Competing for Securities Underwriting Mandates: Banking Relationships and Analyst Recommendations

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ABSTRACT

We investigate whether analyst behavior influenced banks' likelihood of winning underwriting mandates for a sample of 16,625 U.S. debt and equity offerings in 1993 to 2002. We control for the strength of the issuer's investment banking relationships with potential competitors for the mandate, prior lending relationships, and the endogeneity of analyst behavior and the bank's decision to provide analyst coverage. Although analyst behavior was influenced by economic incentives, we find no evidence that aggressive analyst behavior increased their bank's probability of winning an underwriting mandate. The main determinant of the lead-bank choice is the strength of prior underwriting and lending relationships.

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The U.S. securities industry currently faces perhaps the strongest challenge to its integrity since the Great Depression. Particularly troubling are the allegations that in the late 1990s, investment bank research analysts systematically sacrificed objectivity, and thereby misled the investing public, to attract securities underwriting mandates for their banks. Recent work by Lin and McNichols (1998), Michaely and Womack (1999), and Bradley, Jordan, and Ritter (2003) lends weight to these allegations in the sense that analysts are shown to be more optimistic towards their banks' underwriting clients.

And yet, there is no systematic evidence that analyst behavior influenced their bank's likelihood of attracting an underwriting mandate. Moreover, the 1990s witnessed profound changes in the competitive landscape as commercial banks incrementally shed Glass-Steagall constraints on their ability to compete for securities underwriting mandates. By most accounts, commercial banks exploited their larger capital accounts to win underwriting mandates. Investment banks generally had smaller balance sheets but more reputation capital derived from their long experience with capital market transactions.

Against this background, we investigate directly whether analyst behavior influenced the likelihood of banks being awarded underwriting mandates for a sample of 16,625 U.S. debt and equity offerings sold between December 1993 and June 2002. Although analyst recommendation behavior was influenced by economic incentives, we find no evidence that such behavior favorably influenced whether banks won either debt or equity mandates. Far more important appears to be the strength of the bank's relationship with the issuer as measured by the share of the issuer's past securities offerings (both debt and equity) underwritten by the bank, and to a somewhat lesser extent the strength of prior lending relationships.[1]

Our results do not conflict with well-documented examples of analysts sacrificing their objectivity when under pressure from investment bankers. Rather, our modeling approach captures the analyst's tradeoff between career concerns (which we interpret as the cost of jeopardizing her reputation) and the incentives bankers may have provided analysts to bias their recommendations. Our results confirm that analysts were more aggressive when more potential fee income was at stake. More reputable analysts (measured by *Institutional Investor* "all-star" rankings) and more prestigious banks (measured by

equity underwriting market share during the preceding year) were associated with less aggressive analyst behavior. We interpret these findings as a reflection of the value to an analyst of maintaining her reputation capital and the certification function of investment banks (Chemmanur and Fulghieri (1994)). It is noteworthy, however, that during the dot-com bubble (1999-2000) when the stakes were particularly high, even all-star analysts were more aggressive with their recommendations.

In sum, analyst behavior appears to be aggressive when the potential benefits are large and the potential reputational cost is small. Under the assumption that analysts choose optimally (i.e., endogenously) whether to inflate their recommendations, some of our specifications suggest that aggressive analyst recommendation behavior was counterproductive in the sense that it reduced their banks' chances of winning the underwriting mandate. Interpreting aggressive analyst behavior as liquidation of reputation capital, less reputable investment banks competed more aggressively on this dimension but it was a losing proposition. It is possible that banks were foolish or irrational in their behavior. Alternatively, we think it is plausible that bank and analyst decisions generally were calculated but suffered from enormous uncertainty as the industry restructured during the sample period.

Commercial banks entered the securities underwriting business (and had their greatest competitive impact) in the debt markets.[2] Adverse selection theories of capital structure (e.g., Myers and Majluf (1984) and Nachman and Noe (1994)) suggest "managers will prefer debt to equity financing when they have a substantial amount of private information" (Grinblatt and Titman (1998), p. 652). Such informational frictions create demand for investment bank certification and thus should pose a weaker reputational barrier to entry in underwriting debt offerings. Other things equal, incentives to preserve reputation capital should then be less constraining for banks that specialize in debt underwriting, implying a greater willingness to test the limits of investor credulity. Consistent with this view, we find more aggressive analyst behavior ahead of debt deals than ahead of equity deals, even among established analysts. But investment banks competing aggressively on this dimension fought a losing battle: Commercial banks gained considerable market share at their expense.

In broad terms we believe the evidence favors the interpretation that deregulation of commercial banks coupled with enormous deal flow in the late 1990s upset an equilibrium in which market forces (i.e., reputational concerns) moderated the longstanding conflict of interest between investment banking and research.[3] Interpreting aggressive behavior among analysts (and its subsequent fallout) as liquidation of reputation capital, the evidence suggests that it did not serve banks' interests in the short run and we contend it is therefore not likely to characterize long-run equilibrium in the industry.

Our analysis is complicated by several factors. First, a favorable research report, though surely of value to a potential issuer, is not the only consideration in selecting an underwriter. At the transaction level, such decisions are made within the context of complex banking relationships. Second, we show that bank research coverage decisions are strategic and heavily influenced by past dealings with the issuer. Thus, whether we observe a stock recommendation ahead of a given deal is not random and requires explicit modeling. Third, a large literature documents systematic positive biases in earnings forecasts (Brown, Foster, and Noreen (1985), Stickel (1990), Abarbanell (1991), Dreman and Barry (1995), Chopra (1998), and others), which in part appear driven by career concerns (Hong and Kubik (2003) and Hong, Kubik, and Solomon (2000)). Analyst research is an experience good and thus individual analysts have an incentive to build and maintain a reputation for objectivity and forecast accuracy. The private incentive to protect one's reputation and the quasi rents it confers provide a countervailing force against incentives to sacrifice objectivity (Graham (1999)). In short, there is ample reason to believe that analyst behavior reflects at least in part a tradeoff and so cannot be treated as an exogenous determinant of a bank's chances of winning a mandate.

We address these problems by empirically modeling the bank's coverage decision and analyst behavior under the assumption that each is embedded in a banking relationship that evolves over time. Their joint evolution, in turn, conditions the likelihood that an issuing firm grants an underwriting mandate to a particular bank. We develop this structural econometric model in Section I. We use data from six principal sources (SDC, I/B/E/S, Dealscan, 13f filings, *Institutional Investor* magazine, and

news reports) to estimate the model. Section II describes our data and coding choices in some detail. Our empirical results are in Section III. Section IV concludes.

I. The Empirical Model

A. Economic Structure of the Model

In this section we outline the economic structure of the model and provide an overview of the key variables. We defer precise specification of the variables to subsequent sections.

Our central focus is on the determinants of a bank *j*'s likelihood of receiving an issuing firm *i*'s underwriting mandate at time *t*. The probability model takes the general form

$$Pr(\text{bank } j \text{ leads firm } i\text{'s deal at time } t) = f_L(\text{analyst behavior}, \mathbf{X}_L), \qquad (1)$$

where $\mathbf{X}_L$ is a matrix of explanatory variables. By "analyst behavior" we mean either the level of bank *j*'s analyst's recommendation for firm *i*'s stock, or the change in that recommendation. In either case, we normalize by the recommendation behavior of other banks. Thus, we test whether a bank is more likely to win an underwriting mandate if its analyst provided a relatively bullish recommendation for the issuer's stock, or recently upgraded the issuer's stock more aggressively, than did other banks. We control for the reputation of the bank's analyst, the bank's broader reputation within the debt and equity markets, its lending capacity, and the strength of the bank's relationship with the issuer. Other things equal, we expect a higher probability of success from a more reputable bank that maintains a strong relationship with the issuer. Including proxies for lending relationships enables us to examine allegations that commercial banks successfully tied lending facilities to opportunities for underwriting capital market transactions.[4]

Recent regulatory investigations allege that investment bankers pressured analysts to provide more favorable recommendations for potential issuers. Such pressure could take the form of, among others, promises of large year-end bonuses. However, research is an experience good so analysts have an incentive to build and protect a reputation for meaningful recommendations. Thus, if analysts are self-interested, they should weigh career concerns against any immediate expected payoffs from

cooperation with investment bankers. If so, inference is biased by treating analyst behavior as an exogenous determinant of the bank's probability of attracting an underwriting mandate. We address this "simultaneity" problem by obtaining an instrumental variable or fitted value for analyst behavior from the following model:

$$\text{Analyst behavior at time } t = f_A(\mathbf{X}_A), \tag{2}$$

where $\mathbf{X}_A$ is a matrix of explanatory variables that control for both the expected cost to the analyst of jeopardizing her reputation and the benefit she expects to receive (or equivalently, the amount of pressure investment bankers put on her to bias her recommendation upward). Absent data on bonuses promised to research analysts, we control for the latter with proxies for the bank's expected underwriting profits. We contend that profit opportunities are tied to the strength of the banking relationship with the issuing firm, the issuer's general capacity for generating fee income within this relationship, and the fee potential in the deal at hand. We also control for time-variation in the size of the potential pool of "side payments" bankers might use to gain analyst cooperation, based on changes in market-wide deal flows (such as the "hot" market of the late 1990s).

A bank's relationship with an issuer has potentially competing effects on analyst behavior. On the one hand, a bank and its analyst might sacrifice reputation capital to protect a rent stream associated with a strong relationship. Conversely, if an existing banking relationship presents a barrier to entry, there is less incentive for a reputable bank maintaining a strong relationship with the issuer to offer an aggressive recommendation. Competition via more aggressive analyst recommendations would then be the province of less reputable banks seeking to build relationships with issuing firms; analysts employed by more reputable banks and/or those with more "loyal" clients should face less pressure from investment bankers.

If every sample bank covered every sample issuer at the time of every sample transaction, we could estimate (1) and (2) as a system of two simultaneous equations with the dichotomous dependent variable in equation (1) being the only nonstandard feature (Maddala (1983), pp. 244-245). However,

universal coverage is not a feature of the marketplace, and so we observe analyst behavior – and its effect on lead underwriter choice – only if bank *j* covers firm *i*'s stock at time *t*. Moreover, the selection criterion leading to this sample truncation is likely nonrandom: Given resource scarcity, it is plausible, and indeed likely, that bank research directors are strategic in their coverage decisions. We address this "selectivity" problem by modeling the coverage decision explicitly as

$$Pr(\text{bank } j \text{ covers firm } i \text{ at time } t) = f_C(\mathbf{X}_C), \tag{3}$$

where $\mathbf{X}_C$ is a matrix of explanatory variables that control for the strength of the bank's relationship with the issuer, the bank's reputation, and various characteristics of the issuing firm that might attract coverage. Commercial banks were relatively late entrants to the equity markets and generally provided less equity research during the sample period. Thus, we allow their coverage decision criteria to differ from those of investment banks.

B. Econometric Structure of the Model

If bank *j*'s analyst covers firm *i*, we observe both the probability model for winning the underwriting mandate in equation (1) and the analyst behavior model in equation (2). Otherwise, we do not observe (2) and instead observe only a modified form of (1) that relates the probability of winning the underwriting mandate to the explanatory variables $\mathbf{X}_L$ but not to analyst behavior. Suppressing subscripts for *i*, *j*, and *t,* the econometric model is

Coverage case:

$$\left.\begin{aligned} y_A &= \beta_A \mathbf{X}_A + u_A \\ y_L^* &= \beta_L \mathbf{X}_L + \delta_L y_A + u_L \end{aligned}\right\} \quad \text{if } y_C^* > 0 \tag{4}$$

No-coverage case:

$$\left.\begin{aligned} y_A &= 0 \\ y_L^* &= \beta_{LNC} \mathbf{X}_L + u_{LNC} \end{aligned}\right\} \quad \text{if } y_C^* \le 0, \tag{5}$$

where stars indicate unobserved latent variables whose realizations are observed as binary outcomes.

Specifically, y_L^* is a latent variable measuring the propensity of issuer *i* to hire bank *j* as lead underwriter, observed as $y_L = 1$ if $y_L^* > 0$ and $y_L = 0$ if $y_L^* \leq 0$, and y_C^* is a latent variable measuring bank *j*'s propensity to cover firm *i*'s stock at time *t*, which we observe with realizations

$$\begin{aligned} y_C &= 1 \quad if \quad y_C^* = \beta_C \mathbf{X}_C + u_C > 0 \\ y_C &= 0 \quad if \quad y_C^* \leq 0. \end{aligned} \tag{6}$$

The variable y_A is a continuous, observed variable measuring analyst behavior, and u_k ($k = L, A, C, LNC$) are error terms whose distributions are described shortly.

Although the $\mathbf{X}_L$ matrix in the two lead-bank equations in (4) and (5) remains the same, we do not constrain the two coefficient vectors β_L and β_{LNC} to be equal. This enables us to test the hypothesis that in the absence of coverage and thus of strategic analyst behavior, variables such as prior relationships have a significantly stronger effect on a bank's probability of winning underwriting mandates.

C. Estimation

Equations (4)-(6) form a simultaneous equations system with endogenous switching (Maddala (1983), Ch. 8 and especially sections 8.3, 8.6, and Model 1 on p. 241). The switching criterion is given in (6), which determines whether we observe system (4) or (5). To account for the simultaneity problem, estimation is carried out through the following two-step procedure. Consider first the coverage case ($y_C = 1$). In step 1, we estimate the determinants of analyst behavior in reduced-form, including all variables in $\mathbf{X}_A$ and $\mathbf{X}_L$. The model is recursive (y_L^* depends on y_A, but not vice versa), so it is not strictly necessary to include $\mathbf{X}_L$ when estimating the first-step equation.[5] Since analyst behavior is observed only when there is coverage, we account for the resulting selectivity problem, under which ordinary least squares (OLS) yields biased and inconsistent coefficient estimates, by estimating first-step coefficients using the maximum likelihood (MLE) version of Heckman's (1979) sample selection correction based on equation (6).

Step 2 estimates the determinants of a given bank winning a given underwriting mandate,

replacing the analyst behavior variable y_A with the fitted value $\hat{y}_A$ from step 1. Again, we account for selectivity (truncation) by adjusting the probit likelihood function for truncation bias, $E(u_L \mid y_C = 1) \neq 0$ (see Van de Ven and Van Pragg (1981) for the derivation of the joint likelihood function). If the estimates from step 1 are consistent and the equation system is identified, the second step yields consistent estimates ($\hat{\beta}_L, \hat{\delta}_L$). Identification will be discussed in Section III.B. Since step 2 involves a generated regressor, $\hat{y}_A$, which is estimated with sampling error, the second-step covariance matrix is not consistent. Consistent standard errors are obtained using the procedure derived in Murphy and Topel (1985, Section 5).

In the absence of coverage, $y_A = 0$, and so we simply estimate a single-equation probit model of system (5), again corrected for selectivity (truncation) since $E(u_{LNC} \mid y_C = 0) \neq 0$.

Finally, because our unit of observation is a securities transaction, the model for the probability of a given bank winning an underwriting mandate conditions on information for both the winning bank (or, for co-leads, banks) and the banks that unsuccessfully competed for the mandate. Thus, for each transaction, we construct a data panel containing conditioning information for both winning and nonwinning banks. Estimation is made feasible by restricting the set of nonwinning banks to those that were most "active" over the period as defined in the next section.

II. Data

A. The Sample of Securities Offerings

Between January 1, 1988 and June 30, 2002, Thomson Financial's Securities Data Corporation reports 36,173 debt and equity offerings, after excluding transactions by firms classified as SIC 6000-6999 (financial institutions, etc.) and SIC 9000-9999 (government agencies, etc.).[6] The transactions or "deals" range from IPOs to offerings by seasoned firms, and include both public and private offerings and firms. We use the full sample period to generate a variety of variables, including prior relationships between issuers and banks. The distribution of different types of offerings is reported in Table I. Public

common stock offerings, public nonconvertible debt, and private nonconvertible debt each account for around one-third of the number of sample transactions but public debt dominates in dollar terms.[7]

INSERT TABLE I ABOUT HERE

Many issuers are related, so we form "corporate families" on the basis of SDC's "ultimate parent CUSIP" identifier and account for prior relationships between a given bank and any member of a corporate family. For example, AT&T Corp is the parent of AT&T Wireless, Lucent Technologies, Teligent, etc. Transactions involving any of these "subsidiaries" are grouped under AT&T. When Lucent went public in 1996, we condition the probability of a bank receiving the mandate on the strength of its relationship with the AT&T family in the prior *T* years. The 36,173 deals in 1988 through 2002 involve 15,306 unique firms reflecting 12,470 unique corporate families.

The estimation period for the econometric model is restricted to December 1, 1993 through June 30, 2002, because I/B/E/S tracks analyst recommendations only from Q4 1993. We further exclude a) any family of issuers that never hired one of our sample banks (see below) as a lead manager between 1988 and June 2002, and b) purely foreign families of issuers. The first restriction eliminates small deals managed by small banks. Presumably, our (mostly large) sample banks did not compete for these deals. The second restriction keeps the data collection manageable. This leaves an estimation-period sample of 16,625 transactions, shown in the final two columns of Table I, involving 6,821 unique firms and 5,472 unique corporate families.

B. Sample Underwriters

Estimating a bank's probability of winning the underwriting mandate for a particular offering requires data for both the winning bank and its competitors. We focus on the 16 most active debt and equity lead (or joint lead) underwriters, measured by the nominal proceeds from deals completed during the 2000 to 2002 period.[8] We treat each bank as a potential competitor for each deal in the estimation period

(subject to regulatory constraints described below). Many of the sample banks are the product of mergers (or demergers) and acquisitions during the sample period (see Figure 1). The predecessors of the 16 sample banks also are treated as potential competitors for a deal prior to joining forces with one of the final 16. For example, from the perspective of 1988, there were up to 41 independent sample banks in potential competition for each deal.

INSERT FIGURE 1 ABOUT HERE

Table II reports summary statistics for the 16 sample banks (and their predecessors). We compute bank market shares from 1988 to 2002 by allocating to each bank the proceeds underwritten by its predecessor banks. For example, the $323 billion in total capital underwritten assigned to JP Morgan Chase includes the underwriting mandates granted to JP Morgan, Chase, Chemical Bank, Hambrecht & Quist, and Manufacturers Hanover during the sample period. The top five underwriters (Credit Suisse First Boston, Goldman Sachs, Merrill Lynch, Morgan Stanley, and Salomon Smith Barney) each held at least an 11% market share in the debt and equity markets, accounting in aggregate for 63.5% of the dollar amount of capital raised during the sample period.

INSERT TABLE II ABOUT HERE

Together, the 16 sample banks and their predecessors underwrote $1,181 billion in equity and $2,524 billion in debt (in nominal terms) over the sample period – more than 90% of underwriting activity in either market. Their combined market share ranged from 80.7% in 1988 to 96.4% in 1990, falling below 90% only twice, in 1988 and 1989. Excluding other banks therefore results in little loss of data but achieves significant economies in coding banking relationships and in the probability model estimation.

The sample includes commercial banks whose ability to compete for public offers historically was

restricted by the Glass-Steagall Act. We account for this by treating a commercial bank as capable of competing for a public offering mandate prior to the repeal of the Glass-Steagall Act only if it had a so-called Section 20 subsidiary with Tier II securities underwriting authority granted by the Federal Reserve Board.[9] Figure 1 documents the dates on which sample commercial banks received such approval. Tier II authority was not required for private offers, so we treat every sample bank as being in competition for every private deal. On average, 24.3 banks competed for a given deal.

Recall that we exclude from the sample issuers or families that never hired one of our sample banks as lead manager between 1988 and June 2002. Among the remaining 16,625 mandates, nonsample banks won 2,204 mandates. Thus, nonsample banks enter the sample when they won a deal, but they are not treated as competitors for mandates that they did not win.

C. Prior Investment Banking Relationships

The lag between the 1988 beginning-of-the-sample period and the 1993 beginning-of-the-estimation period provides at least five years of prior data for measuring investment banking relationships. Our main proxy for the strength of an issuer's relationship with a particular bank is the bank's share of the client's previous mandates, coded as follows: For firm i at time t, we determine whether the issuer (or any member of its corporate family) extended an underwriting mandate to bank j or any of j's predecessors (but not j's successors); if so, we accumulate the proceeds from the deals that bank j managed for firm i in the preceding T=1…5 years, and divide by the total raised by the firm to reduce the impact of differences in scale across firms. This measure ranges from zero (no relationship) to one (when the issuer maintained an exclusive banking relationship). It is computed separately for debt and equity deals, and for any sample bank that was a potential competitor for the mandate at time t.

Implementation of the algorithm is complex in cases involving one or more acquisitions. Bank of America (BoA), easily the most complicated in the sample, illustrates the point. In October 1997, BoA acquired Robertson Stephens and, from our perspective, inherited Robertson Stephens' history of relationships with a particular firm i. Their joint history then conditions the probability of BoA

winning any future mandate of firm *i*. In June 1998, Robertson Stephens was sold to BankBoston (which was acquired by Fleet in 1999) in advance of BoA's September 1998 merger with NationsBanc. From this point forward, the mandate history of Robertson Stephens, including those received while owned by BoA, belongs to BankBoston (and then Fleet). But we also assume that the probability of BoA receiving a future mandate is conditional on the Robertson Stephens mandate history up to the time it was sold to BankBoston. This element of "double-counting" reflects our inability to trace precisely the extent to which relationships remain exclusive to Robertson Stephens.[10]

Table III provides summary statistics for our relationship proxy at the maximum five-year horizon used in the econometric model. (The econometric results are somewhat stronger under shorter horizons, indicating greater influence from more "recent" relationships. Our conclusions are qualitatively insensitive to the horizon specification.) Results are reported separately for debt and equity transactions, and are partitioned by whether or not the bank won the underwriting mandate and whether or not it provided research coverage for the issuer at the time of the deal in question. Banks providing research coverage that won equity mandates underwrote on average 46.1% of the issuer's equity proceeds raised during the prior five years. The strength of underwriting relationships appears less important among debt offerings as evidenced by the 25.9% share of debt proceeds underwritten by the average winner of an issuer's debt mandate. In general, winners of a mandate in a particular market (debt or equity) had stronger relationships with the issuer on both debt and equity dimensions.

INSERT TABLE III ABOUT HERE

D. "Paying to Play"

From the late 1980s the largest commercial banks bought or built first debt and then equity underwriting capacity in Section 20 subsidiaries. Throughout the early- and mid-1990s, the securities industry criticized commercial banks for using government-insured deposits to subsidize bids for

underwriting mandates with offers of low-margin lending facilities. By 2001, "paying to play" became commonplace as issuers in both the public debt and equity markets demanded credit lines from banks bidding for underwriting business.

We control for this change in the competitive landscape by constructing a measure of prior lending relationships similar to the underwriting relationship measures outlined in the previous section. Loan data are derived from the Loan Pricing Corporation's (LPC's) DealScan database, excluding non-U.S. borrowers and firms in SIC codes 6000-6999 (financial institutions, etc.) and 9000-9999 (government agencies, etc.). LPC lists 15,273 borrowers between 1988 and June 2002 taking out 49,459 loan facilities totaling $8 trillion. We hand-match 6,701 LPC borrowers by name (LPC's principal firm identifier) to our sample of SDC issuers. These account for 30,068 of the 49,459 loan facilities, or 60.79% by number and 79.92% by loan amount.[11] In the case of syndicated loans, each bank acting in a leading role (i.e., "arranger") is credited with the corresponding fraction of the loan.[12]

As Table III shows, the average winning bank had relatively weak lending relationships with equity issuers, in sharp contrast to the importance of prior equity underwriting relationships. Winning banks providing coverage arranged only 2.4% of the average equity issuer's loans in the prior five years. Among debt issuers, lending relationships are somewhat more concentrated, peaking at 7.6% among winning banks not providing coverage. Not coincidentally, Table III confirms the well-known fact that commercial banks enjoyed considerable success in the debt markets. Of course, prior lending relationships need not proxy solely for "tied" loans. Yasuda (2003) shows that bond issuers that hire their lenders as their underwriter obtain keener prices, suggesting that lenders have greater certification capacity. Schenone (2003) finds similar evidence for IPO firms.

Commercial banks' larger balance sheets almost certainly provided greater capacity for sweetening bids for underwriting mandates by including a loan. We compute each bank's share of the corporate loan market in the calendar year before the deal in question, based on loans arranged, as a proxy for their capacity to sweeten their bids or tie lending to capital market transactions. Descriptive statistics are

reported in Table III. Whether or not they provided coverage, large lenders more often failed in the competition for equity deals while succeeding in competition for debt mandates.

E. Supplemental Relationship Measures

The sample period witnessed a high frequency of bank consolidation and associated disruptions to bank-issuer relationships. We therefore supplement the transactions-based relationship variables with measures of banks holding equity stakes in potential issuers (which might cement relationships), key banker movements (who might take relationships with them as they move to a new bank), and bank mergers (which might cause issuers to reevaluate their investment banking relationships).

Ljungqvist and Wilhelm (2003) document a sharp rise from 18.2% in 1996 to 44% in 2000 in the frequency of banks having equity stakes in firms whose IPOs they underwrite. We measure whether this means of cementing a banking relationship was part of a broader trend by merging our sample of issuers with the Spectrum 13f data on equity stakes held by financial institutions. For each deal, we check whether any sample bank active at that time reported an equity holding in the issuer or its corporate parent as of the quarter-end prior to the deal.[13] Table III indicates a generally high frequency of equity stakes among banks winning underwriting mandates. The exception involves equity transactions prior to which the bank did not provide research coverage. This segment of the sample is dominated by commercial banks that for most of the period were prevented by regulation from holding equity stakes in their clients.

The high degree of mobility among investment bankers creates potential for relationship shocks not captured by transaction-based measures of prior relationships. In general, both theory and casual evidence suggest that client relationships are embodied, perhaps in large part, in individual bankers. [14] Thus, their moves should influence the probability of receiving a mandate faced by both the firm they join and the one from which they defected. We control for this effect by tracking the movement of key bankers or teams of bankers during each quarter in the estimation period. We search electronically through the major business periodicals covered by *Lexis/Nexis* and *Proquest* to identify individuals or teams who most likely played key roles in developing and maintaining client relationships. The bulk of the sample comes

from *Investment Dealers' Digest*, which provides weekly reports of the movements of high profile bankers. In general, we focus on movements by bankers at the rank of managing director (or its equivalent) and above, except in cases in which a less senior banker is part of a team or small group of bankers switching firms. We classify key bankers as equity or debt specialists. The latter classification is more precise in the sense that debt specialists are more typically identified clearly as such. In general, M&A professionals are classified as equity specialists. We exclude cases involving prominent traders, foreign exchange, mortgage-backed securities, and derivatives professionals as well as senior bankers primarily involved in management functions. We also exclude professionals whose primary responsibilities fell outside North America. This search yields a sample of 169 records.[15]

In many instances, reported defections probably understate the potential damage to client relationships. Most bank acquisitions were followed by a substantial degree of movement, although not necessarily at the most senior level, where completion of the deal may have depended on bankers signing commitments preventing them from joining competitors for a fixed period. To avoid not detecting what may be a substantial reordering of banking relationships, we code whether the bank was involved in a merger during the quarter before the sample transaction took place.

F. Bank Reputation

We use prior-year debt and equity market shares to proxy for a bank's reputation for success in securities underwriting (Megginson and Weiss (1991)). Among the summary statistics reported in Table III, two patterns stand out. First, banks that win underwriting mandates are more reputable as evidenced by their higher market shares. Second, this is true whether or not the bank provides research coverage. The differences are particularly large for debt transactions.

G. Analyst Behavior

We measure analyst behavior using data from the I/B/E/S "recommendations" database. I/B/E/S tracks analyst recommendations from October 1993, covering roughly 10,000 firms, 8,000 analysts, and 500 banks. Sample firms are matched to I/B/E/S using the corporate parent's CUSIP if possible and

the issuing firm's CUSIP otherwise. Using this algorithm, 3,499 of the 6,821 sample companies and 2,586 of the 5,472 unique corporate families match firms covered in I/B/E/S. Some matches do not correspond with analyst coverage provided by a sample bank. Among the 16,625 sample deals, 10,787 involve issuers covered by at least one sample bank prior to the deal. Issuers that do not appear in I/B/E/S around their deal dates are treated as not receiving coverage from a sample bank.

Table IV provides descriptive statistics for the deals and issuing firms, according to whether or not they received coverage. For both equity and debt deals, firms receiving research coverage from sample banks are significantly larger (as measured by deal size), more frequent and substantial issuers of securities (as evidenced by their deal histories), more mature (as measured by the time from their IPO), and more frequently exchange-listed. Firms are also more likely to receive research coverage when the bank's analysts already provided broad coverage for the issuer's industry (measured by the fraction of firms in the issuer's Fama-French (1997) industry grouping the bank covered over the three-year window ending in the year of the deal in question).

INSERT TABLE IV ABOUT HERE

I/B/E/S codes recommendations from 1 (strong buy) to 5 (sell).[16] We reverse the ordering so that larger numbers indicate more positive recommendations. New, reiterated, or changed recommendations arrive and are recorded by I/B/E/S irregularly and, compared to earnings forecasts, relatively infrequently. Thus, the most recent recommendation for a given firm by a given bank will not necessarily correspond in time with the most recent recommendation from a competing bank. We resolve the time-matching problem by focusing on recommendations recorded in the 730 days prior to a transaction date. This balances concerns that recommendations by competing banks are relatively close in time with concerns that a narrow window potentially eliminates relevant recommendations. Our results are robust to using a one-year window instead. The average (median) recommendation associated with a particular securities

offering was recorded 270 (229) days before the transaction date.

We construct two proxies for analyst behavior. The first measures bank *j*'s recommendation level relative to consensus (measured as the median recommendation of all other banks covering firm *i* in the 730-day window before *i*'s deal).[17] By construction, relative recommendations lie between –4 and + 4. Positive values correspond to relatively optimistic recommendations.

Recent allegations center not on the level of recommendations but on aggressive upgrades prior to the award of an underwriting mandate. We measure relative recommendation upgrades by calculating for each bank the change between its two most recent recommendations. We require the latest recommendation to be within 275 days (nine months) of the deal date and the penultimate recommendation to be no older than two years.[18] The relative upgrade is then defined as a bank's recommendation change for firm *i* less the median change for other banks. Relative upgrades lie between –8 and +8, with positive values representing relatively aggressive upgrades.

The relative upgrade measure has two potential shortcomings. It is zero for the majority of firms, and thus exhibits less variance than do relative recommendations. Moreover, a bank can provide a relative upgrade but still be relatively less optimistic than another bank identified as providing no upgrade. For example, Goldman's analyst might have rated IBM as a "5" (strong buy) and not altered her opinion before the deal date, while Bear Stearns' analyst might have upgraded IBM from "2" to "3." Bear Stearns would be considered to have upgraded the stock more aggressively than Goldman, even though Goldman's analyst held a higher recommendation level which could not be increased further. We account for this in our relative upgrade models by including a dummy equaling one if the next-to-last recommendation was already a "strong buy," so that a further upgrade would have been impossible.[19] In summary, the relative upgrade measure emphasizes whether the analyst changed her opinion while the relative recommendation measure focuses on the (relative) strength of the analyst's opinion.

Table V shows that by either measure, analysts at winning banks were more aggressive in their recommendations, especially prior to debt deals. These results extend the findings of Michaely and

Womack (1999) and Bradley, Jordan, and Ritter (2003) who show that after underwriting an IPO, underwriter-affiliated analysts are relatively more optimistic. However, the differences between the unconditional means are economically small, and there is no difference between the medians.

INSERT TABLE V ABOUT HERE

Table V also summarizes three controls for reputation-related career concerns. The first is based on buy-side evaluations reflected in the annual *Institutional Investor* analyst rankings. We match these rankings to I/B/E/S records by analyst name. For a deal at time *t*, we define a dummy to equal one if bank *j*'s analyst covering the stock was an all-star (i.e., ranked as a top-three or runner-up analyst in her industry) just prior to making the recommendation. Among equity (debt) deals, 32.7% (41.4%) of winning banks have an all-star analyst covering the issuer versus only 26.3% (34.1%) for losing banks. Second, assuming analyst reputation derives, at least in part, from forecasting ability, we measure forecast accuracy as in Hong and Kubik (2003). Finally, we measure the analyst's seniority as the number of years since she first appeared in the I/B/E/S earnings database. Hong, Kubik, and Solomon (2000) find that analysts are less bold early in their careers. For both equity and debt deals, analysts at winning banks in our sample are significantly more senior on average, though only by a few months.

III. Estimation Results

We report the estimation results in three steps. Section III.A provides a brief summary of the results from estimating the switching criterion given in the coverage equation (6), which determines whether we observe system (4) or system (5). As outlined earlier, in the presence of coverage, we use a two-step procedure to estimate system (4). Step 1 estimates the determinants of analyst behavior adjusted for selectivity due to noncoverage. The identification strategy is outlined in Section III.B and the results for step 1 are reported in Section III.C. Step 2 models the probability of winning the underwriting mandate as a function of the fitted values of analyst behavior obtained in step 1, again adjusted for selectivity. In

the absence of coverage, analyst behavior is unobserved and we estimate system (5) as a single-equation model with truncation. The results for these underwriting mandate probability models are reported in Section III.D.

A. The Bank Coverage Model

Table VI reports results of "stand-alone" probit models of the likelihood that an analyst working for bank *j* covers issuer *i*'s stock ahead of a deal at time *t* (equation (6)), estimated separately for equity and debt transactions.[20] We relate the coverage decision to the strength of the bank's relationship with the issuer, the bank's market share, the breadth of the bank's coverage of the issuer's Fama-French industry, and various characteristics of the issuer that might attract coverage. Each of these explanatory variables is interacted with a dummy variable equal to one for commercial banks, to allow for differences in the coverage decision criteria between commercial and investment banks.

INSERT TABLE VI ABOUT HERE

The explanatory power for both the equity and debt models is substantial as evidenced by the pseudo-R^2 exceeding 33% in each case. Consistent with the univariate results shown in Tables III and IV, we find that a firm's stock is more likely to be covered prior to a capital market transaction, the stronger the relationships between bank and issuer, when the bank's analyst already covers a large fraction of the issuer's sector, and for domestic and exchange-listed firms. For firms about to raise equity, coverage is more likely the more mature they are (measured in log years since the initial public offering of equity), the larger their fee-generating capacity (measured by the size of the fee on the deal relative to the bank's prior-year underwriting fee income and the log of the issuer's equity proceeds raised during the previous five years), and the larger the bank's equity market share. In most cases, the magnitude of these effects is smaller for commercial banks, which, all else equal, were less likely to provide coverage.

In sum, the research coverage models reveal that the coverage decision was heavily influenced by

variables associated with the strength of a bank's relationship with the issuing firm and the issuing firm's capacity for sustaining such relationships via fee-generating transactions. Commercial banks were latecomers to the provision of research by virtue of Glass-Steagall restrictions on their participation in securities markets.

B. Identification and Instrument Strength

Before discussing the analyst behavior and lead-bank results, we outline our identification strategy. Identification requires that the analyst behavior equation include one or more variables not included in the lead bank equation. As is typical in structural estimation, we identify the system using a priori exclusion restrictions on the parameter vector, designed to satisfy the rank and order conditions that are necessary and sufficient for identification. Our selection of instruments is guided by economic considerations. Specifically, we propose a set of instruments that likely affect analyst behavior but for which there is no obvious a priori case that they should affect an issuer's choice of lead manager.

As outlined in Section I.A, controlling for prior underwriting relationships, the analyst behavior equation principally models two forces bearing on the recommendation decision, namely, the analyst's career concerns (which we interpret as the cost of jeopardizing the analyst's reputation) and the amount of pressure the bank puts on the analyst to bias her recommendation. Because the term "pressure" includes economic incentives, we interpret these variables as the benefit potentially accruing to the analyst in return for biasing her recommendation.

Our three proxies for career concerns – the analyst's *Institutional Investor* ranking, seniority, and relative forecast accuracy – might conceivably influence the issuer's choice of underwriter. This would be the case if issuers chose underwriters in part on the basis of the prestige, seniority, and accuracy of the analyst. Therefore, our controls for career concerns are not good instruments a priori, and so are included in both equations.

Our proxies for bank pressure, on the other hand, are not obviously related to underwriter choice a priori. We use a set of five bank pressure proxies as instruments. The ideal instrument would be the

bonuses promised to research analysts in return for inflated recommendations, but such data are not publicly available. Nonetheless, it stands to reason that the size of the bonus pool increases with the bank's expected underwriting profits. Our first instrument is hence the underwriting fee earned by the winning bank on the deal in question relative to each bank's total prior-year underwriting fee income.[21,22] Presumably, banks put more pressure on their analysts when competing for deals that are large relative to their normal underwriting revenue.

Our second instrument captures the idea that more active issuers have greater fee potential and thus attract more competition. We proxy for future issuer activity using the issuer's deal history, measured as the cumulative proceeds over the prior five years. Note that unlike our first instrument, deal history varies only across issuers and not across banks competing for a given deal. Thus, this variable is designed to capture cross-sectional variation in how aggressive analysts as a group are ahead of a given deal.

Third, we argue that a "loyal" client base enables a bank to compete less fiercely and thus have less need to pressure its analysts to win underwriting mandates. We follow Ellis, Michaely, and O'Hara (2004) by constructing a loyalty index which for each bank measures how often it retains its clients in consecutive deals, divided by the number of clients.[23] The large commercial banks, for example, have loyalty indices of around 0.7 in the debt markets, meaning that they retain around 70% of their clients from deal to deal. The loyalty index varies across time and banks, but not across issuers.

Finally, we control for time-variation in the size of the potential pool of "side payments" bankers might use to gain analyst cooperation. We proxy for this using the percentage difference in market-wide proceeds raised during the current quarter and a five-year quarterly moving average, and interact it with the bank's lagged overall market share.[24] This proxy captures "hot" markets such as the one in the late 1990s, during which the rewards for aggressive analyst behavior may have been especially large. Like the loyalty index, these variables vary across time and banks, but not across issuers.

Economically, bank pressure should influence analyst behavior, but there is no obvious a priori reason to expect issuers to choose underwriters on the basis of these five proxies. This is clearly true for an

issuer's five-year deal history, as it does not vary across banks. Similarly, it is hard to see why an issuer would base its choice of underwriter on how much its transaction will increase the bank's fee pool, or on the average loyalty of the bank's client base. Indeed, Baker (1990) shows that issuers differ widely in their preferences over loyalty.

Staiger and Stock (1997) show that having valid instruments is not sufficient to ensure unbiased two-stage estimators in finite samples. The instruments also have to be "strong" in the sense that they correlate strongly with the endogenous first-stage variable. Staiger and Stock recommend a critical value of 10 in an *F*-test for the joint significance of the instruments in the first stage. The *F*-statistics, shown in Table VII, suggest our instruments are strong in all models except the relative recommendation specification in the equity sample. There, the bank pressure proxies are jointly significant in the first stage ($p < 0.001$) but the *F*-statistic of 5.2 indicates that they are weak instruments. This has two consequences: The two-step estimator in the equity sample may not improve on a one-step estimator that treats relative recommendations as exogenous; and, the second-step standard errors for this specification may be imprecise because the Murphy-Topel correction is partly based on the first-step covariance matrix.

INSERT TABLE VII ABOUT HERE

C. The Analyst Behavior Models

Table VII presents estimation results for the analyst behavior model (2) in structural form, for each of the two proxies for analyst behavior. The models are estimated separately for debt and equity deals, and conditioned on the coverage decision using joint MLE. The relative upgrade specifications include a dummy variable equaling one if the penultimate recommendation was already a strong buy, ruling out a further upgrade (the coefficients, which are significantly negative as expected, are not reported).[25]

Consistent with prior evidence regarding IPO underwriters, analysts are relatively more aggressive when their bank has a strong relationship with the issuer. Specifically, relative recommendations are

more aggressive the greater the bank's shares of the issuer's past debt and equity proceeds or commercial loans, and among banks with equity stakes in the issuing firm. The effects are present in both equity and debt transactions and generally are highly statistically significant (see columns 1 and 3).[26]

The relative upgrade proxy reflects recent changes in analyst recommendations. As such, it more nearly captures the idea that banks pressured analysts to position their recommendations to help the bank compete for a specific deal. If banks less closely aligned with the issuer compete for deal flow with more aggressive upgrades, we should observe an attenuation of the positive relation between analyst behavior and the bank-issuer relationship proxies observed in the relative recommendation model. This appears to be the case. For the debt deals shown in column 4, the coefficients associated with the bank's debt underwriting and lending relationships are significantly smaller than in the relative recommendations specification. For the equity deals in column 2, the debt underwriting and lending relationship variables cease to be significant at conventional levels, while the coefficient for equity underwriting relationships turns significantly negative: Underwriters with strong equity ties upgrade their recommendations less aggressively ahead of their clients' equity deals. This may anyway be unnecessary, as their recommendations are already relatively more aggressive.

A strong reputation in the equity market provides a countervailing force to aggressive behavior: Banks with large equity market shares are associated with significantly less aggressive relative recommendations ahead of debt deals. In contrast, large debt market and loan market shares are associated with more aggressive behavior, especially for the debt sample.

In reconciling these apparently conflicting effects, it is useful to recall that equity transactions likely suffer more under the burden of informational frictions and so the intermediary's reputation has a more prominent role in certifying issuer quality. One should therefore expect that banks with strong reputations in the equity markets would be less inclined to liquidate reputation capital via overly aggressive behavior in either market. On the other hand, during the estimation period commercial banks gained substantial market share in the debt markets (in part, entering via the corporate loan market), where an

intermediary's reputation poses a weaker barrier to entry. Their gains came largely at the expense of lower-ranked investment banks. Measuring reputation on the basis of a bank's standing in the equity market, less reputable banks (both commercial and investment) faced weaker countervailing forces to their incentive to compete for debt mandates via more aggressive analyst behavior, other things equal.

Relative upgrades are less aggressive among all-star analysts suggesting that career concerns moderate analysts' incentives to bend to investment bankers' demands. The moderating effect of all-star status is reversed during the 1999 to 2000 period often associated with the "dot-com bubble" when the potential rewards for sacrificing one's reputation might have been greater. More accurate forecasting ability and greater analyst seniority are associated with more aggressive behavior in each debt specification, with much weaker evidence in the equity specifications. Thus, reputation concerns appear to have carried less force for tempering aggressive behavior among analysts prior to debt offerings. This is consistent with the debt markets being the point of entry for commercial banks and non-bulge-bracket investment banks (i.e., those with small equity market shares) responding to competitive pressure in this market segment by liquidating reputation capital.

Our proxies for bank pressure behave as expected. Analysts are consistently more aggressive ahead of deals carrying fees that are large relative to their bank's prior-year fee income. Similarly, more active issuers attract more aggressive recommendations and upgrades, consistent with analysts being pressured more when more potential fee income is at stake. Analysts employed at banks whose clients are more loyal issue less aggressive recommendations and upgrades, while an increase in market-wide issuance activity relative to trend is associated with more aggressive behavior.

D. The Determinants of the Probability of Winning an Underwriting Mandate

Having estimated the bank coverage and analyst behavior equations, we now condition the probability of a bank winning an underwriting mandate on its potentially strategic decision regarding whether to cover the issuing firm, and if so, on its analyst's behavior.

Equity Transactions

Table VIII summarizes the results from estimating the underwriting mandate model for equity transactions. Conditional on a bank providing research coverage, there are two specifications in the table, one for each measure of analyst behavior. These correspond to system (4) in Section I. In addition, we estimate the likelihood of winning a deal in the absence of coverage (i.e., system (5)).

INSERT TABLE VIII ABOUT HERE

Strikingly, among equity deals, aggressive relative upgrades reduce a bank's chances of winning an underwriting mandate (p = 0.001). This finding runs counter to the spirit of previous research and the arguments embodied in recent allegations.[27] Interpreting aggressive upgrades as liquidation of reputation capital, this strategy appears ineffective in the case of equity offerings in which reputation is viewed as more central to successful placement: Banks pressed to compete on this dimension fought a losing battle.

The coefficient estimated for the relative recommendation measure, though not significant, also is not positive. Recall, however, that our instruments for this specification are weak, which may bias the Murphy-Topel standard errors upwards and possibly causes the two-step estimator to fail to improve on a simple one-step estimator treating relative recommendations as exogenous. In other words, in the absence of stronger instruments, it is unclear what effect aggressive recommendations have on a bank's likelihood of winning an equity mandate.

If aggressive analyst behavior does not attract equity mandates, what does? The strength of the bank-issuer relationship (measured as the bank's shares of the issuer's prior equity or debt issuance and borrowing) strongly increases the likelihood of the bank winning the issuer's current underwriting mandate. Judging from the magnitude of the coefficients,[28] relationships derived from prior equity deals influence the choice of equity underwriter more than those based on prior debt deals. The fact that lending relationships help win equity mandates is consistent with allegations that commercial banks attempted to tie lending capacity to securities underwriting.[29]

The coefficients for the bank's market share in the prior year suggest that a strong reputation in the equity market at large increases the likelihood of winning a mandate, regardless of whether the bank provides coverage for the issuing firm. By contrast, a strong position in the debt markets has no bearing on competition for equity deals. We interpret this as evidence of a degree of bank specialization in either debt or equity. Large lenders – effectively, commercial banks – were less likely to win equity mandates. Thus, while having a lending relationship helps, just being a large lender does not.

Mergers among banks and movements of key bankers have little effect on the likelihood of winning an equity mandate, except in the absence of coverage, where merging with another bank or hiring bankers from another bank increased, and losing bankers decreased, the chances of winning an equity mandate.

Finally, having an all-star or a more senior analyst provide research coverage for the issuing firm significantly increases a bank's likelihood of winning an equity mandate.

Debt Transactions

The results for debt transactions mirror those for equity deals. Table IX reveals that more aggressive stock recommendation upgrades significantly decreased the likelihood of winning debt underwriting mandates (p = 0.024), while aggressive recommendation levels also did not help a bank's chances of winning a debt mandate (p = 0.014).

INSERT TABLE IX ABOUT HERE

As with equity deals, prior relationships strongly influence an issuer's choice of debt underwriter. This is true for both debt and equity underwriting relationships, though relationships derived from having underwritten an issuer's prior debt offerings are most effective. This is consistent with specialization and mirrors the results for the equity sample. Lending relationships also help win debt mandates.

In the absence of coverage, and in contrast to the equity results, owning an equity stake in the issuing firm had a significantly negative effect on the likelihood of winning debt mandates. Commercial

banks and non-bulge-bracket investment banks account for the bulk of the cases in which no research coverage was provided. Commercial banks were prohibited from holding equity stakes during the first half of the estimation period. Moreover, commercial banks gained substantial debt market share largely at the expense of non-bulge-bracket investment banks (at least through 1998). Thus, we favor the interpretation that in the absence of coverage, lending relationships dominated any positive relationship effects associated with equity ownership. As a consequence, we observe a negative relation between bank equity stakes (mostly held by investment banks) and the likelihood of winning a debt mandate in the absence of coverage. Regardless of this interpretation, commercial banks appear to have gained leverage in the debt markets via their lending capacity.

The coefficients associated with a bank's debt and equity market share during the calendar year preceding a transaction provide further evidence of bank specialization. Banks with larger debt market shares were more likely to win subsequent debt mandates, similar to the direct effect of equity market share on the likelihood of winning subsequent equity mandates. By contrast, banks with larger equity market shares were less likely to win debt underwriting mandates, other things equal. (Recall that debt market share had no effect on the likelihood of winning an equity mandate.) We conjecture that the negative effect of equity market share in the present context reflects, at least in part, competitive pressure from commercial banks. Commercial banks generally had modest equity market share during the sample period but were rapidly gaining debt market share.

We also find that a larger share of the corporate loan market increased a bank's probability of winning debt underwriting mandates. This result is consistent with the argument that competitive pressure from the "pay-to-play" movement initiated by commercial banks had its greatest impact in the debt markets. Both the analyst behavior coefficients and the large gains in debt market share among commercial banks even in the early part of the 1990s suggest that liquidation of reputation capital was not an effective competitive response, at least not across the entire estimation period. In the next section, we examine whether the effectiveness of this competitive strategy changed over time.

Mergers have a positive effect on winning debt mandates, though this is significant only in the upgrade specification. Movements of key bankers, on the other hand, which often coincided with mergers, have a more consistent effect: A bank's chances of winning a mandate were higher when it had recently poached debt professionals from other banks. This suggests that relationships are embodied in key people.

Interestingly, having an all-star analyst covering the issuer's stock had a negative effect on whether the analyst's bank was awarded the debt underwriting mandate. This is consistent with commercial banks – which employ fewer all-stars – successfully competing for debt deals. All else equal, however, issuers were more likely to choose banks employing more senior and, to some extent, more accurate analysts.

Differences Across Time

We now examine whether the effectiveness of competing for underwriting mandates by means of inflated analyst recommendations changed over time. To this end, we split the estimation period into 1993 through 1997 and 1998 through June 2002. The end of the first subperiod corresponds roughly with the de facto repeal of the Glass-Steagall Act revealed by the approval of Citicorp's acquisition of Salomon Smith Barney in 1998. The beginning of the second subperiod coincides with the dot-com bubble, with which allegations of analyst misbehavior primarily are associated. We estimate the full model discussed previously but to conserve space, Table X suppresses all but the analyst-behavior coefficients. The remainder of the model is quite stable across the subperiods and so we simply highlight instances in which partitioning the data leads to qualitative changes in our interpretation of the results.

INSERT TABLE X ABOUT HERE

For the equity sample, we find no evidence that analyst behavior positively influenced the likelihood of winning equity underwriting mandates, even after 1997.[30] The main changes over time concern the increasing importance of highly rated analysts and the (relatively) decreasing importance of prior lending relationships (which go from being three times more effective than debt relationships and nearly as

effective as equity relationships to being the least important source of a bank's relationship benefits).

The picture is similar for debt deals in that we find no evidence that analyst behavior positively influenced the likelihood of winning debt underwriting mandates. The counterproductive effect of aggressive analyst behavior is, in fact, concentrated in the post-1997 period, when commercial banks had established a dominant presence in debt underwriting. The negative signs estimated for both relative recommendations and relative upgrades for that period suggest that incumbent (investment) banks reacted, unsuccessfully, to competition from commercial banks by liquidating reputation capital.

There are three additional significant differences across the two time periods. In contrast to the equity model, the presence of an all-star analyst – typically employed at an investment bank – reduced the likelihood of winning debt mandates during the post-1997 period. Second, large lenders were significantly less likely to win debt mandates pre-1997 but more likely in the post-1997 period. Both of these results are indicative of the successful inroads commercial banks made into the debt markets. Third, holding an equity stake in the issuer helped the bank win the mandate only in the pre-1998 period. A natural interpretation of this finding is that by 1998, the easing of restrictions on holding equity stakes helped level the playing field between investment banks and commercial banks.

Controlling for the Exclusivity of Relationships

It is possible that over our sample period, the majority of issuers maintained relatively exclusive relationships that were not seriously open to competition. We explore whether this possibility influences our findings by interacting the analyst behavior proxies with two measures of the likelihood that a mandate truly is up for grabs.[31]

The first measure is a dummy for firms maintaining relatively weak underwriting relationships. For each of the 5,908 equity deals and 10,717 debt deals in the sample, the dummy variable equals one if during the prior five years no bank competing for the deal underwrote 25% or more of the issuer's prior equity or debt offerings, respectively. In other words, the issuer maintained relationships with at least

five banks. This measure classifies 59.2% of equity issuers and 31.8% of debt issuers as not maintaining exclusive relationships. The second measure attempts to capture a firm's "switching propensity" by estimating probits (separately in the equity and debt samples) for generating the predicted likelihood that a firm will hire a different bank than the one it used in its previous deal. The probits are conditioned on the firm's maturity (log years since IPO), the dummy for firms maintaining relatively weak relationships, the log size of the current deal, and (for debt deals) a dummy for high-yield bond offers. Firms are more likely to switch the more mature they are and if they have weaker relationships. Equity issuers are more likely to switch the larger the current deal, while the reverse is true for debt issuers. Issuers of high-yield bonds are more likely to switch underwriters.

The results using these interactions for the strength of the underwriting relationship are reported in Panels B and C of Table X, respectively. As in the subperiod analysis, we report only the coefficients of interest. In Panel B, more aggressive analyst behavior generally is associated with a significantly lower likelihood of the bank winning the mandate when the issuer maintains relatively weak relationships. Relatively aggressive recommendations ahead of equity or debt deals and aggressive upgrades ahead of debt deals have a significantly detrimental effect on a bank's chances of winning a mandate when the issuer maintains weak relationships. The only exception involves aggressive upgrades ahead of equity deals, where the negative effect on a bank's chances of winning the mandate is neutralized in the presence of a weak relationship.

Similar results obtain when we interact the analyst behavior variables with our measure of switching propensity. The more prone an issuer is to switching underwriters, the less the bank benefits from aggressive analyst behavior. The exception again is aggressive upgrades ahead of equity deals, which neutralize the otherwise harmful effect of such behavior.

These results suggest that competing for mandates that were more likely to be up for grabs by aggressively liquidating reputation capital was counterproductive. Presumably it was the more desperate banks that resorted to such tactics.

IV. Conclusion

We examine 16,625 U.S. debt and equity offerings completed between December 1993 and June 2002 for evidence that sell-side analyst behavior influenced the issuer's choice of bank to underwrite its offering. This is precisely the motivation suggested by recent allegations that analysts misrepresented their beliefs about potential issuers under pressure from investment bankers competing for underwriting mandates. Our findings provide little support for this argument but, perhaps more importantly, they draw attention to the complexity of the situation and some unique features of the sample period.[32]

Issuing recommendations that were aggressive relative to consensus had no beneficial effect on a bank's chances of winning either debt or equity underwriting mandates. In general, the state of bank-issuer relationships and the bank's reputation had far more influence over the outcome of competition for mandates. Furthermore, aggressively upgrading the issuing company's stock recommendation had, if anything, a detrimental effect on the bank's chances of winning.

Our findings may strike some readers as surprising if not implausible in the light of recent regulatory investigations leading to the so called "global settlement" restricting the role of analysts in pitching for investment banking business. However, there is a straightforward economic argument consistent with the negative relation between aggressive analyst behavior and the likelihood of winning equity mandates. Equity transactions are subject to significant information frictions that are best resolved by a credible intermediary. If overly aggressive recommendations undermine credibility, they will compromise a bank's capacity for resolving information frictions. Realizing this, issuing companies choose banks that refrain from biasing their research. Of course, this does not explain why some banks nevertheless pursued such a strategy. It is possible that banks knew they stood little chance of being selected as lead manager in the absence of a prior relationship with the issuer, but nevertheless pressured their analysts into making aggressive recommendations in the hope of being included in the underwriting syndicate.

Theory also suggests that the information frictions that make credibility so important for equity underwriting are less severe in debt offerings. Consistent with this, we find evidence that reputation

concerns carried less force for tempering aggressive behavior among analysts prior to debt offerings.

Both banks and individual analysts have incentives to build and preserve reputations for accuracy and honesty in their research. We find evidence of this moderating force at work in the data. This should not be surprising given the industry's heavy dependence on reputation for carrying out underwriting functions and the longstanding nature of the conflict of interest between investment banking and sell-side research. In view of calls for heavier regulation or even separation of research from investment banking, one might ask whether the fundamentals of securities underwriting have changed. We contend that preservation rather than aggressive liquidation of reputation capital will more likely characterize equilibrium behavior in the industry for the foreseeable future. It does not follow that our findings absolve analysts and their banks from any alleged misconduct.

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Endnotes

[1] There is a substantial literature on commercial bank lending relationships (e.g., Boot and Thakor (2000), Diamond (1991), Petersen and Rajan (1994, 1995)). There is much less theory to guide an empirical analysis of investment banking relationships (however, see Anand and Galetovic (2002) and Fernando, Gatchev, and Spindt (2003)).

[2] Gande, Puri, and Saunders (1999) find that commercial bank entry is associated with a decline in debt underwriting spreads but not in equity underwriting spreads. The effect is strongest among lower-rated and smaller debt issues. Gande et al. (1997) provide evidence that commercial banks brought a larger proportion of small debt offerings to market during the January 1993 to March 1995 period and that more reputable banks (evidenced by market share) obtain lower yields for borrowers. Similarly, Livingston and Miller (2000) report slightly lower gross spreads and lower yields obtained by more reputable banks. After the first quarter of 1997, when the Federal Reserve Board relaxed constraints on cross-marketing and information flows between commercial banks and their "Section 20" affiliates, Roten and Mullineaux (2002) find little evidence that commercial banks and investment banks differed in their underwriting performance.

[3] In a similar spirit, Kroszner and Rajan (1994) challenge claims regarding the effects of conflicts of interest offered as a rationale for the adoption of the Glass-Steagall Act.

[4] Because we cannot observe the fees quoted by banks that subsequently fail to win an underwriting mandate, we do not attempt to control for price competition. However, it is well known that cross-sectional variation in percentage fees paid is minimal, at least for equity deals.

[5] In principle, y_L^* and y_A could be jointly determined if the analyst's expectation of her bank winning the mandate influences her willingness to jeopardize her reputation by inflating the issuer's stock recommendation. Empirically, we find a negative relation between y_A and $E(y_L^*)$, but this is not statistically significant. We thus focus on the recursive model outlined here.

[6] Our results are qualitatively unchanged if we also exclude regulated industries (SIC 4000-4999).

[7] Our results are qualitatively unchanged if we restrict estimation to public nonconvertible debt and common stock offerings.

[8] We exclude Bank One (whose debt market share places it above some of our sample banks) for lack of equity analysts.

[9] In some instances debt and equity approval were granted at different times.

[10] In June 1997, NationsBanc acquired Montgomery Securities. Thus, in addition to "inheriting" relationships via its short-lived ownership of Robertson Stephens, BoA inherited relationships from Montgomery and NationsBanc at the time of the merger. On September 21, 1998, in the wake of the merger, Montgomery's founder, Thomas Weisel, resigned from Montgomery, founded Thomas Weisel Partners, and subsequently raided a large fraction of Montgomery's banking professionals. Relationships held by Montgomery prior to Weisel's resignation are coded as being inherited by Weisel Partners, but similar to the double-counting in the Robertson Stephens case, we also count them as being held by BoA.

[11] Of the remaining 8,572 borrowers not matched to SDC, 1,678 can be matched to the CRSP master tape, so we can definitively rule out that they are in SDC (since we can merge SDC and CRSP without a problem). This leaves unmatched 6,894 borrowers taking out 14,344 loans for $1.3 trillion (16.25% of the total). It is possible that some of these are in fact in SDC, but given the above numbers, we are confident that we have captured the vast majority of lending activity.

[12] Yasuda (2003) shows that lending relationships are strongest at the "arranger" level, though widening the scope to include "lead managers" leaves her results unaffected.

[13] The Spectrum 13f data of institutional holdings are filed with the SEC on a quarterly basis. We match the names of filers to our sample banks using, as necessary, *Nelson's Directory of Investment Managers*. We thank Edie Hotchkiss for help in performing the match.

[14] See Anand and Galetovic (2000) for a discussion of competition among investment banks when client

relationships are embodied in key employees and are therefore nonexcludable.

[15] Some records involve a defection from one sample bank to another, so the number of independent records is much smaller. As one might expect, banker defections cluster for two reasons, namely, an acquisition or a high level of market activity in the banker's area of specialization. When several key bankers defect in close proximity to one another, existing relationships are more likely to suffer. When bankers actually move as teams to a competitor, it is more likely that an existing relationship survived and moved with them. When it was stated explicitly that bankers moved as a team, we code their movement separately as a team movement. Our estimation results are robust to focusing only on team movements.

[16] Strong buys account for 25% of recommendations; 36% are buy recommendations, 37% are hold recommendations, 1.4% are underperform recommendations, and 0.6% are sell recommendations.

[17] We subtract the consensus because Bradshaw, Richardson, and Sloan (2003) document that the analyst consensus moves up ahead of issuance and down ahead of stock repurchases. Our results are robust to the following alternative ways to measure the consensus: Subtracting the mean recommendation; defining the peer group to include only sample banks (rather than all banks); or, taking as the consensus the recommendations of brokers that do not underwrite securities (such as Sanford Bernstein).

[18] If the analyst does not issue a new recommendation in the 275 days before the deal, we assume the prior recommendation still stands, implying a zero upgrade. If the analyst's first recommendation occurs in the 275 days prior to the deal (i.e., initiation of coverage), we assume that the bank previously was neutral toward the issuer (recommendation level 3) and measure the difference between the recommendation at coverage initiation and the assumed neutral prior recommendation. Our results are robust to excluding banks with fewer than two recommendations or, in cases in which coverage is being initiated, using the median rating among competitors rather than a "hold" rating as the basis for relative comparison.

[19] This does not drive our results (see footnote 25 below). Alternatively, it is straightforward to show that a composite measure that adds *relative recommendations* to *relative upgrades* serves to control for the starting level of recommendations. In our example, this composite measure would identify Goldman's analyst as more aggressive than Bear Stearns'. Using this composite measure, we find qualitatively identical results (available on request).

[20] "Stand-alone" means that the coefficients are not those obtained from joint MLE of one of the systems that includes the coverage equation. With two measures of analyst behavior and two selectivity-adjusted equations (in step 1 and 2), we estimate four sets of coverage parameters for each of the debt and equity samples. Instead of reporting all eight sets of coefficients, we report the stand-alone coefficients for the coverage equation. There are slight differences among these parameter estimates and between these and the stand-alone probit estimates. None of our conclusions are sensitive to this reporting convention.

[21] In some cases, SDC does not report the underwriting fee. Missing fee information is filled in using a regression of underwriting spreads on deal size in levels and logs (reflecting nonlinear scale economies), as well as (for debt deals) credit ratings, shelf registration status, industry effects, prior issue experience, and the maturity of the bond. The results are not sensitive to alternative approaches, such as assuming all missing SEO fees equal 5% and all missing debt fees equal 1%.

[22] For new entrants, prior-year fee revenue is often small or even zero. To avoid generating extreme outliers, we measure the relative underwriting fee as $-ln$(1+lagged fee revenue/fee on deal). The minus sign ensures that a larger value for this variable means a more attractive deal worth competing hard for.

[23] Define $I_{c,i} = 1$ if bank j managed issuer i's penultimate deal in the five years to the quarter before time t, and zero otherwise. Define $I_{r,i} = 1$ if bank j managed issuer i's most recent deal in the same window, and zero otherwise. Then the loyalty index for bank j in month t equals $\Sigma_i I_{c,i} I_{r,i} / \Sigma_i I_{c,i}$, that is, the number of retained clients over the total number of clients.

[24] Our results are robust to using shorter windows and to defining the variable separately for equity and debt deals.

[25] As a robustness check, we repeat our analysis on a subsample that drops all cases in which the next-to-last recommendation was a strong buy, so that the relative upgrade specification no longer requires inclusion of the dummy. All results are qualitatively unaffected.

[26] Banks generally are thought to act as intermediaries in securities offerings, balancing the competing interests of issuers and institutional investors. One might expect banks to favor one side or the other locally as they compete for new business opportunities, but not globally, in equilibrium. Thus, the apparent tendency for banks to issue more aggressive recommendations for firms with which they already have strong relationships begs further consideration. If institutional investors do not take such behavior particularly seriously or any negative consequences can be offset by other means, then perhaps this is a relatively low-cost form of nonprice competition of the sort envisioned by Anand and Galetovic (2002). Alternatively, it might reflect banks colluding with issuers against investors during our estimation period. Distinguishing between these and other potential explanations requires additional modeling to incorporate the relationship between banks and institutional investors.

[27] It also illustrates the importance of accounting for sample truncation and the endogeneity of analyst behavior arising from their career concerns. Had we treated analyst behavior as exogenous, the sign on the coefficient for relative upgrades would have flipped to become positive. However, a formal Smith-Blundell (1986) test rejects the null hypothesis that analyst behavior is exogenous with respect to the lead bank choice in our data ($p < 0.0001$).

[28] This being a probit with sample selection correction, the error variance has been normalized to one, so we cannot measure the economic magnitudes corresponding to the estimated coefficients. We can, however, make statements about the relative size of the coefficients.

[29] Drucker and Puri (2004) find that discounting loans increases the likelihood of winning SEO underwriting mandates.

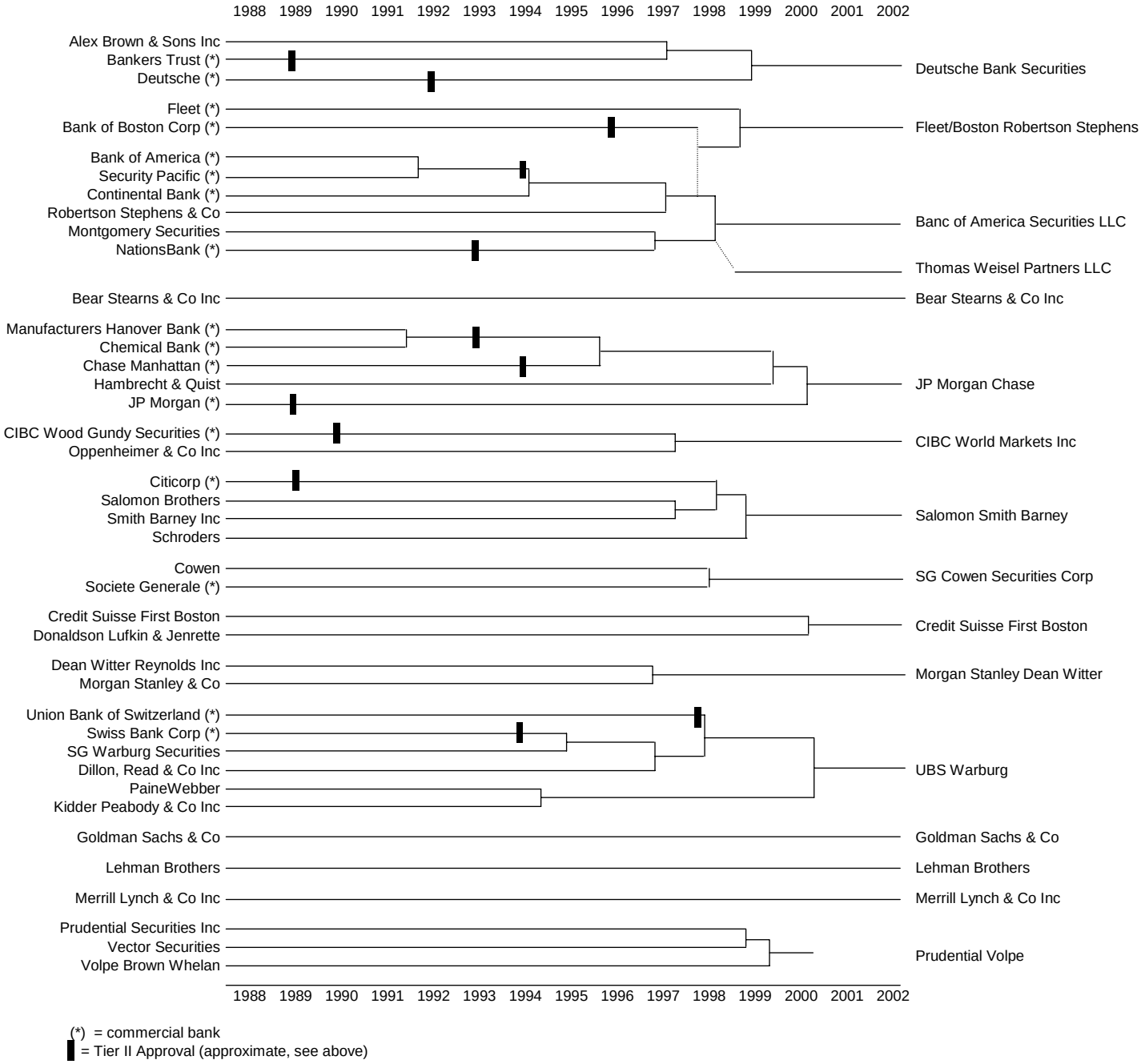
[30] To gain further insight, we interact the analyst behavior instruments with a dummy equaling one for deals completed during the bubble years (1999 and 2000), but find no evidence that analyst behavior had a differential effect on issuers' choices during that period (not shown in the table).

[31] We thank Francesca Cornelli and Raghu Rajan for suggesting this analysis.

[32] Relative to existing research, our research design de-emphasizes the initial public offering by examining all capital market transactions by an issuer during the sample period. From a theoretical perspective, we contend that an issuer's transactions with a bank should not be treated as independent events. Our evidence is consistent with this argument. From a practical perspective, relatively few firms attract analyst research coverage prior to their IPO and thus most IPOs are classified as no-coverage cases in our sample. The exception is carve-outs by parents whose stocks are already covered. In this sub-sample, we still find that aggressive analyst behavior failed to help banks win business. We note, however, that anecdotal evidence suggests that banks and their analysts competed for IPO underwriting mandates by making (nonbinding) commitments to provide favorable research coverage. The finding by Cliff and Denis (2003) that firms are more likely to switch underwriters when they receive less coverage than expected is consistent with punishment for violation of such implicit contracts.

Figure 1. Principal Bank Mergers, 1988-2002

The figure presents a time line of the principal merger and acquisition events involving sample banks over the period 1988 to June 2002. A vertical line indicates a merger of two banks. A dashed line indicates a sale or split-off of a bank. For estimation purposes, the sample includes all banks active as of June 2002 (see the right-hand side legend) as well as their predecessor banks. These are the banks considered in competition for a given deal at a given point in time, as long as they held Tier II authority to underwrite securities at that time. There is one exception. The two boutique investment banks acquired by Prudential Securities, Vector Securities and Volpe Brown Whelan, are not considered in competition for any deals due to their specialized nature and small size. Prudential withdrew from underwriting in Q4 2000. Following a merger, the new entity "inherits" the relationships of its predecessors. Following a sale or a split-off, the new entities inherit the relationships previously developed by the joint entity. We consider a bank merged on the first day of the month following the completion of the merger. From that day on, it competes in its merged form. Tier II authority involves separate approval for debt and equity underwriting. The approval dates (debt, equity) used for the sample commercial banks are as follows: BA Securities (10/11/94, 10/11/94), BT Securities (1/1/93, 1/15/91), BankBoston (11/1/96, 11/1/96), CIBC Wood Gundy Securities (6/30/90, 1/15/91), Chase Securities (7/26/89, 6/15/94), Chemical Securities (6/30/93, -), Deutsche Bank (12/1/92, 12/1/92), JP Morgan Securities (1/1/89, 1/1/90), NationsBank (7/26/93, 7/26/93), SBC (1/3/95, -), UBS Securities (debt underwriting grandfathered throughout sample period, equity: 1/1/95), and Citicorp (7/26/89, expected to receive equity approval as of 3/27/95 but not clear if received prior to merger with Traveler's).



(*) = commercial bank
▌= Tier II Approval (approximate, see above)

Table I.
The Sample of Capital-Raising Transactions

The total sample includes the universe of 36,173 capital-raising transactions between January 1, 1988 and June 30, 2002 reported by Securities Data Corporation excluding transactions by issuers classified as SIC 6000-6999 (financial institutions, etc.) and SIC 9000-9999 (government agencies, etc.). We use this sample to generate a variety of variables, including prior relationships between issuers and banks. Many issuers are related to each other so we form "corporate families" on the basis of SDC's "ultimate parent CUSIP" identifier. I/B/E/S data is available only from late 1993, so for the estimation of our econometric model we focus on a subsample of deals carried out between December 1, 1993 and June 30, 2002. We also exclude a) any issuer or family of issuers that never hired any of our "sample banks" for a capital-raising transaction between 1988 and June 2002 (sample banks are identified in Table II and Figure 1), and b) purely foreign issuers or families of issuers (though we do include corporate families that have at least one U.S. member). The resulting estimation-period subsample is shown in the final two columns.

		1988-June 2002		Estimation period (December 1993-June 2002)	
		No. of deals	Amount raised ($m, nominal)	No. of deals	Amount raised ($m, nominal)
Equity:					
	Common stock	10,945	1,230,040	5,229	745,117
	Private common	1,981	68,305	679	29,051
Debt:					
	Nonconvertible debt	10,638	1,836,942	6,565	1,155,397
	Convertible debt	533	111,231	220	72,886
	Private nonconvertible debt	9,510	557,167	2,714	152,233
	Private convertible debt	280	8,538	102	5,398
	Nonconvertible preferred	555	73,402	217	35,357
	Convertible preferred	309	68,762	142	49,306
	Private nonconvertible preferred	555	21,414	233	8,626
	Private convertible preferred	867	36,600	524	26,435
All deals		36,173	4,012,401	16,625	2,279,807

Table II.
The Bank Sample

The table summarizes the market shares captured by the 16 sample banks for the 36,173 sample transactions completed during the January 1, 1988 through June 30, 2002 sample period. The bank sample comprises the 16 most active underwriters judged by proceeds raised in both debt and equity offerings during 2000 through 2002. Market share is determined by assigning to the lead underwriter 100% of the nominal amount raised. (When there are co-leaders in a transaction, they share equally for the purposes of calculating market share). Many of the 16 banks represent the outcome of one or more mergers or acquisitions during the sample period. In such cases, the surviving bank listed below "inherits" the market share of its predecessors (listed in Figure 1).

	Equity deals		Debt deals		All deals	
	Market share (%)	Amount raised ($m, nominal)	Market share (%)	Amount raised ($m, nominal)	Market share (%)	Amount raised ($m, nominal)
Goldman Sachs & Co	17.5	227,333	13.7	371,736	14.9	599,069
Merrill Lynch & Co Inc	11.5	148,982	13.5	365,412	12.8	514,394
Salomon Smith Barney	8.7	113,432	14.4	389,678	12.5	503,110
Credit Suisse First Boston	14.0	181,579	10.9	297,165	11.9	478,744
Morgan Stanley Dean Witter	12.4	161,265	10.8	293,156	11.3	454,421
JP Morgan Chase	4.5	58,730	9.7	264,421	8.1	323,150
Lehman Brothers	5.0	65,413	6.5	175,650	6.0	241,063
Banc of America Securities LLC	3.0	39,386	5.0	135,634	4.4	175,020
UBS Warburg	4.7	60,459	3.9	105,557	4.1	166,015
Deutsche Banc Securities	4.2	54,185	2.2	60,744	2.9	114,930
Bear Stearns & Co Inc	2.0	26,154	1.6	43,052	1.7	69,207
Prudential Volpe Technology Group	0.8	10,340	0.3	8,918	0.5	19,258
CIBC World Markets Inc	0.8	10,264	0.3	7,036	0.4	17,299
Fleet Boston (Robertson Stephens)	1.0	13,299	0.1	4,069	0.4	17,368
SG Cowen Securities Corp	0.6	8,038	0.1	2,211	0.3	10,248
Thomas Weisel Partners LLC	0.2	2,119	0.0	25	0.1	2,144
All 16 sample banks (and predecessors)	**91.0**	**1,180,977**	**93.0**	**2,524,463**	**92.3**	**3,705,440**

Table III.
Bank-issuer Relationships and Bank Characteristics

The dataset consists of 16,625 deals. The unit of observation is a bank-deal pair. Occasionally, banks co-lead a deal, so there are a total of 18,031 bank-deal pairs in the column headed "winning banks." The column headed "losing banks" refers to bank-deal pairs involving banks that were eligible to compete for but did not win a given deal. On average, there were 24.3 banks treated as competing for every deal. For each bank-deal pair, we report measures of the banks' prior relationships with the issuers' corporate families, the banks' shares of the equity, debt, and corporate loan markets, the extent of bank equity ownership in issuing firms (based on 13f filings as of the quarter-end preceding the deal), and the fraction of commercial banks in each group. The sample is broken down into equity and debt deals, by winning and losing banks, and by whether the bank's analyst covered the issuer's stock in the prior 730 days. The final column shows *t*-tests of the null that the means and fractions for winning and losing banks are equal. Though not shown, comparing coverage and no-coverage, all means and fractions are significantly different with one exception (the fraction of commercial banks among banks winning equity deals). All numbers shown in the table are in percent.

	Winning banks			Losing banks			Test: winner
	mean	*st.dev.*	median	mean	*st.dev.*	median	vs loser
Panel A: Equity - Coverage	N=2,115			N=9,956			
bank's share of issuer's equity deals over the prior 5 years	46.1	*47.2*	31.0	6.4	*22.5*	0	58.3
... debt deals over the prior 5 years	8.3	*24.8*	0	3.0	*13.9*	0	13.5
... loans over the prior 5 years	2.4	*10.9*	0	1.3	*7.5*	0	5.4
bank's share of equity market, prior calendar year	6.3	*5.8*	4.2	4.9	*5.0*	3.2	11.4
... debt market, prior calendar year	5.9	*5.6*	4.8	4.9	*5.2*	2.2	7.9
... loan market, prior calendar year	1.7	*3.2*	0.3	2.0	*3.7*	0.4	-3.6
fraction with bank stake in issuer's equity	48.9			54.9			-5.0
fraction commercial banks	18.6			23.2			-4.5
Panel B: Equity - No coverage	N=4,057			N=126,893			
bank's share of issuer's equity deals over the prior 5 years	7.6	*25.4*	0	0.4	*5.5*	0	64.7
... debt deals over the prior 5 years	4.9	*20.3*	0	0.4	*5.5*	0	43.6
... loans over the prior 5 years	1.3	*8.6*	0	0.6	*6.2*	0	6.7
bank's share of equity market, prior calendar year	5.5	*5.8*	3.2	3.5	*4.8*	1.4	25.8
... debt market, prior calendar year	5.3	*5.7*	2.7	3.7	*4.8*	1.3	21.3
... loan market, prior calendar year	1.5	*3.1*	0.1	2.1	*3.6*	0.3	-10.2
fraction with bank stake in issuer's equity	18.1			13.1			9.1
fraction commercial banks	17.3			30.3			-17.8
Panel C: Debt - Coverage	N=4,474			N=55,282			
bank's share of issuer's equity deals over the prior 5 years	12.7	*31.4*	0	2.9	*15.4*	0	36.8
... debt deals over the prior 5 years	25.9	*30.7*	14.7	4.8	*13.6*	0	87.3
... loans over the prior 5 years	4.1	*12.2*	0	1.1	*5.6*	0	29.7
bank's share of equity market, prior calendar year	8.5	*5.8*	7.2	5.5	*5.4*	3.5	36.1
... debt market, prior calendar year	9.6	*4.9*	10.0	5.4	*5.2*	3.6	52.3
... loan market, prior calendar year	2.5	*4.1*	0.6	1.5	*2.9*	0.3	21.8
fraction with bank stake in issuer's equity	65.5			67.6			-2.8
fraction commercial banks	23.2			17.7			9.3
Panel D: Debt - No coverage	N=7,385			N=193,131			
bank's share of issuer's equity deals over the prior 5 years	4.2	*19.1*	0	0.6	*6.9*	0	40.1
... debt deals over the prior 5 years	18.2	*31.3*	0	1.3	*8.1*	0	143.3
... loans over the prior 5 years	7.6	*20.6*	0	1.3	*7.5*	0	63.7
bank's share of equity market, prior calendar year	4.8	*5.8*	2.4	3.1	*4.5*	1.2	32.9
... debt market, prior calendar year	6.4	*5.7*	4.6	3.2	*4.5*	1.2	59.0
... loan market, prior calendar year	4.5	*5.5*	1.4	2.6	*4.0*	0.8	39.2
fraction with bank stake in issuer's equity	34.1			32.4			3.1
fraction commercial banks	48.3			37.7			18.5

Table IV.
Descriptive Statistics: Issuer and Deal Characteristics

The dataset contains 16,625 deals completed between December 1993 and June 2002, by 6,821 unique companies and 5,472 unique corporate families. Of the 16,625 deals, 10,787 involve issuers that are covered by at least one sample bank (according to I/B/E/S) in the 730 days prior to the deal. These are identified as "coverage" cases in the table. Deal size is the amount raised excluding overallotment options. The fraction of the issuing firm's Fama-French (1997) industry that receives research coverage from bank *j* is measured over the three-year window ending in the year of the deal. All currency amounts are in nominal terms. The last column provides *t*-tests of differences in means/fractions between the coverage and no coverage columns.

	Coverage			No coverage			*t*-test of difference in means/ fractions
	mean	st.dev.	median	mean	st.dev.	median	
Panel A: Equity deals	N=2,909			N=2,999			
deal size (in $m)	179.9	*411.4*	84.0	83.6	*192.6*	44.1	11.6
issuer's equity proceeds in prior 5 years (in $m)	172.1	*511.0*	51.2	14.5	*132.0*	0	16.3
issuer's debt proceeds in prior 5 years (in $m)	262.6	*978.3*	0	39.9	*550.8*	0	10.8
time since IPO (in years)	9.3	*12.5*	3.9	2.2	*6.7*	0	26.8
fraction not listed (%)	0.4			8.1			-14.6
fraction U.S. company (%)	98.5			98.9			-1.5
fraction of issuer's Fama-French industry covered by bank (%)	15.1			13.0			2.3
Panel B: Debt deals	N=7,878			N=2,839			
deal size (in $m)	164.6	*266.2*	90.0	73.6	*114.5*	32.0	17.6
issuer's equity proceeds in prior 5 years (in $m)	263.2	*828.1*	0	52.6	*345.5*	0	13.1
issuer's debt proceeds in prior 5 years (in $m)	2,512.6	*5,433.9*	799.2	258.7	*1,412.5*	0	21.8
time since IPO (in years)	28.4	*18.1*	28.8	16.2	*17.5*	11.0	20.4
fraction not listed (%)	2.2			71.2			-78.2
fraction U.S. company (%)	98.2			94.2			11.1
fraction of issuer's Fama-French industry covered by bank (%)	16.5			14.3			2.8

Table V.
Recommendations and Analyst Characteristics

We construct two measures of analyst behavior. Relative recommendations measure bank *j*'s recommendation level relative to consensus by subtracting from bank *j*'s most recent recommendation the median recommendation of all other banks covering firm *i* in the 730-day window before *i*'s next deal. Relative upgrades are computed as a bank's recommendation change for firm *i* less the median change of other sample banks. By construction, relative recommendations lie between –4 and +4 while relative upgrades lie between –8 and +8. Positive values denote relatively aggressive recommendations or upgrades. We report descriptive statistics for these measures of analyst behavior separately for equity and debt deals, broken down by whether the bank won or lost the underwriting mandate. All-stars are analysts ranked as a top-three or runner-up analyst in their industry in the most recent *Institutional Investor* survey preceding the deal. Relative forecast accuracy is a measure of the analyst's forecast accuracy for the issuer's stock, relative to other analysts. It is constructed as in Hong and Kubik (2003) and ranges from 0 to 100, with a higher number indicating greater forecast accuracy. As a proxy for seniority, we compute the number of years since the analyst first appeared in the I/B/E/S database. We lose some observations for relative forecast accuracy and analyst seniority because not all analysts disclose their name in the I/B/E/S recommendations file. The last column provides *t*-tests of differences in means/fractions comparing winning to losing banks.

	All banks				Winning banks				Losing banks				Test: winner vs. loser
	No. obs.	mean	st.dev.	median	No. obs.	mean	st.dev.	median	No. obs.	mean	st.dev.	median	
Panel A: Equity deals													
relative recommendation	12,071	-0.033	*0.705*	0	2,115	0.114	*0.585*	0	9,956	-0.064	*0.725*	0	10.6
relative upgrade	12,071	0.105	*0.787*	0	2,115	0.133	*0.743*	0	9,956	0.100	*0.796*	0	1.8
fraction of issuers covered by all-star analysts (%)	12,071	27.5			2,115	32.7			9,956	26.3			6.0
relative forecast accuracy	11,237	51.6	*10.5*	52.2	2,011	51.8	*10.6*	52.6	9,226	51.6	*10.5*	52.2	-0.8
analyst's seniority (years in I/B/E/S database)	11,625	6.5	*4.8*	5.5	2,062	6.9	*4.7*	5.9	9,563	6.5	*4.8*	5.4	3.6
Panel B: Debt deals													
relative recommendation	59,756	0.065	*0.802*	0	4,474	0.200	*0.744*	0	55,282	0.055	*0.806*	0	11.7
relative upgrade	59,756	0.100	*0.827*	0	4,474	0.159	*0.810*	0	55,282	0.095	*0.829*	0	5.0
fraction of issuers covered by all-star analysts (%)	59,756	34.6			4,474	41.4			55,282	34.1			9.9
relative forecast accuracy	56,579	52.1	*9.1*	52.8	4,229	52.7	*8.7*	53.0	52,350	52.1	*9.2*	52.8	4.5
analyst's seniority (years in I/B/E/S database)	58,158	7.2	*4.9*	6.4 5	4,320	7.4	*4.9*	6.8	53,838	7.2	*4.9*	6.5	3.3

Table VI. Strategic Coverage Decisions

We estimate the determinants of the coverage decision using probit MLE. This corresponds to equation (3). The coverage decision determines whether or not we observe the analyst's behavior in subsequent tables. Therefore, the estimation results in subsequent tables are conditioned on the coverage decision using the Heckman (1979) MLE framework, where the coverage decision, analyst behavior, and lead-bank choice are jointly estimated. For the purpose of illustrating what determines coverage, this table shows the results of two stand-alone probit models, for equity and debt deals, respectively. The dependent variable is an indicator equal to one if the bank's analyst covers the issuer's stock at any point during the two years preceding the deal. Since commercial banks in our sample period are generally less likely to provide research coverage, we interact all explanatory variables with a dummy equaling one for commercial banks. This provides an estimate of the additional effect of each explanatory variable on the likelihood that a commercial bank (rather than an investment bank) covers the issuer's stock. The dummy for mergers is coded one in the quarter of the event, and ½, ⅓, and ¼ in the next three quarters. Banks that cover a larger fraction of an issuer's industry are more likely to cover the issuer as well. We control for this using the fraction of the issuing firm's Fama-French (1997) industry that is covered by bank *j*, measured over the three-year window ending in the year of the deal. Intercepts and year effects are not shown. Standard errors are shown in italics. We use ***, **, and * to denote significance at the 0.1%, 1%, and 5% levels (two-sided), respectively. The number of observations is 143,021 in the equity model and 260,272 in the debt model.

	Probit 1: Equity deals		Probit 2: Debt deals	
		× commercial bank dummy		× commercial bank dummy
Bank-issuer relationships				
bank's share of issuer's debt deals prior 5 years	0.372***	0.114	0.340***	0.194**
	0.058	*0.127*	*0.028*	*0.065*
bank's share of issuer's equity deals prior 5 years	1.729***	-0.315***	0.543***	-0.044
	0.035	*0.076*	*0.028*	*0.077*
bank's share of issuer's loans prior 5 years	0.452*	-0.001	0.543***	0.088
	0.207	*0.225*	*0.162*	*0.169*
=1 if bank owns equity in issuer	0.564***	-0.116***	0.480***	-0.143***
	0.016	*0.030*	*0.008*	*0.019*
Bank characteristics				
bank's equity market share prior calendar year	1.748***	-0.823	0.147	5.728***
	0.261	*0.965*	*0.129*	*0.503*
bank's debt market share prior calendar year	-0.785**	-0.210	0.876***	0.318
	0.265	*0.549*	*0.152*	*0.331*
bank's loan market share prior calendar year	0.555	-0.098	-0.214	-1.587**
	0.968	*1.016*	*0.546*	*0.580*
dummy: bank involved in merger	-0.021	0.073	0.276***	-0.437***
	0.056	*0.083*	*0.032*	*0.049*
fraction of issuer's Fama-French industry covered	3.271***	1.465***	3.726***	1.766***
	0.063	*0.139*	*0.030*	*0.070*
Issuer and deal characteristics				
underwriting fee relative to bank's prior-year fee income	0.130***	-0.116***	-0.012***	0.049***
	0.006	*0.012*	*0.002*	*0.004*
log issuer's $ equity or debt proceeds prior 5 years	0.127***	-0.002	0.127***	-0.028***
	0.003	*0.006*	*0.002*	*0.003*
log time since IPO	0.478***	-0.167***	-0.073***	-0.035***
	0.011	*0.020*	*0.006*	*0.011*
=1 if domestic firm	0.172***	-0.296***	0.485***	-0.147***
	0.046	*0.060*	*0.023*	*0.036*
=1 if firm is not listed	-0.457***	-0.574***	-1.018***	-0.270***
	0.070	*0.211*	*0.018*	*0.047*
Diagnostics				
LR test: all coefficients = 0 (χ^2)	27,323***		95,707***	
Pseudo-R^2	33.0 %		34.1 %	

Table VII.
Analyst Behavior

The dependent variables are relative recommendations and relative upgrades. These are observed only when the bank covers the stock, so we estimate Heckman (1979) selection models using joint MLE. Representative results for the associated selection equation are shown in Table VI. The estimation results in this table are reported in structural form. The reduced forms used to generate instruments for the models in Tables VIII and IX include also the exogenous variables from the lead-bank equation and are not shown. The relative upgrade models include a dummy equal to one if the previous recommendation was a strong buy; the coefficients, which are negative and significant, are not shown. Analyst characteristics are defined as in Table V. The bubble dummy equals one for deals completed in 1999 and 2000. The five "bank pressure proxies" measure the size of potential rewards for liquidating reputation capital, or equivalently the amount of pressure that might be put on an analyst to deliver a favorable recommendation. These are the instruments we use to identify the system. The more lucrative the client – as measured by the fee on the deal in question relative to the bank's prior-year fee pool, and by the issuer's deal history – the more tempted the analyst to inflate the recommendation. We measure the relative fee as $-ln$(1+lagged fee revenue/fee on deal) to avoid generating extreme outliers in cases in which a bank has small or zero prior-year fee revenue. Banks with more "loyal" clients are less likely to resort to inflating analyst forecasts. We also control for time-variation in the size of the potential pool of "side payments" bankers might use to gain analyst cooperation, based on changes in market-wide deal flows (such as the "hot" market of the late 1990s). This is calculated as the percentage difference in market-wide proceeds raised during the current quarter and a five-year quarterly moving average. Results are robust to using shorter windows. Intercepts are not shown. Standard errors are shown in italics. We use ***, **, *, and † to denote significance at the 0.1%, 1%, 5%, and 10% levels (two-sided), respectively. The Staiger and Stock (1997) test is a test of the strength of the instruments. It is based on an *F*-test of the joint significance of the instruments in the reduced-form models. The critical value for strong instruments is 10. The number of observations where the bank provides research coverage is 11,182 in the equity model and 56,427 in the debt model.

	Equity		Debt	
Relative…	recomm. (1)	upgrades (2)	recomm. (3)	upgrades (4)
Bank-issuer relationships				
bank's share of issuer's debt deals prior 5 years	0.148***	0.074†	0.267***	0.124***
	0.041	*0.043*	*0.022*	*0.021*
bank's share of issuer's equity deals prior 5 years	0.110***	-0.079**	0.120***	0.142***
	0.026	*0.028*	*0.020*	*0.020*
bank's share of issuer's loans prior 5 years	0.118	0.175†	0.648***	0.334***
	0.086	*0.090*	*0.058*	*0.056*
=1 if bank owns equity in issuer	0.085***	0.093***	0.090***	0.078***
	0.017	*0.018*	*0.008*	*0.008*
Bank characteristics				
bank's equity market share prior calendar year	-0.391	0.205	-0.455***	-0.049
	0.259	*0.271*	*0.109*	*0.107*
bank's debt market share prior calendar year	0.818***	0.312	1.266***	0.408***
	0.250	*0.263*	*0.131*	*0.127*
bank's loan market share prior calendar year	0.095	0.383†	1.252***	1.389***
	0.221	*0.232*	*0.140*	*0.137*
Analyst characteristics				
=1 if analyst is ranked "all-star" by *Institutional Investor*	-0.014	-0.073***	0.005	-0.073***
	0.018	*0.019*	*0.008*	*0.008*
… x bubble dummy	0.013	0.086**	0.009	0.105***
	0.029	*0.031*	*0.015*	*0.015*
relative forecast accuracy	0.001	0.000	0.004***	0.001**
	0.001	*0.001*	*0.0004*	*0.0004*
log analyst's seniority (in years)	0.021*	0.007	0.018***	0.032***
	0.010	*0.010*	*0.005*	*0.005*

Table VII.
Analyst Behavior (continued)

Relative…	Equity		Debt	
	recomm. (1)	upgrades (2)	recomm. (3)	upgrades (4)
Bank pressure proxies				
underwriting fee relative to bank's prior-year fee income	0.020***	0.031***	0.004*	0.004*
	0.006	*0.006*	*0.002*	*0.002*
log issuer's $ equity or debt proceeds prior 5 years	0.001	0.009**	0.006***	0.015***
	0.003	*0.003*	*0.002*	*0.002*
loyalty index	-0.094*	-0.100*	-0.134***	-0.059**
	0.046	*0.049*	*0.020*	*0.020*
change in issue activity relative to 5-yr moving average	-0.141***	-0.049	0.001	0.021
	0.038	*0.039*	*0.020*	*0.019*
… x bank's market share	1.075*	1.071†	0.558*	0.434†
	0.554	*0.582*	*0.265*	*0.259*
Diagnostics				
Wald test: all coefficients = 0 (χ^2)	110.1***	1,517***	1,489***	9,294***
Heckman's λ (probability of noncoverage)	0.016	0.003	0.066***	0.124***
Likelihood ratio test of independent equations (ρ=0) (χ^2)	0.8	0.0	48.6***	171.7***
Staiger-Stock (1997) instrument strength test (*F*)	5.2***	239.0***	12.8***	1,487.5***

Table VIII. Lead Bank Choice, Equity Transactions

We estimate the probability that a particular bank is chosen to lead-manage a particular equity deal using probit MLE with sample selection correction as per Table VI. Specifications 1 and 2 use relative recommendations and relative upgrades to model analyst behavior, respectively, instrumented from the models estimated in Table VII, and thus treated as endogenous. Analyst behavior is observed only if the bank provides coverage, so we estimate the probability of winning a deal separately if the bank does or does not provide research coverage. The dummies for mergers and staff arrivals/departures are coded one in the quarter of the event, and ½, ⅓, and ¼ in the next three quarters. Intercepts are not shown. Standard errors are shown in italics. In Specifications 1 and 2, they are based on the Murphy-Topel adjustment. We use ***, **, and * to denote significance at the 0.1%, 1%, and 5% levels (two-sided), respectively. The columns headed "Test" show the significance of Wald tests comparing the coefficients in the coverage and no-coverage cases. The number of covered and noncovered observations is 11,182 and 130,950, respectively.

	Coverage			Test	
	Spec. 1	Spec. 2	No coverage	rel. to Spec. 1	rel. to Spec. 2
Analyst behavior					
Relative recommendations	-0.196				
	0.390				
Relative upgrades		-0.188***			
		0.054			
Bank-issuer relationships					
bank's share of issuer's debt deals prior 5 years	0.635***	0.617***	1.220***	***	***
	0.097	*0.080*	*0.060*		
bank's share of issuer's equity deals prior 5 years	1.973***	1.932***	1.836***	*	
	0.067	*0.059*	*0.061*		
bank's share of issuer's loans prior 5 years	0.683***	0.686***	0.584***		
	0.180	*0.173*	*0.091*		
=1 if bank owns equity in issuer	0.057	0.051	0.128***	**	**
	0.060	*0.053*	*0.025*		
Bank characteristics					
bank's equity market share prior calendar year	2.022***	2.157***	2.215***		
	0.583	*0.486*	*0.246*		
bank's debt market share prior calendar year	0.665	0.508	0.340		
	0.654	*0.510*	*0.257*		
bank's loan market share prior calendar year	-1.207*	-1.144*	-2.687***	***	***
	0.522	*0.519*	*0.256*		
Dummy: bank involved in merger	0.075	0.079	0.193***	*	*
	0.116	*0.097*	*0.050*		
Dummy: equity staff have departed	-0.099	-0.095	-0.107*		
	0.089	*0.088*	*0.049*		
Dummy: equity staff have arrived	-0.134	-0.121	0.134***	***	***
	0.090	*0.088*	*0.041*		
Analyst characteristics					
=1 if analyst is ranked "all-star" by *Institutional Investor*	0.076*	0.072*			
	0.036	*0.036*			
log analyst's seniority (in years)	0.051*	0.047*			
	0.023	*0.022*			
relative forecast accuracy	0.000	-0.001			
	0.001	*0.001*			
Diagnostics					
Wald test: all coefficients = 0 (χ^2)	2,321***	2,338***	2,010***		
Correlation of coverage and lead-bank equations (ρ)	0.415***	0.416***	0.245***		
Likelihood ratio test of independent equations (ρ=0) (χ^2)	109.0***	110.7***	32.1***		

Table IX. Lead Bank Choice, Debt Transactions

We estimate the probability that a particular bank is chosen to lead-manage a particular debt deal using probit MLE with sample selection correction as per Table VI. Specifications 1 and 2 use relative recommendations and relative upgrades to model analyst behavior, respectively, instrumented from the models estimated in Table VII, and thus treated as endogenous. Analyst behavior is observed only if the bank provides coverage, so we estimate the probability of winning a deal separately if the bank does or does not provide research coverage. The dummies for mergers and staff arrivals/departures are coded one in the quarter of the event, and ½, ⅓, and ¼ in the next three quarters. Intercepts are not shown. Standard errors are shown in italics. In specifications 1 and 2, they are based on the Murphy-Topel adjustment. We use ***, **, *, and † to denote significance at the 0.1%, 1%, 5%, and 10% levels (two-sided), respectively. The columns headed "Test" show the significance of Wald tests comparing the coefficients in the coverage and no-coverage cases. The number of covered and noncovered observations is 56,427 and 200,516, respectively.

	Coverage			Test	
	Spec. 1	Spec. 2	No coverage	rel. to Spec. 1	rel. to Spec. 2
Analyst behavior					
relative recommendations	-1.378*				
	0.559				
relative upgrades		-0.062*			
		0.028			
Bank-issuer relationships					
bank's share of issuer's debt deals prior 5 years	2.138***	1.788***	1.996***	***	***
	0.152	*0.038*	*0.032*		
bank's share of issuer's equity deals prior 5 years	0.702***	0.548***	0.467***	***	†
	0.071	*0.036*	*0.045*		
bank's share of issuer's loans prior 5 years	2.167***	1.324***	1.148***	***	***
	0.392	*0.103*	*0.042*		
=1 if bank owns equity in issuer	0.110*	-0.030	-0.192***	***	***
	0.045	*0.022*	*0.014*		
Bank characteristics					
bank's equity market share prior calendar year	-1.338***	-0.796***	-1.743***	†	***
	0.376	*0.245*	*0.208*		
bank's debt market share prior calendar year	7.933***	6.216***	5.366***	***	***
	0.631	*0.282*	*0.201*		
bank's loan market share prior calendar year	2.309*	0.699*	2.869***	***	***
	1.116	*0.309*	*0.147*		
dummy: bank involved in merger	-0.008	0.168***	0.063†	†	**
	0.091	*0.052*	*0.037*		
dummy: debt staff have departed	-0.104†	-0.033	-0.136***		***
	0.058	*0.036*	*0.027*		
dummy: debt staff have arrived	0.169***	0.114***	0.141***		
	0.046	*0.035*	*0.027*		
Analyst characteristics					
=1 if analyst is ranked "all-star" by *Institutional Investor*	-0.063**	-0.062**			
	0.023	*0.020*			
log analyst's seniority (in years)	0.064***	0.037**			
	0.018	*0.013*			
relative forecast accuracy	0.006*	0.001			
	0.003	*0.001*			
Diagnostics					
Wald test: all coefficients = 0 (χ^2)	5,007***	5,188***	8,848***		
Correlation of coverage and lead-bank equations (ρ)	0.166***	0.181***	0.077***		
Likelihood ratio test of independent equations (ρ=0) (χ^2)	43.8***	56.1***	11.9***		

Table X.
Differences Over Time and Interaction Results

As in Tables VIII and IX, we estimate the probability that a particular bank is chosen to lead-manage a particular deal using probit MLE with sample selection correction. In Panel A, we partition the sample into two periods, 1993 to 1997 and 1998 to June 2002. To model analyst behavior, we instrument relative recommendations and relative upgrades from auxiliary models similar to those reported in Table VII, but estimated within each subperiod. To conserve space, we report only the coefficients and Murphy-Topel corrected standard errors for the instrumented analyst behavior variables. In Panel B, we use the entire 1993 to June 2002 estimation sample as in Tables VII through IX, but interact the instrumented analyst behavior variables with a dummy equaling one for firms maintaining relatively weak underwriting relationships (see text for definition). In Panel C, we interact the instrumented analyst behavior variables with a measure of the firm's "switching propensity" to see if analyst behavior has a larger impact on companies that are more prone to switching underwriters. We obtain a proxy for a firm's switching propensity from an auxiliary probit that estimates, deal-by-deal and separately for debt and equity deals, the likelihood that the firm chooses a different underwriter from the one that lead-managed its previous deal, as a function of the firm's maturity (log years since equity IPO), the weak-relationship dummy from Panel B, and the log size of the deal. For debt deals, we add a dummy equaling one if the deal involves high-yield bonds. We use ***, **, *, and † to denote significance at the 0.1%, 1%, 5%, and 10% levels (two-sided), respectively.

	Equity		Debt	
	Relative recommend-ations	Relative upgrades	Relative recommend-ations	Relative upgrades
Panel A: Subperiods				
1993-1997	-0.033	-0.186*	0.033	-0.056
	0.360	*0.084*	*0.370*	*0.046*
1998-June 2002	0.647	-0.123†	-2.749***	-0.010**
	0.614	*0.067*	*0.735*	*0.034*
Panel B:				
Analyst behavior	0.074	-0.284***	-1.326*	-0.032
	0.395	*0.063*	*0.541*	*0.031*
… x dummy (low relationship intensity)	-1.030**	0.388**	-0.265†	-0.158*
	0.330	*0.124*	*0.150*	*0.067*
Panel C:				
Analyst behavior	4.000***	-0.742***	-0.632	0.027
	0.938	*0.123*	*0.427*	*0.067*
… x switching propensity	-5.948***	0.861***	-1.416***	-0.162
	1.855	*0.169*	*0.207*	*0.111*