WHICH TYPES OF ANALYST FIRMS MAKE MORE OPTIMISTIC FORECASTS?

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Abstract:

Research optimism among securities analysts has been attributed to incentives provided by underwriting activities. We examine how analysts' forecast optimism varies with the business activities used to fund research. We find that analysts at firms with underwriting and trading businesses are actually less optimistic than those at pure brokerage houses, who perform no underwriting. The relatively less optimistic forecasts for underwriting firms are not fully explained by bank reputation. Nor is the relative optimism of brokerage firms fully explained by the types of clients they serve (retail or institutional). We conclude that trading activities used to fund research create strong incentives for analyst optimism.

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1. Introduction

The reputation of sell-side financial analysts, particularly those at the leading investment banks, has been seriously impaired during the last two years. First, they were criticized for their optimistic reports on dot-com stocks following the dot-com collapse. They were then censured for failing to detect the accounting and over-valuation problems at Enron. Finally, there is evidence that some of the leading telecom and internet analysts publicly touted firms about which they were privately skeptical.

The popular explanation for all of these failures is that analysts working for investment banks have either been compromised by the hefty bonuses that they can earn from writing positive reports on investment banking clients, or have been pressured to write favorable reports by investment bankers at their firms. Optimistic research presumably helps attract new investment banking clients, and provides the sales pitch used to place new issues with investors. Optimistic analyst earnings forecasts, particularly long-term forecasts, also appear to temporarily boost stock prices at the issue date (see Rajan and Servaes (1997), Lin and McNichols (1998), Michaely and Womack (1999), and DeChow, Hutton and Sloan (2000)) and potentially explain the poor performance of firms after IPO.

In response to regulatory concern about optimistic analyst research at leading investment banks, on April 28, 2003 ten of the largest U.S. investment banks agreed to implement a series of analyst reforms and to pay penalties for prior indiscretions. Reforms included new operating procedures by banks to separate research from investment banking, refocusing security analyst compensation on stock-picking ability, disclosure in analyst reports of any conflicts of interest faced by analysts' firms,

disclosure of analyst forecasting and stock-picking performance, and elimination of 'spinning" (providing shares in "hot" IPOs to executives of favored clients). The ten banks agreed to pay $900 million in fines and disgorgement of profits. In addition, they were required to pay $85 million for investor education and $450 million (over the next five years) to acquire and distribute three independent research reports along with their own reports for every company covered.

The optimism observed in equity research during the tech boom of late 1990s, as well as the regulatory responses raise a number of important research questions. First, how important were investment banking conflicts in explaining analysts' research optimism? Regulators' focus on investment bank analysts suggests that they believe banking conflicts were the primary source of research optimism. Analysts at investment banks were certainly rewarded handsomely for helping to sell new equity offers, and were allegedly pressured by their firms' investment bankers to issue optimistic earnings and price forecasts. There is also evidence of unethical behavior by some investment bank analysts. However, it is unclear whether this behavior was widespread.

Second, given the requirement that investment banks fund independent research, it is worth examining the performance of non-investment bank analysts who will be providing this research. Are these analysts independent? Are their forecasts less optimistic than those made by investment bank analysts?

Finally, more broadly, what factors other than underwriting affect analyst research optimism? In section 2, we describe the major sources of funding for equity research (investment banking, institutional equity, and retail sales) and analyze how they affect analysts' incentives to provide optimistic research. We hypothesize that analysts' role in

trading and sales creates incentives for optimistic research that are potentially as powerful as those provided by underwriting.

To examine the impact of underwriting, and sales and trading incentives on analyst incentives, we analyze differences in the optimism of analysts' earnings, long-term earnings growth, and target price forecasts for four major analyst firm types: lead underwriters (who fund research through underwriting, and sales and trading), new equity issue syndicate members (who fund research through modest fees from distributing new issues, and from sales and trading), brokerage firms (who generate only sales and trading revenues), and pure research firms (who sell research as a stand-alone product). Our tests are designed to examine whether there are systematic analyst firm factors that explain forecast optimism, as alleged by regulators.[1] We do not examine whether investment bank relationships with specific clients are associated with forecast optimism or inaccuracy, the subject of earlier research.

As discussed in section 3, the earnings forecast sample comprises 6,483 analysts who cover 6,755 companies and work for 370 firms during the period January 1996 to December 2002. Approximately 86% of the sample earnings forecasts are made by analysts who work for investment banks that perform underwriting; 9% work for syndicate firms; 4.5% are by brokerage firm analysts; and 0.5% by analysts at research firms. The earnings growth forecast and target price samples are considerably smaller, with less than 4,000 analysts who work for less than 200 firms and cover at most 3,637

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[1] A related study by Carleton, Chen, and Steiner (1998) examines optimism in analyst recommendations for national and regional firm sell-side analysts, and for buy side analysts. Their findings indicate that buy-side analysts issue the least optimistic recommendations, and that national firm analysts issue less optimistic recommendations than regional firm analysts. However, their study does not directly partition firms by the type of activity used to fund research, the object of our paper. A recent working paper by Jacob, Rock and Weber (2003) follows a similar approach to our study, and reports comparable results.

companies. These samples are also heavily dominated by lead underwriter firms - 90% of the forecasts are by underwriter firm analysts, versus 7-8% for syndicate firm analysts, less than 3% for brokerage firm analysts, and 0.6% or lower for research firm analysts.

The results, reported in section 4, indicate that, on average, near-term earnings forecasts, long-term earnings growth forecasts, and target price forecasts made by analysts working at lead underwriter firms are less optimistic than those made by non-underwriter firm analysts. The most optimistic forecasts issued by non-underwriter analysts are typically by analysts working at brokerage firms.

In subsequent tests, we find that the optimism of brokerage firm analysts is partially driven by brokerage firms that specialize in serving retail clients. Analysts at firms that provide trading and sales for retail investors issue more optimistic forecasts of long-term earnings growth and earnings for two to three quarters ahead than those working at firms that specialize in institutional trading. However, price forecasts and one-quarter-ahead forecasts for the two types of brokerage firms are equally optimistic, indicating that brokerage analyst optimism cannot be fully explained by the type of clients served.

We also examine whether the lower relative optimism for underwriter analysts is explained by bulge firms that attract underwriting clients through their reputations, rather than through optimistic research. There is some evidence that bank status is negatively associated with research optimism. Forecasts of next quarter's earnings are less optimistic for bulge investment banks than for non-bulge underwriter, syndicate or brokerage firms. Forecasts of earnings two quarters ahead and twelve-month price forecasts are less optimistic for bulge firms than for syndicate or brokerage firms.

However, even non-bulge underwriters are less optimistic than brokerage firms, implying that brokerage analyst optimism is not driven exclusively by differences in firm reputation.

Finally, we find that earnings forecasts for two to five quarters ahead and price forecasts are more optimistic for analysts with more experience covering a stock, suggesting that over time analysts develop relations with management that makes it difficult to be independent.

As discussed in section 6, the findings in this paper contribute to our understanding of factors that underlie analyst research optimism. They also raise a number of opportunities for future research. Finally, our results raise questions about whether current analyst reforms are likely to reduce analyst optimism.

2. Research Implications of Investment Research Funding

2.1 Research Funding and Analyst Remuneration[2]

Most analyst firms do not sell investment research directly to their clients. Instead, clients pay for research indirectly through mark-ups on other services that are acquired directly from the analyst firm. The types of services that are used to support research, however, differ across analyst firms. Based on the research funding and analyst remuneration, we classify analyst firms into full service investment banks that provide underwriting, trading, and other activities (lead underwriters and syndicate members are both included in this category); brokerage firms that offer securities trading; and pure research firms that sell research as a stand-alone product.

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[2] Our descriptions of research funding and analyst remuneration practices draws heavily from interviews with research directors at leading investment banks and brokerage firms.

Full Service Investment Banks: Full service investment banks typically fund research through a combination of investment banking (underwriting), institutional equity, and retail sales.[3] For example, in 2001 Goldman Sachs reported that 50% of its $321 million research budget was funded through investment banking, and the other 50% was funded through institutional equity (Hintz and Tang, 2002).

Underwriting fees are used to fund research because banks use research to attract new banking clients and to market new offers to investors.[4] Investment banking departments fund research in two ways. First, in the annual budget negotiations, they agree to support a certain share of the research budget. In addition, at year-end underwriter departments award significant bonuses to analysts who have helped to attract new underwriting business and market new issues to investors.

Institutional equity trading helps to cover research through two forms of remuneration: directed commissions and "soft dollars through a third party." Under directed commissions, institutional clients reimburse banks for research they value by directing future security trades (and commissions) to the banks. The largest institutional investors typically designate commission payments to specific research, noting the particular company research that is being reimbursed. This permits the banks to track the performance of their analysts, and for the analysts to identify their most valuable clients. Reimbursement from "soft dollars through a third party" works in a similar manner, except that the institutional client directs its trades to a third party and requests that the

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[3] Full service banks also use fees from their money management business to fund research, which potentially creates a conflict of interest. Analysts interviewed at several banks noted that they face pressure to make optimistic forecasts and recommendations on a stock that is held by bank's money managers. This paper does not examine this potential conflict.

[4] Up until 1975, banks charged fixed commissions for trading, and used some of these funds to finance research by in-house sell-side analysts, which they distributed free to large institutional clients. In May 1975, fixed commissions were deregulated and began to bring in much less revenue, leading brokerage houses to a search for other sources of funding for research, such as investment banking ((Strauss, 1977)).

third party channel a portion of the commissions received to the bank that provided research. Once again, the largest institutions typically designate which particular research report they valued.

Retail investors also cover the costs of research through commissions. Banks quote retail customers a commission structure that implicitly incorporates charges for both research and trade execution. Retail investors are then expected to trade on the basis of research recommendations made by bank analysts, enabling the bank to infer the value placed on research about a specific company from trading volume. In 2001, Merrill Lynch reported that 22% of its $579 million research budget was funded through the retail business (Hintz and Tang, 2002).

At full service investment banks, analysts' bonuses and salary increases reflect the diversity of the different business activities undertaken at the bank. It is common for analysts to be remunerated on the basis of as many as nine different performance criteria, including feedback on research quality from institutional clients, trading volume by retail clients, feedback from internal institutional sales force, traders, and money managers, as well as contributions to underwriting, and merger and acquisition divisions.

Brokerage Firms: Brokerage firms focus exclusively on trading (either institutional, retail or both), and do not undertake underwriting. They, therefore, rely exclusively on trading commissions to fund research. For institutional brokerage firms this takes the form of directed commissions and soft dollars through a third party. Retail brokerage firms fund their research through retail commissions. And firms that provide trading services to both institutional and retail clients use all three sources of funding for research. Because commissions are their primary source of revenue, brokerage firms typically reward their

research analysts using a single measure of performance: trading volume in the stocks that they cover.

Research Firms: Research firms sell equity research to their clients and provide no investment banking or trade execution services. They use two sources of funding for research: soft dollars through a third party, discussed above, and hard dollars. Hard dollars are fees for access to research, typically charged per report or as an annual subscription. Nelson's (2003) reports that 36% of research firms are compensated using hard dollars alone, 10% using only soft dollars, and 54% using a combination of soft and hard dollars.

Soft dollar fees from the large institutional investors specify which particular research the client valued, enabling research firms to monitor the performance of their analysts. Hard dollar funding also enables the research firm to track performance of the analyst by the number of reports sold for companies the analyst covers.

2.2 Research Implications

How do differences in research funding and analyst compensation arrangements across banks affect analyst incentives to provide impartial research to their clients? The above discussion suggests that, at a minimum, analysts' research incentives are likely to be affected by the types of businesses their firms pursue (full service banks versus brokerage firms versus pure research firms).

Underwriting Incentives: Regulators and researchers have generally argued that underwriting incentives are likely to make analysts at full service banks more optimistic than analysts at brokerage or research firms. Optimistic research presumably helps attract

new investment banking clients, and provides the sales pitch used to place new issues with investors.

Research indicates that analysts' recommendations and long-term earnings growth forecasts are more optimistic for investment banking clients (Lin and McNichols (1998), Michaely and Womack (1999), and Dechow, Hutton and Sloan (2000)).[5] Further, optimistic recommendations and long-term earnings forecasts appear to temporarily boost stock prices at the issue date, permitting investment banks to reward their firms' best investors (primarily institutions), who are able to "flip" the stock soon after the issue for an attractive short-term gain (see Aggarwal (2002)).[6]

Lin, McNichols and O'Brien (2003) provide a more detailed analysis of analyst performance surrounding new offers. They show that subsequent to new issues, analysts with investment banking ties are slower to downgrade stocks with bad news than analysts at unaffiliated firms. Hong and Kubik (2003) also find evidence consistent with investment banking business affecting analyst incentives. They show that analysts who are optimistic relative to the consensus tend to be given better assignments, are less likely to be fired from a top brokerage house, and are more likely to be promoted or hired by a better house. This pattern was particularly strong for analysts who covered stocks underwritten by their brokerage houses, and during the mid to late nineties.

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[5] The direction of causality is difficult to interpret in these studies (see Kothari (2000)). Do bank analysts bias their research to help investment bankers sell their client's stock, or do clients select investment banks that have more optimistic opinions of their prospects, thereby facilitating the stock sale? Statistical biases in the analysis are also significant. Kolasinki and Kothari (2003) attempt to distinguish between these explanations by examining analyst forecast performance for targets and acquirers surrounding Mergers and acquisitions. They conclude that there is little evidence that conflicts of interest explain analyst forecast performance for their sample.

[6] Ritter and Welch (2002) show that in the period 1980 to 2001, the average first-day return on IPOs was 18.8%. During the height of the dot com IPO market, this daily return was 65%. The average three-year buy-and-hold return for firms making IPOs in the period 1980 to 2001, adjusted for the market, was -23.4% (see Ritter and Welch (2002)).

While the underwriting business undoubtedly induces some analysts to provide optimistic research, bank and analyst reputations potentially limit this incentive. IPO firms look for more from their investment bank than simply optimistic analysts. They rely on the bank to create a liquid market for their stock, not just at the time of the IPO, but during the post-IPO period. Banks with strong reputations for IPO placement and the leading analysts in the IPO firm's industry are the best placed to perform this task and to land new underwriting business.[7] High status banks and analysts have strong incentives to preserve their reputations, and to avoid attracting new business by simply being overly optimistic relative to other banks and analysts.

Brokerage Incentives: Performance metrics used to evaluate the role of research from a trading business perspective also create incentives for analysts to issue optimistic research reports that encourage investors to purchase shares. Positive reports are more effective than negative reports in increasing trading volume because *any* investor can act on a buy recommendation at relatively low cost by buying the stock. In contrast, negative reports can only be acted on by investors that already own the stock, or by investors willing to incur the additional costs of short-selling.[8]

For institutional investors, analysts' incentives for optimism are likely to be mitigated by several factors. Institutional clients make no contractual commitment to pay for research prior to receiving it. They determine whether research has value after the fact, when they have had sufficient time to fully analyze it and to judge its quality, and compensate the bank accordingly. Because they have access to research from many of

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[7] Podolny (1993) argued that the reputational hierarchy among investment banks creates a perception among customers of legitimacy, reliability, trust, and competence. Eccles and Crane (1988) argue that customers use investment bank reputations as signals of professional quality.

[8] Asquith and Meulbroek (1998) provide evidence that the costs of shorting a stock are significant, and explain several apparent market anomalies.

the large banks, institutional investors are likely to be in a good position to evaluate research quality across banks. This leaves the bank to bear the risk that clients decide its analysts' research is worthless. Banks manage this risk by tying analysts' remuneration to feedback from institutions on the value of research on companies they follow, creating an incentive for analysts to provide high quality research to institutional clients.[9]

In theory, funding research through commissions should also provide incentives for analysts to provide unbiased research to retail investors. Analysts that produce biased research that encourages investors to trade may benefit them in the short term. Yet in a well-functioning market, this type of investment advice is likely to be unsustainable. Investors that base their trading decisions on biased research will earn disappointing returns. Over time, they will learn to discount research from biased analysts and to seek other investment advice. Firms and analysts that produce less biased research are therefore likely to develop a reputation for research quality and to attract investors.

However, in practice, several factors are likely to reduce the alignment between the incentives of analysts and retail investors. First, retail investors typically have relationships with only one investment advisor. This makes it difficult for them to evaluate research quality differences across firms. Consequently, retail investors have to rely on the outcome of investment advice to evaluate research quality, which is a noisy signal given the volatility of the market. If it is costly for retail investors to distinguish

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[9] Soft dollars also create the risk for the bank that the client finds the research valuable but refuses to pay for it. However, this risk is reduced by the ongoing relationship between the bank and its client - if the client refuses to provide adequate reimbursement for past research, the bank can refuse to provide it with any future research.

high and low quality research, there is likely to be a lemons problem in the market, driving out all but the lowest quality (most optimistic) retail analysts.[10]

The rise of discount retail brokers, internet brokerage firms, and low cost internet investment advice also potentially threatens the quality of retail research. These services allow investors to purchase research and trade execution separately, a challenge to firms that continue to bundle the two. Discount brokers do not undertake research, and are therefore able to offer retail investors substantially lower commissions. Internet investment advisors do not provide trade execution, but sell research reports to retail investors for a modest fee per report. This has created a serious challenge for traditional brokerage firms, since investors have access to competing research to help make investment decisions. Investors can also free ride on brokerage research by channeling most of their trades to discount brokers.

The disintermediation of trading and research has put severe downward pressure on commissions for traditional brokerage firms. For example, for the fourth quarter of 1996, Charles Schwab's commission per trade averaged $66.89 (see McFarlan, 2001). By 2002, it had fallen to $35.02 (see McVey, Patrick and McNellis, 2002). In mid-2003, Ameritrade offered internet investors a rate of $11 per trade (see Ameritrade.com). Retail brokerage firms have responded to competitive pressure on commissions by cutting research budgets, and focusing even more intensely on increasing trading volume to cover the cost of research.

In summary, it seems clear that sales and trading create incentives for analysts to be optimistic rather than pessimistic. However, it is unclear whether these incentives are

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[10] One way for retail investors to infer quality is to rely on the brokerage firms' reputation among institutions, for which the costs of judging research are lower. This may work for brokerage firms that serve both retail and institutional investors. But many firms specialize in only one of the client types.

more or less powerful than those for underwriting firms. Our research attempts to answer this question.

Research Firm Incentives: Analysts at pure research firms are expected to have the least incentives to provide optimistic forecasts. They are not rewarded for trading activity, but presumably for providing institutional and retail investors with investment insights on the companies that they cover.

3. Sample and data

Our tests examine differences in analyst earnings, long-term earnings growth, and price forecast optimism across firms. Our initial earnings and long-term earnings growth forecast sample comprises all companies on the *I/B/E/S* (Institutional Broker Estimates System) database during the period January 1996 to December 2002. For each company on the database during this period, we downloaded the company name and CUSIP, all analyst earnings and long-term earnings growth forecasts made for that company, the dates that the forecasts were issued, *I/B/E/S's* codes for analyst and analyst firm names, and *I/B/E/S's* values for actual earnings. To estimate earnings forecast horizons, we also collected quarterly earnings announcement dates for each sample company during the sample period from *Standard & Poor's Compustat*.

A similar approach was followed to create a sample of target price forecasts using the companies listed on *First Call* during the period January 1999 to September 2002.[11] Again, for each listed company we downloaded the company name and CUSIP, analyst target prices, the dates that price forecasts were made and their horizon (typically 12 months), as well as *First Call's* codes for analyst and analyst firm names. We then use

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[11] The difference in start dates between the two samples arises because target price forecasts were not widely available prior to January 1999.

CRSP to collect the stock price on the day of the price forecast, and at the end of the forecast horizon.

Analyst Affiliation

As discussed above, analyst firms are key explanatory variables of interest in the paper. Each firm listed on *I/B/E/S* that employed financial analysts was manually classified into one of four categories for each year of the sample: (1) Underwriter banks that served as a lead underwriter on at least one US equity offering. (2) Syndicate banks that distributed new equity offerings, but did not act as lead underwriters. Syndicate firms underwriting incentives are likely to be significantly weaker than those of underwriter firms, since distribution fees are modest in comparison to those earned by underwriters (Bloch, 1989). (3) Brokerage firms that were exclusively sales and trading operations. (4) Pure research firms, which sold research, but did not undertake any investment banking, syndicate or trading activities.

Two data sources were used to classify the firms. Nelson's Directory of Investment Research (1996-2002) was used to make a preliminary classification. Firms listed in Nelson's as independent research firms and which did not receive any directed commissions were classified as pure research firms. Firms that received directed commissions and were not identified as investment banks by Nelsons were classified as brokerage firms. Any remaining investment banks were separated into underwriter banks and syndicate banks using information on SDC (Securities Data Co.) Platinum. Firms listed by SDC Platinum as "bookrunners" (i.e. lead underwriters) in a given year were classified as underwriter banks. Firms that were listed in the SDC database as

participating in the syndicate of new equity, but not as bookrunners, were classified as syndicate member banks. Firms identified by Nelson's as investment banks/brokers, but which did not appear as either bookrunners or syndicate firms in the SDC database, were reclassified as brokerage firms. Finally, firms that did not appear in Nelson's were classified using the SDC database, or by referring to disclosures of core activities in their annual reports and web sites.[12]

The I/B/E/S data contain current firm names, not historical firm names. As a result, it was also necessary to identify those firms that had been involved in mergers and acquisitions. This was done using SDC data. Firms that had been involved in mergers or acquisitions were tracked closely over the sample years so that the proper transactions (lead underwriting assignments, syndicate participation) could be "credited" to them in each year.

If classifications for a firm differed across years, we examined the reason for the change. For fifteen firms, the change in classification reflected a change in firm strategy. For example, in December 2000 Prudential announced the discontinuation of its investment banking operations. We, therefore, classified Prudential as an underwriter firm prior to 2001, and as a syndicate firm in 2001 and 2002. Ragen Mackenzie, a syndicate bank prior to 2000, was acquired by Wells Fargo and began pursuing investment banking, generating its first lead underwriting assignment in 2002. Ragen Mackenzie was classified as a syndicate firm prior to 2000, and an underwriter firm thereafter. However, in most cases, changes in classifications across years arose because a firm was not a lead underwriter in a given year or a member of a syndicate in a given year, leading it to be classified as either a syndicate or brokerage firm. Since these firms

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[12] Eight firms could not be classified due to a lack of sufficient information.

continued to pursue underwriting and syndicate business, we classified them as investment banks or syndicate firms throughout the sample period.[13]

Firms consistently classified as pure research firms included research boutiques such as JSA Research Inc., Argus Research Corp., Shonstrom Research Associates and Red Chip Review. Brokerage houses included firms such as Standard & Poors, Brown Brothers Harriman & Co., First Dallas Securities, and Taglich Brothers Inc. Syndicate member banks included George K. Baum & Co, Pacific Growth Equities, Sanford C. Bernstein & Co., Inc, and Wasserstein, Perella & Co, Inc. Lead underwriter banks included the large bulge banks (Credit Suisse First Boston, Goldman Sachs, Merrill Lynch, Morgan Stanley, Salomon Smith Barney, and Lehman Bros) as well as firms such as ABN AMRO, William Blair & Company, LLC, Raymond James & Associates, and SG Cowen.

Forecast Optimism

To measure analyst forecast optimism, we adopt a similar approach to Jacob, Lys and Neale (1999), Clement (1999), and Hong and Kubik (2003), who compare the accuracy and optimism of a given analyst's forecast for a particular company and time period to the mean accuracy and optimism for all analysts who make forecasts for the same company and time period within a comparable forecast horizon. This relative performance metric, therefore, controls for any company or time-specific factors that affect forecast optimism.

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[13] To examine whether this classification decision affects our results, we allow the firm assignment to vary from year to year. The results are virtually identical to those reported in the paper.

Relative forecast optimism (*RFOPT*) is estimated for each earnings, long-term earnings growth, or stock price forecast as follows:

$$(1) \qquad RFOPT_{itj}^{t-k} = \frac{FORECAST_{itj}^{t-k} - \overline{FORECAST_{it}^{t-k}}}{STDEV(FORECAST_{it}^{t-k})}$$

$FORECAST_{itj}^{t-k}$ is analyst j's forecast of company i's earnings, long-term earnings growth, or stock price for period t, where the forecast is made at time t-k. This forecast is then compared to the average forecast for all analysts making forecasts for company i's earnings, long-term earnings growth, or stock price for period t, again within the same forecast horizon ($\overline{FORECAST_{it}^{t-k}}$). The relative forecast is deflated by the standard deviation of forecasts across all analysts forecasting earnings, earnings growth, or stock price for company i in period t, again within the same forecast horizon.[14]

For the sample of earnings forecasts, relative optimism is estimated for three different forecast horizons: forecasts made less than 91 days prior to a company's quarterly earnings announcement date, forecasts made more than 90 days and less than 181 days before the earnings announcement, and forecasts made more than 180 days before the quarterly earnings announcement. Relative earnings growth forecast optimism is estimated using all forecasts of three to five year earnings growth for a company that are made in the same year.[15] Finally, relative price forecast optimism is computed using

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[14] We also considered deflating relative forecast optimism by the stock price. However, as noted by Jacob, Lys, and Neale (1999) for earnings, this effectively weights optimism by the price-earnings ratio, implying that changes in price-earnings ratios over time and across firms will affect our measure of relative optimism. In addition, it was not clear that deflating earnings growth rates by price made economic sense. Consequently, we opted for deflating our optimism measures by the standard deviation of the forecasts.
[15] We compared earnings growth forecasts made within a year, rather than a quarter or month, because narrowing the window materially reduces the number of observations available for the tests. For example, using a quarterly comparison, rather than an annual period, reduces the sample by b%.

all target price forecasts (97.6% of which have a 12 month horizon) for a company that are made in the same month.

<u>Sample Data</u>

Table 1 shows the selection procedure for the earnings, long-term earnings growth, and target price forecast samples. Forecasts were excluded from the sample if forecast horizon data was missing; earlier forecasts were issued by the same analyst for the same company, forecast period and horizon; only one forecast was available for a given firm, forecast period and horizon; analyst firm data was missing; all forecasts for a given company, period and horizon were identical; and/or there were missing data on the analyst characteristics or forecast accuracy used in our multivariate tests. The final sample comprised 809,552 earnings forecasts, 25,642 long-term earnings growth forecasts and 91,994 target price forecasts.

To reduce dependence among the sample observations, we eliminated all but the first forecast issued by an analyst with multiple forecasts for the same firm, forecast period and horizon. Single forecasts for a given company, forecast period and horizon were excluded because at least two forecasts have to be available to estimate relative forecast optimism.[16] Finally, if all forecasts for a given company, time period and horizon are identical, the standard deviation of forecasts is zero, in which case our measure of relative optimism is undefined.

As shown in panel A of table 2, the final earnings forecast sample contains 290,738 forecasts made 0-90 days prior to the earnings announcement, 222,259 forecasts with a 91-180 day horizon, and 296,555 forecasts with a 180+ day horizon. Roughly 86%

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[16] We also performed our analysis after requiring that at least three forecasts are issued for each firm and forecast period. The results are similar to those presented in the paper.

of these forecasts are made by analysts working for underwriter banks, versus only 14%

for non-underwriter banks. Among the non-underwriter banks, the bulk of the forecasts

come from syndicate banks (9% of the total). Only 4.5% of the forecasts are from pure

brokerage houses, and roughly half of one percent are from pure research firms.[17]

Panel B of table 2 provides summary data on the 25,642 long-term earnings

growth price forecasts included in the sample. Analysts working for underwriter banks

make 89.7% of these forecasts, compared to 10.3% for non-underwriter bank analysts.

Forecasts by syndicate member banks accounted for 6.9% of total forecasts, versus 2.7%

for brokerage houses and 0.6% for research firm analysts.

Summary data on the 91,994 target price forecasts are reported in Panel C of table

2. Analysts at underwriter banks make 90% of these forecasts, versus 10% for non-

underwriter bank analysts. Syndicate member bank analysts provided 8.3% of total

forecasts, versus 1.5% for brokerage houses and less than 0.1% for research firm

analysts.

Table 3 shows how the frequency of forecast coverage varies across analyst firm

types. For the earnings forecast sample, 59% of the forecasts are made for company-

quarters covered simultaneously by analysts at underwriter, syndicate and brokerage

firms. A further 19% of the forecasts are for company-quarters covered by both

underwriter and syndicate analysts. Not surprisingly, given the low number of research

firm forecasts, there are relatively few company-quarters that include research firm

coverage, raising questions about the power of our statistical tests for research firms and

their economic significance.

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[17] We explored the low frequency of pure research firms further, and discovered that *I/B/E/S* covers only a small fraction of these firms.

For the long-term earnings growth (target price) sample, 35% (47%) of the forecasts are for company-quarters covered by both underwriter and syndicate firm analysts. A further 17% (29%) of the forecasts are for company-quarters where analysts from underwriter, syndicate and brokerage firms all provide coverage. Once again, there are relatively few company-quarters covered by analysts at research firms.

The sample includes earnings and price forecasts made during the technology boom as well as post-boom forecasts. Sixty-one percent of the earnings forecasts occurred prior to April 2000, when the NASDAQ market collapse began, versus 66% for the long-term earnings growth forecasts, and 24% for the price forecast sample. Subsequent tests examine whether the findings are sensitive to market performance by separating the sample forecasts into those made before and those made after April 2000.

We present summary statistics on several dimensions of earnings and price forecast performance in table 4. Earnings forecast horizons average 55, 138, and 288 days for the 0-90, 91-181, and 181+ day horizon subsamples respectively. The most variation is exhibited for the long-term horizon with the first quartile being 240 days and the third quartile 345 days.

Mean earnings forecast bias (defined as the forecast error deflated by the absolute value of the earnings forecast) increases as the forecast horizon lengthens. The mean for the 0-90 day horizon is 0.073, 0.281 for the 91-180 day horizon, and 0.484 for the 181+ day horizon. However, all of these estimates are affected by a small number of very large values that arise when the absolute earnings forecast, the deflator, is close to zero. Median and percentage positive forecast accuracy, therefore, are more representative of forecast behavior. Medians are -0.017, 0.000 and 0.059, and the percentage positive 34%,

48%, and 58% for the three horizons respectively. Forecast accuracy (defined as the absolute value of the forecast error deflated by the absolute value of the earnings forecast) also increases with the length of the forecast horizon. Mean (median) accuracy is 0.414 (0.095) for the 0-90 day horizon, 0.659 (0.167) for the 91-180 day horizon, and 0.866 (0.238) for the 181+ day horizon.

Descriptive data for price forecasts is reported in panel B of table 4. Nearly 98% of the price forecasts have 12-month horizons. The mean, median, as well as the first and third quartiles are, therefore, all 12 months. Analysts almost always projected that prices would increase in the coming year -- 99.9% of the forecasts project price appreciation. The first quartile for expected price growth was 13.1%, the median was 24.3%, and the third quartile was 43.0%. These predictions turned out to be optimistic, in part because they were aggressive given the historical performance of stocks,[18] and in part because of the market decline in 2000. Approximately 78% of the price forecasts were ex post optimistic. Mean forecast bias, defined as the forecast error deflated by the forecasted stock price, was 24.7% and the median was 28.3%. Finally, mean (median) forecast accuracy, the absolute forecast error deflated by the forecasted price, was 41.3% (34.5%).

We do not compute forecast bias and accuracy for the long-term earnings growth forecasts because the forecasts are less precise about the timing of the expected growth than short-term earnings and price forecasts. On average analysts forecast horizons are for three to five years ahead, and the mean and median growth forecasts are 21.3% and 18% respectively.

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[18] See Ibbotson Staff (2003) for market results from 1926-2002.

4. Tests and Results

4.1 Univariate Tests

Earnings Forecast Optimism

Panel A of table 5 presents univariate results for earnings forecast optimism by analyst firm. For each forecast horizon, mean relative forecast optimism is negative for underwriter bank analysts and positive for non-underwriter bank analysts, with differences in means between the two types of analysts being statistically significant at the 5% level or lower. Mean relative forecast optimism is –0.009 for underwriter analysts versus in 0.049 for non-underwriters for forecast horizons of 0-90 days. For forecast horizons of 91-180 days, average relative optimism is –0.008 for underwriter analysts and 0.044 for non-underwriter analysts. Finally, for forecast horizons of 181 days or more, underwriter analysts have a mean forecast optimism of –0.004 compared to 0.015 for non-underwriter analysts.

There are also important differences in relative earnings optimism across finer analyst firm partitions. Underwriter analysts are typically least optimistic, with mean estimates of –0.009, -0.008, and –0.004 for the three horizons, versus 0.034, 0.031, and 0.013 for syndicate firms, and 0.080, 0.069, and 0.023 for brokerage firms. Statistical tests indicate that the differences between underwriters, and either syndicate or brokerage means for these horizons are statistically reliable at the 5% level or lower. Brokerage analysts tend to make the most optimistic forecasts. Mean relative optimism for brokerage firms exceeds that for all other firm classes across the three forecast horizons. Mean forecast optimism for brokerage analysts is statistically different from means for syndicate and underwriter analysts for the 0-90 and 91-181 day horizons, and from the

mean for underwriter forecasts for the 181+ day horizon. The findings for research firms are inconclusive.

These findings suggest that analyst optimism is more closely linked to sales and trading, the sole source of research funding for brokerage firms, than to underwriting. Results for syndicate firms are also consistent with this tentative conclusion. Mean relative optimism estimates for syndicate firms lie between the underwriting and brokerage estimates, reflecting greater reliance on trading by syndicate firms than underwriters, and greater emphasis on underwriting than brokerage firms.

Long-Term Earnings Growth Forecast Optimism

Mean long-term earnings growth forecast relative optimism is shown in panel B of table 5. The findings indicate that, as for short-term earnings, non-underwriter analysts are more optimistic than those at underwriter firms. On average, non-underwriter analysts' relative forecast optimism is 0.065, compared to –0.007 for underwriter analysts. The difference is significant at the 1% level. A finer level of analysis shows that underwriter analysts also make significantly less optimistic forecasts than syndicate analysts, but there are no other differences in mean relative forecast optimism across firm types.

Price Forecast Optimism

Panel C of table 5 presents mean relative price forecast optimism for analysts by firm class. The findings are generally consistent with those reported for earnings. On average, forecasts by underwriter analysts (with mean relative optimism of –0.003) are less optimistic than forecasts by syndicate firm analysts (with a mean of 0.023) and

brokerage analysts (with a mean of 0.232). The mean estimate for underwriter analysts is significantly different from that for both syndicate and brokerage analysts. Once again, syndicate estimates lie in between the underwriter and brokerage extremes. Research analysts appear to make the least optimistic price forecasts of any firm-type (with a mean of –0.058), but there are too few observations to draw any reliable statistical inferences from this estimate.

In summary, univariate results for earnings, long-term earnings growth, and prices indicate that underwriter analysts make systematically less optimistic forecasts than non-bank analysts. For the earnings and price samples, brokerage analysts are generally most optimistic. In contrast, the findings for the long-term earnings growth sample indicate that syndicate analysts are most optimistic. However, it is unclear how much weight to place on the optimism of brokerage analysts relative to syndicate analysts for this sample, since there are only 703 brokerage forecasts.

4.2 Multivariate Tests

Our relative forecast optimism measure controls for many of the factors that earlier research indicates is likely to be associated with analysts' forecast performance. For example, it controls for differences in the volatility of earnings and stock performance across companies that are likely to affect forecast optimism, since an analyst's performance is benchmarked to that of all analysts following the same company. It also controls for the timing of forecasts, which may reflect any general optimism or pessimism about the economy, a sector, or a company, since each analyst is benchmarked against all analysts forecasting for the same company, period and forecast horizon.

However, earlier studies that adopt a similar research design find that a finer measure of forecast horizon is important for explaining forecast accuracy (see O'Brien, 1990, Clement, 1999, and Jacob, Lys and Neale, 1999), although its impact on optimism is not as clearly documented. Also, there is some evidence that analyst company experience is associated with earnings forecast accuracy. As discussed below, there is reason to believe that this variable could be related to forecast optimism. Finally, prior research has found that analyst forecast accuracy is associated with optimism (see Hong and Kubik, 2003). We therefore use multivariate tests to examine the association between relative forecast optimism and analyst firm type after controlling for these factors.

Forecast Horizon Control: Forecast horizon is partially controlled for by benchmarking analysts' performance against all analysts forecasting for the same company, quarter/month and horizon. However, for earnings forecasts this design controls for only three broad horizons (0-90 days, 91-180 days, and 181+ days). We therefore use a finer measure of forecast horizon, the number of days between the forecast issue date and the subsequent earnings announcement date. For price forecasts, analysts' forecasts typically have the same forecast horizon (twelve months), so no finer horizon control is required. For earnings growth forecasts, the horizons are three to five years, so that it is less important to control for differences in the timing of forecasts made within the same year.

Summary statistics for analyst earnings forecast horizons for the four analyst classes are reported in table 6. The mean forecast horizons are quite similar: underwriter firm analyst forecasts have a horizon of 163 days, versus 159 days for syndicate firms, 164 days for brokerage firms, and 179 days for research firms.

Analyst Company Experience Control: Several studies have documented that experience is an important variable to consider for forecast accuracy models (see Clement, 1999 and Jacob, Lys and Neale, 1999). Experience could reflect superior private information that analysts develop about a company's economics the longer they follow it, leading to more accurate forecasts. Alternatively, it could reflect selection bias -- better performing analysts with more accurate and less optimistic forecasts are more likely to be retained.

However, company experience could also be associated with forecast optimism in a different way. Analysts who follow a company for long periods develop a close relationship with management, making it difficult to challenge or question management's performance.[19] This reduced objectivity is likely to be reflected in relatively more optimistic and less accurate forecasts.

To examine these potential effects, we use the variable "Analyst Company Experience," defined as the number of quarters that have elapsed between the analyst's first forecast for the test firm and the current forecast observation, as an independent variable in our analysis.[20] Summary statistics for company experience by analyst firm type are reported in table 6. For the earnings sample, experience varies modestly across analyst classes. On average, pure research firm analysts have 8.3 quarters of company experience, versus 9.4 quarters for brokerage house analysts, 9.5 quarters for syndicate firms, and 11 quarters for underwriters firms. For the long-term earnings growth and target price samples, company experience for underwriter and syndicate analysts is

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[19] The effect of personal interaction on independence was first documented in the social psychology literature by Festinger, Schachter, and Back (1950).

[20] One potential limitation of these estimates is that we have access to *I/B/E/S* forecast data only from 1983 onwards. Consequently, we could understate experience for analysts that entered the profession prior to 1983. However, this is not a serious problem; only 4 of our 6,483 sample analysts are listed on *I/B/E/S* in 1983.

comparable to that for the earnings sample. But research and brokerage analysts experience differs across the samples. For example, for the earnings growth forecast sample, brokerage and research analysts have 12 and 17 quarters of company experience respectively. These differences arise because a relatively small number of brokerage and research analysts with available forecasts for these samples unduly influence the findings, and because there is a tendency for only highly experienced analysts to provide long-term growth and price forecasts.

Analyst Forecast Accuracy Control: Hong and Kubik (2003) find that there is a negative association between analysts' relative forecast accuracy and optimism. This could arise if more talented analysts possess the confidence required to challenge herd behavior by less talented analysts or rosy management forecasts.

To control for this effect, we estimate analysts' average earnings forecast accuracy during the sample period, relative to other analysts that cover the same companies during the same period. We use the same measure of relative forecast accuracy as Hong, Kubik and Solomon (2000) and Hong and Kubik (2003). For each company and quarter that an analyst issues an earnings forecast, the analyst is ranked on forecast accuracy relative to all other analysts covering the same company and quarter. If an analyst issues multiple forecasts the same company-quarter, the latest forecast is used to estimate the forecast accuracy ranking. To allow for differences in analyst coverage across firms and quarters, percentile ranks (ranging from a low of 0% for the least accurate analyst to 100% for the most accurate analyst) are constructed as follows:

$$Percentile\ Rank_{ijt} = 100 - \left\{ \frac{Rank_{ijt} - 1}{Company\ Coverage_{jt} - 1} \right\} * 100$$

where *Rank*$_{ijt}$ is analyst j's forecast accuracy rank for firm i in quarter t, and *Company*

Coverage$_{jt}$ is the number of analysts issuing forecasts for firm i in quarter t. The

Percentile Rank estimates are then averaged across firms and quarters covered by the

analyst to provide an average measure of relative forecast accuracy.

Table 6 provides a summary of relative forecast accuracy by analyst firm type for

the earnings, earnings growth and price samples. The findings indicate that in general

analysts at underwriter and syndicate firms are marginally better at forecasting earnings

than their brokerage and research firm counterparts. For example, for the earnings

sample, the average underwriter/syndicate analyst was ranked in the top 51% of analysts

in terms of forecast accuracy, versus an average of only 48% for brokerage analysts and

49% for research analysts. A similar pattern is observed for the long-term earnings

growth sample. For the price sample, the most accurate forecasters are at research firms.

However, these results are difficult to interpret since so few research analysts forecast

prices.

Earnings Forecast Optimism

Our multivariate tests use relative earnings forecast optimism as the dependent

variable. The independent variables are the analyst-firm class indicator variables, and the

Forecast Horizon, Analyst Company Experience and Analyst Relative Forecast Accuracy

controls. The following two models are estimated:

Model 1: *RFOPT= g(Non-underwriter bank, Forecast horizon, Analyst company experience, Analyst relative forecast accuracy)*
Model 2: *RFOPT = g(Syndicate firm, Brokerage firm, Research firm, Forecast horizon, Analyst company experience, Analyst relative forecast accuracy)*

Model 1 is used to test whether there is any difference in forecast optimism for underwriter and non-underwriter firms. Non-underwriter bank is an indicator variable that takes the value one for all non-underwriter bank analysts. The estimated intercept coefficient is the average relative optimism for underwriter bank analysts, and the indicator coefficient measures the incremental relative optimism for non-underwriter bank analysts.

The second model tests for differences in optimism across different types of analyst firms. Indicator variables are included for Syndicate banks, Brokerage firms, and Research firms. The estimated intercept coefficient is therefore the average relative optimism for underwriter bank analysts, and the indicator coefficients measure the incremental relative optimism for other analyst firms.

One issue for our tests is that the model errors for forecasts made by the same analyst are likely to be serially-correlated. Also, forecasts for different analysts may suffer from heteroskedasticity. To control for these problems, the forecast optimism models are estimated using the robust cluster estimators of variance (Huber/White sandwich estimator). This approach produces "correct" standard errors (in the measurement sense). In comparison to the conventional estimator of variance, the robust cluster estimate of variance requires only that the observations be independent across the individual analysts (clusters).

Table 7 presents the model estimates for earnings forecast optimism. The results generally confirm the univariate findings. As indicated by the Model 1 estimates, analysts at non-underwriter firms make more optimistic one- and two-quarter ahead earnings forecasts than underwriter firms. Non-underwriter indicator coefficients are 0.063 and

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0.046 for the 0-90 day and 91-180 day forecast horizons respectively, and are both statistically significant.

Model 2 findings indicate that the underwriter banks make significantly less optimistic one- and two-quarter ahead forecasts than analysts at syndicate or brokerage firms. The indicator estimates for syndicate and brokerage firms are respectively 0.050 and 0.091 for the 0-90 day horizon, and 0.036 and 0.068 for the 91-180 day horizon. All of these estimates are significant at the 1% level.

Brokerage firms have the most optimistic forecasts of next quarter earnings. For the 0-90 day horizon, the estimated brokerage firm coefficient is significantly higher than those for underwriter and syndicate firms. Estimates for syndicate firms lie in between those for underwriter and brokerage firms. The findings for research firms are inconclusive.

The estimated coefficients for company experience are insignificant for 0-90 day forecasts, but are positive and significant for forecasts longer than 90 days for both models. This suggests that analysts who cover a company for longer periods find it more difficult to take a negative longer-term view on the company relative to their peers, either because their relation with management boosts their confidence about management's ability to deliver strong performance or because they rely more heavily on management's input.

There is also evidence that analyst forecast accuracy is related to forecast optimism as the forecast horizon increases. Analyst forecast accuracy is unrelated to optimism for forecast horizons of 0-90 days, but is negative and significant for horizons greater than 90 days. This indicates that, regardless of the type of firm they work for,

more talented analysts issue less optimistic longer horizon forecasts. Finally, the control for forecast horizon indicates that longer-horizon forecasts are more optimistic.

Long-Term Earnings Growth Forecast Optimism

Models 1 and 2 are re-estimated for earnings optimism are also estimated using relative long-term earnings growth forecast optimism as the dependent variable. The forecast horizon control variable is excluded since daily differences in forecast timing are modest relative to the three- to five-year forecast horizons. The results are presented in Table 8.

Model 1 estimates show that underwriter analysts are systematically less optimistic in their growth forecasts than analysts at non-underwriter firms. The estimated dummy coefficient for non-underwriter firms is 0.065, and significant at the 5% level. However, as shown in Model 2, unlike the near-term earnings findings, this difference is attributable to optimism by syndicate analysts, rather than brokerage analysts. The estimated syndicate dummy is 0.082 and significant at the 1% level, whereas the brokerage estimate is 0.015, and insignificant.

Consistent with the earnings forecast findings, analysts with greater earnings forecast accuracy make less optimistic long-term growth forecasts. But there is no evidence that analyst company experience is related to long-term growth forecast optimism.

Price Forecast Optimism

Table 9 presents the findings for the two models using relative price forecast optimism as the dependent variable. The forecast horizon variable is excluded since almost all forecast horizons are for twelve months.

Estimates for Model 1 show that analysts' price forecasts are more optimistic for non-underwriter banks than for their underwriter firm counterparts. The non-investment bank estimate is 0.058, and statistically reliable. Model 2 indicates that analysts at underwriter firms are less optimistic than analysts at brokerage firms. The brokerage firm estimated coefficient is 0.219. This estimate is highly statistically significant and is also significantly different from the syndicate and research estimates (0.030 and –0.036 respectively), both of which are statistically insignificant.

The company experience and analyst relative forecast accuracy estimates confirm findings reported for earnings forecasts with 90+ day horizons: analysts with more company experience and less accurate earnings forecasts make significantly more optimistic price forecasts.

4.3 Discussion of Results and Additional Tests

Given the concerns expressed by regulators, practitioners and academics about the impact of underwriting on analysts incentives, our results are somewhat surprising. We examine five potential explanations. First, it is possible that the findings are driven by the stock market boom, and that the results do not generalize to a non-boom period. Second, the less biased forecasts of underwriters could reflect high status underwriters relying at least partially on their reputations to attract new banking clients, rather than on optimistic

earnings analyst research. Third, the relative optimism of brokerage firms could reflect brokerage incentives to provide low quality research to retail investors, either because it is more costly for retail investors to infer quality or because recent industry changes make it difficult to charge retail investors for research. Fourth, our tests for underwriters may understate underwriter optimism by pooling firms that make new issues, where underwriters are presumed to be most optimistic, and clients that are unlikely to raise any new public capital. Finally, optimism is an incomplete measure of analyst forecasting performance. For example, less optimistic underwriter analysts can also be less accurate than non-underwriter analysts. We examine each of these explanations in turn.

Impact of the Stock Market Boom: Our sample period includes both the stock market boom, when underwriter research was most biased, and the subsequent crash period, when underwriting and incentives for research bias plummeted. The relative optimism measure does not permit us to test whether there has been a shift in bias over time. However, unreported tests indicate that the patterns observed for the different types of analyst-firms during the full sample period also hold for both the period prior to April 2000 (when the NASDAQ was at its peak), and the subsequent period (when it crashed).

Underwriter Firm Status: As noted above, high status underwriters can potentially rely at least partially on their reputations to attract new banking clients, whereas low status firms have no such reputation advantage and may be more prone to using optimistic research to attract new underwriting business. Consistent with this hypothesis, Hayward and Boeker (1998) found that research department reputation moderates analysts' bias—while analysts rated their clients' securities more favorably than other analysts rating the same

securities, this bias was lower for analysts at highly reputable departments. Phillips &

Zuckerman (2001) also documented that analysts at high status firms were more likely to

issue "sell" ratings than those at middle-tier firms.

The relatively low level of optimism for underwriters may, therefore, reflect a

high frequency of forecasts by high status banks, which dominate the underwriting

business.   To test this hypothesis, we examine whether underwriter status has any impact

on forecast optimism by separating underwriting firms into bulge and non-bulge firms.[21]

Bulge investment banks are the six largest and most reputed banks on Wall Street (Credit

Suisse First Boston, Goldman Sachs, Merrill Lynch, Morgan Stanley Dean Witter,

Salomon Smith Barney, and Lehman Bros).

To test whether the high frequency of bulge firm forecasts explains the low

relative optimism of underwriters, we modify Model 2, discussed above, to include a

Non-bulge underwriter bank indicator. The revised model is as follows:

Model 3: *RFOPT = g(Non-bulge underwriter bank, Syndicate firm, Brokerage firm,*
Research firm, Forecast horizon, Analyst company
experience, Analyst forecast accuracy)

The intercept represents the average forecast optimism for bulge underwriter firms, and

the indicator estimates represent the incremental optimism for Non-bulge underwriter

firms, Syndicate banks, Brokerage firms, and Research firms.

The findings are reported in table 7 for the earnings forecast sample, in table 8 for

the long-term earnings growth sample, and in table 9 for the price forecast sample. The

results are inconsistent across the samples. For the earnings forecast sample, non-bulge

underwriter bank analysts make significantly more optimistic earnings forecasts than

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[21] This classification is well established in practice and has been used to identify high status investment
banks in earlier work (see Eccles and Crane (1988)).

bulge firms for the 0-90 day horizon, but not for longer horizon forecasts. Non-bulge firm analysts make significantly more optimistic long-term earnings growth forecast forecasts, but no such pattern is shown for price forecasts. We conclude that while reputation may play some role in reducing analyst optimism, it is unlikely to explain the difference in relative forecast optimism for underwriter and brokerage firms.

Underwriter Client Effects: A third explanation for our findings is that optimism by brokerage analysts is driven by firms who focus on retail trading, rather than institutional equity business. As discussed above, it is likely to be more costly for retail clients to judge research quality than institutional investors, creating a lemons problem in the retail market. If retail investors cannot easily distinguish high and low quality research, high quality research is likely to be driven out of the market. Also, disintermediation in the retail market makes it more difficult for traditional brokerage firms to cover the costs of research through trading commissions.

To test whether brokerage firms that specialize in retail sales are responsible for the high relative forecast optimism for brokerage firms, we classified brokerage firms by the types of clients they serve (retail or institutional). The first step in our classification was to locate sample brokerage firms in the annual Nelson's Directory of Investment Research. If a firm was listed in the directory, we examined the introductory section that described its business and in some cases client mix. Where possible, this information was used to classify the brokerage firm into those that focused solely on institutional investors, those that served retail clients, and those that served both institutional and retail clients. If the client mix was not described in sufficient detail in Nelson's, we searched the firm's website for information on the type of clients served. If this search was

unsuccessful, we called the number listed in Nelson's directory or on the website and asked whether the firm served retail investors, institutional clients, or both. Finally, we used the Securities Industry Association (SIA) reports to cross-check our classification. SIA collects information for many security firms on types of clients, and the number of institutional and retail representatives employed. The breakdown of a firm's sales force (retail/institutional) and clients' accounts (retail/institutional) was used as another way to resolve classification ambiguities for the firms. [22]

Almost all brokerage houses in our sample serve institutional clients because the data is taken from *I/B/E/S*, which mostly collects data from firms that serve institutional investors. Roughly 54% of the earnings forecasts are made by analysts working for brokerage firms serving only institutional clients, versus 44% for brokerage firms serving both institutional and retail investors (2% of the forecasts could not be classified). For the long-term earnings growth (target price) sample, analysts working for brokerage firms serving only institutional clients make 59% (35%) of the forecasts, compared to 40% (64%) for brokerage firms serving both institutional and retail investors.

To test whether retail brokerage firms explain the relative optimism of brokers, we modify Model 2 by replacing the Brokerage firm indicator with two variables, one for Brokerage firms that focus solely on institutions, and the other for brokers that serve both institutional and retail investors. The revised model is as follows:

Model 4: *RFOPT = g(Syndicate firm, Institutional brokerage firm, Mixed brokerage firm, Research firm, Forecast horizon, Analyst company experience, Analyst forecast accuracy)*

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[22] Thirty-six brokerage firms could not be classified due to a lack of sufficient information. These firms comprised less than 2% of brokerage observations in each of the three samples.

The constant represents the average forecast optimism for underwriter banks, and the indicator estimates reflect the incremental optimism for Syndicate banks, Institutional brokerage firms, Combined institutional brokerage firms, and Research firms.

The findings, reported in table 7 for the earnings forecast sample, table 8 for the long-term earnings growth forecasts, and table 9 for the price forecasts, are only weakly consistent with the hypothesis that retail firms explain brokerage analyst optimism. For earnings forecasts with a 91-180 day horizon, the estimated coefficient for combined retail and institutional brokerage firms is 0.108 and highly significant, whereas the estimate for pure institutional brokerage firms is 0.035 and insignificant. Further, the difference between these estimates is statistically significant. A similar finding is reported for the long-term growth forecasts. The coefficient for combined retail and institutional brokerage firms is 0.110 and the estimate for institutional brokerage firms is -0.048. The difference between these estimates is significant at the 10% level.

However, for earnings forecasts with a 0-90 day horizon and for price forecasts the estimated coefficients for retail and institutional brokers and pure institutional brokers are very similar. The 0-90 day earnings forecast estimate is 0.107 for retail/institutional brokers and 0.078 for pure institutional brokers. For the price forecast sample, the retail/retail and institutional brokers estimate is 0.220 versus 0.224 for pure institutional brokers. All four estimates are statistically significant, indicating the analysts at both types of brokerage firms are more optimistic than underwriter analysts, but the tests of differences in coefficients across brokerage firm types are insignificant.

We conclude that the difference in forecast optimism between brokerage and underwriter firm analysts may be partially driven by firms that focus on the retail

business. However, this appears to be an incomplete explanation since pure institutional brokerage analysts' forecasts of prices and next quarter earnings are more optimistic than those of underwriter firm analysts.

Differences in Optimism for Issuing and Non-Issuing Companies: We examine forecast optimism for all sample firms, whereas the underwriting incentive effects are likely to be most pronounced for firms that make new issues (see Bradshaw, Richardson, and Sloan, 2003). Analysts at underwriter firms have incentives to make optimistic forecasts to win these firms' business; they are less likely to be optimistic for firms that do not raise new equity capital. To examine this explanation, we test whether there were any differences in relative forecast optimism for firms making IPOs and secondary offering during the sample period across the four classes of analyst firms. Consistent with prior research, we find that optimism in 181+ day earnings forecasts is higher for underwriter firm analysts in firm-years when there is an IPO or secondary offering, than in non-issue firm-years. Further, in company-issue years, there is no significant difference in the optimism of underwriter and non-underwriter firms using earnings forecasts with a 181+ day horizon. However, for earnings forecasts with short horizons, for long-term earnings growth forecasts and for price forecasts, non-underwriter firm analysts continue to be more optimistic than underwriter analysts.

Overall, the results are consistent with allegations that underwriter analysts issue more optimistic medium term earnings forecasts for firms that issue new securities. Nonetheless, non-underwriting business activities, such as sales and trading, continue to provide powerful incentives for analyst optimism.

Forecast Accuracy Differences Across Firm Types: Our tests use analyst forecast optimism as the primary measure of analyst bias. However, forecast optimism is an incomplete measure of analyst forecast performance. Consequently, underwriter analysts may be less optimistic than non-underwriter analysts, but they may also be less accurate. To test this possibility, we replicate our tests using relative forecast accuracy as defined by Jacob, Lys and Neale (1999). The results, which are unreported, are similar to those for forecast optimism, and indicate that underwriter analysts have higher forecast accuracy as well as lower forecast optimism.

5. Conclusions

In summary, our findings provide several insights for those concerned about conflicts of interest faced by security analysts. Prior research suggests that underwriter conflicts play an important role in explaining analyst forecast optimism. Our findings on price, long-term earnings growth and earnings forecasts show that on average underwriter analysts make less optimistic price, earnings growth and earnings forecasts than analysts at non-underwriter firms, suggesting that there are also important non-underwriter factors that affect analyst bias.

Several such factors appear to be important in explaining analyst forecast optimism. We show that brokerage firm analysts tend to make the most biased forecasts, implying that sales and trading incentives are important factors underlying analyst research optimism. There is some evidence that this bias is more pronounced for firms that provide retail services, but our classification of firms by client type is noisy, making it difficult to conduct powerful tests. Analyst firm status also appears to partially explain

research optimism, since forecasts of both next quarter's earnings and prices are less optimistic for bulge firms than for non-bulge firms. Finally, there is evidence that optimism in earnings forecasts beyond the next quarter and in price forecasts increases with analysts' longevity covering a company, suggesting that over time analysts develop relations with management that make it difficult to be independent.

Our findings raise several questions for future research and for regulators. For researchers they suggest that the primary force underlying analysts' forecast optimism is not analysts' underwriting incentives, but the sales and trading incentives faced by most analyst firms and brokerage firms in particular. Our findings indicate that retail brokers play some role in explaining this finding. Yet these findings are incomplete since very few of our firms focus purely on retail investors, and for firms that serve both types of clients we do not have data on the relative importance of each type. Consequently, we are not able to provide a powerful test of how retail investors affect analyst forecast optimisms.

The less optimistic forecasts by underwriter firms, particularly for short-horizons, raise questions for researchers about whether underwriter analysts are consciously or sub-consciously influenced by management to shade their short-term forecasts to make *Wall Street* targets more manageable. Prior studies on underwriter analyst incentives show similar findings, yet there is little direct evidence on this issue.

We are unable to conduct a very powerful test of the performance of analysts at pure research firms. As we discuss above, these analysts are likely to have less incentive to be optimistic than brokerage, underwriter or syndicate analysts, since they do not use

research to sell other services, such as trading and underwriting. However, our sample of research firms is quite small; we believe this is largely a product of *I/B/E/S* coverage.

The high level of relative forecast optimism for analysts working for institutional brokers raises questions about how institutional trading affects analysts' incentives. Are trading incentives similar for large and small institutions? As noted earlier, large institutions typically provide analyst firms with detailed feedback on the specific research they value, whereas small institutions typically do not. As a result, trading firms that serve the large institutions have more precise information on analyst performance, enabling more effective analyst reward systems. In contrast, firms that serve small institutions are forced to use a single metric to reward analysts, trading volume in the companies they follow. This is likely to be a noisy measure of analyst research quality and the focus on a single performance metric may lead analysts to attempt to game the system.

For regulators, our findings indicate that recent attempts to eliminate investment banking conflicts may not reduce analyst research optimism, since analyst bias is even more prominent for pure brokerage firms than for firms that also perform underwriting. Requiring sanctioned underwriters to supplement their own research on each company they cover by acquiring and publishing additional research from three independent sources presumably is intended to increase the level of independent research available to investors.[23] However, we find that analysts at underwriter firms are not the most biased in

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[23] In the settlement independent research was defined as "(i) a research report prepared by an unaffiliated person or entity, or (ii) a statistical or other survey or analysis of research reports (including ratings and price targets) issued by a broad range of persons and entities, including persons and entities having no association with investment banking activities, which survey or analysis has been prepared by an unaffiliated person or entity." (Attorney General of the State of New York, 2003, Addendum A, p. 14). These requirements imply that firms that are most likely to be eligible for research funding will be brokerage firms and pure research boutiques.

their earnings and price forecasts – they are among the least biased. Unless the additional resources provided by the ten sanctioned banks leads to the formation of new research firms that will provide unbiased research, or to a material decline in the optimism of analysts at brokerage firms, which are stepping up their research offerings to take advantage of this opportunity,[24] this requirement seems as likely to reduce overall research quality as to increase it.

Finally, our finding that analyst optimism increases the longer an analyst covers a company suggests that analysts develop a close relation to management over time which either consciously or subconsciously affects their independence. Regulation Fair Disclosure, which reduces the ability of managers to provide selective disclosures to favored analysts, may reduce this bias. However, it will probably not affect subconscious analyst identification with management that naturally occurs over time.

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[24] A recent Business Week article noted that in response to the opportunities created by the settlement, "S&P is hiring extra analysts to cover more companies and bulking up the five-page stock reports it aims at retail investors. It brags it now covers 1,160 U.S. stocks -- more than Merrill Lynch & Co. or Morgan Stanley." See "(Still) Pity the Poor Little Guy," Business Week, May 19, 2003.

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Table 1

Selection process for earnings, long-term earnings growth, and target price forecast samples.

	Number of forecasts
Panel A: Earnings forecasts	
Full sample of earnings forecasts on *I/B/E/S* from January 1996 to December 2002	1,313,852
Less:	
Forecasts with missing horizon data	34,338
Duplicate forecasts by analyst in forecast period	337,879
Forecasts for firms covered by only one analyst	88,976
All forecasts for company/horizon are identical	26,729
Forecasts with missing analyst firm data	404
Forecasts with missing analyst performance data	15,974
Final sample	809,552
Panel B: Long-term earnings growth forecasts	
Full sample of growth forecasts on *I/B/E/S* from January 1996 to December 2002	42,010
Less:	
Duplicate forecasts by analyst in forecast period	5,943
Forecasts for firms covered by only one analyst	8,263
All forecasts for company/horizon are identical	1,691
Forecasts with missing analyst firm data	3
Forecasts with missing analyst performance data	468
Final sample	25,642
Panel C: Target price forecasts	
Full sample of price forecasts on *First Call* from January 1999 to December 2002	153,195
Less:	
Duplicate forecasts by analyst in forecast period	17,140
Forecasts for firms covered by only one analyst	36,377
All forecasts for company/horizon are identical	2,479
Forecasts with missing analyst firm data	366
Forecasts with missing analyst performance data	2,849
Forecasts with missing analyst experience data	1,990
Final sample	91,994

Table 2

Frequency of analyst firms, analysts, companies covered, and forecasts by horizon for different classes of analyst firms. Earnings and long-term earnings growth forecast samples are from the period January 1996 to December 2002, as reported by *I/B/E/S*. The target price forecast sample is from the period January 1999 to September 2002, as reported by *First Call*.

	Number of analyst firms	Number of analysts	Number of companies	Number of forecasts		
				0-90 day forecasts	91-180 day forecasts	181+ day forecasts
Panel A: Earnings forecast sample						
Underwriter banks	150	5,277	6,676	247,954	190,835	254,481
Non- underwriter banks						
Syndicate firms	131	1,164	3,965	28,177	20,305	26,678
Brokerage firms	84	447	2,303	13,359	9,971	13,557
Pure research firms	18	88	541	1,248	1,148	1,839
Total non- underwriter banks	229	1,632	4,573	42,784	31,424	42,074
Total	370	6,483	6,755	290,738	222,259	296,555

Table 2 continued

	Number of analyst firms	Number of analysts	Number of companies	Number of forecasts
Panel B: Long-term earnings growth forecast sample				
Underwriter banks	112	3,077	3,201	22,994
Non- underwriter banks				
Syndicate firms	62	370	1,090	1,779
Brokerage firms	28	103	474	703
Pure research firms	3	24	85	166
Total non- underwriter banks	92	482	1,380	2,648
Total	198	3,439	3,229	25,642
Panel C: Target price forecast sample				
Underwriter banks	95	3,425	3,616	82,780
Non- underwriter banks				
Syndicate firms	75	556	1,628	7,669
Brokerage firms	24	121	544	1,428
Pure research firms	5	28	76	117
Total non- underwriter banks	102	701	1,842	9,214
Total	192	3,954	3,637	91,994

Table 3
Frequency of coverage across analyst firm types for the earnings, long-term earnings growth, and price forecast samples. Earnings and long-term earnings growth forecast samples are from the period January 1996 to December 2002, as reported by *I/B/E/S*. The target price forecast sample is from the period January 1999 to September 2002, as reported by *First Call*.

	Earnings sample		Long-term earnings growth sample		Target price sample	
	No. of forecasts	%	No. of forecasts	%	No. of forecasts	%
Coverage by one firm type:						
Underwriter	64,135	8%	9,360	37%	16,846	18%
Syndicate	97	0%	20	0%	24	0%
Brokerage	43	0%	-	0%	2	0%
Research	43	0%	5	0%	2	0%
	64,318	8%	9,385	37%	16,874	18%
Coverage by two firm types:						
Underwriter /Research	4,294	1%	303	1%	377	0%
Syndicate/Research	94	0%	6	0%	-	0%
Brokerage/Research	55	0%	-	0%	-	0%
Underwriter /Brokerage	34,285	4%	2,138	8%	3,374	4%
Syndicate/Brokerage	245	0%	28	0%	13	0%
Underwriter /Syndicate	153,547	19%	8,978	35%	43,447	47%
	192,520	24%	11,453	45%	47,211	51%
Coverage by three firm types:						
Underwriter /Research/Brokerage	4,113	1%	33	0%	34	0%
Syndicate/Research/Brokerage	15	0%	8	0%	-	0%
Underwriter /Syndicate/Brokerage	478,550	59%	4,478	17%	26,515	29%
Underwriter /Syndicate/Research	18,690	2%	214	1%	784	1%
	501,368	62%	4,733	18%	27,333	30%
Coverage by all firm types:						
Underwriter/Syndicate/Brokerage/ Research	51,346	6%	71	0%	576	1%
	51,346	6%	71	0%	576	1%
Total	809,552	100%	25,642	100%	91,994	100%

Table 4

Descriptive statistics on earnings and price forecast bias and accuracy. Earnings forecasts are from the period January 1996 to December 2002, as reported by *I/B/E/S*. Price forecasts are made in the period January 1999 to September 2002, as reported by *First Call*. Forecast horizon is reported in days for the earnings sample and months for the target price sample. Forecast bias is the forecast error deflated by the absolute value of the forecast. Forecast accuracy is the absolute forecast error deflated by the absolute value of the forecast. The estimated price growth rate is the difference between the target price and the pre-forecast price, deflated by the pre-forecast price.

	Forecast horizon	Forecast bias	Forecast accuracy	Forecasted price growth
Panel A: Earnings forecasts				
0-90 day forecast horizon				
Mean	55.0	0.073	0.414	
First quartile	33.0	-0.116	0.030	
Median	57.0	-0.017	0.095	
Third quartile	79.0	0.064	0.280	
Standard Deviation	26.1	2.163	2.125	
Percent positive		34.4%		
91-180 day forecast horizon				
Mean	138.4	0.281	0.659	
First quartile	114.0	-0.111	0.051	
Median	140.0	0.000	0.167	
Third quartile	164.0	0.250	0.481	
Standard Deviation	28.0	2.754	2.689	
Percent positive		48.2%		
181+ day forecast horizon				
Mean	287.6	0.484	0.866	
First quartile	240.0	-0.087	0.073	
Median	286.0	0.059	0.238	
Third quartile	345.0	0.482	0.667	
Standard Deviation	59.5	7.202	7.166	
Percent positive		57.5%		
Panel B: Target price forecasts				
Mean	12.1	0.247	0.413	0.371
First quartile	12.0	0.040	0.164	0.131
Median	12.0	0.283	0.345	0.243
Third quartile	12.0	0.546	0.595	0.430
Standard Deviation	1.0	0.566	0.459	0.922
Percent positive		78.3%		99.9%

Table 5
Mean relative forecast optimism by analyst firm type and forecast horizon. Earnings and long-term earnings growth forecasts are from the period January 1996 to December 2002, as reported by *I/B/E/S*. Price forecasts are made in the period January 1999 to September 2002, as reported by *First Call*. Relative forecast optimism is the difference between an analyst's forecast and the average forecast for all analysts issuing forecasts for the same company, period, and forecast horizon, deflated by the standard deviation of all forecasts for the company, period, and horizon.

Panel A: Earnings forecasts

	Forecast horizon		
	0-90 day forecast horizon	91-180 day forecast horizon	181+ day forecast horizon
Underwriter banks	-0.009^{*}	-0.008^{**}	-0.004^{**}
Non-underwriter banks			
Syndicate firms	0.034	0.031	0.013
Brokerage firms	$0.080^{\#}$	$0.069^{\#}$	$0.023^{\#\#}$
Pure research firms	0.045	0.041	-0.013
Total non- underwriter banks	$0.049^{\#\#}$	$0.044^{\#\#}$	$0.015^{\#\#}$

Panel B: Long term earnings growth and target price forecasts

	Long-term earnings growth forecasts	Target price forecasts
Underwriter banks	-0.007^{***}	-0.003^{**}
Non- underwriter banks		
Syndicate firms	0.080	0.023
Brokerage firms	0.019	$0.232^{\#}$
Pure research firms	0.104	-0.058
Total non- underwriter banks	$0.065^{\#\#}$	$0.055^{\#\#}$

[*] Significantly different from the mean for syndicate, brokerage, and research firms at the 5% level or lower

[**] Significantly different from the mean for syndicate and brokerage firms at the 5% level or lower

[***] Significantly different from the mean for syndicate firms at the 5% level or lower.

[#] Significantly different from the mean for underwriter and syndicate firms at the 5% level or lower.

[##] Significantly different from the mean for underwriter firms at the 5% level or lower.

Table 6

Summary statistics for control variables by analyst-firm class for earnings, long-term earnings growth, and target price forecast samples. Earnings and long-term earnings growth forecast samples are from the period January 1996 to December 2002, as reported by *I/B/E/S*. The target price forecast sample is from the period January 1999 to September 2002, as reported by *First Call*. Control variables include analyst company experience, forecast horizon, and analyst relative forecast accuracy.[a]

	Underwriter firms	Syndicate firms	Brokerage firms	Research firms
Panel A: Earnings forecast sample				
Analyst company experience (in quarters)				
Mean	11.0	9.5	9.4	8.3
Standard deviation	12.4	11.8	13.1	15.0
Forecast horizon (in days)				
Mean	163.4	158.9	164.0	179.3
Standard deviation	108.7	107.9	108.5	108.0
Analyst Relative Forecast Accuracy (%)				
Mean	50.6	50.5	47.9	48.9
Standard deviation	4.5	5.1	4.5	4.6
Panel B: Long-term earnings growth forecast sample				
Analyst company experience (in quarters)				
Mean	9.2	8.9	11.8	17.0
Standard deviation	12.0	12.6	15.6	21.0
Analyst Relative Forecast Accuracy (%)				
Mean	50.9	50.4	49.5	48.7
Standard deviation	4.6	4.8	3.9	3.2
Panel C: Target price forecast sample				
Analyst company experience (in quarters)				
Mean	11.0	9.9	14.3	7.2
Standard deviation	12.1	12.5	14.6	9.2
Analyst Forecast Accuracy (%)				
Mean	51.5	51.5	47.8	54.5
Standard deviation	5.5	6.3	4.1	10.9

[a] Analyst company experience is the number of quarters that the analyst has been covering a company. Forecast horizon is the number of days between the issue of a forecast and the actual earnings announcement. Analyst relative forecast accuracy is the analyst's earnings forecast accuracy percentile ranking relative to all analysts covering the same firms (ranging from a low of 0% to a high of 100%), averaged across all companies and quarters for which the analyst issues a forecast.

Table 7

Relation between relative earnings forecast optimism and analyst firm type estimated using robust cluster analysis. The sample comprises earnings forecasts made in the period January 1996 to December 2002, as reported on *I/B/E/S*. The dependent variable is relative optimism of earnings forecasts for one quarter to five quarters ahead. Independent variables include dummy variables for analyst firm type, forecast horizon, analyst company experience, and analyst relative forecast accuracy.[a]

Independent variables	Model 1	Model 2	Model 3	Model 4
Panel A: Forecast horizon 0 to 90 days (N=290,737)				
Constant	-0.238	-0.244	-0.270	-0.244
	(-7.3)*	(-7.4)*	(-8.0)*	(-7.4)*
Non- underwriter banks	0.063			
	(7.7)*			
Non-bulge underwriter banks			0.015	
			(2.1)**	
Syndicate firm		0.050	0.061	0.050
		(5.4)*	(5.7)*	(5.4)*
Brokerage firm		0.091	0.102	
		(5.6)*	(5.9)*	
Brokerage firm: Institutional				0.078
				(3.6)*
Brokerage firm: Retail and Institutional				0.107
				(4.2)*
Research firm		0.054	0.066	0.054
		(2.3)**	(2.7)*	(2.3)**
Forecast horizon	0.0037	0.0037	0.0037	0.0037
	(40.8)*	(40.8)*	(40.8)*	(40.7)*
Analyst company experience	0.0009	0.0009	0.0014	0.0010
	(0.4)	(0.4)	(0.7)	(0.5)
Analyst relative forecast accuracy	0.0004	0.0005	0.0008	0.0005
	(0.7)	(0.9)	(1.3)	(0.9)
R^2	0.0122	0.0123	0.0123	0.0123

Table 7 continued

Independent variables	Model 1	Model 2	Model 3	Model 4
Panel B: Forecast horizon 91 to 180 days (N=222,259)				
Constant	-0.267	-0.274	-0.282	-0.271
	$(-6.1)^*$	$(-6.2)^*$	$(-6.3)^*$	$(-6.1)^*$
Non-underwriter banks	0.046			
	$(4.6)^*$			
Non-bulge underwriter banks			0.006	
			(0.8)	
Syndicate firm		0.036	0.040	0.036
		$(3.0)^*$	$(3.1)^*$	$(3.0)^*$
Brokerage firm		0.068	0.073	
		$(3.9)^*$	$(4.0)^*$	
Brokerage firm: Institutional				0.035
				(1.4)
Brokerage firm: Retail and Institutional				0.108
				$(5.2)^*$
Research firm		0.040	0.045	0.040
		(1.2)	(1.3)	(1.2)
Forecast horizon	0.0024	0.0024	0.0024	0.0024
	$(28.2)^*$	$(28.2)^*$	$(28.3)^*$	$(28.2)^*$
Analyst company experience	0.0076	0.0077	0.0078	0.0075
	$(3.2)^*$	$(3.2)^*$	$(3.3)^*$	$(3.2)^*$
Analyst relative forecast accuracy	-0.0018	-0.0017	-0.0016	-0.0017
	$(-2.2)^{**}$	$(-2.0)^{**}$	(-1.9)	$(-2.1)^{**}$
R^2	0.0066	0.0067	0.0067	0.0068

Table 7 continued

Independent variables	Model 1	Model 2	Model 3	Model 4
Panel C: Forecast horizon 180+ days (N=296,555)				
Constant	-0.085	-0.084	-0.087	-0.082
	(-1.7)	(-1.6)	(-1.7)	(-1.6)
Non-underwriter banks	0.017			
	(1.7)			
Non-bulge underwriter banks			0.003	
			(0.4)	
Syndicate firm		0.020	0.023	0.020
		(1.6)	(1.6)	(1.6)
Brokerage firm		0.014	0.017	
		(0.8)	(0.9)	
Brokerage firm: Institutional				0.000
				(0.0)
Brokerage firm: Retail and Institutional				0.025
				(1.0)
Research firm		-0.010	-0.007	-0.010
		(-0.4)	(-0.3)	(-0.4)
Forecast horizon	0.0011	0.0011	0.0011	0.0011
	(29.4)*	(29.3)*	(29.4)*	(29.3)*
Analyst company experience	0.0076	0.0075	0.0076	0.0076
	(3.2)*	(3.2)*	(3.2)*	(3.2)*
Analyst relative forecast accuracy	-0.0052	-0.0052	-0.0052	-0.0052
	(-5.3)*	(-5.2)*	(-5.2)*	(-5.2)*
R^2	0.0067	0.0067	0.0067	0.0067

*   Significant at the 1% level using a two-tailed test.
** Significant at the 5% level using a two-tailed test
[a] The dependent variable, relative earnings forecast optimism, is the difference between an analyst's earnings forecast and the average forecast for all analysts forecasting for the same company, quarter, and forecast horizon, deflated by the standard deviation of forecasts for the company, quarter, and horizon. Dummy variables are included for forecasts made by analysts at non-underwriter, non-bulge underwriter, syndicate, brokerage, brokerage: institutional, brokerage: mixed institutional and retail, and research firms. Forecast horizon is the number of days between the issue of a forecast and the actual earnings announcement. Analyst company experience is the number of quarters that an analyst has covered a company. Analyst relative forecast accuracy is the analyst's earnings forecast accuracy percentile ranking relative to all analysts covering the same firms (ranging from a low of 0% to a high of 100%), averaged across all companies and quarters for which the analyst issues a forecast.

Table 8

Relation between relative earnings growth forecast optimism and analyst firm type estimated using robust cluster analysis. The sample comprises 25,642 earnings growth forecasts made in the period January 1996 to December 2002 reported on *I/B/E/S*. The dependent variable is the relative optimism of earnings growth forecasts for three to five years ahead. Independent variables include dummy variables for analyst firm, analyst company experience, and analyst forecast accuracy.[a]

Independent variables	Model 1	Model 2	Model 3	Model 4
Constant	0.432	0.434	0.183	0.432
	(5.3)[*]	(5.3)[*]	(2.1)[**]	(5.2)[*]
Non-underwriter banks	0.065			
	(2.5)[**]			
Non-bulge underwriter banks			0.128	
			(7.4)[*]	
Syndicate firm		0.082	0.171	0.082
		(2.8)[*]	(5.4)[*]	(2.8)[*]
Brokerage firm		0.015	0.106	
		(0.3)	(2.1)[**]	
Brokerage firm: Institutional				-0.048
				(-0.7)
Brokerage firm: Retail and Institutional				0.110
				(1.7)
Research firm		0.096	0.188	0.096
		(1.0)	(2.1)[**]	(1.0)
Analyst company experience	-0.0067	-0.0067	-0.0023	-0.0061
	(-1.3)	(-1.3)	(-0.4)	(-1.2)
Analyst relative forecast accuracy	-0.0084	-0.0085	-0.0054	-0.0085
	(-5.3)[*]	(-5.3)[*]	(-3.3)[*]	(-5.3)[*]
R^2	0.0030	0.0031	0.0073	0.0033

[*]   Significant at the 1% level using a two-tailed test.

[**] Significant at the 5% level using a two-tailed test

[a] The dependent variable, relative earnings forecast optimism, is the difference between an analyst's earnings growth forecast and the average forecast for all analysts forecasting for the same company during the same year, deflated by the standard deviation of forecasts for the company during that year. Dummy variables are included for forecasts made by analysts at non-underwriter, non-bulge underwriter, syndicate, brokerage, brokerage: institutional, brokerage: mixed institutional and retail, and research firms. Analyst company experience is the number of quarters that an analyst has covered a company. Analyst relative forecast accuracy is the analyst's earnings forecast accuracy percentile ranking relative to all analysts covering the same firms (ranging from a low of 0% to a high of 100%), averaged across all companies and quarters for which the analyst issues a forecast.

Table 9
Relation between relative price forecast optimism, analyst company experience, and analyst firm type estimated using robust cluster analysis. The sample comprises 91,994 price forecasts made in the period January 1999 to September 2002 reported on *First Call*. The dependent variable is the relative optimism of target price forecasts for twelve months ahead. Independent variables include dummy variables for analyst firm type, analyst company experience, and analyst forecast accuracy.[a]

Independent variables	Model 1	Model 2	Model 3	Model 4
Constant	0.122	0.108	0.094	0.108
	(2.0)**	(1.7)	(1.5)	(1.7)
Non-underwriter banks	0.058			
	(2.2)**			
Non-bulge underwriter banks			0.011	
			(0.7)	
Syndicate firm		0.030	0.038	0.030
		(1.0)	(1.2)	(1.0)
Brokerage firm		0.219	0.227	
		(5.6)*	(5.6)*	
Brokerage firm: Institutional				0.224
				(3.2)*
Brokerage firm: Retail and Institutional				0.220
				(4.7)*
Research firm		-0.036	-0.029	-0.036
		(-0.5)	(-0.4)	(-0.5)
Analyst company experience	0.023	0.022	0.023	0.022
	(4.9)*	(4.8)*	(4.8)*	(4.7)*
Analyst relative forecast accuracy	-0.0032	-0.0029	-0.0028	-0.0029
	(-2.7)*	(-2.5)**	(-2.4)**	(-2.5)**
R^2	0.0019	0.0026	0.0026	0.0026

* Significant at the 1% level using a two-tailed test;
** Significant at the 5% level using a two-tailed test
[a] The dependent variable, relative earnings forecast optimism, is the difference between an analyst's target price forecast and the average forecast for all analysts forecasting for the same company and month, deflated by the standard deviation of forecasts for the company and month. Dummy variables are included for forecasts made by analysts at non-underwriter, non-bulge underwriter, syndicate, brokerage, brokerage: institutional, brokerage: mixed institutional and retail, and research firms. Analyst company experience is the number of quarters that an analyst has covered a company. Analyst relative forecast accuracy is the analyst's earnings forecast accuracy percentile ranking relative to all analysts covering the same firms (ranging from a low of 0% to a high of 100%), averaged across all companies and quarters for which the analyst issues a forecast.