How banking relationships affect certification:

The role of private information in underwriting

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January 12, 2007

Abstract

I provide evidence that following deregulation allowing for private information transfers within banks, an underwriter is better able to certify a seasoned equity issue if it has a lending relationship with the firm. An unexpected announcement of being underwritten by the firm's lending-relationship bank reduces ex-post information asymmetry and improves the announcement return. Consistent with this enhanced certification effect, firms reveal a preference for lending-relationship banks as underwriters. In turn, these banks select which firms to underwrite based on their private information about the firm and strategically set lower fees the more favorable that information is. Also consistent with their higher certification ability, lending relationships are associated with a fee premium after controlling for the effect of private information on the firm-underwriter match. Overall, these results add support to the value of banks in the production and transmission of information.

Keywords: Certification; Securities underwriting; Universal banking.

JEL classification: G24; G28; G32.

EFMA classification: 230; 530; 540.

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1 Introduction

It is well known that banks that have a lending relationship with a firm are able to obtain information that may not be available to other parties in the market, and that this information advantage makes lending-relationship banks "special" or unique.[1] For example, bank loan announcements and renewals are shown to have a positive effect on returns (James, 1987, Lummer and McConnell, 1989). Therefore, an underwriter with private information resulting from a lending relationship should be able to certify firm value better than other underwriters. This is because by agreeing to pursue the deal, the underwriter puts its reputation on the line and thereby conveys positive private information to outsiders. According to this rationale, being underwritten by a lending-relationship bank should lead to a reduction in information asymmetry and an increase in firm value. Evidence that lending-relationship underwriters provide superior certification in equity offers would constitute additional evidence in support of the uniqueness of bank loans, that is, of the value of banks in the production and transmission of information.

In the U.S., the Federal Reserve Board prohibited banks from transferring non-public information between their lending and underwriting arms until October 31, 1997. Since that date there has been no such restriction, potentially altering the distribution of certification capabilities within the underwriting industry. Therefore, this deregulation has created market conditions that allow for the study of the effects of private information, and in particular of the effect of lending relationships in underwriting.

I show that lending-relationship banks have an incremental certification capability in three ways. First, I show that the existence of a lending relationship with the lead underwriter is positively related to an issue's announcement return. Specifically, an unexpected announcement of using a lending-relationship underwriter is associated with a positive announcement return effect of +39 basis points (bp) on a mean announcement return of -2.7%. However, if that same announcement conforms to a prediction based on publicly observed data, no significant abnormal return obtains. This effect on firm value is consistent with the enhanced certification a lending relationship with the lead underwriter confers upon an equity issue.

Second, I show that lending relationships have a negative impact on information asymmetry. Proxying for information asymmetry using both the relative bid-ask spread and its adverse selection component, I find that the change in asymmetry from before to after the issue announcement is inversely related to the use of a lending-relationship underwriter, at -8% (-14%) relative to the ex-ante mean 4.0% bid-ask spread (0.12 adverse selection component), this effect being stronger the more opaque the firm is.[2] This result

[1] See for example, Campbell and Kracaw (1980), Fama (1985), and Diamond (1991).

[2] The unexpected use of a lending-relationship underwriter has a more significant effect both on announcement returns and the change in information asymmetry the more opaque the firm is. Consistent with this evidence, Booth and Smith (1986) and Chemmanur and Fulghieri (1994) argue that IPO certification is more valuable for firms with higher potential wealth transfers from asymmetric information. This evidence is also consistent with Diamond (1991), who shows that the banks' informational advantage makes them more credible in transmitting information about the quality of the firm to outsiders, and that firms that are less well known benefit the most from such credibility effects.

is intuitive: since the purpose of certification is to provide outsiders with credible information about the firm, certification should reduce information asymmetry. Moreover, in an efficient market the evidence of returns related to lending relationships should be associated with some immediate or future benefit to the firm and its shareholders.[3] Like most certification effects, however, this one does not last forever, as the effect on the relative bid-ask spread lasts about four to five months, diminishing gradually over that time.

Third, if a lending relationship between the firm and the lead underwriter enhances certification, one of a firm's preferred underwriter attributes should be the existence of a lending relationship, after controlling for fees and other firm and underwriter characteristics. The results show that a lending relationship with the firm is an attractive feature in a bank, and that this is more relevant the more opaque the firm is. A lending relationship with the firm increases the probability of becoming lead underwriter from 1% to 12%, ceteris paribus. The previous literature shows that having banking relationships with firms increases the likelihood of a bank becoming lead underwriter.[4] However, the choice of underwriter is possibly affected also by the fees proposed by each bank's competing offer. I therefore analyze firms' revealed preferences for underwriter attributes controlling for the fees charged by every competing underwriter.[5]

Consistent with the lending-relationship banks' superior certification ability, I show that they use their private information to determine their fee structure, and in turn which firms to underwrite. Such private information allows lending-relationship banks to make informed decisions about which firms' issues will affect their own reputations, positively or negatively. Lending-relationship banks are therefore more likely to agree to underwrite issues of firms about which they have favorable private information. In addition, the prospect of a future information monopoly probably induces banks into trying to strengthen their relationships with those firms with favorable private information. One way to do so is by lowering fees now. I show that the fees lending-relationship banks offer the firms they agree to underwrite are lower than those they offer to those firms they end up not underwriting (by 98 bp to 119 bp on an average 4.9% gross spread). This evidence is consistent with an efficient economic outcome whereby lending-relationship banks decide whether to strengthen their relationships with firms based on how favorable the private information

[3]The evidence presented is in line with one of the predictions of Chemmanur and Fulghieri's (1994) model: underwriters with greater reputational capital are more effective in reducing the impact of information asymmetry. In their model they refer to the impact of lower information asymmetry on IPO underpricing, but presumably there should be a drop in information asymmetry after such certification.

[4]Yasuda (2005) finds that lending relationships are a significant factor in the firm's choice of debt underwriter after controlling for the fees charged. Ljungqvist et al. (2006) show that the magnitude of the lending relationship with a firm is directly related to the likelihood of a bank being chosen for debt and equity underwriting. Bharath et al.'s (2006) evidence is consistent with these conclusions, although their reported economic effect is small. Drucker and Puri (2005) find that underwriters that provide concurrent or previous lending to a firm are more likely to be selected as its equity underwriter.

[5]Since the fees charged by not-used underwriters are unobservable, I estimate them endogenously with the existence of a lending or an underwriting relationship, while controlling for how private information held by underwriters affects the matching with firms and the fees charged. I also control for underwriter reputation and the firm's level of information asymmetry, since Duarte-Silva (2006) shows their significant effects on underwriter certification by themselves and in interaction.

about them is.

Also consistent with the superior certification capability of lending-relationship banks, I find that after controlling for how their private information affects the firm-underwriter matching, lending-relationship banks are able to charge firms higher fees, i.e., they manage to extract some of the associated rents from firms. In particular, the existence of a lending relationship is associated with an average premium on underwriting fees between +6 bp and +125 bp, depending on how favorable the bank's private information about the firm is.[6] If a firm uses another underwriter, then besides the higher transaction costs it has to bear, it also loses the certification benefit of its lending-relationship bank. Hence, even if economies of scope between the lending and underwriting arms of lending-relationship banks drive their costs down, it is always optimal for these banks to charge higher fees relative to banks without a lending relationship, as charging equal or lower fees would lead to lower revenues, without altering the fact that the firms would still prefer to choose them. This evidence runs counter to most of the prior literature that reports lower underwriting fees in the presence of lending relationships or with the entrance of commercial banks,[7] an observation that is generally interpreted as caused by lending relationships leading to discounts in underwriting fees through economies of scope. However, the evidence in this paper indicates that at least one major cause behind such apparent discounts is that lending-relationship banks choose to underwrite the firms about which they have favorable private information by charging them lower fees.

Consistent with the relevance of the lending-relationship banks' private information, I find that assessments of the firm's quality by underwriters without a lending relationship with the firm tend to be based more on externally observable characteristics, whereas a lending-relationship bank has more inside knowledge of the firm: several observable firm characteristics (e.g., idiosyncratic risk) affect only the fees charged by non-lending-relationship underwriters.[8]

To obtain the private information used in the tests below, I employ the observation of the relationship with the actual underwriter used, together with publicly observable characteristics of the firm-issue. In particular, the part of the firm-underwriter matching that is not explained by publicly available information

[6] In a theoretical model on conditions for the co-existence of commercial and investment banks, Puri (1999) shows how the former may charge higher underwriting fees in the presence of informational advantages.

[7] The literature shows that that was also the case before the 1933 Glass-Steagall Act. With its gradual relaxation started in 1987, commercial banks started entering the underwriting market, initially through the debt side of the market. Gande et al. (1999) find that debt underwriting fees have declined with commercial bank entry. Yasuda (2005) finds that having a lending relationship with a firm commands a discount in debt underwriting fees. Drucker and Puri (2005) find that firms – especially noninvestment-grade ones – obtain lower yields and lower equity underwriting fees by tying underwriting deals with loans. Narayanan et al. (2004) present evidence that the existence of a lending relationship with a commercial bank underwriter reduces fees in SEOs. In sum, except for Calomiris and Pornrojnangkool (2006), the findings in the prior literature indicate that underwriting fees are lower in the presence of lending relationships.

[8] The results also show that switching from the previous underwriter does not seem to be associated with any significant impact of private information on the fees charged. This makes sense if one considers the fact that the average time between offers is over three years, and hence any private information is probably too dated to be relevant. Consistent with this view, James (1992) shows that the time between offers is directly related to the likelihood of switching underwriters.

is interpreted to be the private information causing the actual match that is observed.[9] Therefore, the econometric method used herein allows one to control for how the private information held by the lending-relationship underwriter affects its own selection of which firms it is more or less prone to underwrite.

Summing up, this paper contributes to the literature by joining the thread on the certification role versus conflicts of interest of lending-relationship banks and the thread on the competitive factors in the underwriting industry. The evidence presented here shows first that the use of lending-relationship banks as underwriters is associated with a positive certification effect, not with conflicts of interest. The prior literature shows such a benefit on debt offerings (e.g., Gande et al. 1997, Roten and Mullineaux, 2002)[10] and IPOs (e.g., James and Weir, 1990, Hebb, 2002, Schenone 2004). Second, this paper provides evidence of (i) how certification affects firms' preferences, (ii) how lending-relationship banks are able to extract some of the benefit they provide the firm via higher fees, and (iii) how these banks strategically set fees in accordance with the private information they hold. These findings are consistent with the observation that relationship banks select which firms to take public in IPOs (Benzoni and Schenone, 2005). In addition, the evidence above helps explain why banks charge lower fees to the firms with which they have lending relationships: basically, private information drives the selection by lending-relationship banks, which improves their certification capabilities and affects the underwriting fees they propose to charge firms.

The remainder of this paper is organized as follows. Section 2 describes the data and the sample selection process. In Section 3, I examine the firm's revealed preferences endogenously with the underwriting fees, while controlling for the role of private information in affecting the match between firms and underwriters. In Section 4, I analyze the effects of banking relationships on announcement returns and information asymmetry. Section 5 concludes.

[9]To be more specific, I estimate the effect of private information on fees following Lee's (1983) polychotomous model adjusted for self-selection. I divide underwriters into four categories according to the existence (or absence) of a lending relationship or an underwriting relationship. This is because another issue related to banking relationships is whether being an underwriting-relationship bank provides the bank relevant private information. Interpreting the self-selection term in this model as proxying for private information, I am able to estimate the extent to which lending-relationship underwriters use such information in the fees they charge.

[10]Ang and Richardson (1994), Kroszner and Rajan (1994), Puri (1994), and Puri (1996) also provide similar evidence for the period before the Glass-Steagall Act.

2 Sample selection and data

The objective of this paper is to analyze how the private information obtained in the course of banking relationships affects the certification capabilities of such banks. Hence, I focus on a period following the dismantling of significant firewalls restricting the transmission of private information within financial institutions; extending the sample to previous years would imply assuming that there were information transfers between the lending and underwriting arms of a financial intermediary. In doing so, I add about one quarter to the effective deregulation date (October 31, 1997) to allow the change sufficient time for it to affect firm-underwriter matches, as an issue does not go public instantaneously after the firm's decision to finance externally.[11] Therefore, the sample period starts in January 1998. Using Thomson Financial's Securities Data Corporation database, I obtain 3,715 seasoned common stock offers by non-financials and non-utilities until June 2006.[12] I exclude all financial and utility firms since their regulatory requirements make their actions more predictable.[13] I exclude all debt issues, due to their higher predictability[14] and their lower potential for adverse selection associated with less negative announcement returns (Myers and Majluf, 1984, and Stein, 1992), and I exclude all initial public offerings, to ensure that I have a firm's market value before an announcement and to reduce the issues of signalling and underpricing. Requiring that every offer in the sample have only one lead manager reduces the sample by 875 observations, and restricting the sample to firms listed on AMEX, NYSE or Nasdaq leads to the deletion of 121 additional offerings. In addition, by using Factiva and SEC filings I combine any offers that are double listed or separated into their several tranches, and I exclude all firms that had at least one offer that was not underwritten, or with missing offer size, underwriting fees, or underwriter name, further reducing the sample by 928 observations. These procedures yield an initial sample of 1,791 issues.

To account for competition among underwriters, I gather data on all the likely competitors for any given firm's offer. Any firm that never hired one of the top 30 equity underwriters (seasoned or not) of any year between 1990 and 2006 is dropped from the sample, so that taking account of mergers and acquisitions among underwriters is a more tractable task.[15] These top banks comprise a total of 91 underwriters, consistent with persistent ranks of the top underwriters. This step further decreases the sample size by 57 issues. The final sample comprises a total of 99 underwriters, including the 91 top ones. The aggregate annual market share of this set of 99 underwriters is consistently above 95%; thus, this filter does not seem

[11] Although this deregulation was announced in August 1997, using the effective date is more conservative.

[12] In this step I exclude rights issues, shelf offerings, foreign issues, REITs, and closed-end funds.

[13] For example, electric utility companies are required to use competitive bidding (Smith, 1977).

[14] The association of debt issues with principal repayments and of equity issues with earnings makes the former more predictable. Also, firms tend to use bank lines of credit until a public issue is justified (given its fixed costs and steep economies of scale), hence the likelihood of a debt issue is associated also with the amount of bank borrowing. Please refer to Smith (1986) and Marsh (1982).

[15] Please note that this filter reduces the variability in underwriter attributes, and hence biases against finding results with respect to them in the tests ahead.

to remove a significant portion of the equity-issuing market. The final sample consists of 1,734 offers by a total of 1,303 firms (1,112 corporate families).

I manually collect data on credit agreements and loans from the firms' SEC filings, including the issues' prospectuses. Toward that end, I randomly select 925 of the 1,734 issues while keeping constant the yearly proportions of deals of the original sample. The majority of the credit agreements are revolvers, followed by term loans. The bridge and syndicated loans included are only those entered into in the respective fiscal year. Table 1 reports descriptive statistics for the overall sample and the subsample of 925 issues used in this paper. Panel A shows that the mean gross spread is 4.8% on an average $78.5 million offer. Further, 15% of the issues in the estimation subsample were underwritten by one of the firm's lending-relationship underwriters, whereas 33% of the firms did not switch underwriters across issues. In Panel B, one sees that the gross spread on issues underwritten by a lending-relationship underwriter is lower than that in the remaining issues. Also, the offers underwritten by lending-relationship banks seem to be larger. Finally, the descriptive statistics of the subsample used here do not differ significantly from those of the overall sample, indicating that the subsample well represents the population it is drawn from.

— Insert Table 1 about here —

To measure underwriter reputation, I use: (i) the underwriters' market shares in the equity issues market, (ii) the underwriters' market shares in the firm's respective one-digit SIC code industry (to control for boutique underwriters), and (iii) the rankings in Jay Ritter's webpage. Since the latter measure ends in 2004, I assume it to be constant for all the issues after that year. The market shares used are floating, i.e., they are calculated for each offer's announcement date as the respective underwriter's market share over the previous three years.[16] A floating ranking has the advantage of capturing the possibility that underwriters' reputations may have changed during the sample period.[17] Further, the market shares are diverse enough to make it unadvisable to simply classify underwriters into two or three tiers. To measure the reputation of lending-relationship banks, in the event firms have more than one lending relationship, I average their reputations.

Besides accounting for underwriters' name changes, I consider mergers and acquisitions by allocating to each bank the proceeds underwritten by its predecessors. I consider as a non-switcher a firm that uses bank A in one offer and then chooses the acquirer of bank A in the next. For example, the volume underwritten by Citicorp, Salomon Brothers, Smith Barney, and Schroders is put under the umbrella of Citicorp for any date after the given acquisition, and any change from Salomon Brothers to Citicorp is

[16]The correlation between Ritter's ranks and market share-based measures of reputation is highest (84%) using the three-year window, with the whole equity market as basis.

[17]Market share-based ranking is also preferred by Megginson and Weiss (1991), Butler et al. (2004), Ellis et al. (2006), Ljungqvist et al. (2006), Burch et al. (2005), and others.

deemed a non-switch. All information on this M&A activity comes from Lexis/Nexis, SDC, and the banks' own corporate information sources. I also record which banks are investment banks and commercial banks using the Dun & Bradstreet database for SIC codes.

Using issues of the *Institutional Investor*, I gather data on all-star analysts in each industry and the underwriter with which they were affiliated. Using I/B/E/S, I gather data on analyst coverage of each firm in the previous 12 months. I also gather key personnel turnover in the industry during the period using Lexis/Nexis, where key personnel is defined as in Ljungqvist et al. (2006); basically only those with rank of managing director or above. The vast majority of the observations come from the Investment Dealer's Digest. I obtain a total of 182 such personnel movements, with most of the movements happening at higher ranked underwriters. Intraday trading data comes from the TAQ database. I also collect issue announcement dates using Lexis/Nexis; when these are not available I assume them to be the filing date.

3 Banking relationships, underwriting fees and the firm's preferences

With the gradual relaxation of the Glass-Steagall Act , a number of commercial banks started underwriting securities through their Section 20 subsidiaries. However, due to concerns about conflicts of interest, these financial intermediaries were forced to block any information flows between their lending and underwriting arms. Effective October 31, 1997, the Federal Reserve Board rescinded the regulation regarding such chinese walls.[18] One effect of this amendment is that banks are now allowed to internally share information obtained through their lending relationships. Because banks that have a lending relationship with a firm are able to obtain information that may not be available to other parties in the market, deeming them "special" (see, e.g., Fama, 1985 and the empirical evidence in James, 1987 and Petersen and Rajan, 1994), this structural change makes it interesting to assess each underwriter type's competitive advantages.

Certification amounts to a revelation of private information, that is, certification is value-increasing and decreases outsiders' uncertainty.[19] Hence, it is value-maximizing to be underwritten by the bank that provides the highest certification possible. Because an underwriter that a priori has private information about the firm is more credible at certifying firm value than one that does not, holding other capabilities constant, lending-relationship banks are expected to provide superior certification. In addition, as Booth

[18] In particular, the Federal Reserve Board's amendment R-0958 to Regulation Y rescinded Firewall 23 on the disclosure of nonpublic information, which prohibited "a bank from disclosing to a section 20 affiliate or a section 20 affiliate from disclosing to an affiliated bank, any nonpublic customer information (including an evaluation of the creditworthiness of an issuer or other customer of that bank, or underwriting subsidiary) without the consent of that customer." One of the reasons given for this change was that commercial banks were at a competitive disadvantage because investment banks "increasingly have access to financial information of issuers through participation in syndicated and other commercial lending transactions, yet they may share that information with their affiliates."

[19] See, e.g., Easterbrook (1984), Heinkel and Schwartz (1986), Booth and Smith (1986), Carter and Manaster (1990), Chemmanur and Fulghieri (1994), and Carter et al. (1998), among others. Please refer to Smith (1986) for more on this literature.

and Smith (1986) and Chemmanur and Fulghieri (1994) show, certification is likely to be more valuable for firms with higher potential wealth transfers from asymmetric information, since with firms that are quite transparent their relationship bank does not hold much of an informational advantage versus other outsiders. Thus, based upon this discussion, I hypothesize the following:

H1a: Being underwritten by a lending-relationship bank as opposed to a non-lending relationship bank is value-maximizing to the firm, especially for firms with higher levels of information asymmetry.

Note that the bank that underwrote the firm's previous issue is not likely to hold much private information, given that the average time between offers is over three years. Hence, one would not expect the certification ability of the previous issue's underwriter to be much stronger than that of other underwriters, holding everything else constant. More formally:

H1b: Being underwritten by the same underwriter as in the previous equity or debt offer is not a relevant value maximizing factor to the firm.

In the remainder of this section I infer whether lending and underwriting relationships are value-maximizing attributes, while taking account of the private information revealed by the identity of the lead underwriter and the endogeneity with the underwriting fees charged. In the next section, I test whether such revealed preferences are actually consistent with value maximization by examining the changes in firm value and in information asymmetry.

3.1 Estimation of underwriting fees

If lending-relationship banks are associated with higher certification, per *H1a*, then it is reasonable to expect that they would try to extract some of the value increase that firms realize. One way to do so is by charging higher underwriting fees. In addition, given the information monopoly held by lending-relationship banks they should be able to extract quasi-rents from the firm (DeAngelo, 1981, Rajan 1992). For example, DeAngelo (1981) shows an optimal path of increasing fees, with the initial auditor assignments being "low-balled," i.e., charged at lower prices or even below cost. So, beyond the certification benefit a firm would forfeit if it did not use its lending-relationship bank, it would also incur into increased transaction costs.

However, it is possible that having a previous lending relationship with the firm leads to efficiencies in costs, i.e., economies of scope (Kanatas and Qi, 1998, 2003). That is, when an underwriter already has information gathered through its lending arm, the effort and cost involved in analyzing the firm is possibly lower. This would be confirmed if one found evidence that some of these savings are passed on to the firm via lower fees, after controlling for how private information affects the bank's underwriting decision, although not finding evidence of lower fees would not imply their absence because the data available cover underwriting fees, not underwriter costs. Drucker and Puri (2005) find that the underwriting fees charged by investment banks in seasoned stock offerings are inversely related to the existence of a concurrent loan,

a previous lending relationship, or both. This is interpreted to be evidence of economies of scope. However, Calomiris and Pornrojnangkool (2006) find evidence against banks discounting fees to increase their market share in the underwriting business.[20]

I argue that if firms realize a certification benefit from being underwritten by a lending-relationship bank, then they are always better off with those banks, ceteris paribus, and hence they are willing to pay a premium in fees to obtain that benefit. Even if economies of scope drive down lending-relationship banks' costs, it is always optimal for them to increase the fees they charge firms. This is because if they charged the same fees as the banks that do not have a lending relationship, then they would observe lower revenues without altering the fact that the firms would still prefer to choose them. Therefore, no matter how likely it is that a firm would use its lending-relationship bank, it is always optimal for that bank to charge higher fees than a non-lending-relationship bank. Formally:

H2: The underwriting fees that a lending-relationship bank proposes to charge a firm are higher than those proposed by a non-lending-relationship bank.

In addition, a non-lending-relationship bank that considers being a firm's underwriter will likely have to expend more effort than a lending-relationship bank in performing its due diligence the more information-asymmetric the firm is.

H3: The level of underwriting fees charged by non-lending-relationship underwriters is directly related to their expected effort in performing due diligence.

Underwriter reputation also is expected to play a role in the fees they charge. Given that underwriters have a reputation to protect, they have an incentive to monitor the quality of the firms they underwrite.[21] The private information they possess allows them to better assess which firms will likely affect their reputations, positively or negatively. Therefore, lending-relationship banks are more prone to agree to underwrite issues of firms about which they have favorable private information. A bank with favorable private information about the firm is more likely to try to strengthen its relationship with that firm than other banks that have no private information about it.[22] Knowing that, the firm's bargaining power increases with favorable private information. Hence, one way to secure (reject) a firm's deal is by lowering (increasing) fees now. Therefore, beyond the effect hypothesized in *H2*, I argue that the fees charged by lending-relationship banks are inversely affected by how favorable the private information they have about the firm is. Formally:

[20] Possibly, underwriters could also aggressively discount fees to gain more business, i.e., pay-to-play. However, the underwriting business has a considerably higher revenue potential than lending, and so if anything one would witness paying-to-play through lower fees on the lending side and not the reverse.

[21] Dunbar (2000) shows in IPOs that short- and long-window returns after equity issues are significantly related to subsequent changes in the underwriters' market shares. Fang (2005) presents evidence consistent with underwriters closely scrutinizing their reputations in the debt market. Fernando et al. (2005) show theoretically and empirically this and other relations between reputation and market share.

[22] Also, losing a deal to another bank probably endows that other bank with private information about the firm, which, if favorable, will likely increase the competition for that firm's banking needs in other lines of business.

H4: The level of underwriting fees charged by the underwriter is inversely related to how favorable the private information held by the underwriter is.

The above implies that the underwriter-firm match is endogenously related to the fees that each underwriter proposes to charge the firm. In particular, the existence of private information affects the firm-underwriter match. Therefore, in the following I control for the possibility that the selection with respect to the existence of banking relationships affects the underwriting fees. Also, to test *H2* and *H3* requires estimates of the unobservable fees that the underwriters (with or without lending relationships with the firm) propose to charge. I turn to this issue next.

3.1.1 Effect of private information on underwriting fees

I perform the above tests using a four-choice model according to the existence or absence of a lending-relationship, and to having switched underwriters from the previous offer (equity or debt) or not. The control for underwriting relationships (defined as not switching underwriters from the previous equity or debt offer) is motivated by *H1b*, i.e., by the possibility that the previous underwriter also holds private information about the firm. Taking account of self-selection of lending-relationship underwriters along with that of underwriting-relationship underwriters requires using either a selectivity-adjusted binary choice model (Lee, 1976) for each of the two categories at a time or a polychotomous model for the four possible choices. The problem with the former method is that it assumes that there are only two choices of underwriter type at a time, yielding a potential selectivity bias in the choice of reputation tier that is not accounted for.[23] Modeling the firm's choice with more than two possibilities allows for the potential fees charged to vary across each possibility.[24] To my knowledge this is the first time that the endogeneity of underwriting fees is taken into account in determining the match between an underwriter and a firm's equity issue. For ease of computation, instead of modeling multiple binary-choice rules and partial observations (Hay, 1980, and Dubin and McFadden, 1984), I follow Lee (1983) and assume that the firms choose whichever possibility maximizes their value when choosing among the available possibilities. For further details please refer to Appendix A. Under this specification, each issue can be underwritten by one of four types: (i) a non-underwriting-relationship, non-lending-relationship bank, (ii) a non-underwriting-relationship, lending-relationship bank, (iii) an underwriting-relationship, non-lending-relationship bank, and (iv) an underwriting-relationship, lending-relationship bank. There is no a priori ranking of these groups and so I do not use an ordered-response model. Rather, I first estimate a multinomial logit equation. I then use the resulting estimates to construct the selectivity correction terms that are used in ordinary

[23] Relative to a polychotomous-choice model, the use of the binary-choice model has the advantage of easier modeling, and also of serving as a check on this model's results.

[24] I also perform similar tests using binary-choice models adjusted for selectivity with respect to lending- and underwriting-relationships (one at a time). They yield similar results.

least squares estimates of each category's unobserved fees. Running separate regressions for each of the four categories has the benefit of not constraining the coefficients to be the same across categories.[25]

This method requires a specification of the factors determining the fees and the match between firm and underwriter type. Regarding the latter, certification is more valuable the higher the potential for wealth transfer from asymmetric information (Booth and Smith, 1986, Chemmanur and Fulghieri, 1994). Therefore, the higher the firm's level of asymmetric information (proxied by the relative bid-ask spread[26]) the higher the value of external certification should be. Under a similar rationale, higher levels of stock volatility are also possibly associated with a higher value of external certification and raise the underwriter's concerns for reputation loss or legal liability.[27] Note that some of the companies in the sample do not disclose any lending relationship in their filings. This can be interpreted as the absence of at least one lending relationship passing the materiality filter required to be disclosed in the company filings. Interpreting the lack of a material lending relationship as higher information asymmetry, I include this factor as well. In addition, larger issues (in absolute terms or relative to firm size) offer more arguments for possible adverse selection, and the underwriter's reputation possibly serves as a certification substitute relative to the existence of a banking relationship.

The econometric procedure used has an identification condition: the specification of at least one factor that may affect the firm-underwriter match but not the fees. Failing to do that results in multicollinearity between the factors in the fees equation and those used as an argument in the term that proxies for private information.[28] In this paper I use the same factors in both estimation steps, and so I am biasing against finding significant results in the fees regressions. As a result, this specification places particularly stringent requirements on the significance of the fees' factors.[29]

In Panel A of Table 2 I present the first-step choice coefficients. The base category is the non-underwriting-relationship, non-lending-relationship category and therefore all of its coefficients are set to zero. Hence, the results should be interpreted as "versus using a non-underwriting-relationship, non-

[25] I also run a single regression across categories in Section 3.1.2.

[26] Please refer to Treynor (1971), Glosten and Milgrom (1985), and Easley and O'Hara (1987) for the link between bid-ask spreads and information asymmetry.

[27] See Tinic (1988), Blackwell et al. (1990), and Lowry and Shu (2002) for related evidence with respect to IPOs and shelf offerings.

[28] In particular, although the latter is non-linear with respect to its argument, it is almost linear in some regions. Vella (1998) shows that ignoring this multicollinearity leads to overestimated second-step standard errors. However, the coefficient estimates remain unbiased and consistent.

[29] I also include in both steps two factors that possibly affect fees but are not likely to impact the firm-underwriter match. First, I include a measure of how hot the equity new issues market is in the particular quarter of interest. This measure possibly affects fees if underwriters raise fees in hot markets, but it should not directly affect the firm-underwriter match. I calculate this measure as the proportion of the current quarter's overall equity-issuing activity relative to the previous three quarters' total. Second, I include the average daily trading volume in the year after the offer of a matched sample of firms based on size (80%-120% of the firm's market value of assets) and industry (one-digit SIC code) that issued equity within two years of the particular offer. It is likely that this affects the fees charged by the underwriters since the average trading volume of the firm's peers has an impact on the underwriter's expected profits from making a market in this stock. However, it should not directly affect the firm's decision to prefer a underwriter with a certain type of relationship, nor should it affect the differential likelihoods of one type of bank or another wanting to underwrite that firm's issue.

lending-relationship bank."

— Insert Table 2 about here —

Consistent with *H1a*, it is clear that the firm's relative bid-ask spread is significantly and directly related to the probability of having its issue underwritten by a lending-relationship bank, either with or without an underwriting relationship. However, since this match is likely to be endogenously related to the fees charged by each underwriter, any conclusions regarding firms' preferences are deferred to Section 3.2. Interestingly, using the same underwriter of the previous equity or debt issue also seems to be significantly related to the firm's level of information asymmetry, although not as significantly.

With the results from this step I build the selectivity correction terms, which are used as factors in determining underwriting fees. These terms are constructed using the part of the firm-underwriter matching that is not explained by publicly available information, and can be interpreted as the private information driving the actual match that is observed.[30] The predicted signs on the coefficients in these fees regressions are as follows. The underwriter will charge higher fees the higher the potential for loss of reputation or risk of legal liability with respect to the specific offer. Therefore, stock volatility (disaggregated into the previous 12-month average systematic and idiosyncratic components) and information asymmetry (proxied by the relative bid-ask spread) should take positive coefficients. I also control for the possibility that a lack of a material lending relationship is associated with higher information asymmetry. Further, because Drucker and Puri (2005) and Calomiris and Pornrojnangkool (2006) argue that the fees charged by commercial and investment banks are different (although in different ways), I also include that factor in the regressions of fees. To control for U-shaped spreads (Altinkilic and Hansen, 2000), I also include the offer size, both in absolute terms and relative to the firm's equity market capitalization. Finally, Duarte-Silva (2006) shows in a simultaneous system of equations modeling the supply and demand for certification that the fees charged by the underwriter are higher the more reputable it is. Therefore, I include this factor in the fees regressions as well.

In Panel B of Table 2, I present category-specific ordinary least squares regressions of fees, with a correction for self-selection. The selectivity correction term is significant for both lending-relationship categories. The statistical interpretation of these coefficients is somewhat counterintuitive: the product of the coefficient and the selection term is an estimate of the category-specific difference between the conditional and the unconditional fees, and thus it can be understood as a measure of the difference in fees between a non-random category-specific observation and an observation with the same characteristics but that is randomly picked and allocated to the same category. In particular, a negative coefficient implies a positive selection effect, i.e., firms in that given category generally pay lower fees than randomly

[30] For more details, please refer to Lee (1976) or Maddala (1996).

assigned firms would. As explained above, the economic interpretation of these factors is that they proxy for the private information held by the respective underwriter. Hence, in this case the results show that such private information is associated with a discount in the underwriting fees by lending-relationship underwriters. This evidence provides support to *H4*, i.e., the level of underwriting fees is inversely related to how favorable the private information held by the underwriter is. The private information that leads a bank to underwrite its lending-relationship firm also implies that the fees charged are lower than those that would have been charged by a bank lacking a lending relationship with the firm.[31] I interpret this difference as evidence of lending-relationship banks caring for their own reputations, and for that purpose using the private information they obtain in the course of such relationships. The private information they have access to in the present will become public in the future (e.g., through an announcement that is merely probable at the time of the issue, or through the firm's future earnings) and consequently affect their reputations.[32] Hence, the evidence presented here is consistent with an efficient economic outcome whereby a lending-relationship bank uses its private information to decide on whether to underwrite, i.e., it prices according to its assessment of firm risk or quality. Economically speaking, this difference amounts to between 98 bp and 119 bp on an average 4.9% underwriting fee charged by lending-relationship banks. In dollar terms this implies a difference reaching almost $900,000 on an average $75 million offer. There is no such effect with underwriting-relationship banks, suggesting that either they do not hold significant private information driving a match with the firm, or if they do it does not affect the fees charged.

A quick look at the table above also shows that the ability to explain the variability in fees charged by underwriters that do not have a lending relationship with the firm is much higher than with the remainder of the sample. Besides the difference in goodness of fit, the table above shows how variables that are publicly available tend to be significant at explaining underwriting fees in the absence of a lending relationship, and not otherwise. Consistent with the private information story, these results indicate that underwriters price more based on publicly observed variables in the absence of a lending relationship than when they have private information borne out of a lending relationship. Stated another way, the factors observable to the researcher or any party external to the firm are noisy proxies of the variables used by lending-relationship banks to establish underwriting fees.

The table above also shows that with non-lending-relationship banks, the level of fees is directly related to the firm's relative bid-ask spread. This effect is consistent with *H3*. A potential problem with the use of

[31] Another way to interpret this evidence is that the firms that are selected into being underwritten by their lending-relationship banks have favorable private information about themselves but cannot credibly transmit this information to other banks. As a result, they select their lending-relationship bank to credibly convey such private information. Under both interpretations, there is favorable private information that the lending-relationship bank can more credibly convey.

[32] An alternative explanation is "low-balling" (DeAngelo, 1981): just as auditors set fees even below total current costs on initial audit engagements with firms, competition among underwriters for a relationship with the firm drives fees down. This is because the transaction costs from changing underwriters later yield quasi-rents to the incumbent, and a bank with favorable private information about the firm has more incentive to "low-ball" than other banks.

this model is its assumption of independence of irrelevant alternatives, i.e., it assumes that the odds ratio for two choices is independent of the total number of choices under consideration by the deciding agent. I perform the likelihood ratio test in McFadden et al. (1977) and find that this assumption is not rejected ($Prob > \chi^2 = 0.46$).[33,34]

3.1.2 Effect of relationships on underwriting fees

The lower fees charged in the presence of favorable private information do not mean that a lending relationship warrants a discount.[35] To test whether lending-relationship underwriters are able to charge firms higher fees (per *H2*), I run the same regression as above except that here I use only one equation with dummy variables for the existence of lending and underwriting relationships, which I interact with the relative bid-ask spread. I also include the selectivity terms (aggregated into a single term, or separately and interacted with category dummies) to control for the effect of private information in affecting the firm-underwriter match and the setting of fees.

— Insert Table 3 about here —

I find that the coefficient on the existence of a lending relationship in the middle column is positive (+1.25) and significant at the 2% level, which is consistent with the differences between the intercepts in Panel B of Table 2. This result indicates that after controlling for how private information affects the firm-underwriter match, the lending-relationship underwriters are able to reap some benefit from their relationship with the firm, between 6 bp and 125 bp, depending on how favorable the bank's private information about the firm is. The latter figure amounts to almost $940,000 on an average $75 million offer. This evidence runs counter to the findings of Drucker and Puri (2005) but is in accordance with the premium on fees reported by Calomiris and Pornrojnangkool (2006). Not having switched from the previous offer is associated with a small positive fee effect of 16 bp; the magnitude of this effect together with its significance of 8% diminish the relevance of this factor for the offer's fees. Further supporting evidence is presented below when I test the certification effects of using a lending-relationship underwriter.

The selectivity terms in the middle set of columns retain their significance, as expected. However, when not controlling for private information and the underwriter's reputation (the rightmost columns), I

[33] Accepting the null that the model is correctly described while assuming independence of irrelevant alternatives implies that if, for example, out of the four categories ($s = 1, ..., 4$) $s = 3$ banks are not available as a possibility for a firm that had previously used that category, the likelihood of using a $s = 1$ bank as opposed to the remaining two possibilities would not be very different. That is the same as saying that the probability of using a $s = 1$ bank relative to the probability of using a $s = 2$ or $s = 4$ bank is independent of the availability of the $s = 3$ banks as a possible choice.

[34] When studying the choice between commercial and investment banks in debt underwriting, Yasuda (2005) reports the selectivity coefficient in a nested multinomial logit specification and finds that it is not significantly different from one, failing to reject that the IIA assumption does not hold. Also, she reports that all qualitative results hold when running a non-nested logit that assumes IIA.

[35] In more rigorous terms, this means that the self-selection is positive assortative, and not driven by adverse selection.

find that the banks that have either type of relationship with the firm provide discounts the more opaque the firm is. In the presence of a relationship the fees charged are not as positively related to the firm's level of information asymmetry (coefficients of -5.83 and -6.67 with a coefficient of 7.40 on the stand-alone bid-ask spread). In economic terms these values amount to discounts given a lending or an underwriting relationship of 24 bp and 28 bp, respectively, for the sample's average relative bid-ask spread. This result is consistent with that found in the prior literature, that is, an apparent discount given by banks to opaque firms (e.g., non-investment grade firms in Drucker and Puri, 2005). This difference in results suggests the importance of controlling for private information. In the presence of this control, more favorable private information makes a firm more likely to be underwritten by a lending-relationship bank, whereas without this control, lending-relationship banks appear to provide a discount. In addition, since these banks tend to have higher market shares, which are associated with lower fees,[36] in the absence of this control the apparent association between lending-relationship banks and discounts is strengthened.

The interaction terms with the relative bid-ask spread do not seem to be significant in either of the first two sets of columns. That is, after controlling for private information held by the underwriter, the fees charged to a firm with a relationship are not more strongly affected by the firm's level of information asymmetry than those charged to a firm without either type of relationship. This is consistent with the evidence regarding selectivity-adjusted fees (in Panel B of Table 2) and with *H3*, as the coefficient on the stand-alone bid-ask spread is positive and significant.

3.2 Firms' revealed preferences

In this section, I analyze the firm's preferences in two ways. First, I model the firm's decision as a choice among underwriters with each one of them as a stand-alone unit. This has the benefit of allowing for more heterogeneity in the problem but is more limiting in testing the influence of several firm-issue attributes in the choice. Therefore, for the purpose of testing *H1a* and *H1b*, the only firm attribute I analyze as possibly affecting the use of an underwriter is the firm's ex-ante level of information asymmetry. Second, I specify the firm's decision as a choice among the four categories specified above. This specification is free from the latter limitation but loses texture in the attributes of underwriters by placing them into bins. Therefore, I use one method to analyze how the firm's preferences are affected by underwriter attributes, and I use a separate model to analyze how the firm's attributes affect the use of each underwriter type.

[36] All the results hold if reputation is measured using one-digit SIC based industry definitions or Jay Ritter's rankings. Given the negative skewness of the underwriters' market shares, taking their natural logarithms actually increases the significance of that factor. However, the result is less straightforward to interpret economically. For the identification problems with respect to reputation in running ordinary least squares, please refer to Duarte-Silva (2006).

3.2.1 Each underwriter as a stand-alone unit

The first method I use is a multinomial logit of the firm's choice among the 99 underwriters in the sample against their potentially value-maximizing attributes and the fees charged by each. The fees are either (i) the fees actually charged by the chosen underwriter[37] or (ii) the predicted latent fees that would have been charged by each of the other 98 underwriters that were competing for the issue at stake. I use the fitted results from the selectivity-adjusted model presented above to obtain the latter, i.e., an estimate of the unobservable underwriting fees that each not-chosen underwriter offered the firm.[38]

As discussed above, underwriting fees are likely to be endogenously related to which underwriter is used. In particular, each underwriter's proposed fees are expected to be negatively related to the likelihood of it leading the firm's issue. Per *H1a* and *H1b*, the existence of a lending or underwriting relationship with each underwriter is also included, as are the existence of research coverage and whether there is an All-Star analyst in the respective industry (see, e.g., Drucker and Puri, 2005, Ljungqvist et al., 2006, Calomiris and Pornrojnangkool, 2006). I also control for key staff arrivals or defections, with this variable taking the value of 1 (-1) if there is an arrival (defection) in the previous six months, and zero if there are both or none. Further, the underwriter's reputation (measured in three ways as detailed in Section 2) is expected to be positively related to its likelihood of being chosen, since the firm benefits from such certification. Because this preference should be stronger among firms with higher demand for certification (Duarte-Silva, 2006), an interaction term with the ex-ante relative bid-ask spread should be positively related to the dependent variable. The same (opposite) rationale applies to the interactions of the bid-ask spread with the existence (absence) of lending relationships, underwriting relationships, research coverage, All-Star coverage, and staff movements. Table 4 presents the results of this choice model.[39]

— Insert Table 4 about here —

As can be seen from the table, a lending relationship with the firm increases the likelihood of becoming lead underwriter from 1% to 12%, ceteris paribus. The evidence supports *H1a*, i.e., firms reveal a preference for lending-relationship banks and this effect is stronger the higher their levels of information asymmetry. I also control for the possibility that the preference towards lending-relationship underwriters might be explained by differences in reputations. I find that, especially the higher the information asymmetry, if

[37] Using the fitted fees for the chosen underwriters would lead to the use of overestimated fees, since ceteris paribus these would be lower than those of the competitors. This would bias the coefficient on fees towards zero. This effect is confirmed empirically but not shown for brevity.

[38] The validity of using the estimated latent fees from the previous step is supported by the adjusted-R^2s and by observing that by regressing the actual fees on their respective estimated latent fees, the intercept is not significantly different from zero and the slope is not significantly different from one: $Fees_i^* = 0.0475 + 0.9924 * Fees_i$, with t-statistics of 0.41 and 0.96. This is confirmed by visual examination of the plot of actual against latent fees.

[39] Ai and Norton (2003) show that in probit and logit models, the statistical significance and the sign on the coefficient of an interaction term need a corrected covariance matrix, which is used here.

an underwriter lacks a lending relationship with the firm and it is of lower reputation than the lending-relationship bank, then it is less likely to become the lead underwriter.

The result in Table 4 with respect to the impact of previous lending relationships on the likelihood of being the lead underwriter is similar to the results in Ljungqvist et al. (2006) and Drucker and Puri (2005). Since the focus of those papers is on the importance of relationships to being lead underwriter, their evidence does not speak to whether such a relationship is evidence of paying-to-play, economies of scope, or private information. In contrast, the focus here is on the certification arising from the revelation of private information through the announcement of which underwriter agreed to underwrite the issue. Therefore, the relevance of testing *H1a* is justified by the evidence regarding the certification effect of lending relationships, which I confirm in the remainder of the paper.

Also, when investigating the relevance of lending relationships to the likelihood of becoming lead underwriter, the papers above do not control for differences in underwriter reputation, different levels of information asymmetry, and underwriting fees. The importance of these controls becomes clear when analyzing the importance of underwriting relationships. Having an existing underwriting relationship with the firm (i.e., having underwritten the firm's prior equity or debt issue) does not seem to significantly affect the likelihood of becoming lead underwriter per se. This holds regardless of the firm's level of information asymmetry. Rather, an existing underwriting relationship only seems to matter to the extent that the absence of such a relationship decreases the likelihood of becoming lead underwriter if the underwriter's reputation is lower than that of the previous underwriter and the firm is relatively opaque. Hence, the evidence seems to support *H1b*.

After controlling for these factors, being a commercial bank or incorporated into one does not seem to affect a firm's preferences, whereas research coverage and an All-Star analyst in the respective industry matters more for opaque firms. A significant staff defection (arrival) also decreases (increases) an underwriter's appeal, and the underwriter's reputation seems to have a stronger impact especially among relatively opaque firms, as predicted. Finally, an underwriter is more likely to be chosen the lower the fees it proposes to charge the firm are.

3.2.2 Polychotomous choice with selectivity

To analyze how several of the firm's attributes affect the use of each underwriter type, I use a polychotomous choice model as discussed above. While the endogeneity of the selection has been accounted for in the estimation of fees, the fees that would be charged by the several possibilities have not been yet considered as an effect in the firm's choice. Similar to the first step, each choice's coefficients are interpreted relative to the base category, which I specify to be the no-underwriting-relationship, no-lending relationship category. As explanatory variables, I retain the ones in the first step, and also include the estimates of each category's

unobservable savings in fees relative to the other possibilities. For this purpose I use the actual fees charged in the given issue and the other categories' latent fees. In these regressions, I use the inverse of such savings due to the possibility of multicollinearity. Hence, if the firms are price-sensitive, I expect to see a negative effect of the inverted savings in fees.

— Insert Table 5 about here —

As can be seen in the second column above, the likelihood of using the previous issue's underwriter when it does not have a lending relationship with the firm is sensitive to the fees charged by the other three categories. When the underwriter has a lending relationship (first and third columns), the likelihood of becoming lead is not significantly affected by the fees charged by underwriters without any kind of relationship. Also, the relative bid-ask spread ahead of the issue is directly related to the probability of a lending-relationship underwriter being chosen, which also supports *H1a*. The predicted choice is consistent with the actual choice in 68% of the cases.[40]

4 Certification and lending relationships

4.1 Effect of lending relationships on announcement returns

Using the methods above, it is clear that firms reveal a preference towards being underwritten by a lending-relationship bank, consistent with *H1a*. Considering that this revealed preference is consistent with value maximization, it is presumably due to the underwriter's informational advantage coupled with its ability to credibly reveal private information. It is therefore likely that this choice is associated with a positive certification effect on firm value.

In addition, a lending-relationship bank's informational advantage should be stronger for relatively opaque firms, as discussed above. On the other hand, an underwriter's reputation for valid certifications should have a more constant effect across different levels of information asymmetry. This suggests that more opaque firms should benefit more from having their issues underwritten by lending-relationship banks. It is possible, however, that concerns about conflicts of interest, due to those banks' claims on the firm's assets, diminish the market's perception of the lending-relationship banks' certification role.[41] In this case, the outsiders' concerns should be greater for more information asymmetric firms, as these firms are associated with greater potential for adverse selection. The net effect is an empirical question. Based upon the above discussion, the hypothesis I test is as follows:

[40] As a specification test, I add the variables *Average trading volume (match sample)* and *Quarter's relative overall issue activity* to the selectivity-corrected probits, and find that they are not significant.

[41] For more on this topic, please refer to Drucker and Puri's (2006) survey.

H5: Being underwritten by a lending-relationship bank has a positive impact on firm value, and this effect is directly related to the firm's level of information asymmetry.

In a market efficiency framework, outside investors will react to a surprise announcement, but not to predicted announcement, as a surprise is due to the release of private information as opposed to publicly available information. If, for example, it was widely expected that a firm would use its lending-relationship underwriter, then the market should not react to the news that the firm conformed to such prediction.[42] In this sense, the actual existence or absence of a lending relationship with the lead underwriter is a noisy measure of its unexpected component given publicly available information, that is, the piece of news that causes an effect on announcement returns. I obtain each issue's prediction with respect to the existence of either type of relationship with the underwriter by fitting the results from the polychotomous-choice model in Section 3.2.2 to each issue, and using Appendix A's Eq. (10). The probability of a lending (underwriting) relationship between the underwriter and the firm is obtained by aggregating the probabilities from the first (second) and third columns in Table 4. Similarly, surprisingly high fees are possibly related to a greater effort by the underwriter to certify the firm's value, and therefore constitute a negative signal to outsiders (Booth and Smith, 1986). Also, the fees should be inversely related to the net benefit to the firm since they are an out-of-pocket expense. The predicted fees used here are the fitted results from Section 3.1.

I control for the effect of underwriter reputation in these tests by including underwriter market share as an explanatory variable. Further, I disaggregate actual reputation into a predicted and a surprise component, to control for the possibility that surprises in underwriter reputation drive a significant effect of underwriter type on announcement returns (Duarte-Silva, 2006). To obtain the predicted underwriter reputation component, I run a separate simultaneous model of the supply and demand for certification. In particular, I specify the following system of equations:

$$Fee_i = \alpha_0 + \alpha_1 Reputation_{S_i} + \mathbf{X_i'}\alpha + \epsilon_{S_i} \quad (1)$$

$$Reputation_{D_i} = \beta_0 + \beta_1 Fee_i + \mathbf{Z_i'}\beta + \epsilon_{D_i} \quad (2)$$

$$Reputation_{S_i} = Reputation_{D_i}. \quad (3)$$

For a discussion of the factors included in X_i and Z_i, please refer to Appendix B. From this system, the higher the reputation, the higher the fees charged should be (supply).[43] In addition, the higher the fees,

[42] It may seem obvious to infer that all firms would then have their issues underwritten by an underwriter with which they have a lending relationship. However, besides the fact that it would make an expectation meaningless, the surprise component being used here is the market's surprise, not the firm's. The effect on announcement returns is due to the disclosure of more information about the firm's value, not the choice of underwriter *per se*.

[43] Please refer to Klein and Leffler (1981), Shapiro (1983), and Allen (1984) for theoretical models showing how a higher price obtains as the outcome of the producer's trade-off between long-term and short-run profit, when quality is unobservable ex-ante. Also, the prior literature that theoretically models underwriter compensation (Booth and Smith, 1986, Carter and

the lower the reputation demanded by the firm should be (demand).[44] Then, based on the predicted values from the simultaneous-equations results above, I derive the surprise element in each offer's underwriter reputation. Table 6 presents the results, which are discussed in Appendix B.

— Insert Table 6 about here —

— Insert Table 7 about here —

Table 7 presents regressions of announcement returns on underwriter and firm-issue characteristics. The left column in Panel A shows that not having an issue underwritten by a lending-relationship bank is associated with a negative effect on announcement returns (coefficient of -0.002 with a p-value of 4%). Panel B shows that this effect appears to be driven by the deviation from the predicted probability of using a lending-relationship bank given publicly available firm-issue characteristics. This is consistent with the idea that lending-relationship banks provide better certification, holding other factors such as underwriter reputation constant.[45] In addition, the coefficient on the interaction term between the lending-relationship bank dummy and the ex-ante relative bid-ask spread (coefficient of -0.089 with a p-value of 5% in Panel B) suggests that the certification by lending-relationship banks is stronger among firms that have higher levels of information asymmetry, supporting *H5*. The evidence therefore supports a certification role of lending-relationship banks, not conflicts of interest. Economically speaking, the certification effect amounts to +39 bp on a mean announcement return of -2.7%.[46] Turning to the effect of underwriter market share on the group of lending-relationship banks, I find that market share has a positive effect on underwriters' certification capabilities. The ex-ante level of information asymmetry also has a positive effect on the relation between reputation and announcement returns, as documented in Duarte-Silva (2006). The effect of underwriter reputation on announcement returns seems to occur within lending-relationship banks as well, and is especially more pronounced for opaque firms.[47] The fact that this regression is based on estimates from a first-step regression may raise concerns that this second step's estimation is inefficient or

Manaster, 1990, Chemmanur and Fulghieri, 1994) predicts that higher reputation should drive higher fees.

[44] In most of the previous literature, the price of the underwriter's services is measured by the gross spread, i.e., total fees divided by the size of the offer. That makes sense in the context of evaluating pricing efficiency since in competition the price should be driven by average cost. In this system, however, I analyze the effect of a bank's reputation, and reputation per dollar issued is somehow more difficult to interpret. Therefore, I define price as the dollar value paid by the firm for the issuing service. This measure can be interpreted as the value/ price of an underwriter's reputation built over time. Measuring underwriter compensation this way is also consistent with the theoretical models of Booth and Smith (1986), Carter and Manaster (1990), and Chemmanur and Fulghieri (1994).

[45] Using Ritter's reputation rankings or industry-specific market shares does not change the results.

[46] White's (1980) test does not reject the null hypothesis of homoskedasticity ($Prob > \chi^2 = 0.30$). The Goldfeldt-Quandt (1965) test – separated by the ex-ante relative bid-ask spread – yields the same result. These tests control for the possibility that the results above are driven by heteroskedasticity, i.e., higher standard errors in the firms with higher information asymmetry.

[47] To check for the possibility that the results on the predicted components are driven by multicollinearity with the control variables, I also run these regressions replacing the predicted probabilities and the predicted reputation with their inverses, and doing the opposite for the fees. I find that the predicted components are not significantly related to the announcement return, while the deviations retain their signs and significances.

based on noisy predictions. Pagan (1984) proves that the ordinary least squares estimate of the unexpected component's coefficient is unbiased, giving a correct estimation of its standard error. He also shows that the standard error of the expected component is understated, and thus a correction would only increase the p-value on the expected component relative to the results I present here.

Next, I separate the sample into two parts according to the firm's ex-ante relative bid-ask spread, dropping the middle quintile. The results are consistent with those above: using a lending-relationship bank is associated with a positive effect on announcement returns in the subsample of opaque firms, and with a positive but insignificant effect in the subsample of transparent firms.[48] I also run the announcement returns against the deviations from the predictions, using windows ranging from three to eleven days around the announcement date. The results still hold but gradually lose significance with the widening of the time window, as would be expected.

In summary, the firms' revealed preferences are consistent with value maximization. A lending relationship with an issue's lead underwriter is associated with a positive certification effect. This is especially evident in the impact of the surprise component on announcement returns, since these are associated with nonpublic information.

4.2 Effect of lending relationships on ex-post asymmetric information

Although it is commonly accepted that underwriter certification benefits the firm, the previous literature does not identify the source of such benefits (e.g., Slovin et al., 1990),[49] nor does it provide an explanation of the specific benefits that justify an abnormal announcement return.[50] I argue that the certification benefit is obtained through a reduction in asymmetric information. Chemmanur and Fulghieri (1994) state that underwriter certification lowers outside investors' information asymmetry at the time of an issue. Presumably that effect should not disappear immediately after the issue. Together with Amihud and Mendelson's (1986) evidence of the relation between the bid-ask spread and the cost of capital, the effect of a change in the levels of information asymmetry implies an effect on returns. Therefore, I expect the announcement of the use of a lending-relationship underwriter to be associated with a decrease in the firm's level of asymmetric information. Again, this must be understood under a market efficiency framework: if, for example, the choice of a lending-relationship underwriter were completely predictable, then the certification the underwriter provides should not affect the level of asymmetric information. I also hypothesize that the stronger effect on announcement returns in more opaque firms is due to an increasing

[48] This is not shown for brevity. Using a dummy for whether an issue's firm is in the group of above- or below-median ex-ante average relative bid-ask spread, algebraically approximately the same specification, leads to the same conclusions.

[49] However, the literature shows effects of the choice of underwriter. For example, Drucker and Puri (2005) find evidence that investment banks reduce fees on equity issues if they underwrite the firm's debt as well. Ellis et al. (2000, 2006) show effects of the choice on market making and analyst coverage after an issue.

[50] However, Duarte-Silva (2006) shows a significant reduction in the relative bid-ask spread upon the announcement of an underwriter that is more reputable than expected given publicly available information.

benefit of underwriter certification with respect to the firm's level of information asymmetry. That is, the announcement of the underwriter should have a larger impact on the level of information asymmetry of more opaque firms than that of more transparent firms. More formally:

H6: The change in a firm's level of asymmetric information upon the announcement of an issue is inversely related to the surprise in the use of a lending-relationship underwriter (relative to what would be expected given observable issue and firm characteristics). This effect is stronger the higher the firm's level of asymmetric information.

Finding evidence in favor of *H6* would be consistent with the results in the previous section. To test the above hypothesis, I run a regression of the change in the relative bid-ask spread from before to after the issue announcement using different windows. In Table 8, I present the results using an ex-ante daily average between 12 and 1 months ahead of the offer announcement, and an ex-post daily average in the third month after the issue. I include as explanatory variables the same factors that helped explain the firm-underwriter match in Section 3. Brown and Warner (1985) show that the power of empirical tests of announcement returns depends critically on the correct identification of the announcement date. Therefore, testing this hypothesis has the advantage over the test of *H5* in Section 4.1 of not being affected by potential errors in identifying the date of the information release, while still measuring the benefit to the firm.[51]

— Insert Table 8 about here —

The results indicate that there is a significant decrease in the level of the relative bid-ask spread upon an announcement of an issue being underwritten by a lending-relationship bank. This is especially powerful evidence given the persistence in bid-ask spreads. The interaction term between the ex-ante bid-ask spread and the surprise component of the lending-relationship underwriter announcement is significant at the 5% level, supporting *H6*. This means that if the outsiders' consensus were that a firm would not use a lending-relationship underwriter but, surprisingly, it does, this would cause an 8% decrease in the bid-ask spread relative to the mean ex-ante level of 4.0%. This result offers an explanation of the specific benefit the firm's shareholders observe from certification by an underwriter that has a lending relationship with the firm: a durable reduction in asymmetric information, which translates into a positive impact on announcement returns.[52]

For robustness, I also regress this proxy for the change in the level of asymmetric information against the same factors as before, but dividing the sample into the top and bottom two ex-ante relative bid-ask

[51] Lease et al. (1991) also show that buy-sell order imbalances around a seasoned equity offer induce negative biases on returns. The test performed here avoids this problem.

[52] Once again, I run these regressions replacing the predicted levels with their inverses to check for the possibility of the significance of these variables' coefficient estimates being driven by multicollinearity with the control variables. I find that they are not significantly related to the change in the relative bid-ask spread, while the deviations' coefficient estimates retain their signs and significance.

spread quintiles;[53] the results continue to hold. I also use a dummy for whether an issue's firm is in either of these two quintile groups. Since this is algebraically approximately the same problem, the results do not change significantly. In terms of economic magnitudes, the results imply that within the relatively opaque group, the same surprise component of the lending-relationship underwriter announcement leads to a 13% decrease in the average relative bid-ask spread.

It is possible that the issues underwritten by a lending-relationship underwriter are associated more with a decrease in the level of the bid-ask spread during the period from 12 months before the announcement date. That would imply a miscalculation of the surprise component. Accordingly, I test for this possibility and find that the change in the relative bid-ask spread ahead of the offer is not sensitive to the surprise in the announcement of the existence of a lending relationship with the lead underwriter. Thus, the results above are reinforced by the fact that choosing a narrower ex-ante time interval does not change the results significantly.[54]

4.2.1 Change in the adverse selection component of the bid-ask spread

Notwithstanding the findings above, not all of the bid-ask spread is caused by asymmetric information. The microstructure literature indicates that this spread is driven by several factors, including information asymmetry, inventory costs, the market-maker's risk aversion, and rents from market power.[55] Since the economic test performed in this paper is on the change in information asymmetry, I obtain the adverse selection component of the bid-ask spread and run it against the same factors used before. To do so, I use Lin et al.'s (1995) model based on trade indicators. Like the models of Huang and Stoll (1997) and Madhavan et al. (1997), this model uses the reaction of the transaction price to the arrival of incoming bids or asks to infer the components of the spread. In this test, the change in the adverse selection component is defined as the difference between its ex-post average between (+5,+15) days after the announcement date and the ex-ante average between (-15,-5) days.[56]

— Insert Table 9 about here —

The results in Table 9 provide additional support for *H6*. In particular, they indicate that the existence of a lending relationship is significantly related to a decrease in the adverse selection component of the bid-ask spread, and the statistical significance of the results is about the same as that using the relative bid-ask spread. The economic significance of the existence of a lending-relationship increases from about

[53] Using White's (1980) test, I cannot reject the null hypothesis of homoskedasticity ($Prob > \chi^2 = 0.21$). Together with the Goldfeldt-Quandt test, these results control for potential heteroskedasticity driving the results.

[54] It is possible that the results above with respect to ex-ante levels of information asymmetry are sensitive to the way they are measured. I run the same tests after removing firms with a stock price under \$5 because the results on the relative bid-ask spread might be driven by those firms. All the results still obtain, and thus are omitted for brevity.

[55] For more on this topic, please refer to Coughenor and Shastri (1999) and Madhavan (2000).

[56] This test is run on a subsample ending in 2003 due to data restrictions.

8% to about 14%. This increased economic significance is probably due to the use of a less noisy measure of information asymmetry.

4.2.2 Effect of the change in information asymmetry on announcement returns

The results above show that using a lending-relationship underwriter seems to affect both announcement returns and the change in information asymmetry. However, this evidence does not necessarily imply that the effect on the change in information asymmetry is associated with the effect on announcement returns. To test this relation, I run a Sobel (1982) test on the mediation effect of the change in information asymmetry. Basically, this is a test on the product of the coefficients on both regressions along the hypothesized path of causality: from the use of lending-relationship underwriter to the change in information asymmetry, and then to an effect on announcement returns. I find that such mediation effect is different from zero at the 1% level of significance. This test therefore suggests that the change in information asymmetry due to the use of a lending-relationship bank is significantly related to the issue's announcement return.[57]

4.3 Lifespan of certification effect

Certification is a one-off event and its effect presumably should not last forever. One might ask, therefore, how long is the life of the effect of the surprise use of a lending-relationship underwriter. To address this question, based on the results above I proxy for the certification effect by the reduction in the relative bid-ask spread.

A caveat applies, however. There is usually an agreement between the issuing firm and the underwriter that the underwriter will provide price support services after the offer (Eckbo, Masulis and Norli, 2006). While such services should lead to a decrease in the bid-ask spread, data on such agreements is hard to gather because often there is no formal commitment. Smith (1977) discusses the role of price support for syndicates in the context of seasoned equity issues. He argues that such support should exist for no more than a few days. Ellis et al. (2000) show that three months after a Nasdaq IPO there is scarce evidence of any price support activities by the lead underwriter. In a later paper Ellis et al.'s (2006) findings suggest that market-making activities are not as important in seasoned stock offerings as in IPOs; they report that in practically all offers in their sample, the lead underwriter represents a small part of the daily trading volume.[58] Based on these findings, it is reasonable to conjecture that if the change in the relative bid-ask spread lasts longer than the lengthiest of the periods described above (three months for Nasdaq IPOs, in

[57] Running a two-stage least squares regression in this context would be hampered by collinearity. The standard errors used are obtained through bootstrapping, since the product of two normally distributed variables does not follow a normal distribution.

[58] In fact, Ellis et al. (2006) show that it is unaffiliated market makers (typically, "wholesaler" firms) who do most of the trading before the offer, their percentage of trading volume actually increasing after the offering.

Ellis et al., 2000), then this would suggest the existence of a lending relationship-based certification effect, beyond the effects of price support. Formally:

H7: The effect on the average daily relative bid-ask spread of the surprise use of an underwriter that has a lending relationship with the firm lasts up to three months, after which it returns to levels that are not significantly different from those before the issue's announcement date.

If *H7* is rejected, the life of a typical underwriter certification effect of a lending relationship is established.[59]

Following the previous rationale that more opaque firms should reinforce the effect of underwriter certification on announcement returns and on the change in the level of information asymmetry, I also hypothesize that such a reinforcement effect gradually weakens over time. Formally:

H8: The effect of the firm's level of asymmetric information on the sensitivity of the change in that level to the surprising use of a lending-relationship underwriter diminishes over time.

— Insert Table 10 about here —

Table 10 presents the results of tests of *H7* and *H8*. Here, I show the same regression as in Table 8 but with different ex-post windows. Each row is denoted by m, indicating that the dependent variable's ex-post window corresponds to the m^{th} month after the issue announcement date. The numbers at the top of each column follow the same ordering as the rows in Panel A of Table 8. For example, (2) in the leftmost set of columns corresponds to the interaction term between the lack of a lending relationship and the ex-ante relative bid-ask spread. The results show that the results in Table 8 hold for about four to five months, gradually losing significance (both statistical and economic) over that time. This is lengthier than what would be expected from market support activities, considering (i) such activities should not last more than a few days, (ii) price support is less important in SEOs than in IPOs, and (iii) the documented maximum support provided is three months for Nasdaq IPOs (Ellis et al., 2000). For stocks traded on the NYSE, the specialist acts as the market maker, and hence the underwriter is mostly passive, with its activities limited to block trading or limit orders. Thus, including NYSE stocks should lead to evidence of price support for less than three months. In summary, the evidence seems to reject *H7*. That is, price support activities are not the cause of the reduction in information asymmetry that arises from the use of a lending-relationship underwriter. The strengthening effect of the firm's ex-ante information asymmetry seems to last about the same time, gradually weakening over that period, and thus supporting *H8*.

[59]The previous literature (e.g., Lewellen, 2006) speaks of how more reputable underwriters engage more in price support activities following an IPO, perhaps to protect their reputations. However, a certification effect should be related to a surprise with respect to the anticipated certification of the underwriter, not to the announcement of using an underwriter which certification ability was completely anticipated. Hence, I expect to find no significant relation between the predicted components of the underwriter's attributes and the change in the level of the relative bid-ask spread.

5 Concluding remarks

In this paper, I show that an issue's certification is enhanced by private information obtained in the course of a lending relationship. The private information revealed through the use of a lending-relationship underwriter leads to a decrease in information asymmetry and in turn higher announcement returns. Consistent with the enhanced certification capability of lending-relationship banks, firms show a preference for such underwriters, which in turn allows them to charge higher fees for that benefit. In managing their reputations, lending-relationship banks base their underwriting decisions on the private information they gather about firms, charging relatively lower fees the more favorable the private information about the firm is.

The sample used in this paper is based on seasoned securities offerings since they provide a natural setting to test the effects of the revelation of private information about the firm: presumably they have all public information incorporated into them. In particular, one can observe the intertemporal effect of lending-relationship banks' added certification, on a firm's equity returns or on changes in its level of information asymmetry.[60]

Based on the above analysis, one may wonder whether investment banks can survive in this new environment in which lending relationships are an important factor in winning underwriting deals. Moreover, Yasuda (2005) finds similar results in the debt market, and Rajan (2002) argues that commercial banks can gain business based upon their private information. Drucker and Puri (2005) and Yasuda (2005) suggest that a possible strategy for investment banks is to expand into lending activities. The evidence presented here confirms this argument. In particular, I show that it is the private information obtained in the course of a lending relationship that matters to the underwriter's selection of firms. That is, there are two components to an underwriter's certification ability: a general certification ability component, as measured, for example, by the underwriter's rank or market share, and the component due to the private information it obtains via a lending relationship. Unless investment banks are or become better than commercial banks with respect to the former, they will probably have to expand into the development of lending relationships. This is confirmed by evidence that shows that when a firm does not use its lending-relationship bank, the underwriter used is generally of higher reputation than that bank.

[60] In the equity underwriting front, James and Wier (1990), Hebb (2002), and Schenone (2004) show that IPOs underwritten by relationship banks are less underpriced. However, the underpricing and the choice of underwriter at the time of the IPO raise several issues. For example, Loughran and Ritter (2004) note that IPO firms have put increasingly more weight on analyst coverage, and since the quality of analyst coverage is directly related to the underwriter's rank, those firms possibly accept higher underpricing in exchange for better ensuing coverage. This effect would reverse the traditional relation between IPO underpricing and underwriter quality. On the other hand, the effects of a relationship in a seasoned issue are more clear. Thus, the underwriter certification effect should be stronger in the case of initial public offerings, given that the adverse selection problem is presumably more severe (Chemmanur and Fulghieri, 1994).

Appendix A: Polychotomous choice with selectivity bias

When examining whether underwriting fees are different for firms underwritten by one type of bank or another, there is a self-selection problem: the unobservability of what the fees would have been had the match between firm and underwriter been different. One way to address this problem is to build a structural model of the firm-underwriter match. Lee (1976, 1978, 1979) focuses on the binary form of such a selectivity problem. In the case of $M \geq 2$ alternatives, one can model the problem as $M-1$ binary decision rules with partial observations (Hay, 1980, Dubin and McFadden, 1984), or based on order statistics (Lee, 1983). For tractability, I follow the latter approach, which I describe below. For further details please refer to Lee (1983), or to the empirical applications in Lee and Trost (1984) and Gyourko and Tracy (1988).[61]

Let I be a polychotomous variable with values 1 to M, where $I_i = s$ if category s is chosen by agent i. Underwriting fees, $y_{i,s}$, are observed only if category s is chosen by agent i. Further, $x_{i,s}$ and $z_{i,s}$ are exogenous variables. We have

$$y_{i,s} = x_i\beta_s + u_{i,s} \tag{4}$$

$$I^*_{i,s} = z_i\gamma_s + \eta_{i,s} \tag{5}$$

$$I_i = s \quad \text{iff} \quad z_i\gamma_s - z_i\gamma_j > \eta_{i,j} - \eta_{i,s}, \tag{6}$$

where $s = 1, 2, ..., M$, $i = 1, 2, ..., N$, and $j = 1, 2, ..., M$ $(j \neq s)$.

This formulation can be simplified by writing

$$I_i = s \text{ iff} \quad I^*_{i,s} > Max(I^*_{i,j}). \tag{7}$$

Letting $\epsilon_{i,s} = Max(I^*_{i,s}) - \eta_{i,s}$,

$$I_i = s \text{ iff} \quad \epsilon_{i,s} < z_i\gamma_s. \tag{8}$$

Now, assuming that $\epsilon_{i,s}$ are i.i.d., and with the type I extreme value distribution such that

$$F_{\epsilon_{i,s}}(c) = exp(-exp(-c)), \tag{9}$$

we obtain

$$P(I_i = s) = P(\epsilon_{i,s} < z_i\gamma_s) = F_{\epsilon_{i,s}}(z_i\gamma_s) = \frac{exp(z_i\gamma_s)}{\Sigma_j exp(z_i\gamma_j)} \tag{10}$$

[61] For the differences versus the more commonly known Heckman (1979) procedure, please refer to chapters 2 and 3 in Lee (1976).

and therefore the cumulative distribution of ϵ_s is

$$P(\epsilon_{i,s} < z_i\gamma_s) = \frac{exp(z_i\gamma_s)}{exp(z_i\gamma_s) + \Sigma_j exp(z_i\gamma_j)},\ j = 1, 2, ..., M\ (j \neq s). \tag{11}$$

These steps above allow for an estimation process that is similar to that of the binary model.[62] In particular, with the distribution function of $\epsilon_{i,s}$ and the fact that $y_{i,s}$ is observed only when $\epsilon_{i,s} < z_i\gamma_s$,

$$\epsilon^*_{i,s} = \Phi^{-1}(F_{\epsilon_{i,s}}(z_i\gamma_s)), \tag{12}$$

where Φ is the cumulative distribution function of the standard normal. Note that $\epsilon_{i,s} < z_i\gamma_s$ is equivalent to $\epsilon^*_{i,s} < \Phi^{-1}(F_{\epsilon_{i,s}}(z_i\gamma_s))$. Hence, one can employ a two-step estimation process as follows. First, one obtains a preliminary estimate of γ. Then, substituting $\widehat{\gamma}$ for γ in

$$y_{i,s} = x_i\beta_s - \sigma_s\rho_s\frac{\phi[\Phi^{-1}(F_{\epsilon_{i,s}}(z_i\gamma_s))]}{F_{\epsilon_{i,s}}(z_i\gamma_s)} + \nu_{i,s}, \tag{13}$$

one obtains estimates by ordinary least squares. In Eq. (13), ρ_s is the correlation coefficient between u_s and ϵ^*_s, and σ^2_s is the variance of u_s. Letting $M = 4$, the case considered in Section 3.1 obtains. Note that I use the corrected estimation method by Bourguignon et al. (2001).

[62] Please refer to Lee (1976), chapters 2 and 3.

Appendix B: Supply and demand for underwriter reputation

A. Factors

On the supply side, the underwriter charges higher fees the more reputable it is, but also the higher is the potential for loss of reputation and the risk of legal liability with respect to the specific offer at stake. Therefore, I include the firm's stock volatility (measured by the six-month daily standard deviation of returns) among the supply factors (X_i). I expect this factor to be positively related to the fees charged. I also include the offer size in absolute terms and relative to firm size, given that it requires different levels of effort by the underwriter. To account for the possibility that the underwriter will charge more when it is working at full capacity, I also account for how hot the market is in that specific quarter by measuring the respective quarter's total equity-issuing dollar volume relative to the previous three quarters' volume. In addition, because the costs to the underwriter are possibly affected by the existence of a previous relationship with the firm, I include whether there is a lending relationship between the firm and the underwriter, and whether it is the same underwriter as in the respective firm's previous offer (equity or debt).

On the demand side, the firm and its offer have certain exogenous characteristics (Z_i) that drive its demand for reputation. In particular, underwriter reputation is more valuable the higher the potential for wealth transfer from asymmetric information (Booth and Smith, 1986, and Chemmanur and Fulghieri, 1994). Therefore, the higher the firm's level of asymmetric information, as measured by the relative bid-ask spread, the higher its demand for reputation should be. Also, larger issues offer more arguments for possible adverse selection, and thus should require greater certification ability, and in turn a more reputable bank. For the same reason, the demand for reputation should be less important the larger the firm relative to the offer size. Finally, an existing lending relationship with any bank possibly contributes to firm certification, so I include that as another factor, where a material lending relationship is defined as one that passes the materiality filter and hence is included in the firm's financial statements.

B. Empirical results

On the supply side, the dependent variable is the natural logarithm of the fees paid by the firm. One can see in Table 6 that it is directly related to the underwriter's market share, as predicted. The measure of how hot the market is does not seem to not have a significant effect. The measures related to offer size are significant and of the predicted sign, and a larger offer is associated with higher dollar costs, even relative to the size of the firm. Riskier firms command a premium in fees, as predicted, and a lending relationship seems to lead to lower fees.

On the demand side, the price of reputation is negatively related to the quantity of reputation

demanded, as predicted. A higher relative bid-ask spread ahead of the offer is also associated with a higher underwriter market share, thus, the higher the level of asymmetric information ahead of the offer, the higher the reputation demanded by the firm, also as predicted. Offers that are larger (both in absolute terms and relative to firm size) are associated with a demand for more reputation. Finally, the existence of a material lending relationship is not significantly related to the level of reputation demanded, although its estimated coefficient is of the predicted sign.

The system's likelihood ratio-based pseudo-R^2 is 28%. The median deviation from the predicted market share is about half a percentage point (pp), which is over ten times smaller than the median actual market share.

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