.S. before about 2007. In contrast, in *accelerated bookbuilt* offerings and *bought* offerings, the offer follows very quickly (often within 24 hours) after the announcement of the issue. The primary difference between these two faster deal types is that in accelerated bookbuilt offerings the issue is sold to external investors, while in bought deals the underwriter purchases the issue from the issuing firm.

Presumably, the ability to move quickly to offer shares has value to the issuer, perhaps because it allows the firm to take advantage of favorable market conditions or to gain a competitive advantage investing in a new activity. However, an offer that is completed very quickly accentuates potential "lemons" concerns because it dramatically reduces the amount of time that investors can perform their due diligence. In the Myers and Majluf (1984) model, the key question that concerns purchasers is whether the value added of the issuing firm's investment opportunity is sufficiently high. Because of the greater potential lemons problem associated with more rapidly completed deals, it follows that underwriter certification is likely to be especially important in such cases.

In the case of IPOs, asymmetric information about the prospects of the firm seeking to go public is one of the most cited motivations for the importance of underwriter quality in the performance of IPOs. This asymmetry gave rise to the "certification hypothesis," under which the IPO underwriters' role is largely one of certifying the value of the issuer given the difficulty investors have in performing their own due diligence. Underwriters with the best reputations (based on their past performance) will have the greatest impact on the performance of the IPO.

While we recognize that it is likely that asymmetric information is a greater concern in IPOs than it is in SEOs, we demonstrate that there is a substantial role for underwriter certification in accelerated and bought offerings. Specifically, controlling for the matching between issuing firms and underwriters, for accelerated and bought deals, both the announcement effect and the discount are significantly related to the quality of the underwriter.

It is important to note that, without controlling for the matching between firms and underwriters, the estimated relation between the announcement effect (or the discount) and underwriter quality is insignificant. This contrast reflects the fact that there is substantial cross-sectional variation among issuers in the extent of their informational challenges. Assortative matching occurs, in which more information-problematic issuers, those most willing to pay the premium associated with underwriter quality, are matched with more reputable underwriters. Because the quality of underwriters is positively correlated with the informational problems of issuers (which have unconditional negative conse-

quences for deal pricing), failing to control for matching will tend to understate the role of underwriters in improving the performance of SEOs.

In contrast, controlling for the matching between issuers and underwriters, we find that while the relation between underwriter quality and the announcement effect is positive it is insignificant for fully marketed deals. Similarly, the relation between the size of the discount and the quality of the underwriter in fully marketed deals is negative but insignificant. In Section 5, we explain this result as a possible consequence of two offsetting influences. The lack of a significant relation between underwriter quality and the performance of fully marketed SEOs may explain the absence of significant discussion of this relation in the prior literature.

Finally, we show that, controlling for the matching between underwriters and firms, issuing firms pay higher total fees for the value afforded by using a higher quality underwriter. However, consistent with the optimality of the matching between the firm and the underwriter, higher quality underwriters are associated with lower marginal fees (fees as a percentage of proceeds). The intuition is that higher quality underwriters charge more in total fees but the value they provide allows issuers to raise more capital in a given deal. These findings indicate that the cost curve associated with raising seasoned equity differs based on the quality of the underwriter leading the deal.

Any analysis of the performance of SEOs must consider how the different aspects of quality (both of firms and of underwriters) may affect outcomes in the issuing process. Heterogeneity of firms and of underwriters is fundamental to modeling the process through which issuing firms choose underwriters to represent them and underwriters select firms they are willing to represent in the market for underwriting services. In the early corporate finance literature, the market for underwriting services has been modeled as a one-sided selection process. In this literature, either the firm chooses the underwriter (e.g., Titman and Trueman, 1986; Habib and Ljungqvist, 2001), or the underwriter selects the firm (e.g., Chemmanur and Fulghieri, 1994). More recently, there seems to be some agreement that issuing firms and underwriters are paired in a manner consistent with two-sided matching (e.g., Fernando et al., 2005; Schroth, 2006; Lyandres et al., 2016).

Endogenous matching between firms and underwriters can cause problems for causal inference regarding outcomes of the issuance process.[2] Consider the "discount" of the offer price relative to the closing price observed on the day prior to the offer. Suppose firm quality is observed by the underwriter but only imperfectly observed by the econometrician. Further, suppose firm quality is related to the issuing firm's decision to match with the underwriter, as well as to the pricing of the offer. Any estimation of the relation between the discount and issuing firm characteristics will result in an endogeneity problem if the unobserved aspects of firm quality matter for the underwriter's decision

[2] Akkus et al. (2018) demonstrate that, unless properly controlled for, mutual selection between firms and underwriters inhibits causal inference regarding outcomes of the IPO underwriting process.

regarding pricing and are also correlated with firm characteristics. Controlling for the matching process is, therefore, a necessary component of our analysis.

To capture and control for two-sided matching in the market for underwriting services we use a two-step approach when we examine the relation between underwriter quality and the performance of SEOs. The first step of the process controls for the endogenous matching between firms and underwriters in the market for underwriting services by estimating a structural matching equation (e.g., Akkus et al., 2018; Fernando et al., 2015). The second step of our estimation combines the structural model of matching with a control function approach (Petrin and Train, 2010) to account for endogenous selection in the examination of the determinants of the various measures of performance for SEOs.

Our primary empirical hypotheses concern the announcement effect, the offering discount, and the fees associated with an SEO. The role of the underwriter's reputational capital in the context of SEOs can be illustrated by considering the relation between the announcement effect and the reputation of the underwriter. It is likely that, for a firm that is already public, which is seeking external equity using a fully marketed deal (a deal that includes a full road show), there will be little scope for underwriter "certification" to influence pricing on the announcement date. That is not to say that, if high-quality underwriters are better able to identify high-quality firms, the market will not make inferences at announcement of a deal. Indeed, if high-quality underwriters are able to identify higher quality firms doing fully marketed SEOs, the market should react to the announcement of such an issue. However, the cross-sectional implications of this expectation for announcement price effects may be muted by other factors. For example, it may be that the choice to do a fully marketed issue is a signal that significant due diligence is required to appropriately price the issue given that the firm is seeking additional equity financing. Therefore, the primary signal the market extracts from the announcement concerns the expected precision of the information to be conveyed in the road show rather than expectations about the selectivity of firms by the underwriter.

In an accelerated deal, the underwriter sells the issue to investors without the time or expense of a road show. Thus, the pricing of the issue is the primary responsibility of the underwriter, implying there should be a much greater role for the reputation of the underwriter to certify the value of the shares, which immediately affects the market's reaction to the news of an offering. The choice of an accelerated (or a bought) deal indicates that conveying information between the firm and investors is not critical for the success of the issue and selectivity among issuers by high-quality underwriters is therefore expected to be highlighted.

In a bought deal the underwriter purchases the issue instead of marketing it to external investors so that there is, strictly speaking, no role for the reputation of the underwriter to certify the pricing of the issue itself. However, given the accelerated time line, one would expect investors to update their

expectations concerning the value of the issuing firm's equity based on the news that a high-quality underwriter will lead the deal. In fact, the signal conveyed by the use of a high-quality underwriter regarding the superior quality of issuing firms may be stronger than that of an accelerated deal because the underwriter is putting both its reputational and its financial capital at risk in the deal.

Our findings indicate that for accelerated and bought deals there is a significant relation between underwriter quality and the performance in the SEO. Specifically, higher quality underwriters are associated with smaller (less negative) announcement effects and a smaller discount of the offer price from the closing price on the day before the offer. In contrast, for fully marketed SEOs, the relation between underwriter quality and either the announcement effect or the discount is insignificant.

While our study represents a more comprehensive analysis of the impact of underwriter quality on SEO performance, two empirical studies have considered effects of underwriter reputation on aspects of SEO performance. Altınkılıç and Hansen (2003) examine the relation between underwriter reputation and the discount on the SEO relative to the prior day's closing price. Their focus is on the change in the size of this discount between the 1980s and the 1990s and the relation between the unexpected discount and the underpricing of the issue. Their study does not attempt to control for the matching between firms and underwriters and due to the timing of their study, their sample is likely to include only fully marketed offerings. Gao and Ritter (2010) also consider the that role high-quality underwriters play in affecting the elasticity of demand for the issuing firm's equity in fully marketed offerings. While Gao and Ritter (2010) do not control for the matching between issuers and underwriters, their view of the role of the underwriter in fully marketed offerings is consistent with ours. Fernando et al. (2015) consider the relation between underwriting fees and underwriter quality in IPOs and SEOs. While they also control for the matching between issuers and underwriters, they do not consider the different measures of performance for SEOs nor do they distinguish between the different deal types for SEOs.

The rest of the paper is organized as follows. Section 2 describes the matching model. Section 3 presents the estimation technique we employ. Section 4 presents our empirical hypotheses. Section 5 describes the data. Section 6 reports the results of the empirical tests and Section 7 concludes.

2 Setting

2.1 The market for underwriting services

To examine the outcomes of SEOs, we model the selection in the matching process between firms and underwriters, accounting for actual matches that occur as well as the alternative, possible but counterfactual, matches. As in Sørensen (2007) and Akkus et al. (2018), the model allows for each firm to match with one (lead) underwriter, but for each underwriter to match with multiple firms; a one-to-many matching model. The scarcity of the human capital of the very best underwriters

prevents them from executing all transactions, and also implies they should earn higher fees relative to less reputable underwriters.

Two types of players participate in the market: issuing firms and underwriters. The set of issuing firms is denoted $\mathcal{F}$ and the set of underwriters is denoted $\mathcal{U}$. A match is defined as a pair $m = (u, f)$, where $u \in \mathcal{U}$ and $f \in \mathcal{F}$. The set of feasible matches, $\mathcal{M} = \mathcal{U} \times \mathcal{F}$, includes all possible pairs of issuing firms matching with underwriters.

The equilibrium concept used in the matching model is pairwise stability. A match $m \in \mathcal{M}$ is said to be "pairwise stable," if for all alternative feasible pairs, neither the firm nor the underwriter benefits from breaking the stable match and choosing one of the alternative pairings. In other words, a match $m \in \mathcal{M}$, is pairwise stable if for every counterfactual pairing involving the firm or the underwriter, either the firm receives a greater payoff from the equilibrium match m, or the underwriter receives a greater payoff from the least valuable of its equilibrium matches, or both (Sørensen, 2007). An equilibrium match is denoted m^*, and the set of all equilibrium matches is denoted $\mathcal{M}^*$, where $\mathcal{M}^* \subseteq \mathcal{M}$. The set of issuing firms that match with underwriter u in equilibrium is denoted $\mathcal{F}_u^*$; i.e., $\mathcal{F}_u^* \equiv \{f \mid (u, f) \in \mathcal{M}^*\} \subseteq \mathcal{F}$. Similarly, the underwriter that matches with firm f in equilibrium is denoted $\mathcal{U}_f^*$; i.e., $\mathcal{U}_f^* \equiv \{u \mid (u, f) \in \mathcal{M}^*\} \subseteq \mathcal{U}$. Note that both an underwriter and a firm may have multiple first-best matches. The set of equilibrium (or actual) matches, $\mathcal{M}^{**} \subseteq \mathcal{M}^*$, consists of each issuing firm matching with a single underwriter.[3]

The set of equilibrium matches is defined by the set of values generated by the feasible matches. The surplus value of a feasible match, $V_{u,f}$, is the joint value generated by the pairing of a specific underwriter u with a specific issuing firm f. We construct the equilibrium in the market for underwriting services for issues of seasoned equity using a non-transferrable utility matching model. We follow Akkus et al. (2018) in the use this approach because the equilibrium conditions of the non-transferrable utility model are simpler to estimate empirically than are the equilibrium conditions of the transferrable utility model.[4]

Following Sørensen (2007) and Akkus et al. (2018), we assume that issuing firms and underwriters split the match value generated by a given match by a fixed proportion α. In particular, the surplus value generated for the firm is $(1 - \alpha) V_{u,f}$ and the surplus value generated for the underwriter is $\alpha V_{u,f}$. For a given firm f, the condition that the surplus value of every non-equilibrium match is less

[3] In the specification of the equilibrium we allow for ties in the match surplus (the value created by the match between an issuing firm and an underwriter) only for generality of the model. However, this possibility does not affect the empirical analysis.

[4] The assumption of non-transferrable utility is relatively mild in the sense that the resulting matching equilibrium is similar to the equilibrium in a transferrable utility model in the following sense. Every equilibrium in a transferrable utility matching model can be identified as an underwriter-optimal stable matching in a non-transferrable utility matching model (e.g., Echenique et al., 2013; Akkus et al., 2018). Therefore, if the matching equilibrium is optimal for the underwriter (perhaps due to relative scarcity; e.g., Chen and Ritter (2000) in the IPO market), the empirical content of the non-transferrable utility model and the transferrable utility model will be the same.

than the value of the equilibrium match can be written

$$(1-\alpha)V_{u\notin\mathcal{U}_f^*,f} \;<\; (1-\alpha)\min_{u\in\mathcal{U}_f^*} V_{u,f} \tag{1}$$

or equivalently

$$V_{u\notin\mathcal{U}_f^*,f} \;<\; \min_{u\in\mathcal{U}_f^*} V_{u,f}. \tag{2}$$

Since each firm f matches with only one underwriter, the value of every $u \in \mathcal{U}_f^*$ must be the same. Therefore, this condition can be simplified to

$$V_{u\notin\mathcal{U}_f^*,f} \;<\; V_{u\in\mathcal{U}_f^*,f}. \tag{3}$$

For a given underwriter u, the condition that the value of any counterfactual match is less than the least of that underwriter's equilibrium matches can be written

$$\alpha V_{u,f\notin\mathcal{F}_u^*} \;<\; \alpha\min_{f\in\mathcal{F}_u^*} V_{u,f} \tag{4}$$

or equivalently

$$V_{u,f\notin\mathcal{F}_u^*} \;<\; \min_{f\in\mathcal{F}_u^*} V_{u,f}. \tag{5}$$

In a non-transferrable utility matching model, the assumption that issuing firms and underwriters share the match value according to a fixed proportion implies that the equilibrium requirements are independent of the proportion itself. Pairwise stability requires one (or both) of the inequalities (3) or (5) to hold true. Therefore, for a given underwriter u and a given firm f, these conditions may be written

$$V_{u,f \;|\; u\notin\mathcal{U}_f^* \text{ or } f\notin\mathcal{F}_u^*} \;<\; \overline{V}_{u,f} \;\equiv\; \max\left\{V_{u\in\mathcal{U}_f^*,f}, \min_{f\in\mathcal{F}_u^*} V_{u,f}\right\}. \tag{6}$$

$\overline{V}_{u,f}$ is the upper bound of the match value for all counterfactual matches in the open set of all non-equilibrium matches. Equation (6), therefore, can be used to estimate the upper bounds for the match values of the feasible but counterfactual matches in a specific matching market.

In the definition of pairwise stability, the inequality representing the underwriter's value implicitly assumes that the underwriter is capacity constrained, so that in each market (each period) the underwriter may only match with a limited number of issuing firms. Khanna et al. (2008) and Hanley and Hoberg (2010) provide empirical support for the idea that underwriters face capacity constraints. As discussed in Akkus et al. (2018), this assumption can be eliminated, which makes the inequality representing the issuing firm's value the only requirement. Because the definition of the upper bound of the value on counterfactual matches is a maximum, eliminating the assumption of a capacity constraint makes this bound *more* restrictive and, therefore, represents a greater constraint on the data in the estimation. The empirical evidence indicating that underwriters are capacity constrained and the fact that including this constraint is a more conservative approach causes us to utilize both the

firm and the underwriter constraint in our implementation of the pairwise stability condition.

2.2 The match surplus

The match surplus represents the value created by the match and shared between the issuing firm and the underwriter. This value is the basis on which any match is established. Conceptually, the value created by a match for the firm is the sum of the funds raised in the issue and the value added achieved by the use of the proceeds. The underwriter receives the dollar value of the fees less the actual cost of underwriting the issue. The total value added or surplus created by the match between underwriter u and firm f may be written

$$V_{u,f} \quad = \quad MVE^{*}_{t+1} + GS - MVE^{-}_{t+1} - C \tag{7}$$

where MVE^{*}_{t+1} represents the market value of equity after the offering is complete, MVE^{-}_{t+1} represents the counterfactual market value of equity in the absence of the issue, GS denotes the gross spread, and C represents the costs of underwriting.

Following Akkus et al. (2018), we model the match surplus $V_{u,f}$ using the structural matching equation

$$V_{u,f} \quad = \quad \beta_0 + \mathbf{X}'_{u,f}\boldsymbol{\beta} + \varepsilon_{u,f}, \tag{8}$$

which is defined for all feasible (observed and counterfactual) matches $(u, f) \in \mathcal{M}$. In Equation (8), $\mathbf{X}_{u,f}$ is a column vector of observable underwriter and firm characteristics that are expected to influence the surplus, and $\varepsilon_{u,f}$ represents the unobservable determinants of the surplus for each feasible match.

2.3 The match surplus proxy

A challenge with this methodology is to find a proxy for the surplus created (and shared between issuer and underwriter) by the observable matches. Once a suitable proxy is chosen, the pairwise stability requirement can then be used to infer upper bounds for the feasible but counterfactual matches based on the proxy. The bounds on the counterfactual matches combined with the proxy for the surplus created by the observable matches allows consistent estimation of the structural equation for the match surplus using a censored regression.

Practically, one must identify the portion of the total surplus that is specific to a particular match and is shared between the issuing firm and the underwriter. Akkus et al. (2018), in their examination of the IPO market, use the long-run value of the issuing firm as their primary proxy for the match surplus. Their reasoning for this choice is that because the underwriter is actively making a market in the newly public equity and is likely to hold shares in the firm for a significant period, the underwriter

will necessarily share in the post issue value of the firm's equity as well as helping to determine this value. Furthermore, it has been argued that for IPOs (Kang and Lowery, 2014) the underwriter captures a substantial portion of the underpricing in the form of indirect compensation.

Similar arguments are not used in the case of a seasoned offer of equity. Commonly, a liquid market in the firm's shares exists prior to the SEO so that the underwriter is not charged with making a market in the shares of the issuing firm. Furthermore, because the firm is relatively mature, it is unlikely that the value added from the use of the proceeds of the offering differs across the firm's feasible set of underwriters. For these reasons our primary proxy for the match surplus is the total amount raised in the offering, identified as the "deal value" in the Dealogic database. This measure consists of the issuing firm's proceeds and the fees paid to the underwriter. Compared to the concept represented in Equation (7), deal value omits the value added by the use of proceeds (i.e., investment NPV) as well as the underwriters costs related to the issue. As argued above, the NPV is not likely to vary for the firm across the feasible underwriters in an SEO, nor is the NPV expected to be shared between the issuing firm and the underwriter. Because the costs of underwriting are not observable, we follow Akkus et al. (2018) and use industry and year fixed effects in the estimation to account for time and industry variation in these costs. Indicator variables for the three deal types are also included in the estimation, which will account for any difference in costs across the deal types. Accounting for underwriting costs in this way, "deal value" then represents the value created by the match between the firm and the underwriter that is shared by the two parties.

For robustness purposes we perform the analysis using different representations of the more expansive definition in Equation (7) and obtain very similar results.[5] This robustness is not surprising because, as noted and demonstrated by Akkus et al. (2018), consistent estimation requires that the proxy for the match surplus be a good proxy, not for the overall match surplus, but only for the portion of the surplus that is not accounted for by the control variables and the fixed effects in the structural matching equation.

3 Estimation

3.1 Estimation of the structural matching equation

The proxy for the match surplus is used to represent the match surplus for the observed matches. This proxy then allows us to use the pairwise stability condition to provide upper bounds for the surplus for

[5]There are various ways to capture the counterfactual equity value in the absence of an offer. One is to consider the equity value just prior to the announcement of the SEO. Alternatively, an estimated value of the shares outstanding prior to the SEO adjusted for a measure of the firm's systematic return from the period prior to the announcement to a point in time after the offering. There are no meaningful differences in results using these different proxies. Again, theoretically, use of these measures would assume that the value added from the firm's use of the proceeds of the offering differs across its choice of underwriters. This seems unlikely.

each of the counterfactual matches. To generate the bounds for the counterfactual matches we assume that each calendar year represents a relevant matching market. Feasible matches for each market are between firms that announce an SEO during a given calendar year and any lead underwriter associated with an SEO announced during that same year. Firms or underwriters that are not part of observed matches during a given calendar year are assumed to not be participating in that market.

The structural matching equation is

$$V_{u,f} = \alpha_0 + \mathbf{X}'_{u,f}\boldsymbol{\alpha} + \gamma_i + \gamma_t + \varepsilon_{u,f} \tag{9}$$

where

$$V_{u,f} = \begin{cases} V^*_{u,f}, & \text{if } (u,f) \text{ is observable} \\ \overline{V}_{u,f}, & \text{if } (u,f) \text{ is unobservable} \end{cases},$$

and γ_i stands for industry fixed effects and γ_t for year fixed effects.

We use a parsimonious model to explain the surplus proxy in the matching equation. The main explanatory variable of interest is underwriter quality. This variable is included in the regression on its own and is also interacted with indicator variables for the deal type to allow-quality to have differential effects on matching for the different deal types. The number of lead underwriters reported in Dealogic is also used as an explanatory variable to represent the difficulty in placing the offering. Sales reported at the end of the issuing firm's fiscal year prior to the announcement are used to control for firm size because, for a given deal value, it is easier for a large firm to issue the new equity than it is for a small firm to do so. The return volatility of the issuing firm's equity is used as a measure of firm risk. Amihud's (2002) measure of illiquidity provides a measure of the elasticity of the demand for the firm's equity (Gao and Ritter, 2010). We use the firm's market-to-book ratio to capture the issuing firm's growth options.[6] The number of SEOs in the previous quarter is used to capture general financial market conditions as well as waves in the SEO market.[7]

An important choice regarding the specification of the matching equation concerns the nature of the matching in the market for underwriter services. In this market, firms match with underwriters and deal types are chosen. How and when deal type is chosen dictates the appropriate approach to estimating the structural matching equation.

The deal type may affect the match between underwriters and issuing firms. If firms unilaterally select the type of deal they will use prior to matching with an underwriter, then the matching between firms and underwriter may be conditional on the chosen deal type and the structural matching equation

[6] We use the market-to-book ratio as a forward looking measure of the firm's investment opportunity set. Following Denis (1994) we instead consider the level of the firm's lagged capital expenditures normalized by the book value of assets and obtain very similar results.

[7] We also utilize measures of the 15 day, prior to the announcement of the SEO, average return and volatility of return for a market index as controls for financial market conditions. Including these measures provides no incremental explanatory power and no change to the results presented here.

could be estimated for each deal type separately. This approach, however, assumes that firms and underwriters consider characteristics of their match partners differently across deal types. Such an approach would impose a restrictive structure on the data that does not seem to be warranted by the behavior in this market.

In contrast, if firms and underwriters are willing to implement any of the different deal types for each offering then the matching is conceptually between firms and underwriters deal type pairs. In this case, feasible matches would be between firm A and underwriter X for deal type T. Where an alternative match would be between firm A and underwriter X for deal type R (conceptually, different divisions in an investment bank specialize in different deal types and compete against their within-firm counterparts as well as the different divisions of other investment banks). This approach adds a great deal of noise to the estimation of the matching equation by dramatically increasing the number of feasible but unobserved matches.

We take an approach that, conceptually, lies between these two extremes. The matching equation is estimated using all SEOs across all deal types. The specification matches issuing firms with underwriters holding the observed deal type constant across all feasible matches. This presumes that deal type is chosen prior to the match (which may be necessary for accelerated and bought deals) but assumes that similar considerations go into the selection of a match between the firm and the underwriter. The regression does include indicator variables for the deal types that are interacted with the measure of underwriter quality allowing the impact of the quality of the underwriter on the matching to differ across deal types. This allows deal types to differentially influence the matching between the issuing firm and the underwriter while limiting the censored observations to the set of alternative underwriters.[8]

When using the structural matching equation all feasible matches are considered in the specification, and the parameters of the equation can be consistently estimated using a censored regression in which the surplus for each counterfactual observation is censored at the observation-specific upper bound defined by the stability conditions, $\overline{V}_{u,f}$. The estimated coefficients of this model capture the effects of the observed characteristics of the issuing firms, the underwriters, and the market for SEOs on the match surplus. Non-zero coefficients indicate non-random matching between firms and underwriters with respect to the relevant observed characteristics. Importantly, the estimated residual from this equation, $\hat{\varepsilon}_{u,f}$, captures the influence of unobserved characteristics of the underwriters and the firms on the matching process. The inclusion of this residual in the specification of the outcome equations then allows us to control for these unobserved characteristics of the matching between firms and underwriters when we examine the performance of the SEOs.

[8]For comparison, we present findings estimated assuming matching is between firms and underwriter deal type pairs in the Appendix. The same economic message is found in those estimates as is found in the results presented here.

3.2 Estimation of the outcome equations

To provide consistent estimates of the parameters in empirical models of outcomes of the underwriting process, we follow the methodology in Petrin and Train (2010) and Akkus et al. (2018). Accordingly, we specify the outcomes of the issue as

$$Y_{u,f} \quad = \quad \beta_0 + \mathbf{X}'_{u,f}\boldsymbol{\beta} + \gamma_i + \gamma_t + \nu_{u,f} \tag{10}$$

where, $Y_{u,f}$ is the outcome of interest, $\mathbf{X}_{u,f}$ is a set of firm, underwriter, and market characteristics thought to influence the outcome variable, and $\nu_{u,f}$ is an error term. The outcomes and the explanatory variables in the above equation are observed only for the actual matches. The observed characteristics, $\mathbf{X}_{u,f}$, are endogenous regressors in this equation because $\nu_{u,f}$ includes unobserved factors that affect the pattern of matching and, therefore, the resulting match surplus. If these unobserved factors related to the matching are correlated with the observed characteristics, an OLS estimation of the above equation suffers from an endogeneity problem. One, therefore, cannot consistently estimate the coefficients of interest, $\boldsymbol{\beta}$, for the outcome variables without being able to control for the unobserved characteristics that influence the matching.

The dependence of the outcome equation's error term on unobservable characteristics of the matching process can be expressed as

$$\nu_{u,f} \quad = \quad \delta\varepsilon_{u,f} + \rho_{u,f} \tag{11}$$

for all observed matches. Following Akkus et al. (2018) we assume that ρ is independently distributed $N(0, \sigma_\rho)$, and that the parameter δ captures the effect of the unobserved (to the econometrician) determinants of matching on the outcome variable. The structural relation assumed between the errors of the matching equation and the outcome variable equation therefore implies the following covariance matrix for the outcome and matching errors

$$\begin{bmatrix} \nu_{u,f} \\ \varepsilon_{u,f} \end{bmatrix} \quad \sim \quad N\left(\begin{bmatrix} 0 \\ 0 \end{bmatrix}, \begin{bmatrix} \sigma_\rho^2 + \delta^2\sigma_\varepsilon^2 & \delta\sigma_\varepsilon^2 \\ \delta\sigma_\varepsilon^2 & \sigma_\varepsilon^2 \end{bmatrix} \right). \tag{12}$$

With these assumptions, the two-step control function approach is used to obtain consistent estimates of the parameters of interest, $\boldsymbol{\beta}$, in the outcome equations. In the first step the matching Equation (9) is estimated using a censored regression so that the actual and all counterfactual matches may be included in the estimation. From the censored regression, we obtain the estimates $\hat{\alpha}_0$ and $\hat{\boldsymbol{\alpha}}$, and construct the vector of residuals $\hat{\varepsilon}_{u,f}$ for all feasible matches. In the second step, Equation (10) is estimated with OLS using the firm, underwriter, and deal-specific characteristics from the observed matches used in the first-stage regression as well as the estimated residuals from the first-stage, $\hat{\varepsilon}_{u,f}$, as a regressor. Petrin and Train (2010) prove that controlling for $\hat{\varepsilon}_{u,f}$ in the second-stage regression controls for selection on unobservable variables. Therefore, including it as a regressor in addition to

the characteristics $\mathbf{X}_{u,f}$ allows consistent estimation of $\boldsymbol{\beta}$. The control function approach has been shown to account for selection in recent applications in economics and finance (Card, 2001; Schroth and Szalay, 2009; Wooldridge, 2015; Akkus et al., 2018).[9]

Following Petrin and Train (2010) and Akkus et al. (2018), we bootstrap the standard errors in the second-stage regression to account for the sampling variation in the entire two-step process. The standard errors are computed using a block bootstrap procedure where resampling is done underwriter by underwriter. This process allows the within-underwriter errors to have an arbitrary correlation structure and accounts for within-underwriter correlation among the observations that may arise from the specification of the surplus proxy and the bounds of the surplus for the counterfactual matches.

4 Hypotheses

The empirical hypotheses focus on the relation between the measures of SEO performance and underwriter quality, utilizing the logic of the certification hypothesis, as developed by Booth and Smith (1986) and Beatty and Ritter (1986), as well as other arguments developed in the IPO literature and adapted to the setting of a seasoned equity issue. Under the certification hypothesis, in the presence of superior information possessed by the issuing firm, the underwriter's quality or reputation may be used to certify the value of the issued shares to external investors. The summary statistics (discussed in Section 5.3 below) indicate significant sorting of issuing firms into deal types, which must be taken in to account in the empirical analysis.

The existing literature regarding SEOs examines four primary measures of performance for SEOs. The "announcement effect" is the most often examined measure of SEO performance. This effect is measured as the two day cumulative abnormal return for the announcing firm's equity on the day of and the day after the announcement day. The "rebound return" is measured as the abnormal return for the issuing firm's equity between the closing price on the day following the announcement date and the closing price on the day before the offer date. The "discount" is defined as the percentage difference between the closing price on the day before the offer and the offer price, while the "underpricing" is defined as the percentage difference between the offer price and the closing price on the offer day. Finally, we also examine the "fees" (both total fees and fees as a percentage of the deal value) paid to the underwriter by the issuing firm.

[9] Akkus et al. (2018) provide an intuitive discussion of the relation between this approach and the Heckman selection correction.

4.1 Announcement effect

The announcement effect, the commonly negative price response to the announcement of a firm's decision to issue seasoned equity, is often interpreted as a response to the potential for asymmetric information to have influenced a firm's decision to sell equity.[10] The certification hypothesis suggests that if the underwriter's reputation or quality is relied upon by investors as an indication that the issuing firm's equity is appropriately priced, then the expectation is that the announcement effect will be negatively related to the quality of the underwriter. In other words, if high-quality underwriters match with high-quality firms (issuers that have valuable investment opportunities rather than those seeking to sell overpriced equity), then the announcement of an SEO with a high-quality underwriter will mitigate the need for investors to update their estimate of value given the announcement.

The short time line of accelerated or bought offerings implies there may be a scope for investors to rely on the underwriter's certification of the value of the issue. For accelerated offerings in particular, where the underwriter markets the issue to external investors, the quality of the underwriter may certify the value of the issue and should therefore be significantly related to the market's response to the announcement of an accelerated SEO. One expects that there should be a smaller (i.e., a less negative) price response to the announcement of a seasoned equity offering when the lead underwriter for an accelerated deal is of higher quality.

Bought deals share the shortened time line of accelerated deals, however, because the underwriter purchases the issue in a bought deal the prediction regarding the announcement effect is somewhat ambiguous. The market's inference regarding firm quality may be more strongly related to the underwriter's quality in a bought deal relative to an accelerated deal because the underwriter's reputational and financial capital are both put at risk. A counter to this argument, however, is that an alternative investment for an underwriter to a bought deal with a publicly traded firm is to simply invest its capital in a diversified portfolio of similar firms that are not seeking new equity financing. In light of this alternative use of its capital, it may be that only the very highest quality firms will be able to utilize a bought deal. In that case, there may be little cross-sectional heterogeneity within the set of firms doing a bought deal, and therefore, little detectable relation between the announcement effect and underwriter quality. Under this alternative investment, however, the underwriter does not benefit from the (net) fees and discount associated with the bought deal. This added compensation from the bought deal may induce underwriters to accept some risk that the issuing firm is not of the highest quality.[11]

[10] Myers and Majluf (1984) suggest that firms may issue either to sell overvalued shares or to fund valuable investments and that the perceived probability of these possibilities impacts the announcement effect. In general, a high-quality underwriter's certification may help to disentangle these possibilities.

[11] For practical reasons, the hypothesis regarding the announcement effect for bought deals is largely irrelevant. The need to measure the announcement effect using a two day cumulative abnormal return makes this hypothesis difficult

The summary statistics (Panel D of Table 1) indicate that fully marketed deals are, on average, used for smaller, riskier firms with less liquid equity relative to accelerated or bought deals. The distinguishing characteristic of a fully marketed SEO is the information production and communication that occurs during the road show. For this deal type, a high-quality underwriter's superior ability to evaluate the appropriate price of the issue via its due diligence and the communication with investors during the road show should be an important prominent aspect of quality. Given the nature of the issuing firms that utilize a fully marketed deal and the fact that the equity of these firms is currently traded, we expect there to be little scope for certification of the issue by the underwriter at the time of the announcement. In other words, while market participants should update their expectations based on the quality of the underwriter, given that the central feature of a fully marketed deal is an extended period of information exchange between the underwriter and investors, the perceived tie between underwriter quality and firm quality is expected to be relatively weak for firms that elect a fully marketed offering relative to those that utilize the other deal types.

Hypothesis 1. *Controlling for the matching between underwriters and issuing firms, accelerated offers with higher quality lead underwriters should have smaller (less negative) announcement effects. For bought deals, the relation between underwriter quality and the announcement effect should be positive and should be stronger than it is for the accelerated offers. For fully marketed deals, there should be a relatively small positive relation between the announcement effect and underwriter quality because the underwriter does not certify the offering, and instead leads a road show to gather and share relevant information concerning the issuing firm.*

4.2 Rebound return

As noted above, one may hypothesize that a higher quality underwriter will be able to more clearly or credibly convey information during the marketing or book building process. Fully marketed deals allow the lead underwriter to convey information concerning valuation of the issuing firm to investors and the information conveyed by a high-quality underwriter is expected to be more precise than the information conveyed by a low-quality underwriter. However, given that the identity of the lead underwriter is revealed in the issuance announcement, and expectations therefore incorporate the identity of the underwriter, we expect no relation between the level of the rebound return in a fully marketed offer and the reputation of the lead underwriter.[12] In accelerated and bought deals there is little opportunity for the underwriter to convey information to investors during the limited period

to examine for bought deals. Panel F of Table 1 indicates that only 4 bought deals in our sample are completed more than one day after the announcement date. We are therefore unable to measure the announcement effect independently of the offering for the vast majority of bought deals.

[12]It is possible that the volatility of the rebound return is higher for deals with higher quality underwriters as the information (both positive and negative) that these underwriters convey generates a stronger response from the market.

between the announcement and the offer. Bought and accelerated deals are completed so quickly after they are announced that we do not examine the rebound return for these deal types.[13]

Hypothesis 2. *Controlling for the matching between the underwriter and the firm, the abnormal return for the issuing firm's equity between the day after the announcement date and the closing price one day before offer date should be unrelated to underwriter quality in fully marketed deals.*

4.3 Discount

The discount in an SEO measures the percentage difference between the closing price on the day before the offer (a natural reference for a seasoned offering) and the offer price. For a given firm quality, discounting the offer relative to the closing price of the prior day is a way for the underwriter to induce external investors to purchase the issue and is a choice variable. If higher quality underwriters match with higher quality issuers, or if higher quality issuers convey valuation information more credibly than do lower quality underwriters, they should need to rely on this costly mechanism to a lesser extent than lower quality underwriters.

For an accelerated deal, the pricing of the deal is the primary input of the underwriter. Given the risk to the investors implied by the announcement of an issue of additional equity, the average discount should be positive. However, due to the certification of firm quality that a high-quality underwriter is able to provide, a high-quality underwriter should be able to place an accelerated deal with a lower discount than a low-quality underwriter.

For bought deals, the discount represents an adjustment for the *underwriter's* uncertainty that the existing market price of the issuing firm is appropriate given that the firm is seeking new equity financing. Because the underwriter does not market the issue to external investors, the average discount is expected to be smaller for bought deals than it is for accelerated deals. If higher quality underwriters match with higher quality firms the discount should be negatively related to underwriter quality.

In a fully marketed deal, a high-quality underwriter is expected to perform a more informative road show. Because the information released during the road show for a seasoned offering can be incorporated into the contemporaneous stock price, the closing price on the day before the offering is expected to be more precise. Therefore, relative to an accelerated deal (in which only the certification of the underwriter is used to establish the closing price on the day before the offer) one could expect a lower average discount. Furthermore, if underwriter quality facilitates the road show, then the discount is expected to vary inversely with underwriter quality, as argued in Gao and Ritter (2010).

For fully marketed deals, an alternative and opposing hypothesis is that higher quality underwriters

[13]For accelerated deals the mean (median) number of days between the announcement of the deal and the offer is 1.9 (1.0). For bought deals the mean (median) value of this variable is 2.3 (1.0).

can use their market power to provide a greater discount to benefit the network of investors that participate in the deal. Chen and Ritter (2000) claim that this is done in exchange for future business from these investors. This claim, however, does not seem to have been raised with respect to SEOs, perhaps due to the existence of an active market in the offered equity prior to the issue and the large difference in magnitude between the average underpricing of 15% or more in IPOs and an average discount of about 3.5% in SEOs. However, to the extent that the underwriter can influence the allocations of the issued shares, this hypothesis cannot be dismissed. Thus, given that we have two opposing hypotheses regarding the relation between underwriter quality and the discount in fully marketed offerings, we regard this relation to be ambiguous.

Hypothesis 3. *Controlling for the matching between the underwriter and the firm, the discount should be positive and it should be negatively related to underwriter quality for accelerated deals. For fully marketed deals, the affect of underwriter quality on the discount is ambiguous in sign. In bought deals, the discount should be smaller on average (relative to that in accelerated deals) and the discount should be negatively related to underwriter quality.*

4.4 Underpricing

Underpricing on the day of the issue (e.g., Gao and Ritter, 2010) may represent a costly substitute to having more fully marketed the issue. Therefore, it may be argued that a higher quality underwriter will be able to price the SEO more accurately relative to the closing price on the offer day. However, in contrast to the discount, the underpricing is less clearly affected by the actions of the underwriter. In an efficient market, the ability to predict the closing price on the day of the offer is not necessarily related to the quality of the underwriter. Thinking of the closing price on the offer day as being equal to the closing price on the day before the offer (ignoring the small daily expected return) *expected* underpricing should be equal to the expected discount.

Hypothesis 4. *Reflecting the hypothesis for the discount, controlling for the matching between the underwriter and the firm, for all deal types the underpricing on the offer day should vary with underwriter quality in a manner that is similar to the discount, however, the relation should be weaker than that observed for the discount.*

An alternative to Hypothesis 4 was proposed by Altınkılıç and Hansen (2003) who argue that the unexpected discount may be a last minute signal to investors of information not released during the marketing effort. We consider this possibility below. Finally, to the extent that matching with a higher quality underwriter adds value to the issuing firm via superior performance of the offering, high-quality underwriters can demand compensation for providing this value and issuing firms should

be willing to pay for this value.

4.5 Fees

In fully marketed deals, high-quality underwriters provide value via a more informative road show, and a superior road show is likely to be more costly to implement. In accelerated deals, the cost of the road show is absent. Nevertheless, to the extent the underwriters reputation certifies the value of the issue, higher quality underwriters have greater reputational capital at risk and should demand additional compensation for this added risk. In a bought deal, the underwriter's *financial* capital is put at risk. The fact that the issue is not marketed to external investors implies that the underwriter faces relatively little reputational risk in these offerings. Therefore, it is not clear that there is a relation between underwriting cost and underwriter quality in a bought deal. Thus, the relation between underwriter quality and fees is expected to be weaker for bought deals relative to accelerated and fully marketed deals. Therefore, controlling for the matching between an issuing firm and the lead underwriter, the total fees paid to high-quality underwriters are expected to be larger than those paid to low-quality underwriters. This effect should be weaker for bought deals relative to accelerated and fully marketed deals.

Altınkılıç and Hansen (2000) raise the question of whether there are economies of scale in underwriting fees. This issue can be addressed within our context by considering the fees as a percentage of the proceeds of the offering. Altınkılıç and Hansen (2000) show that the percentage fee (which approximates the marginal cost of raising an additional dollar in new financing) is decreasing in the size of the offering (for a wide range of values of deal proceeds). Their analysis, however, does not control for the matching between issuing firms and underwriters. We consider the closely related question of whether, controlling for the matching between the firm and the underwriter, the marginal cost (approximated by the fees per dollar raised) is related to the quality of the underwriter. The difficulty with this question is that both the total fees (the numerator) and the proceeds (the denominator) are expected to be influenced by the quality of the underwriter.[14] Our expectation is that for the firms that are willing to pay the cost associated with matching with a high-quality underwriter, the expectation is that the proceeds of the issue will increase in greater proportion than will the fees (i.e., both parties must benefit from the match).

Hypothesis 5. *Controlling for the matching between the underwriter and the issuer, the higher the reputation of the underwriter leading the SEO, the higher should be the gross fees paid to the underwriter in the SEO. This effect should be stronger for the accelerated deals and fully marketed deals than it is for bought deals. The underwriting fee as a percentage of proceeds (which approximates the*

[14] A high-quality underwriter may charge higher fees for a given deal but may also be able to raise more proceeds for the firm.

marginal cost) should be decreasing in underwriter quality for all deal types.

5 Data

The primary data sources for our analysis are Dealogic for historical information on SEOs, Compustat for historical information on firm specific characteristics, Intraday Trade and Quote (TAQ) data for estimation of the firm-specific degree of risk, and Center for Research in Security Prices (CRSP) data for estimation of the market value of the firm and price changes.

5.1 Matching the SEO data

Following the evaluation of relative accuracy between data sources detailed by Gao and Ritter (2010), we obtained data on all U.S. SEOs announced between February 1993 and December 2017 from the Dealogic database. A difficulty with using these data is that the firm identifier used by Dealogic is different from the firm identifiers used by the Compustat or the CRSP databases. To gather and match firm-specific characteristics and pricing data, the SEO firms from Dealogic were first matched with Compustat firms manually. To this end, we use the following process:

i. Firms are first matched by exact name. If a firm in Dealogic has the exact same name as a firm in Compustat, we count the Compustat firm as a match. We confirm exact name matches using the fields TIC (ticker), CUSIP, and SIC to ensure they are true matches. Some of the exact name matches have CUSIP numbers that do not match between the Compustat and the Dealogic databases. We re-examine these cases by searching the Compustat database for matches by CUSIP number. The CUSIP matches are examined manually to determine if the CUSIP matches are superior to the match provided by an exact name match. In this process, 31 of the exact name matches are replaced with CUSIP matches.

ii. For SEO firms in the Dealogic database that do not have an exact name match with firms in Compustat, if the ticker symbol is available in Dealogic, and it is an exact match for a ticker symbol in the Compustat database, the firm is matched using the ticker symbol. These matches were then confirmed manually using the firm name and the SIC code.

iii. For firms in Dealogic without exact name or ticker symbol matches, we match by CUISP. If the Dealogic CUSIP matched a CUSIP in Compustat, we count this as a match and these matches are confirmed manually using firm name and SIC code.

iv. For firms in Dealogic that do not match by exact name, ticker, or CUSIP, with a firm in Compustat, string name matches are used if the Levehnstein string match distance ratio between the Compustat firm name and the Dealogic name is greater than 0.8 and the SIC codes are the same in the Dealogic and the Compustat databases.

This process results in 9,654 ECMDEALS from Dealogic with an identified GVKEY in the Compustat database. The GVKEY is used to gather the relevant data from Compustat for the matched SEO firms in the Dealogic database. After eliminating duplicate observations, the matching to the CRSP database is accomplished using the CCM bridge from the merged CRSP Compustat database created by WRDS. This links the ECMDEAL, GVKEY, and PERMNO firm identifiers for the SEO firms. After matching ECMDEAL, GVKEY and PERMNO identifiers for the different databases and eliminating the SEOs without a complete set of firm specific characteristics we are left with 4,169 unique SEOs.

One aspect of the SEOs in the sample that may be important to consider is that in roughly 15% of the total deals, Dealogic reports zero new shares issued. Random spot checking of these deals indicate that these deals are dedicated to insiders selling shares (i.e., all shares sold in the offering are secondary shares) rather than the firm raising new equity capital. Reported results examine only the deals in which the firm raises new capital, however for robustness, we also examine the subset of deals that are offerings of secondary shares. In the text we highlight any meaningful differences in inference when we restrict the sample in this way.

5.2 Variables

The following firm- and deal-specific variables are employed in our empirical tests:

- Underwriter Reputation (REPUTATION) is measured as the underwriter's market share of the SEO market in the year prior to the calendar year of the announcement (Megginson and Weiss, 1991).[15] Market share represents a measure of underwriter quality that aggregates different aspects of underwriter ability or quality that may vary over time.
- Number of lead managers (#LEAD) is the number of lead underwriters for the issue as reported by Dealogic.
- Sales (SALE) is the net sales of the firms in thousands of dollars in the year of the SEO. This is used to control for firm size and in all regressions we use the hyperbolic sine of this number.[16]
- The market to book ratio (MARKET_BOOK) is the firm's market to book ratio reported at the end of the fiscal year prior to the SEO.
- The number of SEOs (#SEO) is the number of SEOs in the month prior to the firm's SEO, and is

[15] Measured by the number of SEOs for which the underwriter is identified as the lead underwriter in the prior year relative to the total number of SEOs in the prior year. For deals with more than one lead underwriter listed we use the first of those listed as "lead" underwriters by Dealogic (a list that is commonly out of alphabetical order). If we instead use the highest measure of reputation amongst the underwriters listed as lead underwriters the same results are obtained. One could use the Carter/Manaster measure that is available in a time series on Jay Ritter's website. However, this measure is based on IPO activity rather than SEO activity and so is less relevant for our study.

[16] This is similar to using the natural logarithm of sales except that it allows values of zero. Filtering the data to eliminate the observations for which the firm's sales are zero and using the natural log of sales provides the same results but imposes an unnecessary restriction on the data.

used to control for financial market conditions and waves in the SEO market.

- Illiquidity (ILIQ) is the illiquidity, measured by Amihud's (2002) measure, of the firm's equity at the fiscal year end in the year prior to the SEO.
- Risk (RISK) is the firm's risk during the year prior to the SEO. It is computed using five-minute returns taken from the TAQ database. For each firm on each day, we compute the variance of intraday returns, applying the Scholes and Williams (1977) correction for non-synchronous trading and a correction for heteroscedasticity.[17] Each month, we then compute the monthly variance of stock returns using the average of daily variances, scaled to a monthly frequency.

The outcome variables we examine are defined as follows.

- Deal value is the total proceeds of the deal (expressed in millions of dollars). The natural log of this value serves as the match surplus proxy.
- The announcement effect is defined as the two day (the day of the announcement and the day after) unexpected return for the issuing firm, where the expected return is calculated using a single factor market model estimated over the 30 trading days prior to the announcement day. The two day effect is considered because we do not have data on the exact time of the announcement, which may occur after the close of trading on the announcement day.
- The rebound return is defined as the unexpected return for the issuing firm measured from the closing price on the day following the announcement date through the closing price on the day before the offer. As with the announcement effect, the expected return is measured using a market model where the issuing firm beta is estimated over the thirty trading days prior to the announcement day.
- The discount is defined as the percent difference between the closing price on the day prior to the offering and the offer price.
- Underpricing is defined as the percent difference between the closing price on the offer day and the offer price.
- Fees are defined as the dollar value (in millions of dollars) of the total underwriter fees reported in Dealogic. In all regressions we use the natural logarithm of this value. We also consider the percentage fee, as an approximation to the marginal fee, defined as the total dollar fees divided by the dollar value of the proceeds.

To limit the impact of errors and outliers in the data, we trim the firm and deal characteristics at the upper and lower 1.0 percentiles and remove observations for which the book value of assets is not strictly positive and observations with negative values for sales and the value of Amihud's measure of illiquidity. After these screens we are left with 3,746 total SEOs, 3,211 in which the firm issued a

[17] See, for example, French et al. (1987).

strictly positive amount of new equity.

5.3 Summary statistics

Table 1 reports summary statistics of the relevant variables. These statistics are provided as a quick overview of the nature of the firms issuing seasoned equity. They also contain information about differences in the types of firms that utilize different types of SEO deals.

Panel A of Table 1 presents the summary statistics for the entire sample of SEOs, panel B represents the subsample of SEOs for which the firms issued new shares, and panel C the subsample of SEOs for which the offering is made up of entirely secondary shares. One of the facts that is immediately apparent from Panel A is that raising seasoned equity is an expensive proposition. Average (median) fees as a percent of proceeds are 4.77% (5.00%). The standard deviation of 1.32% and the range of outcomes (a minimum of 0.35% and a maximum of 8.0%) do not reflect the same type of clustering found in fees for initial public offerings by Chen and Ritter (2000). Furthermore, the average discount of the offer price from the closing price on the day before the offer is 4.86%, which also represents a cost related to the issue.[18]

Comparison of Panel C with Panel B shows that SEOs made up entirely of secondary shares tend to be larger deals, to have more reputable lead underwriters, and list a greater number of lead underwriters. Panel C also shows that deals made up of only secondary shares have higher market-to-book ratios, lower levels of Amihud's illiquidity measure, and are less risky relative to firms that raise new capital (Panel B). The firms in Panel C also have lower discounts of the offer price relative to the closing price on the day before the offer and lower underpricing (measured as the percentage difference between the offer price and the closing price the day of the offer), as well as smaller announcement effects and lower fees.

[Table 1]

One way to classify the available choices over deal type is by whether the demand curve for the equity of the issuing firm is elastic or inelastic. Gao and Ritter (2010), for example, examine whether marketing by underwriters in fully marketed deals is successful in increasing the demand elasticity for shares in the issuing firm's stock. From this perspective, accelerated and bought deals may be chosen to raise funds for issuers whose existing demand curves are already highly elastic (or are expected to be elastic post-announcement). A fully marketed format may be more likely to be used in cases for which the current demand curve for the firm's share is expected to be inelastic conditional on the announcement of the offering. From a different perspective, both fully marketed and accelerated deals

[18] If we restrict the sample to firms with more than one day between the announcement and the offer day, then the average discount remains relatively large at 3.5%, and the discount is measured after the market's response to the announcement that the firm is seeking new equity financing.

are sold to external investors while bought deals are purchased by the underwriter. A distinction between these deal types is that bought deals are likely to be utilized by issuers for which, from the underwriter's perspective, the possibility that an informational asymmetry has motivated the offer to sell equity is very small. For the firms that utilize fully marketed or accelerated deals, appropriate pricing conditional on the firm's decision to issue, is less certain from the underwriter's perspective.

In order to shed some light on the differences in firms pursuing different types of offers, we report summary statistics separated by deal type in Panels D, E, and F. The statistics suggest sorting of firms into the different deal types consistent with the discussion above. Bought deals are notable in several respects. On average, bought deals are more frequently done by the most reputable underwriters and have fewer lead underwriters than either fully marketed or accelerated deals. Bought deals are also used by the least risky, most liquid issuing firms. SEOs from these issuers result in very low discounts, have low underpricing, and the lowest average fees. Not only are the averages for risk and illiquidity lower for bought deals but the standard deviation of these measures for the firms employing bought deals is also very low relative to the other deal types, suggesting a relatively low level of cross-sectional heterogeneity for issuers utilizing this type of deal.

Accelerated deals have an intermediate average level of underwriter reputation and, on average, the highest number of lead underwriters are involved in this type of deal. Accelerated deals also have the highest average discount and the largest (most negative) average announcement effect of the different deal types. Average risk and illiquidity for accelerated deals are lower than for firms utilizing fully marketed deals. The dispersion in the measure of risk is lower than it is for firms that choose fully marketed deals. The dispersion of the illiquidity measure is higher. Firms using accelerated deals also have the second highest average level of fees.

Finally, fully marketed deals are used for (on average) riskier, less liquid issuers that have the highest market-to-book ratios. The dispersion in these measures across firms using fully marketed deals is also relatively high. Not surprisingly, the fully marketed deals have the highest level of average fees. The high average fees likely reflect the cost of the road show but may also reflect other costs the underwriter is exposed to for this deal type. The average announcement effect and the average discount for fully marketed deals are approximately equal to those of bought deals.

These differences in deal type summary statistics are consistent with the categorization discussed above. Bought deals are utilized for a narrow set of the highest quality (least-opaque) firms. The summary statistics and the nature of the deal suggest that there is less of a problem associated with asymmetric information and that the demand for their shares is highly elastic. Firms with highly uncertain quality appear to use fully marketed offers. Again, the presence of an extended road show indicates a significant possibility for asymmetric information and a need to identify a price at which there will be sufficient demand for new shares. Accelerated deals are chosen for firms between these

extremes. The size of the average discount indicates a possibility for asymmetric information but the accelerated nature of the deal suggests that demand for the new shares can be created quickly by appropriate pricing by the underwriter.

Table 2 provides the cross correlations between the variables using the full sample. None of the explanatory variables show strong correlations. There seems to be little grounds for concern about multi-collinearity with using this set of variables in our regression analysis.

[Table 2]

6 Findings

The market's response to deals in which all of the shares are secondary shares is likely to be different from those in which the firm raises new equity capital. Furthermore, the matching between the firm and the underwriter may or may not be determined by the same process as for firms that raise new equity. Because of the potential differences between SEOs in which the issuing firm raise new equity capital and those consisting entirely of secondary shares, we perform the estimations for the sample of all SEOs and also for the sample including only those SEOs in which the issuer raises new capital. This latter sample will be the focus of our discussion of the findings.

The analysis also accounts for the differences in the length of time between the announcement and the offer across deal types for some of our tests. Most importantly, if the announcement and the offer are separated by less than two days, the measure of the announcement effect (the two-day cumulative abnormal return) is contaminated by the offer itself. Similarly, in such a case, the discount may reflect a closing price on the day before the offer that does not incorporate the news that the firm will seek new financing. In our analysis of the announcement effect and the discount, we therefore drop observations for which the number of days between the announcement and the offer is not strictly greater than one.

6.1 First-stage regression tests

Table 3 depicts the first-stage regression tests. The findings presented here use Deal Value as the proxy for the match surplus. Columns (1) and (3) of this table report, respectively, the findings of an OLS estimation and the censored Tobit estimation of Equation (8) using all of the available SEOs with no missing variables. Columns (2) and (4) report, respectively, findings of the OLS and censored Tobit regressions restricting the data to those SEOs in which the firm issues a strictly positive number of new shares (our main findings).

For both samples, the difference between the OLS coefficient estimates and those of the Censored Tobit indicates significant non-random sorting across the characteristics related to the underwriters,

the issuing firms, and the financial market. The estimates show that higher reputation underwriters are associated with more valuable deals. The interaction terms imply that the relation between underwriter reputation and deal value is stronger for bought deals than for accelerated or fully marketed deals. A greater number of "lead" underwriters is associated with more valuable deals. Also, larger firms, and firms that have higher market-to-book ratios are the issuers behind larger deals. Similarly, riskier firms and firms with more illiquid stock tend to undertake less valuable (smaller) deals. Larger deals are observed when the market for SEOs is most active.

As suggested by Myers and Majluf (1984), the size of the offering is itself likely to increase the informational problems associated with placing it in the market. This indicates that information problems of SEOs are not a *firm* characteristic alone, but are also an issue characteristic. High-quality underwriters are not just solving the problems of high-asymmetric information firms. Rather, they are solving the problems of high-asymmetric information *offerings*, which may include large offerings by firms that do not exhibit the greatest potential asymmetric information.

The differences in the coefficient values for the explanatory variables between the OLS and the censored Tobit estimates demonstrate the importance of including all feasible (rather than only the observed) matches in the estimation. Also note that the coefficient estimates from the censored Tobit regressions using the full sample or the sample restricted to firms that raise new equity capital are relatively similar, suggesting that the matching between issuers and underwriters is the result of similar considerations regardless of whether the issuing firm is raising new capital or simply selling secondary shares.

[Table 3]

6.2 Announcement effect

In our second-stage regressions, we utilize the estimated residual from the corresponding first-stage regression. That is, if the second-stage regression is estimated for all SEOs (only SEOs with strictly positive new shares) then the second-stage regression uses the estimated residual from the censored Tobit in Column (3) (Column (4)).

The first performance measure we examine is the announcement effect (e.g., Mikkelson and Partch, 1986). The findings are reported in Table 4. Columns (1) and (3) of this table examines all SEOs while Columns (2) and (4) consider only those SEOs with a strictly positive number of new shares sold for the issuing firm. In this analysis, we restrict attention to SEOs for which there is strictly more than one trading day between the announcement of the SEO and the offer date.[19] As in the first-stage regression, we account for the different types of deals by including indicator variables for

[19]Similar results are obtained if we restrict "days announcement to offer" to be greater than 2 or 4. However, doing so effectively restricts the analysis to fully marketed deals.

fully marketed deals and for bought deals and by interacting these dummy variables with the measure of underwriter quality.

The main finding from Table 4 is that, consistent with the certification hypothesis and Hypothesis 1, after controlling for the unobserved characteristics of the matching between firms and underwriters, the use of a high-quality underwriter is associated with a significantly smaller (less negative) announcement effect for accelerated deals. To see this, note that the announcement effect is negative, while the coefficient estimate on REPUTATION is strictly positive, which reduces the absolute value of the former. The estimated coefficient on the interaction between the dummy variable FULL and underwriter quality indicates that this effect is significantly smaller for the fully marketed deals. In fact, the sum of the coefficients is close to zero. The bootstrapped standard errors indicate that the relation between the announcement effect and underwriter quality for fully marketed deals is insignificant. For the case of bought deals, the estimated coefficient on the interaction term reported in Column (4) is insignificant, suggesting a similar relation between underwriter quality and the announcement effect for bought deals as there is for accelerated deals. This coefficient estimate, however, is based on so few observations that the findings regarding the estimated relation between the announcement effect and underwriter quality in bought deals are inconclusive.

This appears to be the first time the certification hypothesis has been documented for US SEOs.[20] Columns (1) and (2) in Table 4 indicate that standard OLS regressions explaining the announcement effect using a measure of underwriter quality results in the finding of an insignificant relation. The contrast in these regression tests illustrates the endogeneity introduced by the assortative matching between firms and underwriters and the importance of controlling for this matching when examining the relation between the announcement effect and underwriter quality. The significance of the estimated coefficient on the residual from the first-stage regression (ehat) provides another indication of the importance of controlling for the unobserved aspects of the matching between underwriters and issuers when examining the announcement effect.

The announcement effect is significantly smaller for deals in which the issuing firm has a higher market-to-book ratio.[21] Finally, riskier firms see a significantly stronger (more negative) announcement effect. These findings support the view that asymmetric information is an important friction that arises when firms raise seasoned equity.

[Table 4]

[20] Cooney et al. (2003) examine a sample of Japanese SEOs and interpret their findings as being consistent with the certification hypothesis.

[21] The positive coefficient estimate on the market-to-book ratio is consistent with the findings in Denis (1994), who examines whether firms with better investment opportunities experience a lower announcement effect. In our analysis, substituting capital expenditures (scaled by book assets) for the market-to-book ratio also results in a positive and highly significant coefficient estimate.

6.3 Rebound return

Table 5 depicts the findings from our examination of the rebound return. As discussed above, the analysis of the rebound return is restricted to fully marketed SEOs. Columns (1) and (3) provide, respectively, the OLS and matching market corrected estimates for the set of all fully marketed SEOs, and Column (2) and (4) present the findings for the fully marketed SEOs in which the issuing firm raises new equity capital. Consistent with our discussion of Hypothesis 2 and market efficiency, the rebound return for the fully marketed deals is not significantly related to the quality of the lead underwriter. Note that the coefficient estimates in the OLS regressions for the underwriter quality variable are much larger than in the matching market-corrected regressions. This difference and the significance of the coefficient estimate on the residual from the first-stage regression (ehat) highlight the importance of controlling for the matching in the examination of SEO performance. Considering the other control variables, controlling for the matching between underwriters and firms, the unexpected return between the announcement day and the offer day is larger for larger firms, riskier firms, and during times of higher activity in the SEO market.

[Table 5]

6.4 Discount

Table 6 examines the discount, defined as the percent difference between the offer price and the closing price on the day before the offer. Columns (1) and (3) present, respectively, the OLS and the matching market-corrected estimates based on the sample of all SEOs. Columns (2) and (4) presents, respectively, the results restricting the estimation to consider only those SEOs in which the issuing firm raises new equity. In both sets of estimates, we restrict attention to those deals for which there is strictly more than one day between the announcement of the SEO and the offer itself so that the estimates are based upon discounts measured relative to a closing price that incorporates the announcement of the new issue. In these estimates, however, the findings relating to bought deals are again based on a very small number of observations.

Consistent with Hypothesis 3, controlling for the matching between underwriters and issuing firms, in Column (4) we see a significantly positive intercept (a reflection of the conditional average discount for accelerated deals) and a significantly negative relation between underwriter quality and the size of the discount for accelerated deals. In contrast, in Column (3), where estimates are based on a sample that includes SEOs made up entirely of secondary shares, the estimated coefficient on reputation is negative but insignificant. Note that in Columns (1) and (2) the estimated coefficients on the reputation variable from the OLS regressions are both insignificant, again indicating the importance of controlling for the matching between underwriters and issuing firms when examining the performance

of SEOs.

For bought deals, the estimated coefficient on the interaction term between bought deals and reputation also differs depending upon which sample is used. In Column (4), consistent with Hypothesis 3, the estimated coefficient on the interaction term is negative and significant, indicating an even stronger inverse relation between underwriter quality and the discount in bought deals relative to accelerated deals. However, in Column (3) the estimated coefficient is positive but insignificant. Thus, in both accelerated and bought deals the relation between underwriter quality and the discount is dependant upon the sample used.

One way to reconcile these conflicting estimations builds on the Hansen and Torregrosa (1992) finding about the effects of insiders' sales of stock as a part of SEOs. Recall that the sample in Column (3) includes deals in which only secondary shares are sold. Hansen and Torregrosa (1992) find that when insider sales are large, underwriter fees are higher, as this reflects a negative signal from insiders about firm value. Also, recall that we find more information-problematic deals tend to produce matches with higher-quality underwriters, which means that deals made up entirely of secondary shares may tend to produce more matches with high-quality underwriters. Panel C of Table 1 indicates that this is the case: the mean REPUTATION of deals with only secondary shares offered is 0.08, while for deals with positive new shares in Panel B, the comparable figure is 0.06. Thus, the estimated relation between underwriter quality and the discount presented in Column (3) may reflect the fact that the deals in Column (3) include a large proportion of highly information-problematic deals. Such deals are more challenging to place in the market, which may explain the difference in this estimated relation between Columns (3) and (4).

The estimated coefficients on the interaction term between reputation and the dummy for fully marketed deals is positive in both Columns (3) and (4) but significantly so only in the sample restricted to firms raising new equity. This indicates that the effect of underwriter quality on the discount is significantly weaker for fully marketed deals. The sum of these coefficients in Column (4) is not different from zero, indicating that for fully marketed deals there is no relation between underwriter quality and the size of the discount.

The discount is smaller for deals with a greater number of lead underwriters, for larger firms, for firms with higher market-to-book ratios (firms with strong investment opportunities), and during periods of high SEO activity. The discount is larger for riskier firms and for firms with less liquid equity. Finally, the significance of the estimated coefficient on the residual from the first-stage regression reinforces the importance of controlling for the matching between firms and underwriters.

[Table 6]

6.5 Underpricing

Table 7 presents the findings regarding the underpricing in the offerings, defined as the percent difference between the closing price on the offer day and the offer price. Columns (1) and (3) present, respectively, the OLS and matching market-corrected estimates for the sample of all SEOs and Columns (2) and (4) present the findings using only those SEOs for which the issuing firm raised new equity capital. As indicated in Hypothesis 4, the expectation is that underpricing should be essentially the discount plus noise. Therefore, the prediction is that expected underpricing will be lower for higher quality underwriters. The findings in Columns (3) and (4) of Table 7 show a significantly negative relationship between underpricing and underwriter quality for accelerated deals. The estimated coefficients for the interaction terms between reputation and the deal type dummy variables indicate this relationship is not significantly different for bought or fully marketed deals relative to accelerated deals.

Consistent with the findings regarding the discount, riskier and less liquid firms do see significantly greater underpricing while larger firms experience less underpricing. Underpricing is lower for deals with a greater number of lead underwriters. Finally, note that in this instance there is little difference between the inference obtained from the OLS estimations and the matching market-corrected estimates. However, the significance of the coefficient estimate for the first-stage residual again indicates that controlling for matching is important when examining the performance of the SEO.

[Table 7]

6.6 Fees

Table 8 presents findings related to the fees associated with the SEOs. All findings in this table are based on the subset of SEOs in which the issuing firm raises new equity capital.[22] Columns (1) and (2) report the findings of the OLS estimates for which the dependant variables are the log of total fees and the total fees as a percentage of the proceeds of the issue (deal value), respectively. Columns (3) and (4) report the findings for the matching market corrected estimates for which the dependant variables are the log of total fees and the total fees as a percent of the proceeds of the issue (or deal value), respectively. The findings provide interesting insights into underwriting costs.

Column (3) of Table 8 shows a significantly positive relation between the total fees paid by the issuing firm to the underwriter and the measure of the underwriter's quality for accelerated deals. Consistent with Hypothesis 5, the dummy variable for fully marketed deals indicates that the (conditional) average fees in fully marketed deals are significantly higher than for accelerated deals while the (conditional) average fees for bought deals are significantly lower. Furthermore, in Column (3), the

[22] Findings for the complete sample are presented in the appendix. The results are very similar.

interaction terms with the indicator variables for deal type show that there is no significant difference in the relation between underwriter quality and total fees bought or fully marketed deals as compared to accelerated deals. While, consistent with Hypothesis 5, the estimated coefficient on the interaction term between quality and the indicator for bought deals is negative, it is insignificant.

In Column (3), total fees are larger for larger firms and for firms with higher market-to-book ratios. Fees are also higher during periods of greater SEO market activity and for deals with a higher number of lead underwriters. Fees are smaller for firms with a higher level of risk and a higher measure of illiquidity. These last two results are difficult to reconcile with intuition, although we shed further light on these results in the discussion of cost curves and endogenous issue size choices that appears below.

Column (4) of Table 8 presents the matching market corrected estimates using the percentage fee as the dependant variable. Underwriter quality is negatively related to (this approximation of) the marginal cost of raising capital for accelerated deals. The interaction terms also indicate that for both bought and fully marketed deals this relation is significantly stronger. An interpretation of the results in Table 8 is that the cost curve for raising equity capital of a high-quality underwriter has a higher intercept but a lower marginal cost relative to the cost curve associated with a low-quality underwriter. These findings complement the findings in Altınkılıç and Hansen (2000) who provide a similar characterization of the cost curves for issuing seasoned equity. Their characterization, however, examines the costs based upon differential sizes of the issues, while we examine the differences across levels of underwriter quality.

Consider the total proceeds of a given SEO. The use of a higher quality underwriter will increase the proceeds of the deal but also increase the amount taken by the underwriter in the form of fees. Consistent with the logic of the matching model, this tradeoff will not be equally valuable for every firm. For a given firm, it depends upon the extent to which a higher quality underwriter can increase the offer's proceeds relative to the increase in the associated costs and fees. Consider the finding in the first-stage regression, indicating that larger firms match with higher quality underwriters. If larger firms tend to issue larger amounts of equity, then the different shapes of the cost curves for high versus low-quality underwriters explains the interest large firms have in matching with high-quality underwriters. Similarly, if riskier firms with less liquid equity tend to issue smaller amounts of equity, then the nature of the cost curves we identify suggest that these types of firms would find it beneficial to match with lower quality underwriters, as was indicated in the first-stage regression findings.

[Table 8]

6.7 Residuals

Table 9 presents an examination of the relation between the residuals of the different outcome regressions. This is similar in spirit to the examination in Altınkılıç and Hansen (2003) concerning their finding that unexpected values of the discount correlates with underpricing. We explore three ideas, each of which is consistent with hypotheses in the SEO and the IPO literatures. This analysis focuses on how unexpected values of the total fees in the deal are correlated with the unexpected levels of the announcement effect and the discount, and how unexpected levels of the discount are related to unexpected levels of underpricing. These important questions are related to the earlier literatures and may shed light on questions related to competition in the market for underwriting services.

Panel A of Table 9 presents the simple cross correlations between the residuals of the second-stage regressions for the announcement effect, the discount, underpricing, and the total fees. We see that the unexpected level of the announcement effect correlates positively with the unexpected levels of the fees paid by the issuing firm. Given that the residuals are from regressions that control for the quality of the lead underwriter and the number of lead underwriters in the deal this correlation raises the question of whether the underwriter is able to undertake other actions to limit the negative price response to the announcement of the new issue, actions that are motivated by a higher than expected fee.

Notice that higher unexpected fees are also associated with lower than expected levels of the discount (and lower than expected underpricing) for the issue. Therefore, there appears to be some substitutability between the two main sources of cost to the issuer in the SEO. The discount is a choice variable for the underwriter and can directly benefit the underwriter (in bought deals) or their investors (in accelerated or fully marketed deals). An issuing firm that pays higher than expected fees (conditional on the matching and the predictive firm and underwriter characteristics) may subsequently see superior performance in the SEO. This evidence may be seen as support for the arguments in Chen and Ritter (2000), that the market power possessed by underwriters allows them to select non-competitive levels of the discount, and that this is done for cases in which the issuer insists upon a highly beneficial fee in the deal.

The unexpected discount is highly correlated with the unexpected level of underpricing. This finding is related to the findings in Altınkılıç and Hansen (2003), who interpret their result as a consequence of the underwriter's conveying information to the investors via the unexpected discount. The information regarding the value of the issue contained in the chosen discount allows investors to more accurately price the firm's shares in the aftermarket. We find that this result is true not only for fully marketed deals but also for accelerated and bought deals.

[Table 9]

Regression analysis provides the same message as the simple correlations. Higher unexpected fees are associated with significantly higher (less negative) unexpected announcement effects and significantly lower than expected values for the discount and underpricing. This reinforces the notion that there is some substitutability between the main costs of the SEO to the issuing firm, underwriter fees and the performance of the offering. In particular, a deal with lower than expected total fees, on average, will have a significantly higher than expected discount even after controlling for the unexpected level of the announcement effect. Further, unexpected underpricing is significantly positively related to the unexpected discount, controlling for the residuals from the announcement effect regression and the fees regression.

7 Conclusion

To examine the causal relations between measures of the performance of seasoned equity offerings and characteristics of the issuing firm and the underwriting, we control for the selection in the matching process using a structural model of two-sided matching between issuing firms and underwriters (Akkus et al., 2018). Controlling for the matching between issuing firms and underwriters in the market for underwriting services, the price impact of announcements of SEOs is shown to be significantly positively related to measures of the underwriter's quality, or reputation, for accelerated and bought deals, a relation that is not present in the absence of a control for the matching between issuing firms and underwriters. In contrast, the relation between the announcement effect and underwriter quality in fully marketed deals is insignificant. We also find that, for accelerated and bought deals, the discount in the pricing of SEOs is smaller when a higher quality underwriter is used. These findings demonstrate the important role of the underwriter in addressing informational concerns when firms issue seasoned equity.

The lack of a relation between either the announcement effect or the discount, on the one hand, and underwriter quality, on the other hand, in fully marketed deals may reflect the fact that the impact of underwriter quality on the information collected and conveyed in the road show does not vary sufficiently across levels of underwriter quality. This finding is also consistent with a need in a fully marketed SEO for information exchange between the underwriter and investors. If higher quality underwriters work with a higher quality network of investors, the benefit brought by a high-quality underwriter may be diluted by the need to compensate their investor network with a larger discount. Finally, the result may reflect the Chen and Ritter (2000) view that high-quality underwriters may distribute abnormal profits to their investors in the form of higher discounts in exchange for these investors overpaying for other services.

For all deal types the fees paid to the underwriter vary positively with underwriter quality. Fur-

thermore, across all deal types, fees as a percentage of deal value are negatively related to underwriter quality. These findings are consistent with our matching model in which issuing firms are paying more in order to match with higher quality underwriters, however, the issuing firm also shares in the higher value created by the match. They also suggest that the nature of the cost curve for raising seasoned equity differs significantly across levels of underwriter quality. Specifically, higher quality underwriters have a higher fixed fee but a lower marginal cost per dollar raised.

Despite its prominence in the IPO literature, the relation between underwriter reputation and the announcement effect does not appear to have been examined in the SEO literature. The recent relatively popularity of deal types which allow a significant role for underwriter certification of the issue allows us to close this gap. Our findings illustrate the importance of information asymmetry in raising seasoned equity capital and provide a more complete picture of the role of the underwriter in issuing seasoned equity. They also highlight the importance the matching process in the market for underwriting services and the impact this process can have on inference.

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Tables

Table 1: Summary Statistics

This table presents the number of observations, the Means, Standard Deviations, Medians, Minima, and Maxima of variables of interest for different subsamples of the SEOs. REPUTATION is defined as the underwriter's market share of the SEO market in the prior calendar year. #LEAD is the number of lead managers reported by Dealogic. MARKET BOOK is the firm's market-to-book ratio reported at the end of the fiscal year prior to the announcement year. SALE is the hyperbolic sine of the dollar value of the firms's sales (in thousands of dollars) reported at the end of the fiscal year prior to the announcement year. #SEO is the number of SEOs in the three months prior to the announcement date. ILIQ is Amihud's measure of the illiquidity of the firm's equity. RISK is the average daily variance of return for the firm's equity in the year prior to the announcement date. DEAL VALUE is dollar value (in millions of dollars) of the total proceeds raised in the SEO. UNDERPRICE is the percent difference between the closing price on the offer day and the offer price in the SEO. DISCOUNT is the percent difference between the closing price the trading day prior to the offer day and the offer price in the SEO. ANNOUNCE is the two day cumulative abnormal return (estimated using a market model) for the announcement day and the following trading day. FEES is the dollar value (in millions of dollars) of the total fees paid to the underwriter in the SEO. %FEES is the value of the total fees paid to the underwriter in the SEO normalized by the total proceeds.

Panel A: Full Sample

Statistic	N	Mean	St. Dev.	Median	Min	Max
REPUTATION	3,746	0.0656	0.0583	0.0547	0.0003	0.2879
#LEAD	3,746	1.9875	1.4941	1	1	14
MARKET BOOK	3,746	2.7685	2.2300	1.8966	0.7912	16.3985
SALE	3,746	0.6187	1.3861	0.1545	0.0000	12.9320
#SEO	3,746	36.7696	16.8302	34	5	85
ILIQ	3,746	0.0204	0.0414	0.0065	0.0001	0.4774
RISK	3,746	0.0264	0.0265	0.0168	0.0014	0.1580
DEAL VALUE	3,746	146.2418	143.7936	98.9600	8.4700	999.1514
UNDERPRICE	3,746	0.0231	0.0300	0.0164	−0.0575	0.1544
DISCOUNT	3,746	0.0447	0.0512	0.0367	−0.0667	0.3115
ANNOUNCE	2,306	−0.0265	0.0517	−0.0254	−0.1910	0.1359
FEES	3,746	6.1766	5.2678	4.6000	0.4187	36.2237
%FEES	3,746	4.7597	1.2541	5.0000	0.4650	7.0000

Panel B: Positive New Shares

Statistic	N	Mean	St. Dev.	Median	Min	Max
REPUTATION	3,211	0.0621	0.0575	0.0514	0.0003	0.2879
#LEAD	3,211	1.9330	1.4316	1	1	14
MARKET BOOK	3,211	2.8116	2.2878	1.9100	0.8008	16.3985
SALE	3,211	0.5020	1.2634	0.1165	0.0000	12.9320
#SEO	3,211	36.9517	17.1015	34	5	85
ILIQ	3,211	0.0221	0.0436	0.0070	0.0001	0.4774
RISK	3,211	0.0283	0.0275	0.0192	0.0014	0.1567
DEAL VALUE	3,211	134.9619	131.2977	93.1500	8.4700	999.1514
UNDERPRICE	3,211	0.0239	0.0306	0.0168	−0.0575	0.1544
DISCOUNT	3,211	0.0464	0.0529	0.0370	−0.0667	0.3115
ANNOUNCE	1,955	−0.0266	0.0533	−0.0254	−0.1910	0.1359
FEES	3,211	5.9249	4.9190	4.5150	0.4376	36.2237
%FEES	3,211	4.9096	1.1572	5.0000	0.4650	7.0000

Panel C: Only Secondary Shares

Statistic	N	Mean	St. Dev.	Median	Min	Max
REPUTATION	535	0.0870	0.0583	0.0839	0.0004	0.2879
#LEAD	535	2.3140	1.7922	2	1	11
MARKET BOOK	535	2.5101	1.8262	1.8472	0.7912	12.2976
SALE	535	1.3188	1.8182	0.6374	0.0047	12.0745
#SEO	535	35.6766	15.0682	34	6	85
ILIQ	535	0.0103	0.0217	0.0039	0.0001	0.2634
RISK	535	0.0152	0.0163	0.0104	0.0014	0.1580
DEAL VALUE	535	213.9426	189.7946	152.3250	11.3172	999.0625
UNDERPRICE	535	0.0178	0.0254	0.0143	−0.0557	0.1525
DISCOUNT	535	0.0344	0.0375	0.0330	−0.0646	0.1686
ANNOUNCE	351	0.0229	0.0217	0.0196	−0.0069	0.1394
FEES	535	7.6877	6.8184	5.5660	0.4187	35.7990
%FEES	535	3.8598	1.4260	4.2500	0.4650	6.9900

Panel D: Fully Marketed Deals

Statistic	N	Mean	St. Dev.	Median	Min	Max
REPUTATION	2,249	0.0622	0.0558	0.0531	0.0003	0.2879
#LEAD	2,249	1.5985	1.0428	1	1	11
MARKET BOOK	2,249	2.8601	2.1945	2.0905	0.7912	15.4038
SALE	2,249	0.5048	1.1101	0.1396	0.0000	12.2570
#SEO	2,249	35.9449	17.1765	33	6	85
ILIQ	2,249	0.0243	0.0440	0.0090	0.0001	0.4545
RISK	2,249	0.0309	0.0287	0.0209	0.0014	0.1580
DEAL VALUE	2,249	136.5007	135.6325	93.1031	8.4700	998.2500
UNDERPRICE	2,249	0.0248	0.0274	0.0183	−0.0526	0.1544
DISCOUNT	2,249	0.0354	0.0467	0.0283	−0.0667	0.3056
ANNOUNCE	2,075	−0.0256	0.0518	−0.0246	−0.1910	0.1359
FEES	2,249	6.3378	5.2041	4.7649	0.4376	36.2237
%FEES	2,249	5.0973	0.7783	5.0200	1.1430	7.0000

Panel E: Accelerated Deals

Statistic	N	Mean	St. Dev.	Median	Min	Max
REPUTATION	1,200	0.0685	0.0620	0.0601	0.0003	0.2879
#LEAD	1,200	2.8750	1.8989	2	1	14
MARKET BOOK	1,200	2.7741	2.3513	1.7845	0.8012	16.3985
SALE	1,200	0.7312	1.6520	0.1369	0.0000	12.1180
#SEO	1,200	38.4767	16.4869	37	5	85
ILIQ	1,200	0.0167	0.0395	0.0040	0.0001	0.4774
RISK	1,200	0.0214	0.0221	0.0142	0.0014	0.1567
DEAL VALUE	1,200	157.2648	153.0851	108.6750	9.4024	999.0625
UNDERPRICE	1,200	0.0242	0.0336	0.02	−0	0
DISCOUNT	1,200	0.0635	0.0582	0.05	−0	0
ANNOUNCE	227	−0.0350	0.0503	−0.0326	−0.1857	0.1110
FEES	1,200	6.7550	5.5338	5.1190	0.5062	34.7760
%FEES	1,200	4.8406	1.0569	4.8	0	7

Panel F: Bought Deals

Statistic	N	Mean	St. Dev.	Median	Min	Max
REPUTATION	297	0.0799	0.0583	0.0744	0.0004	0.2879
#LEAD	297	1.3468	0.7912	1	1	8
MARKET BOOK	297	2.0526	1.8369	1.4298	0.8542	15.8730
SALE	297	1.0261	1.8917	0.3622	0.0000	12.9320
#SEO	297	36.1178	14.9873	34	6	68
ILIQ	297	0.0056	0.0165	0.0017	0.0001	0.2410
RISK	297	0.0123	0.0149	0.0070	0.0014	0.1058
DEAL VALUE	297	175.4683	157.7689	121.5923	11.3172	999.1514
UNDERPRICE	297	0.0056	0.0277	0.0020	−0.0560	0.1330
DISCOUNT	297	0.0382	0.0266	0.0336	−0.0467	0.1538
ANNOUNCE	4	−0.0384	0.0299	−0.0444	−0.0636	−0.0012
FEES	297	2.6197	2.6679	1.8307	0.4187	19.4194
%FEES	297	1.8759	1.2398	1.4600	0.4650	5.9410

Table 2: Correlations

This table presents the correlation coefficients between variables of interest. REPUTATION is defined as the underwriter's market share of the SEO market in the prior calendar year. #LEAD is the number of lead managers reported by Dealogic. MARKET BOOK is the firm's market-to-book ratio reported at the end of the fiscal year prior to the announcement year. SALE is the hyperbolic sine of the dollar value of the firms's sales (in thousands of dollars) reported at the end of the fiscal year prior to the announcement year. #SEO is the number of SEOs in the three months prior to the announcement date. ILIQ is Amihud's measure of the illiquidity of the firm's equity. RISK is the average daily variance of return for the firm's equity in the year prior to the announcement date. DEAL VALUE is dollar value (in millions of dollars) of the total proceeds raised in the SEO. UNDERPRICE is the percent difference between the closing price on the offer day and the offer price in the SEO. DISCOUNT is the percent difference between the closing price the trading day prior to the offer day and the offer price in the SEO. ANNOUNCE is the two day cumulative abnormal return (estimated using a market model) for the announcement day and the following trading day. FEES is the dollar value (in millions of dollars) of the total fees paid to the underwriter in the SEO. %FEES is the value of the total fees paid to the underwriter in the SEO normalized by the total proceeds.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) REPUTATION	1												
(2) #LEAD	0.2642	1											
(3) MARKET BOOK	-0.0392	-0.1066	1										
(4) SALE	0.2082	0.2186	-0.2125	1									
(5) #SEO	-0.1319	0.0263	0.0583	-0.0593	1								
(6) ILIQ	-0.2498	-0.1845	-0.0163	-0.1551	0.0808	1							
(7) RISK	-0.2357	-0.266	0.2625	-0.1945	0.082	0.2973	1						
(8) DEAL VALUE	0.3438	0.4139	-0.0426	0.4083	-0.0091	-0.2805	-0.2625	1					
(9) UNDERPRICE	-0.1271	-0.089	0.1334	-0.1305	0.0355	0.1757	0.2716	-0.1568	1				
(10) DISCOUNT	-0.1091	-0.0036	0.0554	-0.0637	0.0111	0.2043	0.2403	-0.1647	0.4105	1			
(11) ANNOUNCE	0.0504	-0.028	3e-04	0.0056	0.018	-0.0583	-0.1029	0.0977	0.052	-0.3358	1		
(12) FEES	0.3404	0.4226	0.0224	0.3063	-0.0196	-0.2668	-0.2057	0.9092	-0.0946	-0.1613	0.0996	1	
(13) %FEES	-0.2278	-0.1544	0.2156	-0.3308	0.0475	0.3107	0.3704	-0.4349	0.3054	0.1929	-0.1058	-0.1452	1

Table 3: First-Stage Regression Tests

This table reports the findings of the first-stage regression tests. Columns (1) and (3) report the OLS and Censored Tobit estimates, respectively, of Equation (9) using the entire sample of SEOs to explain the matching. Columns (2) and (4) report the OLS and Censored Tobit estimates, respectively, of Equation (9) using the subsample of SEOs in which the issuing firm issues a strictly positive number of new shares. VALPROXY is the natural logarithm of the dollar value of the total proceeds raised in the SEO. REPUTATION is defined as the underwriter's market share of the SEO market in the prior calendar year. #LEAD is the number of lead managers reported by Dealogic. MARKET BOOK is the firm's market-to-book ratio reported at the end of the fiscal year prior to the announcement year. SALE is the hyperbolic sine of the firms's sales (divided by 1000) reported at the end of the fiscal year prior to the announcement year. #SEO is the number of SEOs in the three months prior to the announcement date. ILIQ is Amihud's measure of the illiquidity of the firm's equity. RISK is the average daily variance of return for the firm's equity in the year prior to the announcement date. Standard errors are in parentheses, *p<0.1; **p<0.05; ***p<0.01.

	(1)	(2)	(3)	(4)
	OLS		*Tobit*	
Constant	2.6195***	2.7053***	1.0848***	1.2049***
	(0.1404)	(0.1522)	(0.1202)	(0.1290)
REPUTATION	3.7734***	3.6930***	6.0182***	5.6572***
	(0.2940)	(0.3024)	(0.2267)	(0.2320)
BOUGHT	0.1512**	0.1556**	0.0682	0.0585
	(0.0663)	(0.0769)	(0.0483)	(0.0567)
FULL	0.2939***	0.2813***	0.1669***	0.1753***
	(0.0411)	(0.0430)	(0.0317)	(0.0335)
REPUTATION X BOUGHT	−0.0025	0.1324	1.1143**	1.5238***
	(0.6631)	(0.7501)	(0.4991)	(0.5819)
REPUTATION X FULL	−1.0776***	−0.8779**	0.4253	0.2544
	(0.3708)	(0.3914)	(0.2931)	(0.3073)
#LEAD	0.1567***	0.1636***	0.1616***	0.1647***
	(0.0088)	(0.0097)	(0.0070)	(0.0076)
SALE	0.1469***	0.1339***	0.1287***	0.1170***
	(0.0069)	(0.0072)	(0.0061)	(0.0063)
#SEO	0.0041***	0.0032***	0.0031***	0.0023***
	(0.0007)	(0.0008)	(0.0006)	(0.0006)
ILIQ	−4.2678***	−4.2549***	−3.6845***	−3.7213***
	(0.2632)	(0.2640)	(0.2610)	(0.2608)
RISK	−2.7576***	−2.7917***	−2.2467***	−2.3515***
	(0.4838)	(0.4925)	(0.4135)	(0.4198)
MARKET BOOK	0.0507***	0.0456***	0.0430***	0.0381***
	(0.0054)	(0.0057)	(0.0044)	(0.0046)
Observations	3,746	3,211		
R^2	0.5367	0.5332		
Log Likelihood			−13,518.7300	−11,541.5200

Table 4: Second-Stage Regression Results: Announcement Effect

This table reports the findings of OLS and Matching Market Corrected versions of Equation (10) for which the dependent variable is the announcement effect. Columns (1) and (3) present the findings for all SEOs in the sample and Columns (2) and (4) present the findings restricting the sample to only those SEOs in which the issuing firm issues a strictly positive number of new shares. ANNOUNCE is the two day cumulative abnormal return (estimated using a market model) for the announcement day and the following trading day. REPUTATION is defined as the underwriter's market share of the SEO market in the prior calendar year. #LEAD is the number of lead managers reported by Dealogic. MARKET BOOK is the firm's market-to-book ratio reported at the end of the fiscal year prior to the announcement year. SALE is the hyperbolic sine of the firms's sales (divided by 1000) reported at the end of the fiscal year prior to the announcement year. #SEO is the number of SEOs in the three months prior to the announcement date. ILIQ is Amihud's measure of the illiquidity of the firm's equity. RISK is the average daily variance of return for the firm's equity in the year prior to the announcement date. Standard errors are in parentheses, *p<0.1; **p<0.05; ***p<0.01.

	(1)	(2)	(3)	(4)
	OLS		Matching Market Corrected	
Constant	-0.0521^{***}	-0.0578^{***}	-0.0673^{***}	-0.0732^{***}
	(0.0155)	(0.0175)	(0.0125)	(0.0118)
REPUTATION	0.0817	0.1064	0.1098^{***}	0.1297^{***}
	(0.0641)	(0.0752)	(0.0283)	(0.0278)
BOUGHT	0.0037	−0.0053	0.0080	−0.0011
	(0.0344)	(0.0373)	(0.0051)	(0.0051)
FULL	0.0021	0.0042	0.0036	0.0061
	(0.0074)	(0.0084)	(0.0042)	(0.0040)
REPUTATION X BOUGHT	−0.1733	−0.0951	-0.1719^{***}	−0.0615
	(0.3984)	(0.5015)	(0.0492)	(0.0491)
REPUTATION X FULL	−0.0786	−0.1103	-0.0728^{**}	-0.1051^{***}
	(0.0672)	(0.0788)	(0.0342)	(0.0336)
#LEAD	0.0020	0.0014	0.0019^{***}	0.0012^{*}
	(0.0013)	(0.0017)	(0.0007)	(0.0007)
SALE	0.0004	0.0005	0.0002	0.0002
	(0.0008)	(0.0009)	(0.0007)	(0.0007)
#SEO	0.0001	0.0001	0.0001	0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
ILIQ	0.0248	0.0278	0.0243	0.0266
	(0.0284)	(0.0303)	(0.0284)	(0.0289)
RISK	-0.2161^{***}	-0.2147^{***}	-0.2132^{***}	-0.2133^{***}
	(0.0510)	(0.0552)	(0.0516)	(0.0499)
MARKET BOOK	0.0014^{**}	0.0018^{***}	0.0013^{**}	0.0016^{***}
	(0.0006)	(0.0007)	(0.0006)	(0.0006)
ehat			0.0091^{***}	0.0092^{***}
			(0.0016)	(0.0016)
Observations	2,518	2,125	2,518	2,125
R^2	0.0613	0.0733	0.0701	0.0814

Table 5: Second-Stage Regression Results: Rebound Return

This table reports the findings of OLS and Matching Market Corrected versions of Equation (10) for which the dependent variable is the rebound return. Columns (1) and (3) present the findings for all Fully Marketed SEOs in the sample and Columns (2) and (4) present the findings restricting the sample to only those Fully Marketed SEOs in which the issuing firm issues a strictly positive number of new shares. REBOUND is the idiosyncratic return (estimated using a market model) between the announcement day and the trading day prior to the offer day. REPUTATION is defined as the underwriter's market share of the SEO market in the prior calendar year. #LEAD is the number of lead managers reported by Dealogic. MARKET BOOK is the firm's market-to-book ratio reported at the end of the fiscal year prior to the announcement year. SALE is the hyperbolic sine of the firms's sales (divided by 1000) reported at the end of the fiscal year prior to the announcement year. #SEO is the number of SEOs in the three months prior to the announcement date. ILIQ is Amihud's measure of the illiquidity of the firm's equity. RISK is the average daily variance of return for the firm's equity in the year prior to the announcement date. Standard errors are in parentheses, *p<0.1; **p<0.05; ***p<0.01.

	(1)	(2)	(3)	(4)
	OLS		Matching Market Corrected	
Constant	-0.2778^{***}	-0.3060^{***}	-0.3485^{***}	-0.3920^{***}
	(0.1009)	(0.1157)	(0.0799)	(0.0796)
REPUTATION	-0.2646	-0.2957	-0.0745	-0.1032
	(0.1666)	(0.1975)	(0.1853)	(0.1901)
#LEAD	0.0023	0.0011	0.0012	-0.0008
	(0.0107)	(0.0146)	(0.0049)	(0.0049)
SALE	0.0072	0.0104	0.0055	0.0083^{*}
	(0.0063)	(0.0072)	(0.0042)	(0.0044)
#SEO	0.0013^{**}	0.0013^{*}	0.0012^{**}	0.0011^{**}
	(0.0006)	(0.0007)	(0.0005)	(0.0005)
ILIQ	-0.2011	-0.1546	-0.2130	-0.1717
	(0.2040)	(0.2256)	(0.1568)	(0.1630)
RISK	1.0836^{***}	1.1209^{***}	1.0852^{**}	1.1159^{**}
	(0.3721)	(0.4164)	(0.4919)	(0.5041)
MARKET BOOK	-0.0001	-0.0005	-0.0009	-0.0013
	(0.0045)	(0.0051)	(0.0032)	(0.0032)
ehat			0.0503^{***}	0.0620^{***}
			(0.0098)	(0.0102)
Observations	2,249	1,921	2,249	1,921
R^2	0.0327	0.0358	0.0382	0.0427

Table 6: Second-Stage Regression Results: Discount

This table reports the findings of OLS and Matching Market Corrected versions of Equation (10) for which the dependent variable is the discount. Columns (1) and (3) present the findings for all SEOs in the sample and Columns (2) and (4) present the findings restricting the sample to only those SEOs in which the issuing firm issues a strictly positive number of new shares. DISCOUNT is the percent difference between the closing price the trading day prior to the offer day and the offer price in the SEO. REPUTATION is defined as the underwriter's market share of the SEO market in the prior calendar year. #LEAD is the number of lead managers reported by Dealogic. MARKET BOOK is the firm's market-to-book ratio reported at the end of the fiscal year prior to the announcement year. SALE is the hyperbolic sine of the firms's sales (divided by 1000) reported at the end of the fiscal year prior to the announcement year. #SEO is the number of SEOs in the three months prior to the announcement date. ILIQ is Amihud's measure of the illiquidity of the firm's equity. RISK is the average daily variance of return for the firm's equity in the year prior to the announcement date. Standard errors are in parentheses, *p<0.1; **p<0.05; ***p<0.01.

	(1)	(2)	(3)	(4)
	OLS		Matching Market Corrected	
Constant	0.0560***	0.0609***	0.0680***	0.0757***
	(0.0125)	(0.0139)	(0.0115)	(0.0113)
REPUTATION	−0.0117	−0.0288	−0.0339	−0.0514**
	(0.0518)	(0.0598)	(0.0230)	(0.0240)
BOUGHT	0.0046	0.0119	0.0012	0.0078**
	(0.0277)	(0.0297)	(0.0033)	(0.0035)
FULL	−0.0015	−0.0010	−0.0028	−0.0028
	(0.0060)	(0.0067)	(0.0033)	(0.0034)
REPUTATION X BOUGHT	0.0412	−0.0658	0.0401	−0.0982***
	(0.3216)	(0.3989)	(0.0325)	(0.0329)
REPUTATION X FULL	0.0379	0.0554	0.0333	0.0504*
	(0.0543)	(0.0627)	(0.0282)	(0.0289)
#LEAD	−0.0017	−0.0018	−0.0016***	−0.0016***
	(0.0010)	(0.0014)	(0.0006)	(0.0006)
SALE	−0.0036***	−0.0037***	−0.0034***	−0.0034***
	(0.0007)	(0.0007)	(0.0006)	(0.0006)
#SEO	−0.0002***	−0.0002**	−0.0002***	−0.0002***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
ILIQ	0.1692***	0.1831***	0.1695***	0.1842***
	(0.0229)	(0.0241)	(0.0267)	(0.0256)
RISK	0.3271***	0.3415***	0.3248***	0.3401***
	(0.0412)	(0.0439)	(0.0465)	(0.0436)
MARKET BOOK	−0.0021***	−0.0022***	−0.0020***	−0.0021***
	(0.0005)	(0.0005)	(0.0005)	(0.0005)
ehat			−0.0072***	−0.0089***
			(0.0013)	(0.0013)
Observations	2,518	2,125	2,518	2,125
R^2	0.1748	0.1909	0.1822	0.2012

Table 7: Second-Stage Regression Results: Underpricing

This table reports the findings of OLS and Matching Market Corrected versions of Equation (10) for which the dependent variable is the underpricing. Columns (1) and (3) present the findings for all SEOs in the sample and Columns (2) and (4) present the findings restricting the sample to only those SEOs in which the issuing firm issues a strictly positive number of new shares. UNDERPRICE is the percent difference between the closing price on the offer day and the offer price in the SEO. REPUTATION is defined as the underwriter's market share of the SEO market in the prior calendar year. #LEAD is the number of lead managers reported by Dealogic. MARKET BOOK is the firm's market-to-book ratio reported at the end of the fiscal year prior to the announcement year. SALE is the hyperbolic sine of the firms's sales (divided by 1000) reported at the end of the fiscal year prior to the announcement year. #SEO is the number of SEOs in the three months prior to the announcement date. ILIQ is Amihud's measure of the illiquidity of the firm's equity. RISK is the average daily variance of return for the firm's equity in the year prior to the announcement date. Standard errors are in parentheses, *p<0.1; **p<0.05; ***p<0.01.

	(1)	(2)	(3)	(4)
	OLS		Matching Market Corrected	
Constant	0.0171***	0.0216***	0.0226***	0.0279***
	(0.0066)	(0.0074)	(0.0068)	(0.0067)
REPUTATION	−0.0234*	−0.0289**	−0.0316**	−0.0373**
	(0.0138)	(0.0147)	(0.0139)	(0.0145)
BOUGHT	−0.0151***	−0.0109***	−0.0148***	−0.0105***
	(0.0031)	(0.0037)	(0.0034)	(0.0035)
FULL	0.0038**	0.0044**	0.0043**	0.0048**
	(0.0019)	(0.0021)	(0.0021)	(0.0023)
REPUTATION X BOUGHT	0.0129	0.0139	0.0089	0.0080
	(0.0310)	(0.0365)	(0.0316)	(0.0318)
REPUTATION X FULL	−0.0137	−0.0173	−0.0192	−0.0221
	(0.0174)	(0.0191)	(0.0170)	(0.0180)
#LEAD	−0.0011***	−0.0011**	−0.0011***	−0.0011***
	(0.0004)	(0.0005)	(0.0004)	(0.0004)
SALE	−0.0010***	−0.0010***	−0.0010***	−0.0009**
	(0.0003)	(0.0003)	(0.0004)	(0.0004)
#SEO	0.000003	0.00001	0.00001	0.00002
	(0.00003)	(0.00004)	(0.00004)	(0.00004)
ILIQ	0.0458***	0.0450***	0.0437**	0.0427**
	(0.0123)	(0.0129)	(0.0174)	(0.0171)
RISK	0.2086***	0.2127***	0.2067***	0.2108***
	(0.0226)	(0.0240)	(0.0271)	(0.0263)
MARKET BOOK	−0.0001	0.00004	−0.00004	0.0001
	(0.0003)	(0.0003)	(0.0003)	(0.0003)
ehat			−0.0036***	−0.0043***
			(0.0008)	(0.0008)
Observations	3,746	3,211	3,746	3,211
R^2	0.1599	0.1642	0.1649	0.1706

Table 8: Second-Stage Regression Results: Fees

This table reports the findings of OLS and Matching Market Corrected versions of Equation (10) for which the dependent variable is a measure of the underwriter's fees in the SEO. All findings are derived from the subsample of SEOs in which the issuing firm issues a strictly positive number of new shares. In Columns (1) and (3) the dependent variable is the log of the dollar value of total fees in the SEO and in Columns (2) and (4) the dependent variable is the ratio of total fees relative to the proceeds of the SEO. FEES is the natural logarithm of the dollar value (in millions of dollars) of the total fees paid to the underwriter in the SEO. %FEES is the value of the total fees paid to the underwriter in the SEO normalized by the total proceeds. REPUTATION is defined as the underwriter's market share of the SEO market in the prior calendar year. #LEAD is the number of lead managers reported by Dealogic. MARKET BOOK is the firm's market-to-book ratio reported at the end of the fiscal year prior to the announcement year. SALE is the hyperbolic sine of the firms's sales (divided by 1000) reported at the end of the fiscal year prior to the announcement year. #SEO is the number of SEOs in the three months prior to the announcement date. ILIQ is Amihud's measure of the illiquidity of the firm's equity. RISK is the average daily variance of return for the firm's equity in the year prior to the announcement date. Standard errors are in parentheses, *p<0.1; **p<0.05; ***p<0.01.

	(1)	(2)	(3)	(4)
	OLS		Matching Market Corrected	
Constant	−0.0968	5.8248***	−1.4316***	6.4922***
	(0.1449)	(0.1718)	(0.1388)	(0.1388)
REPUTATION	3.6253***	−0.4045	5.3729***	−1.2782***
	(0.2879)	(0.3413)	(0.3341)	(0.3341)
BOUGHT	−0.5971***	−2.2776***	−0.6835***	−2.2344***
	(0.0732)	(0.0868)	(0.1229)	(0.1229)
FULL	0.3534***	0.3124***	0.2590***	0.3596***
	(0.0409)	(0.0485)	(0.0567)	(0.0567)
REPUTATION X BOUGHT	−2.4342***	−3.8656***	−1.1963	−4.4845***
	(0.7141)	(0.8467)	(1.1020)	(1.1020)
REPUTATION X FULL	−0.9715***	−0.6019	0.0359	−1.1056***
	(0.3726)	(0.4418)	(0.4188)	(0.4188)
#LEAD	0.1547***	−0.0810***	0.1556***	−0.0815***
	(0.0092)	(0.0109)	(0.0104)	(0.0104)
SALE	0.0875***	−0.1840***	0.0725***	−0.1765***
	(0.0068)	(0.0081)	(0.0089)	(0.0089)
#SEO	0.0034***	0.0004	0.0026***	0.0008
	(0.0007)	(0.0009)	(0.0009)	(0.0009)
ILIQ	−3.8547***	2.1932***	−3.3799***	1.9558***
	(0.2514)	(0.2980)	(0.2892)	(0.2892)
RISK	−2.2849***	2.7875***	−1.8933***	2.5917***
	(0.4688)	(0.5559)	(0.5169)	(0.5169)
MARKET BOOK	0.0361***	−0.0327***	0.0295***	−0.0294***
	(0.0054)	(0.0064)	(0.0068)	(0.0068)
ehat			0.8897***	−0.4448***
			(0.0201)	(0.0201)
Observations	3,211	3,211	3,211	3,211
R^2	0.4996	0.6854	0.9366	0.7342

Table 9: Residuals

This table reports an examination of the residuals from the second-stage regressions. Panel A reports the simple cross correlations of the residuals from the second-stage matching market corrected regressions of the measures of performance. Panel B reports the findings of OLS regressions using the residuals from the second-stage matching market corrected regressions of the measures of performance as the dependant and explanatory variables. UNDERPRICE is the percent difference between the closing price on the offer day and the offer price in the SEO. DISCOUNT is the percent difference between the closing price the trading day prior to the offer day and the offer price in the SEO. ANNOUNCE is the two day cumulative abnormal return (estimated using a market model) for the announcement day and the following trading day. FEES is the dollar value (in millions of dollars) of the total fees paid to the underwriter in the SEO.

Panel A: Correlations

	Announcement Resid.	Discount Resid.	Underpricing Resid.	Fees Resid.
Announcement Resid.	1			
Discount Resid.	-0.0203	1		
Underpricing Resid.	-4e-04	0.4582	1	
Fees Resid.	0.0532	-0.1323	-0.1347	1

Panel B: Regression Tests

	(1) Announce	(2) Discount	(3) Underpricing
Constant	−0.0000	0.0000	0.0000
	(0.0012)	(0.0009)	(0.0005)
Fees Resid.	0.0044**	−0.0087***	−0.0030***
	(0.0018)	(0.0014)	(0.0008)
Announcement Resid.		−0.0105	0.0060
		(0.0171)	(0.0091)
Discount Resid.			0.2657***
			(0.0115)
Observations	2,125	2,125	2,125
R^2	0.0028	0.0177	0.2157

Online Appendix

Table OA.1: Second-Stage Regression Results: Fees

This table reports the findings of OLS and Matching Market Corrected versions of Equation (10) for which the dependent variable is a measure of the underwriter's fees in the SEO. All findings are derived from the entire sample of SEOs. In Columns (1) and (3) the dependent variable is the log of the dollar value of total fees in the SEO and in Columns (2) and (4) the dependent variable is the ratio of total fees relative to the proceeds of the SEO. FEES is the natural logarithm of the dollar value (in millions of dollars) of the total fees paid to the underwriter in the SEO. %FEES is the value of the total fees paid to the underwriter in the SEO normalized by the total proceeds. REPUTATION is defined as the underwriter's market share of the SEO market in the prior calendar year. #LEAD is the number of lead managers reported by Dealogic. MARKET BOOK is the firm's market-to-book ratio reported at the end of the fiscal year prior to the announcement year. SALE is the hyperbolic sine of the firms's sales (divided by 1000) reported at the end of the fiscal year prior to the announcement year. #SEO is the number of SEOs in the three months prior to the announcement date. ILIQ is Amihud's measure of the illiquidity of the firm's equity. RISK is the average daily variance of return for the firm's equity in the year prior to the announcement date. Standard errors are in parentheses, *p<0.1; **p<0.05; ***p<0.01.

	(1)	(2)	(3)	(4)
	OLS		Matching Market Corrected	
Constant	−0.1852	5.8865***	−1.5393***	6.5646***
	(0.1342)	(0.1627)	(0.1274)	(0.1274)
REPUTATION	3.7623***	−0.2097	5.7430***	−1.2016***
	(0.2809)	(0.3407)	(0.3456)	(0.3456)
BOUGHT	−0.7262***	−2.4627***	−0.7994***	−2.4260***
	(0.0633)	(0.0768)	(0.1322)	(0.1322)
FULL	0.3560***	0.2764***	0.2440***	0.3325***
	(0.0392)	(0.0476)	(0.0574)	(0.0574)
REPUTATION X BOUGHT	−2.0211***	−3.0146***	−1.0356	−3.5081***
	(0.6336)	(0.7684)	(1.1736)	(1.1736)
REPUTATION X FULL	−1.1751***	−0.6992	0.1510	−1.3634***
	(0.3543)	(0.4296)	(0.4008)	(0.4008)
#LEAD	0.1504***	−0.0729***	0.1547***	−0.0750***
	(0.0084)	(0.0102)	(0.0102)	(0.0102)
SALE	0.0926***	−0.2086***	0.0766***	−0.2006***
	(0.0066)	(0.0079)	(0.0089)	(0.0089)
#SEO	0.0039***	−0.0006	0.0031***	−0.0002
	(0.0007)	(0.0009)	(0.0009)	(0.0009)
ILIQ	−3.7929***	2.4397***	−3.2783***	2.1819***
	(0.2514)	(0.3049)	(0.2956)	(0.2956)
RISK	−2.1031***	3.3958***	−1.6523***	3.1700***
	(0.4622)	(0.5606)	(0.5002)	(0.5002)
MARKET BOOK	0.0393***	−0.0399***	0.0325***	−0.0365***
	(0.0052)	(0.0063)	(0.0067)	(0.0067)
ehat			0.8823***	−0.4419***
			(0.0200)	(0.0200)
Observations	3,746	3,746	3,746	3,746
R^2	0.5180	0.7053	0.9290	0.7482

Table OA.2: Second-Stage Regression Results: Announcement Effect

This table reports the findings of OLS and Matching Market Corrected versions of Equation (10) considering the first-stage matching to be between issuing firms and underwriter deal type pairs for which the dependent variable is the announcement effect. Columns (1) and (3) present the findings for all SEOs in the sample and Columns (2) and (4) present the findings restricting the sample to only those SEOs in which the issuing firm issues a strictly positive number of new shares. ANNOUNCE is the two day cumulative abnormal return (estimated using a market model) for the announcement day and the following trading day. REPUTATION is defined as the underwriter's market share of the SEO market in the prior calendar year. #LEAD is the number of lead managers reported by Dealogic. MARKET BOOK is the firm's market-to-book ratio reported at the end of the fiscal year prior to the announcement year. SALE is the hyperbolic sine of the firms's sales (divided by 1000) reported at the end of the fiscal year prior to the announcement year. #SEO is the number of SEOs in the three months prior to the announcement date. ILIQ is Amihud's measure of the illiquidity of the firm's equity. RISK is the average daily variance of return for the firm's equity in the year prior to the announcement date. Standard errors are in parentheses, *p<0.1; **p<0.05; ***p<0.01.

	(1)	(2)	(3)	(4)
	OLS		Matching Market Corrected	
Constant	-0.0521^{***}	-0.0578^{***}	-0.0693^{***}	-0.0748^{***}
	(0.0155)	(0.0175)	(0.0118)	(0.0123)
REPUTATION	0.0817	0.1064	0.1070^{***}	0.1277^{***}
	(0.0641)	(0.0752)	(0.0282)	(0.0283)
BOUGHT	0.0037	−0.0053	0.0013	-0.0091^{*}
	(0.0344)	(0.0373)	(0.0048)	(0.0052)
FULL	0.0021	0.0042	0.0036	0.0057
	(0.0074)	(0.0084)	(0.0041)	(0.0041)
REPUTATION X BOUGHT	−0.1733	−0.0951	-0.1767^{***}	−0.0678
	(0.3984)	(0.5015)	(0.0467)	(0.0501)
REPUTATION X FULL	−0.0786	−0.1103	-0.0701^{**}	-0.1037^{***}
	(0.0672)	(0.0788)	(0.0347)	(0.0333)
#LEAD	0.0020	0.0014	0.0018^{**}	0.0011
	(0.0013)	(0.0017)	(0.0007)	(0.0007)
SALE	0.0004	0.0005	0.0002	0.0003
	(0.0008)	(0.0009)	(0.0007)	(0.0007)
#SEO	0.0001	0.0001	0.0001	0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
ILIQ	0.0248	0.0278	0.0231	0.0255
	(0.0284)	(0.0303)	(0.0278)	(0.0286)
RISK	-0.2161^{***}	-0.2147^{***}	-0.2131^{***}	-0.2129^{***}
	(0.0510)	(0.0552)	(0.0502)	(0.0514)
MARKET BOOK	0.0014^{**}	0.0018^{***}	0.0013^{**}	0.0016^{***}
	(0.0006)	(0.0007)	(0.0006)	(0.0006)
ehat			0.0091^{***}	0.0092^{***}
			(0.0016)	(0.0016)
Observations	2,518	2,125	2,518	2,125
R^2	0.0613	0.0733	0.0701	0.0814

Table OA.3: Second-Stage Regression Results: Rebound Return

This table reports the findings of OLS and Matching Market Corrected versions of Equation (10) considering the first-stage matching to be between issuing firms and underwriter deal type pairs for which the dependent variable is the rebound return. Columns (1) and (3) present the findings for all Fully Marketed SEOs in the sample and Columns (2) and (4) present the findings restricting the sample to only those Fully Marketed SEOs in which the issuing firm issues a strictly positive number of new shares. REBOUND is the idiosyncratic return (estimated using a market model) between the announcement day and the trading day prior to the offer day. REPUTATION is defined as the underwriter's market share of the SEO market in the prior calendar year. #LEAD is the number of lead managers reported by Dealogic. MARKET BOOK is the firm's market-to-book ratio reported at the end of the fiscal year prior to the announcement year. SALE is the hyperbolic sine of the firms's sales (divided by 1000) reported at the end of the fiscal year prior to the announcement year. #SEO is the number of SEOs in the three months prior to the announcement date. ILIQ is Amihud's measure of the illiquidity of the firm's equity. RISK is the average daily variance of return for the firm's equity in the year prior to the announcement date. Standard errors are in parentheses, *p<0.1; **p<0.05; ***p<0.01.

	(1)	(2)	(3)	(4)
	OLS		Matching Market Corrected	
Constant	-0.2778^{***}	-0.3060^{***}	-0.3605^{***}	-0.4058^{***}
	(0.1009)	(0.1157)	(0.0783)	(0.0812)
REPUTATION	-0.2646	-0.2957	-0.0752	-0.1079
	(0.1666)	(0.1975)	(0.1931)	(0.1885)
#LEAD	0.0023	0.0011	0.0007	-0.0015
	(0.0107)	(0.0146)	(0.0050)	(0.0050)
SALE	0.0072	0.0104	0.0057	0.0085^{*}
	(0.0063)	(0.0072)	(0.0042)	(0.0044)
#SEO	0.0013^{**}	0.0013^{*}	0.0012^{**}	0.0011^{**}
	(0.0006)	(0.0007)	(0.0005)	(0.0005)
ILIQ	-0.2011	-0.1546	-0.2196	-0.1793
	(0.2040)	(0.2256)	(0.1628)	(0.1606)
RISK	1.0836^{***}	1.1209^{***}	1.0860^{**}	1.1187^{**}
	(0.3721)	(0.4164)	(0.5024)	(0.5224)
MARKET BOOK	-0.0001	-0.0005	-0.0009	-0.0014
	(0.0045)	(0.0051)	(0.0033)	(0.0033)
ehat			0.0503^{***}	0.0620^{**}
			(0.0105)	(0.0245)
Observations	2,249	1,921	2,249	1,921
R^2	0.0327	0.0358	0.0382	0.0427

Table OA.4: Second-Stage Regression Results: Discount

This table reports the findings of OLS and Matching Market Corrected versions of Equation (10) considering the first-stage matching to be between issuing firms and underwriter deal type pairs for which the dependent variable is the discount. Columns (1) and (3) present the findings for all SEOs in the sample and Columns (2) and (4) present the findings restricting the sample to only those SEOs in which the issuing firm issues a strictly positive number of new shares. DISCOUNT is the percent difference between the closing price the trading day prior to the offer day and the offer price in the SEO. REPUTATION is defined as the underwriter's market share of the SEO market in the prior calendar year. #LEAD is the number of lead managers reported by Dealogic. MARKET BOOK is the firm's market-to-book ratio reported at the end of the fiscal year prior to the announcement year. SALE is the hyperbolic sine of the firms's sales (divided by 1000) reported at the end of the fiscal year prior to the announcement year. #SEO is the number of SEOs in the three months prior to the announcement date. ILIQ is Amihud's measure of the illiquidity of the firm's equity. RISK is the average daily variance of return for the firm's equity in the year prior to the announcement date. Standard errors are in parentheses, *p<0.1; **p<0.05; ***p<0.01.

	(1)	(2)	(3)	(4)
	OLS		Matching Market Corrected	
Constant	0.0560***	0.0609***	0.0697***	0.0773***
	(0.0125)	(0.0139)	(0.0112)	(0.0118)
REPUTATION	−0.0117	−0.0288	−0.0317	−0.0494**
	(0.0518)	(0.0598)	(0.0236)	(0.0233)
BOUGHT	0.0046	0.0119	0.0065*	0.0156***
	(0.0277)	(0.0297)	(0.0033)	(0.0034)
FULL	−0.0015	−0.0010	−0.0027	−0.0024
	(0.0060)	(0.0067)	(0.0034)	(0.0034)
REPUTATION X BOUGHT	0.0412	−0.0658	0.0439	−0.0921***
	(0.3216)	(0.3989)	(0.0329)	(0.0321)
REPUTATION X FULL	0.0379	0.0554	0.0312	0.0491*
	(0.0543)	(0.0627)	(0.0289)	(0.0287)
#LEAD	−0.0017	−0.0018	−0.0015***	−0.0015***
	(0.0010)	(0.0014)	(0.0006)	(0.0006)
SALE	−0.0036***	−0.0037***	−0.0034***	−0.0035***
	(0.0007)	(0.0007)	(0.0006)	(0.0006)
#SEO	−0.0002***	−0.0002**	−0.0002***	−0.0002***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
ILIQ	0.1692***	0.1831***	0.1705***	0.1852***
	(0.0229)	(0.0241)	(0.0263)	(0.0257)
RISK	0.3271***	0.3415***	0.3247***	0.3397***
	(0.0412)	(0.0439)	(0.0445)	(0.0440)
MARKET BOOK	−0.0021***	−0.0022***	−0.0020***	−0.0021***
	(0.0005)	(0.0005)	(0.0005)	(0.0005)
ehat			−0.0072***	−0.0089***
			(0.0013)	(0.0013)
Observations	2,518	2,125	2,518	2,125
R^2	0.1748	0.1909	0.1822	0.2012

Table OA.5: Second-Stage Regression Results: Underpricing

This table reports the findings of OLS and Matching Market Corrected versions of Equation (10) considering the first-stage matching to be between issuing firms and underwriter deal type pairs for which the dependent variable is the underpricing. Columns (1) and (3) present the findings for all SEOs in the sample and Columns (2) and (4) present the findings restricting the sample to only those SEOs in which the issuing firm issues a strictly positive number of new shares. UNDERPRICE is the percent difference between the closing price on the offer day and the offer price in the SEO. REPUTATION is defined as the underwriter's market share of the SEO market in the prior calendar year. #LEAD is the number of lead managers reported by Dealogic. MARKET BOOK is the firm's market-to-book ratio reported at the end of the fiscal year prior to the announcement year. SALE is the hyperbolic sine of the firms's sales (divided by 1000) reported at the end of the fiscal year prior to the announcement year. #SEO is the number of SEOs in the three months prior to the announcement date. ILIQ is Amihud's measure of the illiquidity of the firm's equity. RISK is the average daily variance of return for the firm's equity in the year prior to the announcement date. Standard errors are in parentheses, *p<0.1; **p<0.05; ***p<0.01.

	(1)	(2)	(3)	(4)
	OLS		Matching Market Corrected	
Constant	0.0171***	0.0216***	0.0235***	0.0287***
	(0.0066)	(0.0074)	(0.0068)	(0.0067)
REPUTATION	−0.0234*	−0.0289**	−0.0304**	−0.0363**
	(0.0138)	(0.0147)	(0.0145)	(0.0149)
BOUGHT	−0.0151***	−0.0109***	−0.0121***	−0.0068**
	(0.0031)	(0.0037)	(0.0033)	(0.0033)
FULL	0.0038**	0.0044**	0.0043*	0.0050**
	(0.0019)	(0.0021)	(0.0023)	(0.0022)
REPUTATION X BOUGHT	0.0129	0.0139	0.0108	0.0110
	(0.0310)	(0.0365)	(0.0306)	(0.0310)
REPUTATION X FULL	−0.0137	−0.0173	−0.0202	−0.0227
	(0.0174)	(0.0191)	(0.0182)	(0.0181)
#LEAD	−0.0011***	−0.0011**	−0.0011***	−0.0011***
	(0.0004)	(0.0005)	(0.0004)	(0.0004)
SALE	−0.0010***	−0.0010***	−0.0010***	−0.0009**
	(0.0003)	(0.0003)	(0.0004)	(0.0004)
#SEO	0.000003	0.00001	0.00001	0.00002
	(0.00003)	(0.00004)	(0.00004)	(0.00003)
ILIQ	0.0458***	0.0450***	0.0442**	0.0433**
	(0.0123)	(0.0129)	(0.0180)	(0.0178)
RISK	0.2086***	0.2127***	0.2067***	0.2106***
	(0.0226)	(0.0240)	(0.0267)	(0.0271)
MARKET BOOK	−0.0001	0.00004	−0.00003	0.0001
	(0.0003)	(0.0003)	(0.0003)	(0.0003)
ehat			−0.0036***	−0.0043***
			(0.0009)	(0.0008)
Observations	3,746	3,211	3,746	3,211
R^2	0.1599	0.1642	0.1649	0.1706

Table OA.6: Second-Stage Regression Results: Fees

This table reports the findings of OLS and Matching Market Corrected versions of Equation (10) considering the first-stage matching to be between issuing firms and underwriters cross deal types for which the dependent variable is a measure of the underwriter's fees in the SEO. All findings are derived from the subsample of SEOs in which the issuing firm issues a strictly positive number of new shares. In Columns (1) and (3) the dependent variable is the log of the dollar value of total fees in the SEO and in Columns (2) and (4) the dependent variable is the ratio of total fees relative to the proceeds of the SEO FEES is the natural logarithm of the dollar value (in millions of dollars) of the total fees paid to the underwriter in the SEO. %FEES is the value of the total fees paid to the underwriter in the SEO normalized by the total proceeds. REPUTATION is defined as the underwriter's market share of the SEO market in the prior calendar year. #LEAD is the number of lead managers reported by Dealogic. MARKET BOOK is the firm's market-to-book ratio reported at the end of the fiscal year prior to the announcement year. SALE is the hyperbolic sine of the firms's sales (divided by 1000) reported at the end of the fiscal year prior to the announcement year. #SEO is the number of SEOs in the three months prior to the announcement date. ILIQ is Amihud's measure of the illiquidity of the firm's equity. RISK is the average daily variance of return for the firm's equity in the year prior to the announcement date. Standard errors are in parentheses, *p<0.1; **p<0.05; ***p<0.01.

	(1)	(2)	(3)	(4)
	OLS		Matching Market Corrected	
Constant	−0.0968	5.8248***	−1.5878***	6.5703***
	(0.1449)	(0.1718)	(0.1297)	(0.1297)
REPUTATION	3.6253***	−0.4045	5.1724***	−1.1780***
	(0.2879)	(0.3413)	(0.3279)	(0.3279)
BOUGHT	−0.5971***	−2.2776***	−1.4620***	−1.8452***
	(0.0732)	(0.0868)	(0.1265)	(0.1265)
FULL	0.3534***	0.3124***	0.2177***	0.3802***
	(0.0409)	(0.0485)	(0.0554)	(0.0554)
REPUTATION X BOUGHT	−2.4342***	−3.8656***	−1.8121	−4.1766***
	(0.7141)	(0.8467)	(1.1131)	(1.1131)
REPUTATION X FULL	−0.9715***	−0.6019	0.1693	−1.1723***
	(0.3726)	(0.4418)	(0.4021)	(0.4021)
#LEAD	0.1547***	−0.0810***	0.1458***	−0.0765***
	(0.0092)	(0.0109)	(0.0107)	(0.0107)
SALE	0.0875***	−0.1840***	0.0752***	−0.1779***
	(0.0068)	(0.0081)	(0.0087)	(0.0087)
#SEO	0.0034***	0.0004	0.0026***	0.0008
	(0.0007)	(0.0009)	(0.0009)	(0.0009)
ILIQ	−3.8547***	2.1932***	−3.4883***	2.0100***
	(0.2514)	(0.2980)	(0.3043)	(0.3043)
RISK	−2.2849***	2.7875***	−1.8523***	2.5712***
	(0.4688)	(0.5559)	(0.4853)	(0.4853)
MARKET BOOK	0.0361***	−0.0327***	0.0287***	−0.0290***
	(0.0054)	(0.0064)	(0.0070)	(0.0070)
ehat			0.8897***	−0.4448***
			(0.0199)	(0.0199)
Observations	3,211	3,211	3,211	3,211
R^2	0.4996	0.6854	0.9366	0.7342