

# Investment Banking Relationships and Analyst Affiliation Bias: The Impact of Global Settlement on Sanctioned and Non-Sanctioned Banks

**Shane A. Corwin**\*

Mendoza College of Business  
University of Notre Dame  
Notre Dame, IN 46556  
scorwin@nd.edu

**Stephannie Larocque**

Mendoza College of Business  
University of Notre Dame  
Notre Dame, IN 46556  
larocque.1@nd.edu

**Mike Stegemoller**

Hankamer School of Business  
Baylor University  
Waco, TX 76798  
michael\_stegemoller@baylor.edu

January 2015

## **Abstract**

We examine the impact of the Global Analyst Research Settlement on analyst affiliation bias in stock recommendations. Using a comprehensive measure of investment bank-firm relationships, including equity and debt underwriting and M&A advising, we find that affiliation bias is substantially reduced, but not eliminated, for analysts employed by banks named in the settlement. In contrast, we find strong evidence of analyst affiliation bias both before and after the Global Settlement for analysts at non-sanctioned banks. The results hold after controlling for shifts in the recommendation schemes used by investment banks and are robust to alternative empirical specifications.

*JEL classification:* G10, G24, G34, L14

*Keywords:* Analysts, Recommendations, Investment Banking, Investment Banking Relationships

\* We thank Robert Battalio, Larry Brown, Gus De Franco, Marcus Kirk, Tim Loughran, and Hai Lu for helpful comments. Steven Carroll, Brian Ford, and Travis Johnson provided excellent research assistance. Any remaining errors are the responsibility of the authors.

## 1. INTRODUCTION

Conflicts of interest within investment banks and other financial institutions have been the subject of numerous academic studies (see Mehran and Stulz 2007 for a discussion). One particular conflict that has received significant attention from both regulators and academics is analyst affiliation bias. Specifically, prior research provides strong evidence that analysts are overly optimistic when their employers have equity underwriting relationships with the covered firms. Early in the 2000s, several attempts to reduce conflicts of interest were implemented in the securities industry, culminating in the 2003 Global Analyst Research Settlement (Global Settlement). In particular, a major purpose of the Global Settlement reached between the SEC, NYSE, NASD, New York Attorney General, and North American Securities Administrators Association and 12 of the largest investment banks was to reduce the conflicts of interest between the investment banking and research departments within the major banks.<sup>1</sup> Subsequent research suggests that investment banks changed their behavior following the Global Settlement<sup>2</sup>, but provides little evidence on affiliation bias for analysts employed by sanctioned and non-sanctioned banks nor on relationships beyond the well-studied equity underwriting relationship. In this study, we use a broad measure of investment banking relationships, including equity and debt underwriting and mergers and acquisitions (M&A) advising, to examine analyst affiliation bias for a large sample of sanctioned and non-sanctioned investment banks (IBs) in the periods before and after the Global Settlement and contemporaneous regulatory changes.

Sell-side financial analysts provide buy/sell recommendations and earnings forecasts for a set of covered firms. In general, analysts are compensated and earn a reputation based on the quality of the information they provide. Despite these incentives to produce accurate information, however, analysts can also face pressure to issue optimistic or biased coverage. In particular, the financial services firms that employ analysts also compete for lucrative underwriting and M&A advisory mandates and may seek to

---

<sup>1</sup> The original settlement in April 2003 named ten investment banks, including Bear Stearns, CSFB, Goldman Sachs, Lehman Brothers, J.P. Morgan, Merrill Lynch, Morgan Stanley, Citigroup (Salomon Smith Barney), UBS Warburg, and U.S. Bancorp Piper Jaffray. Similar settlements with Deutsche Bank and Thomas Weisel were added later. We refer to these banks (including other name variations of the same banks) as “sanctioned” banks.

<sup>2</sup> See, for example, Kadan, Madureira, Wang, and Zach (2009).

use biased coverage as one means of winning potential clients. As a result, analysts face a conflict between their role in providing quality information to financial markets (and the associated reputational concerns) and the motivations of their employers to win future investment banking business.

Following prior research, we define an affiliated analyst as one whose employer also has an investment banking relationship with the covered firm. Existing research suggests that affiliated analysts tend to produce optimistic (i.e., upward biased) recommendations and earnings forecasts relative to unaffiliated analysts (see, for example, Dugar and Nathan 1995, Lin and McNichols 1998). This research focuses primarily on affiliation through equity underwriting relationships, with a particular emphasis on affiliation at the time of an equity issue.<sup>3</sup> However, equity underwriting is only one of many services that investment banks provide to firms. In the fourth quarter of 2013, for example, equity underwriting accounted for only 36% of total investment banking revenues at Goldman Sachs, compared to 34% for financial advising and 30% for debt underwriting. This suggests that investment banking relationships may have an impact beyond that evidenced through equity underwriting.<sup>4</sup>

To better understand the impact of investment banking relationships on analyst behavior, we examine the individual equity, debt, and M&A components of the relationship, as well as the overall investment banking relationship. We expect the results to be strongest for the overall relationship for two reasons. First, since equity, debt, and M&A transactions are discrete observations of the firm-bank relationship, viewing all of these transactions together allows us to observe the relationship at more points in time, better capturing the ongoing nature of the relationship. Second, we expect investment banking relationships that span multiple functional areas to put more pressure on analysts than narrow relationships.

To analyze affiliation bias, we study recommendations on a large sample of U.S. non-financial firms between 1998 and 2009 by analysts whose employers are either sanctioned investment banks or top

---

<sup>3</sup> One exception is Ljungqvist, Marston, Starks, Wei, and Yan (2007) who control for both equity and debt underwriting affiliations. This study is discussed in more detail below.

<sup>4</sup> The importance of firm-wide relationships may also change over time. For example, Corwin and Stegemoller (2014) find that the tendency of firms to use the same investment bank in multiple functional areas (i.e., equity underwriting, debt underwriting, or M&A advising) has increased significantly over time.

non-sanctioned banks. Our main variable of interest is the analyst's relative recommendation, defined as the difference between the analyst recommendation (with strong buy=5 and strong sell=1) and the median recommendation across all analysts covering the stock. Following Ljungqvist et al. (2007), we construct this variable at the end of each quarter, using the most recent recommendation by each analyst during the preceding twelve months. In our main tests, we regress this variable on proxies for investment banking relationships and a set of control variables shown in prior literature to have an association with analyst recommendations. Our primary relationship variable is an indicator variable equal to one if, during the prior three years, the firm hired the investment bank as a lead or co-manager on an equity or debt deal or as an advisor on an M&A transaction. However, we also provide tests using a continuous measure of relationships, defined as the proportion of a firm's total transaction value during a three-year window for which the investment bank acted as a lead manager, co-manager, or advisor. We define these relationship variables separately for equity, debt, and M&A transactions, as well as for the combined set of transactions across all types.

Consistent with prior research, we find strong evidence of analyst affiliation bias prior to the Global Settlement in 2003. For banks named in the Global Settlement (sanctioned banks), this bias is evident for all individual transaction types and for the overall relationship measure. For non-sanctioned banks in the period prior to the Global Settlement, we find mixed evidence of an affiliation bias based on individual transaction type relationship measures, but strong evidence of an affiliation bias based on the overall relationship measure. This evidence is consistent with our prediction that the overall measure better captures the ongoing nature of the investment banking relationship. The more striking results appear during the period following the Global Settlement. During this period, there remains evidence of an affiliation bias for sanctioned banks, but the bias is substantially reduced from the pre-Global Settlement effect. In contrast, non-sanctioned banks continue to exhibit strong analyst affiliation bias even after the Global Settlement. This bias is evident across all types of transactions and for the overall relationship measure. These results suggest that while the Global Settlement was successful at reducing

analyst affiliation bias for the banks named in the settlement, conflicts of interest persist, especially for non-sanctioned investment banks.

Our results are robust to several alternative specifications and robustness checks. While our main results are based on relationship indicator variables, we find similar results based on continuous measures of relationships. The results are also robust to alternative fixed effects specifications, including firm, analyst, and investment bank fixed effects. Most importantly, our results are not driven by the shift of many investment banks from a five-tier to a three-tier recommendation scheme following the Global Settlement (Kadan et al. 2009). We find similar results when we repeat our analysis on a relative recommendation variable based on a three-tier recommendation scheme.

As an alternative specification, we use logistic regressions to examine the impact of investment banking relationships on the likelihood of issuing a buy or strong buy and the likelihood of issuing a sell or strong sell. Consistent with the relative recommendation results, this analysis suggests that prior to the Global Settlement, analysts at both sanctioned and non-sanctioned banks were significantly more likely to issue a buy or strong buy recommendation and significantly less likely to issue a sell or strong sell recommendation when affiliated with the firm through an investment banking relationship. After the Global Settlement, the bias for sanctioned banks is reduced, but remains significant. For non-sanctioned banks, the bias is significant both before and after the Global Settlement. For both groups of banks, the logit results suggest that a significant affiliation bias remains following the Global Settlement, with the effect being substantially larger for non-sanctioned banks.

As a final test, we examine whether incorporating lending data has an impact on the measurement of analyst affiliation bias. We find only weak evidence that lending relationships have an incremental effect on the measurement of analyst affiliation bias. Thus, affiliation bias appears to be best captured through the equity, debt, and M&A relationships. We assert that an overall measure, incorporating equity underwriting, debt underwriting, and M&A advising, is better able to capture investment banking relationships and their effects than measures based on any one type of transaction.

In summary, our findings suggest that conflicts of interest within investment banks have not been completely eliminated by the Global Settlement and contemporary regulatory changes. Our results suggest that the Global Settlement reduced, but did not eliminate, analyst affiliation bias in recommendations from banks named in the Global Settlement. Further, for large banks not named in the Global Settlement, we find strong evidence of a continued affiliation bias in the post-Global Settlement period. This suggests that our findings are driven by the punitive and bank-specific requirements imposed by the Global Settlement, rather than the broader regulatory changes that accompanied the settlement.

The remainder of the paper is organized as follows. Section 2 summarizes the literature related to analyst affiliation bias, provides background information on the Global Settlement, and describes our main hypothesis. In Section 3, we describe our data and sample construction. Section 4 presents our main results related to analyst affiliation bias and Section 5 examines the incremental impact of lending relationships. Section 6 concludes.

## **2. BACKGROUND AND HYPOTHESIS DEVELOPMENT**

### ***2.1. Analyst Affiliation Bias***

Sell-side financial analysts have been widely studied as proxies for the market's expectations. At the same time, however, analysts' recommendations, target prices, and forecasts have been shown to be optimistic (Beneish 1991; Bradshaw 2004; La Porta 1996). In particular, prior research provides strong evidence of a link between analyst optimism (or bias) and investment banking relationships between covered firms and the banks that employ analysts. Dugar and Nathan (1995) find that recommendations and earnings forecasts are more optimistic for analysts who also have an investment banking relationship with the covered firm than for non-affiliated analysts and Lin and McNichols (1998) show that analysts employed by lead and co-managing underwriters issue growth forecasts and recommendations on the issuing firms that are significantly more favorable than those made by unaffiliated analysts. Further, Dechow, Hutton, and Sloan (2000) provide evidence that analysts employed by lead managers of equity offerings make more optimistic long-term growth forecasts around equity offerings and O'Brien,

McNichols, and Lin (2005) conclude that investment banking relationships increase analysts' reluctance to reveal negative news.

Prior studies also point to factors that appear to mitigate analyst affiliation bias. Cowen, Groysberg, and Healy (2006) find that the bias is lower for bulge bracket investment banks than for lower-tier banks, suggesting that the reputational concerns of bulge bracket banks outweigh the benefits of biased analyst coverage. Ljungqvist et al. (2007) argue that, because analysts rely on institutional investors for trading commissions and ratings, they will be less likely to produce biased coverage on affiliated stocks that are also highly visible to institutional investors. Their results confirm that relative recommendations are negatively related to the presence of institutional investors.

Other research examines the impact of analyst bias on investors and the post-recommendation performance of covered firms. De Franco, Lu, and Vasvari (2007) examine the investor consequences of analysts' misleading behavior in the period prior to the Global Settlement. Using a sample of 50 firm-events identified in the Global Settlement in which analysts' private beliefs differed from their public disclosures, they provide evidence that these events are associated with selling by sophisticated investors and a wealth transfer from individuals to institutions. Michaely and Womack (1999) report that in the month following the post-IPO quiet period, affiliated analysts issue more buy recommendations for the IPO firm than do unaffiliated analysts, and the IPOs recommended by affiliated analysts substantially under-perform IPOs recommended by unaffiliated analysts. Similarly, Barber, Lehavy, and Trueman (2007) find that the "buy" and "strong buy" ratings of IB-employed analysts tend to underperform those of other analysts.

Research also examines whether analyst coverage affects the investment bank's ability to win future business from the covered firm. Bradshaw, Richardson, and Sloan (2006) surmise that all analysts bias their recommendations and forecasts in an attempt to win underwriting business. Ljungqvist, Marston, and Wilhelm (2006) find little evidence that optimistic analyst coverage affects an investment bank's likelihood of winning future lead underwriting mandates. However, Ljungqvist, Marston, and

Wilhelm (2009) show that optimistic analyst coverage does increase the likelihood of winning future co-managing appointments, which in turns leads to an increased likelihood of future lead mandates.

Existing research focuses primarily on affiliation through equity underwriting relationships. However, some recent research extends the analysis of affiliation bias to other areas. Ljungqvist et al. (2007) examine both equity and debt underwriting relationships and find that affiliation bias is stronger with respect to equity relationships. Kolasinski and Kothari (2006) investigate affiliation bias in analyst recommendations issued around M&A deals. They find that analysts affiliated with acquirer advisors upgrade acquirer stocks around M&A deals and target-affiliated analysts issue optimistic coverage on acquirers after exchange ratios (for all-stock deals) have been set.

## ***2.2. The Global Settlement***

During 2000, the securities industry attempted to reduce investment banking conflicts of interest, with the Securities Industries Association endorsing best practices around research and investment banking and the Association for Investment Management and Research (since renamed CFA Institute) releasing a white paper titled “Preserving the Integrity of Research.” In 2002, the Sarbanes-Oxley Act (SOX) amended the Securities and Exchange Act of 1934 with the creation of Section 15D, which required the NYSE and the NASD to adopt rules designed to address research analysts’ conflicts of interest. To comply with SOX, in 2002 the NYSE amended its Rule 351 (Reporting Requirement) and Rule 472 (Communication with the Public), while the NASD released Rule 2711 (Research Analysts and Research Report).<sup>5</sup> These rules were approved by the SEC in May 2002.

In 2001, following allegations of research tainted by investment banking conflicts of interest, the

---

<sup>5</sup> NYSE Rule 472 (Communication with the Public) requires that research reports be approved by a supervisory analyst, that research analysts not be subject to the supervision of any member of the investment banking department, that research analysts not purchase issuer securities prior to an IPO, that an IB not distribute research regarding an issuer 40 calendar days following an IPO offering in which the IB acted as a manager or co-manager, that an IB not issue a favorable research report in return for business, that analysts not receive compensation for investment banking business, and that the above be disclosed in the analyst’s research reports. NYSE Rule 351(f) requires an annual letter of attestation by the investment bank that it is in compliance with Rule 472. Similarly, NASD Rule 2711 (Research Analysts and Research Report) restricts relationships between investment banking and research departments and restricts the review of research reports by the subject company. It also prohibits analyst compensation based upon investment banking services, prohibits the promise of favorable research, imposes a 40 (10) day quiet period for research following an IPO (SEO), restricts personal trading by analysts in their covered stocks, and requires additional disclosures in research reports as well as additional supervisory procedures at the investment bank.

New York Attorney General began investigating Merrill Lynch and, subsequently, several other large investment banks. This investigation culminated in April 2003 with the Global Analyst Research Settlement reached by the SEC, NYSE, NASD, New York Attorney General, and North American Securities Administrators Association with ten of the largest investment banks – Bear Stearns, CSFB, Goldman, Lehman, J.P. Morgan, Merrill Lynch, Morgan Stanley, Citigroup (Salomon Smith Barney), UBS Warburg, and U.S. Bancorp Piper Jaffray (with Deutsche Bank and Thomas Weisel added later).<sup>6</sup> The Global Settlement required the payment of \$875 million in penalties and disgorgement, \$432.5 million to fund independent research, and \$80 million to fund investor education. In addition, the settlement made numerous structural reforms including the physical separation of investment banking and research departments, the inability to compensate research analysts based upon investment banking revenues, and the prohibition of research analysts taking part in investment banking pitches and roadshows.

Subsequent research suggests that these regulatory changes affected the behavior of analysts within investment banks. Kadan, Madureira, Wang, and Zach (2009) find that the overall informativeness of recommendations (measured using absolute price reactions) declined following the Global Settlement. They also document that sanctioned banks shifted their stock recommendations from a 5-tier scale to a 3-tier scale. Barniv, Hope, Myring, and Thomas (2009) and Chen and Chen (2009) both document that the mapping between analysts' forecasts and target prices improved following the regulatory changes of the early 2000s. Clarke, Khorana, Patel, and Rau (2011) investigate market reactions to independent, affiliated, and unaffiliated analysts before and after the Global Settlement. They find that affiliated (independent) analysts issued fewer (more) strong buys following the settlement, with recommendation upgrades by affiliated analysts being more informative in the post-period. Moreover, Guan, Lu, and Wong (2012) find that forecasts by research firms are more optimistic than those of brokerage firms, syndicate firms, and investment banks following the regulatory changes in the early 2000s, but that forecast

---

<sup>6</sup> See <http://www.sec.gov/news/press/2003-54.htm> for the April 2003 press release and <http://www.sec.gov/news/press/2003-144.htm> for the SEC's October 2003 approval of Global Settlement.

accuracy and recommendation profitability for research firms are not significantly different from those of investment banks after the reforms.

Despite these behavior changes, there is some evidence that the Global Settlement may not have eliminated analyst affiliation bias. Using data from 1994 through 2008, Malmendier and Shanthikumar (2014) distinguish between strategic and non-strategic distortions in analyst behavior. Consistent with their expectations for strategic behavior, they find that affiliated analysts tend to issue more positive recommendations, but similar or more negative forecasts, than unaffiliated analysts.<sup>7</sup> In a recent survey of sell-side analysts, Brown, Call, Clement, and Sharp (2014) report that analysts view the generation of investment banking business as an important driver of their compensation and feel pressure from their research management to issue optimistic forecasts and/or recommendations. Recent actions by FINRA against Citigroup and Goldman Sachs also provide evidence of analyst involvement in IPO road shows and of analysts tipping selected clients, even after the Global Settlement.

### ***2.3. Hypothesis***

We contribute to the literature on analyst affiliation bias by examining the differential impact of the Global Settlement and contemporaneous regulatory changes on affiliation bias for sanctioned and non-sanctioned banks. We also provide a detailed analysis of the link between affiliation bias and the equity, debt, and M&A components of investment banking relationships. Our primary hypothesis is that analyst affiliation bias was eliminated following the Global Settlement. However, by separating sanctioned and non-sanctioned banks, we are able to examine two variations of this hypothesis. If the Global Settlement and concurrent regulatory changes imposed on the industry eliminated the conflicts of interest within investment banks that lead to analyst affiliation bias, we expect the bias to be eliminated for both sanctioned and non-sanctioned banks. However, if the principal effects of the Global Settlement

---

<sup>7</sup> Although not the main subject of our analysis, we also examined the relation between investment banking relationships and the bias and accuracy of analyst earnings forecasts. We define bias and accuracy by comparing each analyst's most recent forecast to actual earnings, where bias and accuracy are scaled by the standard deviation of forecasts across all analysts following the stock and normalized by subtracting the consensus (median) level of bias/accuracy. We find some evidence of optimistic forecasts by GS banks in the period prior to Global Settlement, but little evidence of a link between investment banking relationships and forecasts for GS banks in the post period or for non-sanctioned banks in either the pre or post period. We find little evidence of a consistent relation between analyst affiliation and forecast accuracy for either class of banks.

result from the punitive aspects or bank-specific requirements of the settlement, we expect affiliation bias to be eliminated only for sanctioned banks. We test these alternative versions of the hypothesis below.

### **3. Data and Sample Characteristics**

To construct our sample, we use two main data sources. First, we use SDC to identify all equity, debt, and M&A activity by a large sample of U.S. firms, allowing us to measure the relationships between firms and their investment banks. Second, we use I/B/E/S data to identify the stock recommendations of sell-side analysts and the brokerage firms for which the analysts work. Together, these two datasets allow us to provide a detailed examination of the link between analyst recommendations and investment banking relationships both before and after the Global Settlement.

#### ***3.1. Sample Firms and Investment Banking Activity***

We begin with the sample of all U.S. firms with listed common stock (CRSP share codes 10 or 11) between 1996 and 2009. After eliminating financials, utilities, and government agencies, the resulting sample includes 8,322 unique firms. For these firms, we then use the Securities Data Company (SDC) database to collect information on all public and private issues of equity and debt by the firm and any M&A transactions in which the firm is either the acquirer or the target. Firms are identified based on PERMCO in the CRSP data and based on CIDGEN in the SDC data. Firms are matched between the two databases using Cusip and, where possible, Ticker. To provide meaningful analysis of investment banking relationships, we exclude transactions for which either the transaction value or the identity of the underwriter/advisor is missing.

To identify affiliation through investment banking relationships, we focus on the most important investment banks in the sample. To identify these banks, we begin with the full sample of banks identified as lead or co-managing underwriters in the equity and debt samples or as advisors in the M&A sample.<sup>8</sup> We then compute market share ranks on an annual basis for each transaction type (equity, debt, and M&A). Finally, we compute each bank's average market share rank in each transaction type category

---

<sup>8</sup> Investment bank names are cleaned to eliminate multiple variations of the same investment bank name and to adjust for mergers and acquisitions among investment banks.

across all years during which the bank appears in the sample and limit our analysis to those investment banks with an average market share rank of 25 or higher in at least one transaction type category. In cases where one of the top 25 banks reflects the merger of two or more predecessor banks, all predecessor banks are also included. As shown in Table A2 in the Appendix, the resulting sample includes 57 different investment bank names during the sample period, with 48 active at the beginning of the sample period and 28 active at the end of the sample period.<sup>9</sup>

### **3.2. Analyst Recommendations**

To test analyst affiliation bias, we focus on analyst stock recommendations, one of the analysts' primary and most visible outputs. We collect recommendations data, including the identity of the broker employing the analyst, from I/B/E/S. We then link the recommendations to the sample of CRSP firms using CUSIPs and hand-match the broker names in I/B/E/S to the sample investment banks using the I/B/E/S broker translation file.

Following Ljungqvist et al. (2007) we examine recommendations at a quarterly frequency. For each calendar quarter end and each firm in our sample, we select the most recent recommendation issued during the preceding 12 months by each analyst covering the stock. We code recommendations as 1 (strong sell) through 5 (strong buy). We then define each analyst's relative recommendation, *RelRec*, by subtracting the consensus (i.e., median) recommendation across all analysts covering the firm in the same one-year window.<sup>10</sup> Finally, we limit our sample to stocks covered by at least one analyst employed by a sample investment bank. The resulting sample includes 216,242 quarterly observations, involving 4,628 analysts and 5,111 sample stocks.

### **3.3 Variable Construction and Sample Characteristics**

Our main empirical tests examine the relation between the relative recommendations of analysts

---

<sup>9</sup> For clarity following large investment bank mergers, we assign a new name to the combined bank. For example, we refer to the combination of Citibank and Salomon Smith Barney as Citigroup Salomon Smith Barney and the combination of UBS Warburg and Paine Webber as UBS Paine Webber. The 28 ultimate banks considered here compares to 16 studied in Ljungqvist et al. (2006) and Ljungqvist et al. (2007). Lehman and Merrill Lynch are eliminated from the sample because their recommendations are excluded from the I/B/E/S database for all or part of our sample period.

<sup>10</sup> In order to compute relative recommendations, our sample is restricted to firms that are followed by two or more analysts. As discussed in Section 3 below, we also provide robustness tests based on a redefined three-point recommendation scale. Our main conclusions are robust to this alternative specification.

(*RelRec*) and investment banking relationships between the analyst's firm and the covered stock, after controlling for firm, analyst, and investment bank characteristics that have been shown to affect recommendations. Our empirical model closely follows that in Ljungqvist et al. (2007), with several important differences. First, we examine investment banking relationships across a wider set of transaction types, including equity, debt, and M&A transactions. Second, we define relationships both within specific functional areas and across all functional areas. Finally, we examine affiliation bias both before and after the Global Settlement, allowing for differences between investment banks named in the Global Settlement and other banks. Table A1 in the Appendix contains all variable definitions.

Summary statistics for our sample of quarterly observations are provided in Panel A of Table 1. Consistent with previous research, we find that analysts primarily issue "buy" or "strong buy" recommendations, giving a mean (median) analyst recommendation across our sample of 3.6 (4.0). As noted earlier, our main variable of interest is the relative recommendation of the analyst (*RelRec*), defined as the difference between the analyst's recommendation and the consensus (i.e., median) recommendation across all analysts following the stock. *RelRec* has a range from -4 to +3, with a mean (median) of 0.0025 (0.0000) across our sample observations.

To proxy for investment banking relationships, we examine each firm's equity, debt, and M&A transactions during the 36 months preceding each quarter end. We then define relationship dummy variables (*IBRel*) for each investment bank-firm pair that equal one if the investment bank acted as lead or co-managing underwriter on an equity or debt issue, or as an advisor on an M&A transaction. While the majority of our tests are based on these relationship dummy variables, we also analyze continuous relationship variables based on the proportion of each firm's equity, debt, and M&A transaction value for which the bank acted as lead or co-managing underwriter, or advisor.

We define relationship measures both by transaction type (equity, debt, or M&A) and across all

combined transactions (overall relationship).<sup>11</sup> We expect affiliation bias to be better captured by overall relationships than by type-specific relationships for two reasons. First, equity, debt, and M&A transactions are discrete measures of what is likely an ongoing relationship. Thus, the use of multiple transaction types will better capture the ongoing nature of any underlying relationship. Second, if there is any pressure placed on the analyst to produce optimistic coverage, then this pressure will only be magnified when the investment banking relationship spans multiple functional areas.

To illustrate the potential benefits of the overall relationship measure, Figure 1 plots the time series of relationships between Convergys Corp. and Citi-Salomon-Smith, based on 36-month windows. Convergys used this bank as a lead equity underwriter on their August 1998 IPO, as a lead debt underwriter in September 2000 and December 2004, and as an M&A advisor in April 2001. When we incorporate all three transaction types, we are able to capture the ongoing nature of the relationship between Convergys and Citi-Salomon-Smith over the entire period from 1998 through 2007. However, when we define relationships based on any individual transaction type (equity, debt, or M&A) the relationship measure is spotty and only covers sub-periods from August 1998 through December 2007.

Summary statistics for our type-specific and overall relationship measures are provided in the second section of Table 1. Across all quarterly observations, the mean transaction type-specific relationship ranges from 2.43% for M&A transactions to 3.24% for equity transactions. Incorporating all transaction types, the mean overall relationship is 5.90%. In untabulated results, we find that the proportion of quarterly observations with no relationship equals 87.2% for the overall relationship measure, compared to 93.5% for equity, 93.6% for debt, and 96.3% for M&A. This provides one indication that the overall relationship measure may better identify ongoing relationships in cases where type-specific relationship measures do not.

Our remaining control variables are motivated by prior literature and closely follow the specification in Ljungqvist et al. (2007). To control for investment bank characteristics, we define two

---

<sup>11</sup> For the overall relationship variable, we measure at each quarter end date the proportion of a firm's combined equity, debt, and M&A transaction value during the preceding 36 months for which each investment bank acted as lead underwriter, co-managing underwriter, or adviser, and an indicator variable for whether this value is greater than zero.

continuous variables and a set of indicator variables. We define investment bank size (*IB\_Size*), as the number of analysts employed by the investment bank during quarter  $t$ , based on I/B/E/S recommendations.<sup>12</sup> Investment bank market share, *IB\_MktShare*, is the proportion of total deal value across all firms during the previous 12 months for which the investment bank acted as a lead or co-managing underwriter or M&A advisor. Like the relationship measures, *IB\_MktShare* is defined by transaction type (equity, debt, or M&A) and across all combined transactions (overall). As shown in Table 1, the mean (median) number of analysts employed by an investment bank is 89 (85) and investment bank market shares average 4.55%, 4.77%, and 4.38% for equity, debt, and M&A, respectively. We also define two indicator variables, *IB\_GS* and *IB\_NonGS*, to distinguish between those investment banks sanctioned in the Global Settlement (including subsequent name variations of the same banks) and other non-sanctioned banks, respectively. Based on this categorization, 57% of our quarterly observations are from sanctioned banks and 43% from non-sanctioned banks. Appendix Table A2 lists the sample investment banks in each category.

We define six analyst-level characteristics. Four of these variables are defined directly from the I/B/E/S recommendations data. *Seniority* is the number of years since the analyst first appeared in I/B/E/S and *Seasoning* is the number of years since the analyst initiated coverage on the particular stock. *NFollow* is the number of firms followed by the analyst during the quarter and *JobMove* is an indicator variable that equals 1 if the analyst changed employers during the quarter. Following Hong and Kubik (2003) and Ljungqvist et al. (2007), we define relative forecast accuracy (*RelAccuracy*) based on the analyst's average earnings forecast accuracy across all followed stocks.<sup>13</sup> Finally, *AllStar* is an indicator variable that equals 1 if the analyst is ranked as an All-Star by *Institutional Investor* magazine during year  $t-1$ ,

---

<sup>12</sup> Ljungqvist et al. measure investment bank size as the number of registered representatives employed by the IB.

<sup>13</sup> For each analyst following each firm, we first estimate the absolute value of the difference between the analyst's most recent forecast of fiscal-year earnings and actual earnings, scaled by prior year price. We then rescale such that the most accurate analyst following the firm scores 1 and the least accurate analyst scores 0. Finally, each analyst's relative forecast accuracy is defined as their mean score across all stocks followed over years  $t-2$  through  $t$ . See Appendix Table A1 for a more complete description.

and 0 otherwise. For the mean (median) observation in our sample the analyst has seniority of 5.4 (4.9) years, seasoning of 2.3 (1.4) years, and follows 11 (10) stocks. The mean and median values of relative accuracy are 41.23% and 40.96%, respectively. Finally, 18.9% of the recommendation observations in our sample are issued by All-Star analysts and 3.2% by analysts that changed employers during the quarter.

Our last set of control variables is related to firm characteristics. *ANF* is the number of analysts issuing recommendations for the firm during the previous 12 months, based on I/B/E/S recommendations. *MV* is the firm's market value of equity at the end of the prior calendar year, as defined by CRSP. *InstHoldings* is the percentage of shares held by institutional investors at the end of the quarter, based on Thomson Reuters' 13F filings. Lastly, *Proceeds* is the total value of transaction by the firm during the previous 36 months, defined for each transaction type (equity, debt, or M&A) and across all combined transactions (overall). Across all observations in our sample, mean (median) values are 11 (1) for analyst following, \$9.6 (\$1.9) billion for market capitalization, and 62% (70%) for institutional holdings. Three-year proceeds average \$77 million, \$428 million, and \$1,055 million for equity, debt, and M&A, respectively. Across quarterly observations with non-zero proceeds, these averages increase to \$300 million, \$1,145 million, and \$2,981 million.

Panel B of Table 1 provides mean values of all variables for the subsamples of observations involving sanctioned and non-sanctioned banks. As expected, sanctioned banks tend to be larger and have higher market shares than non-sanctioned banks. For example, the mean values of *IB\_Size* (i.e., number of analysts) and equity market share are 116.2 and 7.2% for sanctioned banks, compared to 52.1 and 1.01% for non-sanctioned banks. Other categories of market share and measures of investment banking relationships provide similar results. Analyst and firm characteristics also differ significantly between the two groups of banks, though the differences are smaller economically than the differences in bank size and market share. Analysts employed by sanctioned banks are more likely to be ranked as All Stars, have higher seniority and seasoning, and follow more stocks than analysts employed by non-sanctioned banks.

In addition, analysts employed by sanctioned banks tend to follow larger stocks, with higher institutional ownership and more equity, debt, and M&A activity. While forecast bias and accuracy are similar across the two groups of analysts, recommendations and relative recommendations tend to be higher for analysts at non-sanctioned banks, on average. As a result, we control for differences between sanctioned and non-sanctioned banks in our analysis to follow. Despite the observed differences described above, non-sanctioned banks and the firms that hire them are involved in a significant fraction of equity, debt, and M&A activity over our sample period and account for a large fraction (43%) of the quarterly analyst observations in our data.

To highlight the relation between investment banking relationships and analyst recommendations, Figure 2 plots the frequency of various recommendations for sanctioned and non-sanctioned banks across the entire sample of quarterly observations. Frequencies are further categorized by whether or not the analyst was affiliated with the covered firm, where affiliation is defined based on the overall investment banking relationship over the previous 36 months. Results for the period prior to the Global Settlement are provided in Panel A and results for the period following Global Settlement are provided in Panel B.

The plots on the left show frequencies based on a 5-tier recommendation scale. From these graphs, it is clear that Sell and Strong Sell recommendations are rare in the period before the Global Settlement. While negative recommendations are more common in the post period, they remain relatively rare. Most importantly, the graph shows that affiliated analysts are more likely to issue Strong Buy recommendations and less likely to issue Hold or Sell recommendations than unaffiliated analysts. Although the bias is reduced in the period after the Global Settlement, it does not appear to be eliminated for either sanctioned or non-sanctioned banks, and remains particularly strong for non-sanctioned banks.

Kadan et al. (2009) note that, following the Global Settlement, many large investment banks shifted from 5-tier to 3-tier recommendation schemes. This shift is also evident in our data. For example, from 1998-2001, Deutsche Bank's investment recommendations included the five categories: Strong Buy, Buy, Hold, Underperform, and Sell. In contrast, from 2004-2009, Deutsche Alex Brown's investment

recommendations included the three categories: Buy, Hold, and Sell. To ensure that our results are robust to this shift in recommendation schemes, we reassign all recommendations to a 3-tier scale. Frequencies based on this redefined scale are shown on the right side of Figure 2. The results from this redefined scale are consistent with those from the 5-tier scale, with affiliated analysts being less likely to issue Sell or Hold recommendations and more likely to issue Buy recommendations.

The results in Figure 2 suggest that analyst affiliation bias persists following the Global Settlement. However, these frequencies do not control for other factors that may affect analyst recommendations. In the next section, we therefore analyze analyst recommendations in a multivariate framework.

#### 4. Results

In this section, we describe our main results related to analyst affiliation bias. Using the quarterly data described above, we estimate variations of the following general model specification:

$$\begin{aligned}
 RelRec_{ijkt} = & \alpha + \beta_1 \times IB\_GS + \beta_2 \times IB\_NonGS + \beta_3 \times IBRel_{jkt} \times IB\_GS + \beta_4 \times IBRel_{jkt} \times IB\_NonGS \\
 & + \sum_{i=1}^I \delta_i \times AnalystChar_i + \sum_{j=1}^J \gamma_j \times IBChar_j + \sum_{k=1}^K \lambda_k \times StockChar_k + \varepsilon_{ijkt},
 \end{aligned} \tag{1}$$

where  $IBRel_{jkt}$  indicates an investment banking relationship between investment bank  $j$  and firm  $k$  during the 36 months ending in quarter  $t$ , and the remaining variables represent controls for analyst, investment bank, and stock characteristics. Our main tests are based on a comparison of the relationship interaction terms involving  $IB\_GS$  and  $IB\_NonGS$ , which are dummy variables that distinguish between investment banks that were and were not sanctioned in the Global Settlement, respectively. To examine the impact of the Global Settlement on analyst affiliation bias, we provide two sets of analysis. In the full period analysis, we interact the relationship variables with a dummy variable equal to one for all quarters after the Global Settlement and zero otherwise. We also provide separate analyses for the sub-periods 1998-2001 and 2003-2009. Following Kadan et al. (2009), we define the implementation date for the Global Settlement as September 2002, but because the investigations related to investment banking conflicts of interest were ongoing during 2002, we exclude 2002 from the sub-period analysis. Our general

specifications also include year and firm fixed effects.

#### ***4.1 Relative Recommendations and Investment Banking Relationships***

The full period regression results are presented in Table 2. *P*-values based on robust standard errors clustered by firm are reported below the coefficients. Examining the coefficients on the control variables, we see that relative recommendations are lower for large investment banks and for analysts that cover a large number of stocks, and higher for more experienced analysts and for stocks followed by a large number of analysts. Investment bank market share is positively related to relative recommendations for equity, M&A, and overall relationships, but negatively related for debt relationships. The coefficient signs for investment bank market share, for analyst All-Star ranking, seasoning, and number of firms followed, and for the firm's analyst following are generally consistent with results reported in Ljungqvist et al. (2007), but the negative coefficient on investment bank size differs from their results.<sup>14</sup> Consistent with expectations, the coefficient on the post-Global Settlement dummy variable indicates that relative recommendations dropped in the post period. As in Table 1, there is also evidence that non-sanctioned banks tend to have higher recommendations than sanctioned banks, especially in the post-Global Settlement period.

Turning to the results for investment banking relationships, we find strong evidence that both sanctioned and non-sanctioned banks exhibited significant affiliation bias in the pre-Global Settlement period. This result holds for each type-specific relationship (equity, debt, and M&A), as well as for the overall relationship. However, the post-GS interaction terms point to significant differences between sanctioned and non-sanctioned banks in the period following the Global Settlement. For sanctioned banks, the interaction terms suggest that analyst affiliation bias is significantly reduced in the post-Global Settlement period. In particular, the combined post-Global Settlement effects listed at the bottom of the table show that analyst affiliation bias is insignificant in the post period for equity relationships, and marginally significant for debt and M&A relationships. The results for overall relationships point to

---

<sup>14</sup> In our analysis of the sub-period from 1998-2001 (Table 3 Panel A), we obtain a positive and significant coefficient on investment bank size, consistent with Ljungqvist et al.'s (2007) results for the 1994-2000 sample period.

statistically significant affiliation bias for sanctioned banks in the period after the Global Settlement, but the magnitude of the effect is substantially reduced from the pre period. Based on the coefficients on the overall relationship variable (0.160) and the post-GS interaction term (-0.129), affiliation bias is reduced by approximately 81% in the post Global Settlement period for sanctioned banks.

The results for non-sanctioned banks provide a sharp contrast. For these investment banks, analyst affiliation bias is not reduced significantly in the period following the Global Settlement. The results provide strong evidence of a continued analyst affiliation bias in the period following the Global Settlement for non-sanctioned banks, regardless of whether relationships are measured based on equity, debt, or M&A transactions, or across all combined transactions. Based on the coefficients on the overall relationship variable (0.171) and the post-GS interaction term (-0.010), affiliation bias is reduced by only 5.9% in the post Global Settlement period for non-sanctioned banks and this reduction is statistically insignificant.

To better understand the effects of analyst affiliation bias in the periods before and after the Global Settlement, we estimate models using two sub-periods: 1998-2001 and 2003-2009. The results are presented in Panels A and B of Table 3, respectively. As in Table 2, the results for the first sub-period point to significant analyst affiliation bias for both sanctioned and non-sanctioned banks. For sanctioned banks, the coefficient on *IBRel* is positive and significant for all type-specific and overall relationships. For non-sanctioned banks, the coefficient is positive and insignificant for equity and debt relationships, positive and marginally significant for M&A, and significantly positive for the overall relationship measure. . Equality of coefficients between sanctioned and non-sanctioned banks cannot be rejected for any of the relationships measures in the pre-settlement sub-period.

The results for the second sub-period (Panel B) confirm the findings from Table 2. For sanctioned banks, the coefficient on *IBRel* is positive but insignificant for equity relationships, positive and marginally significant for debt and M&A, and significantly positive for overall relationships. However, as in Table 2, the impact of investment banking relationships on relative recommendations is substantially

reduced for sanctioned banks in the post-Global Settlement period. For non-sanctioned banks, significant analyst affiliation bias remains in the post-Global Settlement period, regardless of the relationship measure used. Indeed, the coefficients uniformly increase in the second sub-period for non-sanctioned banks. Equality of coefficients between sanctioned and non-sanctioned banks is rejected in the second sub-period for equity ( $p$ -value=0.002), M&A (0.014), and overall relationships (0.000), but is not rejected for debt relationships (0.145).

The results from Tables 2 and 3 suggest that overall investment banking relationships better capture analyst affiliation bias than relationship measures based solely on equity, debt, or M&A transactions. As noted earlier, this may reflect that relationships spanning multiple functional areas put more pressure on analysts to produce optimistic recommendations or it may be the result of the overall measure better capturing the continuous nature of the underlying investment banking relationship. In unreported results, we examine whether any of the type-specific relationship measures have incremental explanatory power when included in the regression with the overall measure. In each case, the effects of type-specific relationships are subsumed by the overall relationship measure. Given these results, we focus on overall investment banking relationships throughout the rest of the paper.

The specifications described in Tables 2 and 3 follow prior literature by including firm fixed effects. To examine the robustness of the results to this choice and to the specification of the relationship measure, Table 4 reports results from alternative specifications incorporating analyst and investment bank fixed effects using both the indicator and continuous relationship measures. Results for the sub-periods before and after the Global Settlement are provided in Panels A and B, respectively. The first column in each panel of Table 4 repeats the overall relationship specification from Table 3. Comparing this specification to those based on alternative fixed effects and continuous relationship measures shows that the main results are robust to these alternative specifications. For both continuous and discrete measures of investment banking relationships, the results point to significant analyst affiliation bias in the first sub-period, regardless of specification. In the second sub-period, the results become somewhat weaker after

incorporating investment bank fixed effects, but remain significant, especially for non-sanctioned banks. Interestingly, results for sanctioned banks are statistically significant based on relationship dummy variables, but insignificant based on continuous relationship measures.

In unreported results, we estimated two other robustness checks. First, we re-estimated the basic model for the subsets of sanctioned and non-sanctioned banks. Second, we re-estimated the model for the subset of firms covered by at least one affiliated and one non-affiliated analyst. In all cases, the findings are consistent with the overall results reported above.

Taken together, the results in Tables 2 through 4 provide strong evidence of analyst affiliation bias in the period following the Global Settlement for at least some investment banks. While this bias is substantially reduced in the post-Global Settlement period for investment banks named in the settlement, it remains significant when measured based on overall investment banking relationships. The coefficients from Table 2 suggest an 81% reduction in the magnitude of the bias for sanctioned banks when measured with the overall relationship. For the banks not named in the Global Settlement, analyst affiliation bias remains large and significant even after the Global Settlement. These results suggest that the reduction in affiliation bias is driven by the punitive and bank-specific requirements of the Global Settlement, rather than the broader regulatory changes that accompanied the settlement.

#### ***4.2. Relative Recommendations based on a 3-Tier System***

Kadan et al. (2009) point out that, following the Global Settlement, many brokerages shifted from 5-tier to 3-tier recommendation scales, with all ten of the original Global Settlement banks adopting 3-tier scales in 2002 or soon thereafter. If only sanctioned banks shifted to this new recommendation scale or if the shift differs by bank type, it is possible that our measure of relative recommendations is inflated for non-sanctioned banks relative to sanctioned banks. To ensure that our results are not driven by this shift in recommendation scales, we re-estimate our main regressions after redefining all recommendations based on a 3-tier scale. Specifically, we redefine I/B/E/S recommendations such that a 3 represents a Strong Buy or Buy and a 1 represents a Sell or Strong Sell, and recalculate relative recommendations accordingly.

Table 5 reports regression results based on this redefined relative recommendation variable, with results for the sub-periods before and after the Global Settlement reported in Panels A and B, respectively. For completeness, we provide results based on transaction type relationships (equity, debt, and M&A), as well as overall relationships. For both sub-periods, the results are generally consistent with the main results presented in Tables 2 and 3. In the first sub-period, there is evidence of analyst affiliation bias for sanctioned banks based on all relationship measures. For non-sanctioned banks, there is evidence of analyst affiliation bias based on M&A and overall relationships, but insignificant results based on equity and debt relationships.

In the second sub-period, the impact of analyst affiliation is reduced for sanctioned banks, though it remains statistically significant for all relationship measures. For non-sanctioned banks, we again find strong evidence of analyst affiliation bias in the post-settlement period based on both transaction type and overall relationship measures. Thus, our results are not driven by the shift of some investment banks from a 5-tier to a 3-tier recommendation scale.

#### ***4.3. Logit Models for Buy/Sell Recommendations***

As an alternative test, we follow Kadan et al. (2009) in estimating logit models for the likelihood of buy/strong buy recommendations and the likelihood of sell/strong sell recommendations, where we focus on affiliation effects and differences between sanctioned and non-sanctioned banks. The models follow the specification described in equation (1). However, we define two alternative dependent variables. The first is an indicator variable equal to one if the analyst issues a buy or strong buy recommendation and zero otherwise. The second is an indicator variable equal to one if the analyst issues a sell or strong sell recommendation and zero otherwise. The logit framework has two advantages over the regression specifications presented earlier. First, like the analysis in Table 5, the dependent variables in the logit models are defined based on a 3-tier recommendation scale and are therefore robust to a shift in recommendation scales by some investment banks. Second, the dependent variables in the logit model are defined directly from I/B/E/S recommendations and are therefore unaffected by the definition of

“consensus” ranking used in the construction of *RelRec*.

Table 6 presents the results from the logit models for both the full period and the pre/post Global Settlement sub-periods. Again, the findings point to significant analyst affiliation bias. In the models for buy/strong buy recommendations, the results suggest that both sanctioned and non-sanctioned banks are significantly more likely to issue buy or strong buy recommendations when affiliated with the covered firm through an investment banking relationship. For sanctioned banks, this effect is strongest during the first sub-period, but remains statistically significant even after the Global Settlement. For non-sanctioned banks, affiliation bias is statistically significant and similar in magnitude both before and after the Global Settlement.

The logit results for sell/strong sell recommendations point to symmetric effects in terms of pessimistic recommendations, although the results appear to be driven primarily by the period after the Global Settlement. Specifically, during the post-Global Settlement period, both sanctioned and non-sanctioned banks are less likely to issue sell or strong sell recommendations when affiliated with the firm through an investment banking relationship.

The results from the logit models are largely consistent with those based on relative recommendations and suggest that analysts tend to issue more optimistic (or less pessimistic) recommendations on firms with which their employer has an investment banking relationship.

## **5. The Impact of Lending Activity on Analyst Affiliation Bias**

The passage of the Gramm-Leach-Bliley Act in 1999 led to a substantial increase in the role of commercial banks in investment banking and more direct ties between lending and underwriting relationships. For example, Ljungqvist et al. (2006), Drucker and Puri (2005), Yasuda (2005), and Bharath, Dahiya, Saunders, and Srinivasan (2007) find that lending relationships increase the likelihood of a bank being awarded future debt and equity underwriting business, and Corwin and Stegemoller (2014) identify important links between lending and the cross-functional nature of investment banking relationships. In this section, we examine whether lending relationships have any incremental impact on

analyst affiliation bias, after controlling for investment banking relationships based on equity, debt, and M&A transactions.<sup>15</sup>

To examine lending relationships, we use Dealscan data to collect the sample of syndicated loans involving our sample firms. We match CRSP firms to Dealscan data using the link table provided by Michael Roberts and Wharton Research Data Services (see Chava and Roberts (2008)). For each loan, we identify the loan amount and all lenders identified as having lead arranger credit. Notably, the Dealscan data include both loans and revolving credit line agreements. We believe credit lines are an important part of a lending relationship, regardless of whether or not the loan is drawn down. However, the fact that these loans may not be drawn down suggests that the total loan values in Dealscan will not be comparable to the transaction values in the equity, debt, and M&A datasets.

To integrate the lending and investment banking datasets, we hand match lender names to our sample of large investment banks. Following the construction of the investment banking variables, we calculate investment bank market share, firm loan proceeds, and firm-lender relationships at the end of each quarter. For each investment bank in our sample, we calculate lending market share based on all loans over the prior twelve months. For each firm in our sample, we calculate lending proceeds as the sum of all loans received over the preceding 36 months. Finally, for each firm-investment bank pair, we calculate the lending relationship as the proportion of the firm's total loan value over the preceding 36 months for which the investment bank was assigned lead arranger credit and we calculate a revised "overall" relationship measure combining lending with equity, debt, and M&A transaction values.

Summary statistics for the lending variables are provided in Panel A of Table 7. Across all quarterly observations in our sample, the lending relationship has a mean value of 2.82% and the overall relationship incorporating lending has a mean value of 5.84%. Investment bank market share has a mean (median) value of 4.56% (0.74%) based on lending alone and 4.58% (2.05%) based on the combined values of lending, equity, debt, and M&A transactions. The average value of three-year lending proceeds

---

<sup>15</sup> Although they do not analyze recommendations, Chen and Martin (2011) examine the relation between earnings forecast accuracy and lending relationships. They find that forecast accuracy improves after a firm borrows from an affiliated bank, suggesting that lending provides affiliated analysts with an informational advantage over other analysts.

for the firms in our sample is \$964.1 million across all observations and \$1,818.3 million across observations with positive lending proceeds.

Table 7 describes coefficients from regressions of relative recommendations on the set of control variables and investment banking relationship variables, after incorporating lending, with results for the pre and post-Global Settlement sub-periods in Panels B and C, respectively. To conserve space, coefficients on control variables are not included. The table provides results from four different specifications. The first specification includes only lending relationship indicators. This specification suggests that lending relationships have a positive impact on analyst affiliation bias in the 1998-2001 sub-period, but an insignificant effect after 2002. In the second specification, we include the lending relationship indicator in addition to the overall relationship indicator based on equity, debt, and M&A transactions. This regression suggests that lending may have some incremental impact on affiliation bias beyond that captured by the investment banking relationship, but the impact is again strongest during the first sub-period.

In the third specification, we again include the overall relationship indicator based on combined equity, debt, and M&A transactions, but we add an interaction with the lending relationship indicator. The results from this specification suggest that the affiliation bias associated with investment banking relationships is magnified in cases where there is also a lending relationship, especially during the first sub-period. Finally, in the fourth specification, we provide results based on the redefined overall relationship indicator that incorporates equity, debt, M&A, and lending transactions. This combined measure produces results that are similar to those from the overall relationship measure without lending, with affiliation bias being significant for non-sanctioned banks in both sub-periods and strongest for sanctioned banks in the first sub-period.

The results in Table 7 provide weak evidence that lending leads to incremental affiliation bias effects beyond those captured by investment banking relationships, at least during the first sub-period. However, unlike the main results based on equity, debt, and M&A relationships, the findings in Table 7

are sensitive to the inclusion of alternative fixed effects. In untabulated results, we find that when either analyst or investment bank fixed effects are included in these models, the incremental effects of lending become insignificant. Thus, there is limited evidence of any incremental impact of lending relationships on analyst affiliation bias in the period after the Global Settlement.

## **6. Conclusion**

Previous research provides strong evidence of conflicts of interest between investment banking and research departments within large investment banks. In particular, research shows that analysts tend to issue optimistic recommendations on firms with which their employer has an equity underwriting relationship. One of the major purposes of the 2003 Global Analyst Research Settlement reached between the SEC, NYSE, NASD, New York Attorney General, and North American Securities Administrators Association and 12 of the largest investment banks was to reduce these conflicts of interest. In this study, we use a comprehensive measure of relationships between investment banks and firms to examine the impact of the Global Settlement on analyst affiliation bias.

Our data include all equity, debt, and M&A transactions by U.S. firms, allowing us to analyze a more comprehensive measure of investment banking relationships than has been studied in prior literature. In general, we find evidence of analyst affiliation bias for each individual type of investment banking relationship. However, our results suggest that an overall measure spanning all functional areas does a better job of capturing investment banking relationships and the related affiliation bias.

To better understand the impact of the Global Settlement and contemporaneous regulatory changes on analyst behavior, we separate analysts employed by investment banks named in the Global Settlement (sanctioned banks) and other top investment banks (non-sanctioned banks). Consistent with prior research, our results provide strong evidence of analyst affiliation bias for both groups of banks in the period prior to the Global Settlement. Following the Global Settlements, affiliation bias is substantially reduced, but not eliminated, for those banks named in the Global Settlement. In contrast, we find strong evidence of analyst affiliation bias for non-sanctioned banks even after the Global Settlement.

These findings suggest that the Global Settlement and related regulatory changes were only partially successful in mitigating conflicts of interest between investment banking and analyst research. In particular, the impact appears limited to the subset of sanctioned banks, suggesting that the decline in analyst affiliation bias is driven by the punitive aspects or bank-specific requirements of the Global Settlement more than the broader regulatory changes imposed on the industry.

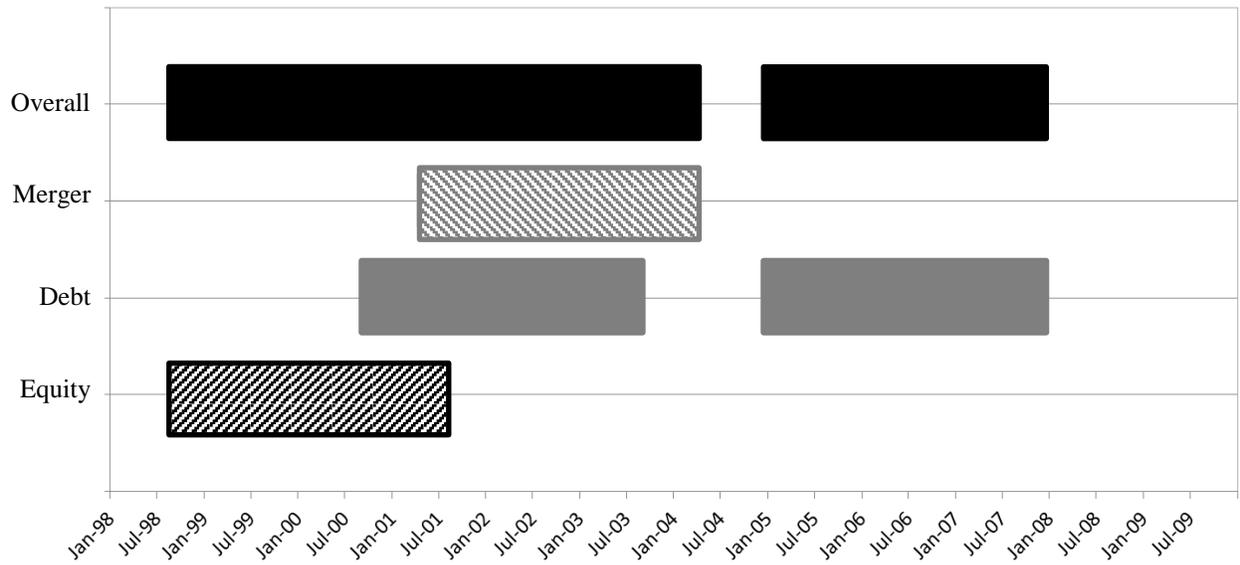
## References

- Barber, B., R. Lehavy, and B. Trueman. 2007. Comparing the stock recommendation performance of investment banks and independent research firms. *Journal of Financial Economics* 85: 490–517.
- Barniv, R., O.-K. Hope, M. Myring, and W. Thomas. 2009. Do analysts practice what they preach and should investors listen? Effects of recent regulations. *The Accounting Review* 84 (4): 1015-1039.
- Beneish, M. 1991. Stock prices and the dissemination of analysts' recommendations. *Journal of Business* 64 (3): 393-416.
- Bharath, S., S. Dahiya, A. Saunders, and A. Srinivasan, 2007, So what do I get? The bank's view of lending relationships, *Journal of Financial Economics* 85, 368-419.
- Bradshaw, M. 2004. How do analysts use their earnings forecasts in generating stock recommendations? *The Accounting Review* 79 (1): 25-50.
- Bradshaw, M., S. Richardson, and R. Sloan. 2006. The relation between corporate financing activities, analysts' forecasts and stock returns. *Journal of Accounting and Economics* 42: 53-85.
- Brown, L., A. Call, M. Clement, and N. Sharp. 2014. Inside the "black box" of sell-side financial analysts. *Journal of Accounting Research*, forthcoming.
- Chava, S., and M. Roberts, 2008, How does financing impact investment? The role of debt covenants, *Journal of Finance* 63, 2085-2121.
- Chen, T., and X. Martin. 2011. Do bank-affiliated analysts benefit from lending relationship? *Journal of Accounting Research* 49 (3): 633-675.
- Chen, C.-Y., and P. Chen. 2009. NASD Rule 2711 and changes in analysts' independence in making stock recommendations. *The Accounting Review* 84 (4): 1041-1071.
- Clarke, J., A. Khorana, A. Patel, and P. Rau. 2011. Independents' day? Analyst behavior surrounding the Global Settlement. *Annals of Finance* 7: 529-547.
- Corwin, S. A., and M. Stegemoller. 2014, The changing nature of investment banking relationships. Working paper, University of Notre Dame and Baylor University.
- Cowen, A., B. Groysberg, and P. Healy. 2006. Which types of analyst firms are more optimistic? *Journal of Accounting and Economics* 41: 119-146.
- Dechow, P., A. Hutton, and R. Sloan. 2000. The relation between analysts' forecast of long-term earnings growth and stock price performance following equity offerings. *Contemporary Accounting Research* 17 (1): 1-32.
- De Franco, G., H. Lu, and F. Vasvari. 2007. Wealth transfer effects of analysts' misleading behavior. *Journal of Accounting Research* 45 (1): 71-110.
- Drucker, S., and M. Puri, 2005, On the benefits of concurrent lending and underwriting, *Journal of Finance* 60, 2763-2799.

- Dugar, A., and S. Nathan. 1995. The effect of investment banking relationships on financial analysts' earnings forecasts and investment recommendations. *Contemporary Accounting Research* 12 (1): 131-160.
- Francis, J. and D. Philbrick. 1993. Analysts' decisions as products of a multi-task environment. *Journal of Accounting Research* 31: 216-230.
- Guan, Y., H. Lu, and F. Wong. 2012. Conflict-of-interest reforms and investment bank analysts' research biases. *Journal of Accounting, Auditing, and Finance* 27 (4): 443-470.
- Hong, H., and J. Kubik. 2003. Analyzing the analysts: career concerns and biased earnings forecasts. *Journal of Finance* 58: 313-351.
- Irvine, P. 1996. Do analysts generate trade for their firms? Evidence from the Toronto stock exchange. *Journal of Accounting and Economics* 30: 209-226.
- Kadan, O., L. Madureira, R. Wang, and T. Zach. 2009. Conflicts of interest and stock recommendations – the effect of the Global Settlement and related regulations. *Review of Financial Studies* 22 (10): 4189-4217.
- Kadan, O., L. Madureira, R. Wang, and T. Zach. 2012. Analysts' industry expertise. *Journal of Accounting and Economics* 54: 95-120.
- Kolasinski, A., and S.P. Kothari. 2008. Investment banking and analyst objectivity: Evidence from analysts affiliated with mergers and acquisitions advisors. *Journal of Financial and Quantitative Analysis* 43 (4): 817-842.
- La Porta, R. 1996. Expectations and the cross-sections of returns. *The Journal of Finance* 51 (5): 1715-1742.
- Lin, H., and M. McNichols. 1998. Underwriting relationships, analysts' earnings forecasts and investment recommendations. *Journal of Accounting and Economics* 25 (1): 101-127.
- Ljungqvist, A., F. Marston, and W. J. Wilhelm, Jr., 2006, Competing for securities underwriting mandates: Banking relationships and analyst recommendations, *Journal of Finance* 61, 301-340.
- Ljungqvist, A., F. Marston, L. Starks, K. Wei, and H. Yan. 2007. Conflicts of interest in sell-side research and the moderating role of institutional investors. *Journal of Financial Economics* 85: 420-456.
- Ljungqvist, A., F. Marston, and W. Wilhelm. 2009. Scaling the hierarchy: How and why investment banks compete for syndicate co-management appointments. *The Review of Financial Studies* 22 (10): 3977-4007.
- McNichols, M., and P. O'Brien. 1997. Self-selection and analyst coverage. *Journal of Accounting Research* 35 (Supplement): 167-199.
- Mehran, H., and R. Stulz. 2007. The economics of conflicts of interest in financial institutions. *Journal of Financial Economics* 85: 267-296.
- Michaely, R. and K. Womack. 1999. Conflict of interest and the credibility of underwriter analyst recommendations. *The Review of Financial Studies* 12 (4): 653-686.

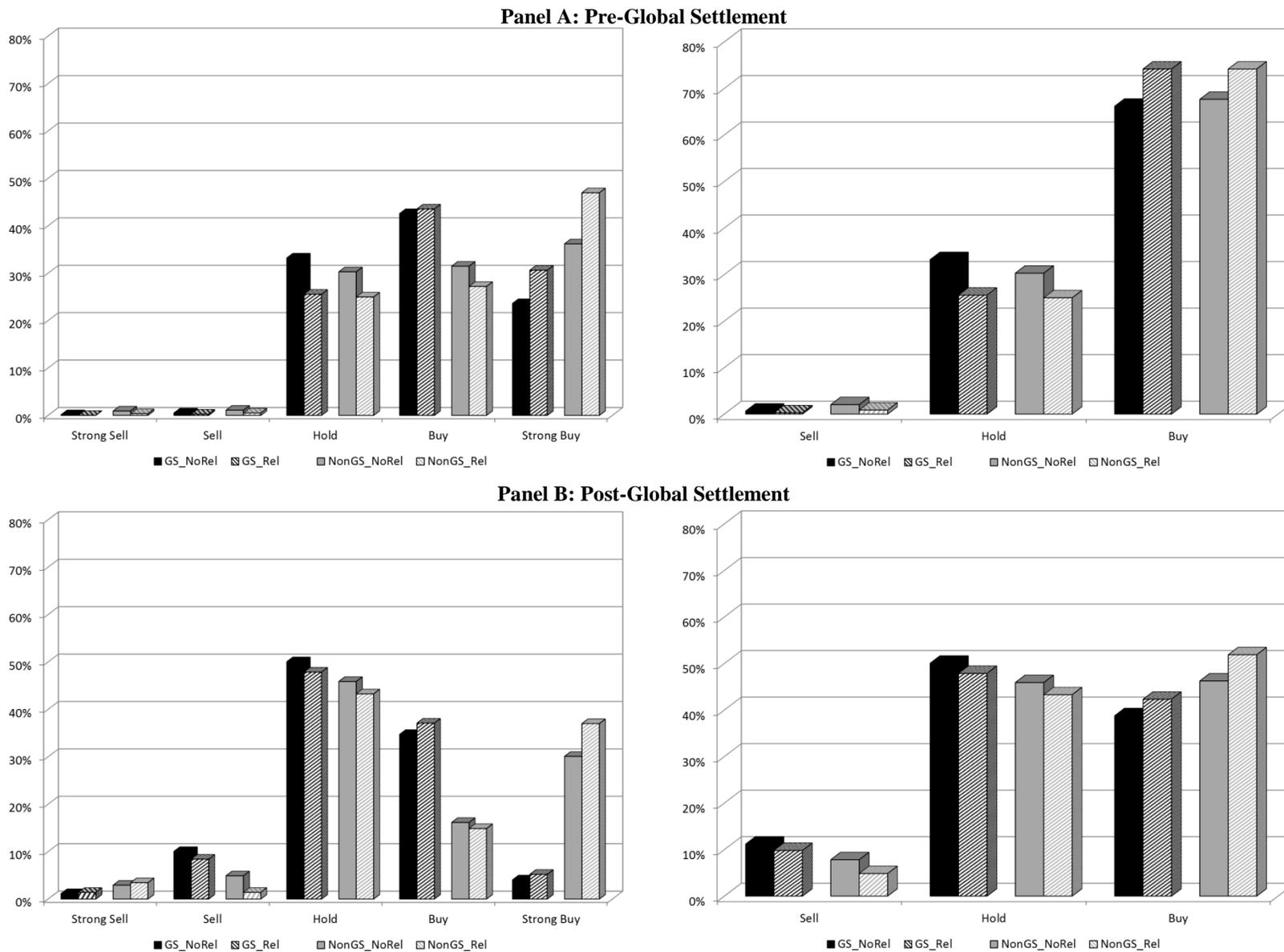
O'Brien, P., McNichols, M., Lin, H., 2005. Analyst impartiality and investment banking relationships. *Journal of Accounting Research* 43, 623–650.

Yasuda, A., 2005, Do bank relationships affect the firm's underwriter choice in the corporate bond underwriting market? *Journal of Finance* 60, 1259-1292.



**Figure 1 – Relationship Illustration for Convergys Corp and Citi Salomon Smith**

This figure provides an illustration of our measures of investment banking relationships. We define a firm-bank pair as having a relationship if at any point during the preceding 36 months, the firm had an equity, debt, or M&A transaction for which the investment bank served as a lead or co-managing underwriter or M&A advisor. Equity, debt, and M&A relationships are defined based only on transactions within each category. The overall relationship is defined based on transactions across all three categories.



**Figure 2 – Recommendation Frequency Before and After Global Settlement**

The figure plots recommendation frequencies for our sample of quarterly data, where frequencies are classified on both a five-tier and a three-tier scale. Analysts are classified as being affiliated with either a Global Settlement bank or a non-Global Settlement bank and firm-analyst observations are separated into those that are associated with an investment bank relationship and those that are not, based on the overall investment banking relationship.

**Table 1 – Summary Statistics**

This table provides descriptive statistics for the variables used in this study. Variable definitions are contained in Appendix Table A1. Panel A provides summary statistics for the full sample, including 216,242 quarterly observations. The non-zero proceeds variables are based on 55,221 observations for equity, 80,823 observations for debt, 76,491 observations for M&A, and 140,997 observations for all combined transactions (overall). Panel B provides mean values for the subsamples of observations related to sanctioned and Non-sanctioned bank analysts. The  $p$ -value in the last column of Panel B is from a test of difference in means across sanctioned and Non-sanctioned banks based on analysis of variance.

Panel A: Full Sample Summary Statistics					
	Mean	Median	Min	Max	Std. Dev.
<i>Recommendation and Forecast Measures:</i>					
Analyst Recommendation	3.61	4.00	1.00	5.00	0.91
Relative Recommendation	0.0025	0.00	-4.00	3.00	0.80
Adjusted Forecast Bias	-0.0351	0.00	-9.24	5.57	0.96
Adjusted Forecast Accuracy	0.0437	0.00	-9.11	5.34	0.87
<i>IB Relationship Measures:</i>					
IBRel_Equity (%)	3.24	0.00	0.00	1.00	15.51
IBRel_Debt (%)	2.72	0.00	0.00	1.00	13.03
IBRel_Merger (%)	2.43	0.00	0.00	1.00	14.14
IBRel_Overall (%)	5.90	0.00	0.00	1.00	19.49
<i>IB Characteristics:</i>					
IB_Size	88.74	85.00	1.00	250.00	49.65
IB_MktShare_Equity (%)	4.55	2.81	0.00	22.11	4.84
IB_MktShare_Debt (%)	4.77	2.13	0.00	21.64	5.63
IB_MktShare_Merger (%)	4.38	1.70	0.00	34.13	5.67
IB_MktShare_Overall (%)	4.47	2.18	0.00	23.06	5.17
<i>Analyst Characteristics:</i>					
RelAccuracy (%)	41.23	40.96	0.00	100.00	10.33
AllStar	0.19	0.00	0.00	1.00	0.39
Seniority	5.43	4.92	0.00	16.18	3.47
Seasoning	2.33	1.39	0.00	16.18	2.46
NFollow	10.96	10.00	1.00	103.00	7.22
JobMove	0.03	0.00	0.00	1.00	0.18
<i>Firm/Stock Characteristics:</i>					
ANF	10.02	9.00	2.00	51.00	6.18
InstHoldings (%)	62.10	69.81	0.00	100.00	29.44
MV	9,592.51	1,886.44	0.76	602,432.92	28,686.62
Proceeds_Equity	76.61	0.00	0.00	12,189.10	312.10
Proceeds_Debt	427.87	0.00	0.00	34,879.74	1,335.85
Proceeds_Merger	1,054.52	0.00	0.00	153,653.35	5,672.22
Proceeds_Overall	1,575.53	152.30	0.00	178,009.68	6,477.18
Proceeds_Equity <sup>+</sup>	300.01	139.20	0.70	12,189.10	560.73
Proceeds_Debt <sup>+</sup>	1,144.78	491.25	3.00	34,879.74	1,988.39
Proceeds_Merger <sup>+</sup>	2,981.15	591.59	0.95	153,653.35	9,231.15
Proceeds_Overall <sup>+</sup>	2,416.34	498.18	0.70	178,009.68	7,893.76

**Table 1 – continued**

Panel B: Sanctioned vs. Non-Sanctioned Banks			
	Sanctioned Banks	Non-Sanctioned Banks	<i>p</i> -value for difference
N	123,708	92,534	-
<i>Recommendation and Forecast Measures:</i>			
Analyst Recommendation	3.48	3.78	0.000
Relative Recommendation	-0.0777	0.1098	0.000
Adjusted Forecast Bias	-0.0395	-0.0293	0.013
Adjusted Forecast Accuracy	0.0442	0.0430	0.739
<i>IB Relationship Measures:</i>			
IBRel_Equity (%)	4.42	1.67	0.000
IBRel_Debt (%)	4.46	0.81	0.000
IBRel_Merger (%)	3.45	1.07	0.000
IBRel_Overall (%)	8.32	2.67	0.000
<i>IB Characteristics:</i>			
IB_Size	116.15	52.09	0.000
IB_MktShare_Equity (%)	7.20	1.01	0.000
IB_MktShare_Debt (%)	7.35	1.31	0.000
IB_MktShare_Merger (%)	7.20	0.60	0.000
IB_MktShare_Overall (%)	7.24	0.78	0.000
<i>Analyst Characteristics:</i>			
RelAccuracy (%)	41.05	41.47	0.000
AllStar	0.28	0.06	0.000
Seniority	5.48	5.37	0.000
Seasoning	2.46	2.16	0.000
NFollow	11.49	10.25	0.000
JobMove	0.03	0.04	0.000
<i>Firm/Stock Characteristics:</i>			
ANF	10.12	9.88	0.000
InstHoldings (%)	63.18	60.66	0.000
MV	10,253.75	8,708.50	0.000
Proceeds_Equity	81.28	70.37	0.000
Proceeds_Debt	479.30	359.12	0.000
Proceeds_Merger	1,131.00	952.27	0.000
Proceeds_Overall	1,708.67	1,397.54	0.000
Proceeds_Equity <sup>+</sup>	343.35	251.06	0.000
Proceeds_Debt <sup>+</sup>	1,195.89	1,063.66	0.000
Proceeds_Merger <sup>+</sup>	3,102.64	2,806.65	0.000
Proceeds_Overall <sup>+</sup>	2,593.51	2,173.63	0.000

**Table 2 – Full Period Regressions for Relative Recommendations**

This table provides the results from estimating regressions of relative recommendations on investment bank relationship measures, investment bank characteristics, analyst characteristics, and stock characteristics for the full sample period 1998 to 2009. Columns 1 through 3 respectively use equity, debt, and M&A investment banking relationship measures while column 4 uses an overall relationship measure. *p*-values based on robust standard errors are presented in parentheses below the coefficients, where standard errors are clustered by firm. Each model contains year and firm fixed effects. *GS* and *NonGS* refer to sanctioned and non-sanctioned banks, respectively. Variable definitions are contained in Appendix Table A1.

	Equity Relationship	Debt Relationship	M&A Relationship	Overall Relationship
Intercept	0.168 (.001)	0.263 (.000)	0.162 (.002)	0.169 (.001)
Post	-0.134 (.000)	-0.139 (.000)	-0.143 (.000)	-0.122 (.000)
<i>IB Relationship Measures:</i>				
IBRel_GS	0.122 (.000)	0.129 (.000)	0.108 (.000)	0.160 (.000)
IBRel_GS*Post	-0.121 (.000)	-0.102 (.000)	-0.068 (.024)	-0.129 (.000)
IBRel_NonGS	0.171 (.000)	0.162 (.004)	0.172 (.001)	0.171 (.000)
IBRel_NonGS*Post	-0.030 (.590)	-0.055 (.390)	-0.023 (.748)	-0.010 (.789)
<i>IB Characteristics:</i>				
Ln(IB_Size)	-0.044 (.000)	-0.084 (.000)	-0.042 (.000)	-0.048 (.000)
IB_MktShare	-0.573 (.000)	0.735 (.000)	-0.650 (.000)	-0.548 (.000)
IB_NonGS	0.019 (.071)	0.064 (.000)	0.011 (.296)	0.028 (.009)
IB_NonGS*Post	0.200 (.000)	0.198 (.000)	0.205 (.000)	0.187 (.000)
<i>Analyst Characteristics:</i>				
RelAccuracy	-0.010 (.707)	-0.004 (.878)	-0.008 (.760)	-0.008 (.778)
AllStar	-0.013 (.153)	-0.034 (.000)	-0.013 (.156)	-0.018 (.038)
Ln(Seniority)	0.023 (.000)	0.023 (.000)	0.023 (.000)	0.023 (.000)
Ln(Seasoning)	0.010 (.084)	0.013 (.033)	0.010 (.101)	0.010 (.088)
Ln(NFollow)	-0.045 (.000)	-0.037 (.000)	-0.043 (.000)	-0.043 (.000)
JobMove	-0.006 (.565)	-0.004 (.698)	-0.007 (.499)	-0.004 (.717)
<i>Stock Characteristics:</i>				
Ln(ANF)	0.048 (.000)	0.046 (.000)	0.047 (.000)	0.048 (.000)
Ln(MV)	0.005 (.325)	0.005 (.297)	0.006 (.267)	0.005 (.329)
Ln(Proceeds)	-0.001 (.670)	0.000 (.905)	-0.001 (.505)	0.000 (.783)
InstHoldings	-0.165 (.467)	-0.201 (.375)	-0.196 (.386)	-0.157 (.489)

**Table 2 - continued**

---

<i>Combined Post Effects:</i>				
GS Banks	0.001 (.951)	0.028 (.087)	0.041 (.038)	0.031 (.009)
Non-GS Banks	0.142 (.000)	0.107 (.019)	0.150 (.001)	0.161 (.000)
Adjusted R <sup>2</sup>	.051	.052	.051	.052
N	216,242	216,242	216,242	216,242

---

**Table 3 – Sub-period Regressions for Relative Recommendations**

This table provides the results from estimating regressions of relative recommendations on investment bank relationship measures, investment bank characteristics, analyst characteristics, and stock characteristics. Results for the sub-periods before (1998-2001) and after (2003-2009) Global Settlement period are provided in Panels A and B, respectively. Columns 1 through 3 respectively use equity, debt, and M&A investment banking relationship measures while column 4 uses an overall relationship measure. *p*-values based on robust standard errors are presented in parentheses below the coefficients, where standard errors are clustered by firm. Each model contains year and firm fixed effects. *GS* and *NonGS* refer to sanctioned and non-sanctioned banks, respectively. Variable definitions are contained in Appendix Table A1.

	Equity Relationship	Debt Relationship	M&A Relationship	Overall Relationship
Panel A: 1998 – 2001				
Intercept	-0.272 (.003)	-0.214 (.022)	-0.265 (.004)	-0.237 (.011)
<i>IB Relationship Measures:</i>				
IBRel_GS	0.072 (.005)	0.121 (.000)	0.063 (.022)	0.119 (.000)
IBRel_NonGS	0.050 (.294)	0.097 (.122)	0.136 (.029)	0.106 (.003)
<i>IB Characteristics:</i>				
Ln(IB_Size)	0.065 (.000)	0.031 (.002)	0.058 (.000)	0.052 (.000)
IB_MktShare	-0.223 (.043)	1.126 (.000)	0.236 (.032)	0.259 (.027)
IB_NonGS	0.104 (.000)	0.156 (.000)	0.120 (.000)	0.129 (.000)
<i>Analyst Characteristics:</i>				
RelAccuracy	0.049 (.284)	0.062 (.178)	0.052 (.260)	0.053 (.253)
AllStar	-0.013 (.363)	-0.053 (.000)	-0.027 (.054)	-0.036 (.011)
Ln(Seniority)	-0.007 (.554)	-0.006 (.607)	-0.008 (.539)	-0.008 (.501)
Ln(Seasoning)	0.054 (.000)	0.051 (.000)	0.053 (.000)	0.052 (.000)
Ln(NFollow)	-0.049 (.000)	-0.037 (.000)	-0.045 (.000)	-0.043 (.000)
JobMove	-0.039 (.008)	-0.040 (.007)	-0.037 (.012)	-0.033 (.023)
<i>Stock Characteristics:</i>				
Ln(ANF)	0.036 (.008)	0.035 (.010)	0.036 (.009)	0.038 (.006)
Ln(MV)	-0.004 (.664)	-0.004 (.648)	-0.004 (.670)	-0.005 (.631)
Ln(Proceeds)	0.000 (.989)	-0.003 (.405)	-0.001 (.593)	-0.005 (.171)
InstHoldings	-0.845 (.024)	-0.855 (.022)	-0.852 (.022)	-0.838 (.025)
Adjusted R <sup>2</sup>	.047	.052	.047	.049
N	59,703	59,703	59,703	59,703
PERMCO clusters	3,367	3,367	3,367	3,367
GS – NonGS = 0	.694	.709	.275	.743

**Table 3 – continued**

	Equity Relationship	Debt Relationship	M&A Relationship	Overall Relationship
Panel B: 2003 – 2009				
Intercept	0.307 (.000)	0.408 (.000)	0.302 (.000)	0.298 (.000)
<i>IB Relationship Measures:</i>				
IBRel_GS	0.010 (.612)	0.037 (.025)	0.045 (.032)	0.042 (.001)
IBRel_NonGS	0.161 (.000)	0.107 (.020)	0.176 (.000)	0.179 (.000)
<i>IB Characteristics:</i>				
Ln(IB_Size)	-0.076 (.000)	-0.131 (.000)	-0.080 (.000)	-0.080 (.000)
IB_MktShare	-1.124 (.000)	0.648 (.000)	-1.023 (.000)	-1.000 (.000)
IB_NonGS	0.170 (.000)	0.230 (.000)	0.171 (.000)	0.173 (.000)
<i>Analyst Characteristics:</i>				
RelAccuracy	-0.044 (.233)	-0.042 (.249)	-0.037 (.312)	-0.037 (.308)
AllStar	-0.007 (.583)	-0.024 (.039)	-0.009 (.444)	-0.012 (.331)
Ln(Seniority)	0.028 (.000)	0.027 (.001)	0.026 (.001)	0.027 (.001)
Ln(Seasoning)	-0.005 (.480)	-0.001 (.940)	-0.006 (.449)	-0.006 (.456)
Ln(NFollow)	-0.036 (.000)	-0.032 (.000)	-0.031 (.000)	-0.033 (.000)
JobMove	0.022 (.124)	0.022 (.127)	0.018 (.208)	0.020 (.165)
<i>Stock Characteristics:</i>				
Ln(ANF)	0.033 (.001)	0.031 (.002)	0.031 (.002)	0.033 (.001)
Ln(MV)	-0.004 (.639)	-0.003 (.678)	-0.002 (.769)	-0.003 (.720)
Ln(Proceeds)	-0.001 (.793)	-0.001 (.726)	-0.001 (.513)	-0.001 (.598)
InstHoldings	-0.003 (.992)	-0.011 (.975)	-0.014 (.967)	0.009 (.980)
Adjusted R <sup>2</sup>	.068	.067	.069	.068
N	136,193	136,193	136,193	136,193
PERMCO clusters	3,473	3,473	3,473	3,473
GS – NonGS = 0	.002	.145	.014	.000

**Table 4 – Alternative Models for Relative Recommendations**

This table provides results from regressions of relative recommendations on overall investment bank relationship measures, investment bank characteristics, analyst characteristics, and stock characteristics. Results for the sub-periods before (1998-2001) and after (2003-2009) Global Settlement period are provided in Panels A and B, respectively. Columns 1 through 3 use an indicator variable for the overall investment banking relationship while columns 4 through 6 use a continuous variable for the overall relationship measure. Columns 1 and 4 include firm fixed effects, columns 2 and 5 use analyst fixed effects, and columns 3 and 6 use investment bank fixed effects. All models contain year fixed effects. *p*-values based on robust standard errors are presented in parentheses below the coefficients, where standard errors are clustered by firm. Variable definitions are contained in Appendix Table A1.

	Overall Relationship Dummy			Overall Relationship Continuous		
	Panel A: 1998 – 2001					
Intercept	-0.237 (.011)	-0.098 (.355)	-0.684 (.000)	-0.245 (.008)	-0.099 (.347)	-0.691 (.000)
<i>IB Relationship Measures:</i>						
IBRel_GS	0.119 (.000)	0.098 (.000)	0.104 (.000)	-	-	-
IBRel_NonGS	0.106 (.003)	0.072 (.009)	0.070 (.011)	-	-	-
IBRelC_GS	-	-	-	0.098 (.000)	0.098 (.000)	0.102 (.000)
IBRelC_NonGS	-	-	-	0.118 (.014)	0.085 (.019)	0.090 (.011)
<i>IB Characteristics:</i>						
Ln(IB_Size)	0.052 (.000)	0.002 (.922)	0.135 (.000)	0.052 (.000)	0.002 (.938)	0.135 (.000)
IB_MktShare	0.259 (.027)	0.517 (.003)	0.281 (.141)	0.356 (.002)	0.562 (.001)	0.341 (.073)
IB_NonGS	0.129 (.000)	0.028 (.249)	-	0.127 (.000)	0.027 (.270)	-
<i>Analyst Characteristics:</i>						
RelAccuracy	0.053 (.253)	0.121 (.066)	0.123 (.001)	0.054 (.246)	0.120 (.068)	0.123 (.001)
AllStar	-0.036 (.011)	0.003 (.887)	-0.013 (.272)	-0.034 (.016)	0.003 (.900)	-0.012 (.334)
Ln(Seniority)	-0.008 (.501)	-0.031 (.317)	-0.006 (.524)	-0.008 (.524)	-0.030 (.328)	-0.006 (.546)
Ln(Seasoning)	0.052 (.000)	0.030 (.001)	0.042 (.000)	0.052 (.000)	0.030 (.001)	0.042 (.000)
Ln(NFollow)	-0.043 (.000)	-0.041 (.000)	-0.018 (.014)	-0.043 (.000)	-0.041 (.000)	-0.018 (.012)
JobMove	-0.033 (.023)	-0.029 (.038)	-0.032 (.020)	-0.035 (.017)	-0.030 (.035)	-0.033 (.016)
<i>Stock Characteristics:</i>						
Ln(ANF)	0.038 (.006)	0.048 (.000)	0.044 (.000)	0.037 (.007)	0.047 (.000)	0.043 (.000)
Ln(MV)	-0.005 (.631)	0.011 (.001)	0.004 (.125)	-0.004 (.654)	0.011 (.001)	0.005 (.101)
Ln(Proceeds)	-0.005 (.171)	-0.001 (.625)	-0.002 (.190)	-0.003 (.305)	0.000 (.870)	-0.001 (.563)
InstHoldings	-0.838 (.025)	-0.711 (.003)	-0.738 (.001)	-0.846 (.023)	-0.715 (.003)	-0.746 (.001)
Fixed Effects	Firm	Analyst	IB	Firm	Analyst	IB
Adjusted R <sup>2</sup>	.049	.122	.052	.047	.122	.051
N	59,703	59,703	59,703	59,703	59,703	59,703

**Table 4 – continued**

	Overall Relationship Dummy			Overall Relationship Continuous		
	Panel B: 2003 – 2009					
Intercept	0.298 (.000)	-0.278 (.008)	0.157 (.002)	0.284 (.000)	-0.280 (.008)	0.155 (.002)
<i>IB Relationship Measures:</i>						
IBRel_GS	0.042 (.001)	0.039 (.001)	0.020 (.090)	-	-	-
IBRel_NonGS	0.179 (.000)	0.097 (.000)	0.066 (.014)	-	-	-
IBRelC_GS	-	-	-	-0.003 (.884)	0.029 (.143)	-0.003 (.895)
IBRelC_NonGS	-	-	-	0.260 (.000)	0.117 (.005)	0.084 (.042)
<i>IB Characteristics:</i>						
Ln(IB_Size)	-0.080 (.000)	-0.078 (.000)	-0.103 (.000)	-0.078 (.000)	-0.077 (.000)	-0.102 (.000)
IB_MktShare	-1.000 (.000)	-0.427 (.021)	-0.745 (.000)	-0.939 (.000)	-0.387 (.038)	-0.728 (.000)
IB_NonGS	0.173 (.000)	0.162 (.000)	-	0.175 (.000)	0.165 (.000)	-
<i>Analyst Characteristics:</i>						
RelAccuracy	-0.037 (.308)	0.046 (.385)	0.007 (.837)	-0.040 (.274)	0.046 (.386)	0.006 (.856)
AllStar	-0.012 (.331)	-0.012 (.452)	-0.004 (.723)	-0.009 (.447)	-0.011 (.479)	-0.003 (.779)
Ln(Seniority)	0.027 (.001)	0.060 (.006)	0.009 (.198)	0.027 (.001)	0.061 (.006)	0.009 (.183)
Ln(Seasoning)	-0.006 (.456)	0.002 (.794)	0.006 (.404)	-0.006 (.448)	0.001 (.836)	0.005 (.431)
Ln(NFollow)	-0.033 (.000)	-0.012 (.113)	-0.018 (.001)	-0.034 (.000)	-0.012 (.108)	-0.018 (.001)
JobMove	0.020 (.165)	0.013 (.356)	0.028 (.041)	0.020 (.166)	0.013 (.366)	0.028 (.042)
<i>Stock Characteristics:</i>						
Ln(ANF)	0.033 (.001)	0.053 (.000)	0.035 (.000)	0.033 (.001)	0.053 (.000)	0.035 (.000)
Ln(MV)	-0.003 (.720)	0.035 (.000)	0.031 (.000)	-0.003 (.742)	0.035 (.000)	0.030 (.000)
Ln(Proceeds)	-0.001 (.598)	0.000 (.947)	-0.001 (.545)	0.000 (.913)	0.001 (.384)	0.000 (.969)
InstHoldings	0.009 (.980)	0.189 (.287)	-0.188 (.244)	0.014 (.967)	0.170 (.340)	-0.196 (.225)
Fixed Effects	Firm	Analyst	IB	Firm	Analyst	IB
Adjusted R <sup>2</sup>	.068	.107	.060	.068	.107	.060
N	136,193	136,193	136,193	136,193	136,193	136,193

**Table 5 – Relative Recommendations based on a 3-Tier System**

This table provides the results from estimating regressions of relative recommendations on investment bank relationship measures, investment bank characteristics, analyst characteristics, and stock characteristics. Results for the sub-periods before (1998-2001) and after (2003-2009) Global Settlement period are provided in Panels A and B, respectively. In this table, relative recommendations are measured based on a 3-tier system where a strong buy or buy recommendations are coded as 3 and strong sell or sell recommendations are coded as 1. Columns 1 through 3 respectively use equity, debt, and M&A investment banking relationship measures, while column 4 uses an overall relationship measure. *p*-values based on robust standard errors are presented in parentheses below the coefficients, where standard errors are clustered by firm. Each model contains year and firm fixed effects. Variable definitions are contained in Appendix Table A1.

	Equity Relationship	Debt Relationship	M&A Relationship	Overall Relationship
Panel A: 1998 – 2001				
Intercept	0.088 (.144)	0.102 (.086)	0.086 (.149)	0.093 (.120)
<i>IB Relationship Measures:</i>				
IBRel_GS	0.032 (.037)	0.080 (.000)	0.044 (.011)	0.073 (.000)
IBRel_NonGS	0.011 (.659)	0.011 (.724)	0.075 (.018)	0.035 (.049)
<i>IB Characteristics:</i>				
Ln(IB_Size)	0.009 (.138)	0.001 (.847)	0.009 (.155)	0.006 (.295)
IB_MktShare	0.033 (.631)	0.338 (.000)	0.109 (.104)	0.082 (.251)
IB_NonGS	-0.013 (.076)	0.002 (.824)	-0.010 (.199)	-0.005 (.546)
<i>Analyst Characteristics:</i>				
RelAccuracy	0.071 (.011)	0.074 (.008)	0.072 (.010)	0.072 (.011)
AllStar	-0.008 (.379)	-0.018 (.038)	-0.010 (.240)	-0.014 (.113)
Ln(Seniority)	-0.003 (.677)	-0.003 (.736)	-0.003 (.678)	-0.004 (.642)
Ln(Seasoning)	0.016 (.016)	0.015 (.023)	0.016 (.018)	0.016 (.019)
Ln(NFollow)	-0.021 (.000)	-0.017 (.001)	-0.020 (.000)	-0.019 (.000)
JobMove	-0.021 (.019)	-0.021 (.017)	-0.020 (.020)	-0.019 (.034)
<i>Stock Characteristics:</i>				
Ln(ANF)	-0.023 (.012)	-0.023 (.014)	-0.024 (.012)	-0.023 (.014)
Ln(MV)	-0.019 (.003)	-0.019 (.003)	-0.019 (.003)	-0.019 (.002)
Ln(Proceeds)	0.001 (.626)	-0.001 (.547)	0.000 (.931)	0.000 (.875)
InstHoldings	-0.758 (.004)	-0.756 (.005)	-0.753 (.005)	-0.750 (.005)
Adjusted R <sup>2</sup>	.057	.059	.057	.058
N	59,703	59,703	59,703	59,703

**Table 5 – continued**

	Equity Relationship	Debt Relationship	M&A Relationship	Overall Relationship
Panel B: 2003 – 2009				
Intercept	0.519 (.000)	0.508 (.000)	0.515 (.000)	0.489 (.000)
<i>IB Relationship Measures:</i>				
IBRel_GS	0.030 (.057)	0.036 (.007)	0.048 (.007)	0.042 (.000)
IBRel_NonGS	0.086 (.001)	0.096 (.000)	0.145 (.000)	0.113 (.000)
<i>IB Characteristics:</i>				
Ln(IB_Size)	-0.057 (.000)	-0.069 (.000)	-0.061 (.000)	-0.052 (.000)
IB_MktShare	-1.207 (.000)	-0.381 (.000)	-1.090 (.000)	-1.375 (.000)
IB_NonGS	-0.042 (.000)	0.000 (.979)	-0.042 (.000)	-0.048 (.000)
<i>Analyst Characteristics:</i>				
RelAccuracy	-0.026 (.349)	-0.027 (.328)	-0.018 (.507)	-0.018 (.514)
AllStar	-0.011 (.207)	-0.018 (.044)	-0.014 (.113)	-0.013 (.143)
Ln(Seniority)	0.015 (.009)	0.015 (.009)	0.014 (.015)	0.015 (.011)
Ln(Seasoning)	0.005 (.382)	0.006 (.291)	0.005 (.425)	0.004 (.510)
Ln(NFollow)	-0.019 (.000)	-0.020 (.000)	-0.013 (.006)	-0.015 (.002)
JobMove	0.007 (.512)	0.006 (.576)	0.002 (.811)	0.003 (.728)
<i>Stock Characteristics:</i>				
Ln(ANF)	-0.008 (.344)	-0.008 (.327)	-0.009 (.241)	-0.008 (.303)
Ln(MV)	-0.029 (.000)	-0.028 (.000)	-0.027 (.000)	-0.027 (.000)
Ln(Proceeds)	-0.001 (.734)	0.000 (.846)	-0.001 (.396)	-0.001 (.434)
InstHoldings	-0.214 (.440)	-0.211 (.447)	-0.224 (.420)	-0.205 (.460)
Adjusted R <sup>2</sup>	.050	.047	.052	.053
N	136,193	136,193	136,193	136,193

**Table 6 – Logit Models for Buy/Sell Recommendations**

This table provides the results from estimating logistic regressions of the probability that an analyst issues a buy or strong buy (sell or strong sell) recommendation on overall investment bank relationship measures, investment bank characteristics, analyst characteristics, and stock characteristics in columns 1 to 3 (4 to 6). Results for the full sample period from 1998 to 2009 are presented in columns 1 and 4. The remaining columns present results for the sub-periods before (1998-2001) and after (2003-2009) Global Settlement. *p*-values based on robust standard errors are presented in parentheses below the coefficients, where standard errors are clustered by firm. Each model contains year and firm fixed effects. Variable definitions are contained in Table A1 of Appendix 1.

	Buy or Strong Buy			Sell or Strong Sell		
	Full Period	1998-2001	2003-2009	Full Period	1998-2001	2003-2009
Post	-0.741 (.000)	-	-	1.879 (.000)	-	-
<i>IB Relationship Measures:</i>						
IBRel_GS	0.529 (.000)	0.455 (.000)	-	-0.786 (.000)	-0.579 (.130)	-
IBRel_GS*Post	-0.345 (.000)	-	0.178 (.000)	0.520 (.015)	-	-0.261 (.000)
IBRel_NonGS	0.400 (.000)	0.256 (.030)	-	-1.313 (.000)	-0.612 (.144)	-
IBRel_NonGS*Post	-0.107 (.318)	-	0.324 (.000)	0.513 (.168)	-	-0.809 (.000)
<i>IB Characteristics:</i>						
Ln(IB_Size)	-0.190 (.000)	-0.125 (.000)	-0.172 (.000)	0.251 (.000)	-1.155 (.000)	0.355 (.000)
IB_MktShare	-2.763 (.000)	0.663 (.077)	-4.712 (.000)	5.931 (.000)	-1.266 (.558)	5.708 (.000)
IB_NonGS	-0.243 (.000)	-0.046 (.278)	-	1.277 (.000)	0.166 (.415)	-
IB_NonGS*Post	0.192 (.000)	-	-0.136 (.000)	-1.007 (.000)	-	0.362 (.000)
<i>Analyst Characteristics:</i>						
RelAccuracy	0.228 (.004)	0.583 (.000)	0.049 (.630)	0.178 (.253)	-0.927 (.141)	0.411 (.013)
AllStar	-0.021 (.409)	-0.017 (.712)	-0.021 (.499)	0.178 (.000)	-0.165 (.476)	0.185 (.000)
Ln(Seniority)	0.08 (.000)	0.008 (.844)	0.057 (.006)	-0.167 (.000)	-0.367 (.036)	-0.140 (.000)
Ln(Seasoning)	-0.108 (.000)	-0.104 (.003)	-0.066 (.001)	0.130 (.000)	0.548 (.001)	0.112 (.001)
Ln(NFollow)	-0.116 (.000)	-0.149 (.000)	-0.071 (.000)	0.115 (.000)	0.127 (.349)	0.071 (.015)
JobMove	0.071 (.009)	0.026 (.588)	0.099 (.005)	-0.027 (.648)	0.103 (.593)	-0.054 (.408)
<i>Stock Characteristics:</i>						
Ln(ANF)	-0.430 (.000)	-0.599 (.000)	-0.286 (.000)	0.143 (.002)	0.021 (.914)	0.172 (.002)
Ln(MV)	0.653 (.000)	0.833 (.000)	0.627 (.000)	-0.650 (.000)	-0.534 (.000)	-0.591 (.000)
Ln(Proceeds)	0.005 (.365)	-0.023 (.062)	0.011 (.072)	0.001 (.89)	0.000 (.991)	0.006 (.552)
InstHoldings	0.066 (.000)	0.177 (.000)	0.053 (.000)	-0.037 (.016)	-0.042 (.440)	-0.022 (.217)

**Table 6 – continued**

---

<i>Combined Post Effects:</i>						
GS Banks	0.184 (.000)	-	-	-0.266 (.000)	-	-
NonGS Banks	0.293 (.000)	-	-	-0.800 (.000)	-	-
Pseudo R <sup>2</sup>	.078	.060	.027	.112	.163	.034
N	212,107	54,219	133,483	171,542	11,111	109,467

---

**Table 7 – Analyst Affiliation Effects and Lending**

This table provides results related to the incremental effects of lending relationships on analyst affiliation bias. Panel A provides descriptive statistics for the lending variables. Panels B and C presents the results from regressions of relative recommendations on overall investment banking and lending relationship measures, and a set of control variables related to investment bank, analyst, and stock characteristics, with results for the sub-period before Global Settlement (1998-2001) in Panel B and results for the post period (2003-2009) in Panel C. *p*-values based on robust standard errors are presented in parentheses below the coefficients, where standard errors are clustered by firm. Coefficients on the control variables are not reported. Each model contains year and firm fixed effects. Variable definitions are contained in Table A1 of Appendix 1.

Panel A – Summary Statistics						
	N	Mean	Median	Min	Max	Std. Dev.
<i>IB Relationship Measures:</i>						
IBRel_Lending (%)	216,242	2.82	0.00	0.00	1.00	14.16
IBRel_Overall (+loan) (%)	216,242	5.84	0.00	0.00	1.00	18.38
<i>IB Characteristics:</i>						
IB_MktShare_Lending (%)	216,242	4.56	0.74	0.00	35.92	8.29
IB_MktShare_Overall (+loan) (%)	216,242	4.58	2.05	0.00	23.83	5.50
<i>Firm/Stock Characteristics:</i>						
Proceeds_Lending	216,242	964.14	40.00	0.00	73,197.78	2,730.11
Proceeds_Overall (+loans)	216,242	2,538.37	375.00	0.00	251,207.45	8,315.22
Proceeds_Lending <sup>+</sup>	114,659	1,818.33	675.00	0.50	73,197.78	3,536.08
Proceeds_Overall (+loans) <sup>+</sup>	164,818	3,330.35	798.75	0.50	251,207.45	9,385.00
Panel B: Regression Results, 1998–2001						
IBRel_GS <sub>Overall</sub>		-	0.108 (.000)	0.101 (.000)		-
IBRel_NonGS <sub>Overall</sub>		-	0.080 (.023)	0.077 (.042)		-
IBRel_GS <sub>Lending</sub>		0.095 (.008)	0.154 (.000)	-		-
IBRel_NonGS <sub>Lending</sub>		0.110 (.009)	0.234 (.000)	-		-
IBRel_GS <sub>Overall</sub> *IBRel_GS <sub>Lending</sub>		-	-	0.176 (.000)		-
IBRel_NonGS <sub>Overall</sub> *IBRel_NonGS <sub>Lending</sub>		-	-	0.207 (.040)		-
IBRel_GS <sub>Overall+Lending</sub>		-	-	-		0.093 (.000)
IBRel_NonGS <sub>Overall+Lending</sub>		-	-	-		0.135 (.000)
Adjusted R <sup>2</sup>		.058	.050	.049		.052
N		59,703	59,703	59,703		59,703

**Table 7 – continued**

Panel C: Regressions Results, 2003–2009				
IBRel_GS <sub>Overall</sub>	-	0.028 (.035)	0.026 (.068)	-
IBRel_NonGS <sub>Overall</sub>	-	0.159 (.000)	0.152 (.000)	-
IBRel_GS <sub>Lending</sub>	0.025 (.246)	0.072 (.001)	-	-
IBRel_NonGS <sub>Lending</sub>	0.064 (.113)	0.069 (.109)	-	-
IBRel_GS <sub>Overall</sub> *IBRel_GS <sub>Lending</sub>	-	-	0.067 (.008)	-
IBRel_NonGS <sub>Overall</sub> *IBRel_NonGS <sub>Lending</sub>	-	-	0.082 (.201)	-
IBRel_GS <sub>Overall+Lending</sub>	-	-	-	0.030 (.014)
IBRel_NonGS <sub>Overall+Lending</sub>	-	-	-	0.121 (.000)
Adjusted R <sup>2</sup>	.067	.069	.068	.067
N	136,193	136,193	136,193	136,193

## APPENDIX

### Table A1 – Variable Definitions

Variable	Definition
<b><i>Analyst Recommendation and Global Settlement Variables:</i></b>	
$RelRec_{ijkt}$	= Relative Recommendation. The most recent recommendation issued by analyst $i$ (from investment bank $j$ ) for firm $k$ during the one-year window ending in quarter $t$ , normalized by subtracting the consensus (median) recommendation across all analysts covering firm $k$ (whether or not they are in our sample) in the same one-year window.
$Post_t$	= Post Global Settlement. An indicator variable that equals one for all quarters after the Global Analyst Research Settlement and zero otherwise. Following Kadan et al. (2009), we define the beginning of the post Global Settlement period as September 2002.
<b><i>IB Relationship Measures:</i></b>	
$IBRelC_{jkt}$	= Investment Bank Relationship (Continuous). The proportion of a firm $k$ 's total transaction value over the 36 months ending in quarter $t$ for which investment bank $j$ acted as a lead or co-managing underwriter or an M&A advisor. This variable is calculated separately based on equity, debt, and M&A transactions, as well as the combined set of transactions across all three areas.
$IBRel_{jkt}$	= Investment Bank Relationship (Dummy). A dummy variable equal to one if $IBREL$ for a particular transaction category (equity, debt, M&A, lending, or overall) is positive and zero otherwise.
<b><i>IB Characteristics:</i></b>	
$IB\_Size_{jt}$	= Investment Bank Size. The number of analysts employed by investment bank $j$ during quarter $t$ , according to the I/B/E/S recommendations file.
$IBMktShare_{jt}$	= Investment Bank Market Share. The proportion of total deal value in a particular transaction category (equity, debt, M&A, lending, or all four combined) during the previous 12 months for which investment bank $j$ acted as lead underwriter or advisor.
$IB\_GS_j$ ( $IB\_NonGS_j$ )	= Global Settlement (Non-Global Settlement) Investment Bank. Indicator variables to identify whether or not investment bank $j$ was one of the 12 investment banks included in the Global Analyst Research Settlement (including subsequent name variations as shown in Appendix Table A2). The twelve investment banks included in the Global Settlement are: Bear Stearns; Citigroup (Salomon Smith Barney); CS First Boston; Deutsche Bank; Goldman Sachs; JP Morgan; Lehman Brothers; Merrill Lynch; Morgan Stanley; Thomas Weisel, UBS Warburg; and U.S. Bancorp Piper Jaffray.
<b><i>Analyst Characteristics:</i></b>	
$RelAccuracy_{ijt}$	= Relative Analyst Accuracy. The relative forecast accuracy of the analyst, as defined in Hong and Kubik (2003). For each analyst $i$ following firm $k$ , we first estimate the absolute value of the difference between the analyst's most recent forecast of fiscal-year earnings (issued between January 1 and July 1 of year $t$ ) and actual earnings, scaled by price (as of the end of year $t-1$ ). We then rescale such that the most accurate analyst following firm $k$ scores 1 and the least accurate analyst scores 0. Finally, each analyst's relative forecast accuracy is defined as the mean score across all stocks followed by the analyst over years $t-2$ through $t$ .

**Table A1 continued**

---

$AllStar_{ijt}$	=	All Star Analyst. An indicator variable that equals 1 if the analyst is ranked as an All-Star by <i>Institutional Investor</i> magazine during year $t-1$ , and 0 otherwise.
$Seniority_{ijt}$	=	Analyst Seniority. The number of years since analyst $i$ first appeared in I/B/E/S.
$Seasoning_{ijt}$	=	Analyst Seasoning. The number of years since analyst $i$ initiated coverage of firm $k$ , according to I/B/E/S.
$NFollow_{ijt}$	=	Number of Firms Followed. The number of firms followed by analyst $i$ during quarter $t$ , according to I/B/E/S.
$JobMove_{ijt}$	=	Analyst Job Move. An indicator variable that equals 1 if analyst $i$ changed employers during quarter $t$ , according to I/B/E/S.
<b>Stock Characteristics:</b>		
$ANF_{kt}$	=	Analyst Following. The number of analysts issuing recommendations for firm $k$ during the previous 12 months, according to the I/B/E/S recommendations file.
$MV_{kt}$	=	Market Value. The market value of equity for firm $k$ at the end of year $t-1$ , according to CRSP.
$DealValue_{kt}$	=	Aggregate Deal Value. The total deal value by firm $k$ in a particular transaction category (equity, debt, M&A, lending, or all four combined) during the previous 36 months.
$InstHoldings_{kt}$	=	Institutional Holdings. The percentage of shares of firm $k$ held by institutional investors at the end of quarter $t$ , according to Thomson Reuters' 13F filings.

---

**Table A2 – Sample Investment Banks**

This table lists the investment banks included in our final sample, including all predecessor banks in the case of mergers. Investment Banks that were sanctioned in the Global Settlement and subsequent name variations that are also treated as sanctioned banks in our analysis are listed in bold type. Merrill Lynch and Lehman were included in the Global Settlement but are not included in our sample because they are missing from the I/B/E/S data for all or part of our sample period.

<b>Ultimate IB Name</b>	<b>Predecessor IBs</b>
<i>Sanctioned Banks:</i>	
<b>Bank of America Merrill Lynch</b>	Advest; Banc America; Bank of America; <b>Bank of America Merrill Lynch</b>
<b>Citigroup Salomon Smith Barney</b>	Schroder; <b>Salomon Smith Barney; Citigroup Salomon Smith Barney</b>
<b>CS First Boston</b>	DLJ; <b>CS First Boston</b>
<b>Deutsche Alex Brown</b>	<b>Deutsche Bank; Deutsche Alex Brown</b>
<b>Goldman Sachs</b>	<b>Goldman Sachs</b>
<b>JP Morgan Chase</b>	<b>Bear Stearns; Chase HQ; Robert Flemming; JP Morgan; JP Morgan Chase</b>
<b>Morgan Stanley Dean Witter</b>	<b>Morgan Stanley; Morgan Stanley Dean Witter</b>
<b>Thomas Weisel</b>	<b>Thomas Weisel</b>
<b>UBS Paine Webber<sup>a</sup></b>	JC Bradford; <b>Paine Webber; UBS; UBS Warburg; UBS Paine Webber</b>
<b>US Bancorp Piper Jaffray</b>	US Bancorp; <b>Piper Jaffray; US Bancorp Piper Jaffray</b>
<i>Non-Sanctioned Banks:</i>	
ABN AMRO	ABN AMRO
BNP Paribas	Paribas; BNP Paribas
CIBC	CIBC
Commerzbank	Dresdner Kleinwort; Commerzbank
Friedman	Friedman
HSBC	HSBC
ING Barings Furman	ING Barings Furman
Lazard	Lazard
Needham	Needham
Prudential Securities	Vector Securities; Volpe Brown Whelan; Prudential Securities
Raymond James	Raymond James
RBC Capital Markets	Dain Rauscher Wessels; Ferris; Tucker Anthony Sutro; RBC Capital Markets
Robert Baird	Robert Baird
Scotia	Scotia
SG Cowen	Societe Generale; SG Cowen
Stephens	Stephens
Sun Trust Robinson	Sun Trust Equitable; Sun Trust Robinson
Wells Fargo	Black; JW Charles; Everen; First Union; First Van Kasper; Wachovia; Wachovia Corp; Wells Fargo
William Blair	William Blair

<sup>a</sup> In the case of UBS Paine Webber, occurrences of UBS, UBS Warburg, and Paine Webber prior to the UBS-Paine Webber merger are also classified as sanctioned banks. These three investment banks account for only 191 (0.09%) of the quarterly observations in our analysis.