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ABSTRACT

Why do analysts display overoptimism about the stocks they cover? According to the selection hypothesis, analysts pick their favorite stocks and are truly too optimistic. According to the conflict-of-interest hypothesis, analysts distort their view to maximize profits via commissions and underwriting business, in particular if affiliated with an underwriting bank. We analyze the concurrent issuance of recommendations and earnings forecasts to assess the relative importance of both explanations for affiliated and for unaffiliated analysts. First, we show that recommendations and forecasts reach different audiences. Small traders follow recommendations but not forecast updates; large traders discount recommendations and follow earnings forecasts. As a result, analysts may choose to distort recommendations but prove their analyst quality in their forecasts. The selection hypothesis implies, instead, a positive correlation between recommendation and forecast overoptimism. We find that, while affiliated analysts issue more optimistic recommendations than unaffiliated analysts, their earnings forecasts are more pessimistic. Moreover, forecast optimism is negatively correlated with recommendation optimism for affiliated analysts but positively for unaffiliated analysts. Similar discrepancies between the timing of recommendations and forecasts confirm that active distortion is a major explanation for the recommendation optimism of affiliated analysts.

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I. Introduction

Why do security analysts issue overly positive recommendations? A large literature in finance and accounting documents the upward distortions of analyst recommendations, particularly when the issuing analyst has an underwriting relationship with the recommended firm. It is less transparent why these distortions occur. Do analysts truly have too positive expectations about the stock they cover? Or do they consciously bias recommendations upwards in an effort to please their clients and induce investors to purchase the stock? Understanding the causes of analyst overoptimism is especially important in light of regulatory debates about optimal analyst regulation. If analyst overoptimism results from misaligned incentives, fines and mandatory separation of research and investment banking might be effective measures. If overoptimism is due to selection and unconscious upward bias, policy-makers might provide help in detecting and overcoming "winner's curse" rather than chasing conscious distortions.

In this paper we evaluate the relative importance of the selection and the conflict-of-interest explanations, separately for affiliated and unaffiliated analysts. Affiliated analysts, whose brokerage belongs to an investment bank that underwrites securities of the covered firm, are particularly likely to be affected by misaligned incentives. Positive analyst coverage after an equity issuance is often viewed as part of an implicit agreement between underwriter and issuer.[1] Moreover, analysts' compensation depends, directly or indirectly, on their "support" in generating profits for the corporate finance department.[2]

In order to assess the importance of those explanations, we exploit that analysts provide investment advice using different modes of communication such as stock recommendations and earnings forecasts. First, we use the IBES data set on recommendations and quarterly and one-year earnings forecasts to show that, while the recommendations of affiliated analysts are significantly more positive than those of unaffiliated analysts, the reverse is true for annual earnings forecasts: affiliated analysts issue significantly lower forecasts than unaffiliated analysts on average. The results replicate in a regression framework, controlling for the number of days until the earnings announcement.

[1] Michaely and Womack [1999].

[2] Michaely and Womack [2003]; Hong and Kubik [2003].

We then show that different types of investors react differently to these two forms of investment advice. Following Lee and Radhakrishna [2000], we distinguish between small (individual) and large (institutional) investors based on the size of their trades, using trading data from the New York Stock Exchange Trades and Quotations (TAQ) database (1993-2002). We document distinctly different patterns of trade reactions to recommendations and to earnings forecasts among the two types of investors. In the case of recommendations, the trade reaction of small investors is as strong as or stronger than that of large investors. Moreover, we know from Malmendier and Shanthikumar [2007] that large traders generally discount the positive content of recommendations (e.g. display a neutral or less positive reaction to positive recommendations and a negative reaction to neutral recommendations), in particular if the analyst is affiliated. In contrast, small investors take analyst recommendations literally, e.g. buy in response to buy recommendations, hold in response to hold recommendations, and they do not distinguish between affiliated and unaffiliated recommendations. The trade reactions to earnings forecasts look rather different. Large investors strongly react to forecast updates of both affiliated analysts and unaffiliated analysts, in the direction of the update. In contrast, the trade reaction of small investors is either insignificant or significantly negative (for unaffiliated and affiliated updates, respectively). Small traders display a significantly positive abnormal trade reaction on the event date, but their reaction is uncorrelated or negatively correlated with the direction of the forecast update. Thus, the simple "buy" or "sell" message of recommendations appears to be accessible also for individual investors. The more complicated forecasts of given dollar amounts of earnings are more accessible to institutional investors and their buy-side analysts.

Given the differential reaction of different types of investors to different types of information, analysts who distort strategically may do so differently for recommendations and for forecasts. In particular, the net benefit of distortion is likely to decrease as the investor's sophistication increases. Sophisticated investors, and in particular institutional investors who have their own buy-side analysts, might detect the distortion. Moreover, the relative benefits of proving to be a high-quality analyst are larger the larger the trades of the customer. Therefore, to the extent that strategic distortion explains analyst optimism, its degree should be higher in information primarily consumed by individual investors than in information primarily consumed by more sophisticated, institutional in-

vestors. If, instead, overoptimism reflects the true beliefs of analysts, we expect analysts to express their positive view in all of their communications, and the distortion should be similar across the different types of investment advice.

The differences between recommendation and forecast optimism for affiliated and unaffiliated analysts are consistent with the conflict-of-interest interpretation but not consistent with the selection hypothesis.

Two additional findings corroborate this interpretation. First, we analyze the duration and timing of recommendations and forecasts, separately for affiliated and unaffiliated analysts. In particular, affiliated analysts may update more frequently due to better access to information. For recommendations, the opposite is the case. On average, affiliated analysts wait 43 more days before updating their recommendation. Moreover, affiliated analysts update recommendations faster upwards than downwards. Unaffiliated analysts, instead, do not display a significant difference in their updating decision between upgrades and downgrades. We also find that affiliated analysts issue their – on average overly positive – recommendations only if the consensus is very high. They then stick to their positive recommendations when the consensus is becoming more negative, rather than taking an active updating decision. For forecasts, instead, the timing of updates is virtually identical for affiliated and unaffiliated analysts. Regardless of affiliation, analysts appear to incorporate new information at a similar speed. These findings suggest that recommendation updates are, compared to earnings forecast updates, more of a strategic choice than a mere reflection of news about the company.

Second, we relate individual analysts' overoptimism in recommendations to their overoptimism in earnings forecasts, separately for affiliated and unaffiliated analysts.. We find a positive correlation for unaffiliated analysts and a negative correlation for unaffiliated analysts. Thus, those affiliated analysts who express the most overoptimism in recommendations are most pessimistic in their forecasts. This within-analyst negative correlation is consistent with the conflict-of-interest interpretation: The same analysts who bias recommendations upwards to induce small-investor stock purchases and please management also bias forecasts downwards to allow management to beat their earnings forecasts. Anecdotal evidence suggests these lower pre-announcement forecasts are something managers desire, to help achieve positive earnings surprises, and that managers may pressure analysts to issue them. In a separate regression, we show directly that

affiliated analysts are more likely to make negative errors in their last forecast before the earnings announcement, i.e. their earnings forecasts are more likely to result in a firm meeting or beating the forecast.

We also replicate all results using quarterly earnings forecasts and long-term-growth forecasts. Quarterly earnings forecasts typically yield similar results to annual forecasts, though the quarter schedule constrains analysts more (e.g. in the timing). Long-term growth (LTG) forecasts are more difficult to categorize in terms of target audience. On the one hand, they are less straightforward to read than recommendations, suggesting a sophisticated (large-investor) audience. On the other hand, they are often vague and hard to verify ex post, allowing for distortions without negative consequences. Not surprisingly, our results are less clear-cut. Affiliated and unaffiliated LTG forecasts are not significantly different. Neither group of traders appears to respond to affiliated LTG forecasts, while large traders respond to the information in unaffiliated LTG forecasts.

Together, these results suggest that affiliated analysts make a conscious decision to distort recommendations, to which small investors respond, and to display no overoptimism in their earnings forecasts, to which large investors respond. While genuine overoptimism and selection may also influence analyst distortions, they do not suffice to explain our results. At least some affiliated analysts communicate to different types of investors "in different tongues."

These dual modes of communication make analysts and large traders better off: Since the benefits of distortion are smaller vis-à-vis sophisticated investors, large investors receive more accurate information than small investors, and analysts profit from small investors' trade reaction to overly positive recommendations. As a result, competition among analysts is unlikely to remedy the selective distortion. We examine the effect of analyst competition on recommendation behavior, relating recommendation optimism to the number of analysts covering a stock. We find that stronger competition does not mitigate affiliated analyst recommendation bias – affiliated analysts in fact issue more positive recommendations if the number of other analysts covering a stock is higher.

This paper relates to the evidence in Lin and McNichols [1998] and Michaely and Womack [1999] that stock recommendations by affiliated analysts are more favorable but perform more poorly over short (three-day) and long (up to two-year) horizons. Iskoz [2002] confirms these results for strong buy recommendations and provides evidence that

institutional investors account for the distortions of affiliated analysts, as far as one can deduce from the quarterly changes in institutional ownership. In Malmendier and Shanthikumar [2007], we provide evidence that small investors follow recommendations "literally" while larger traders account for analyst bias. Ottaviani and Squintani [2004] analyze a cheap-talk model in which the receiver may be naive and believes that the sender is honest, leading to too much communication and biased equilibrium allocation. The behavioral-finance literature on investor reaction to firms' accounting choices, issuance decisions, and repurchase offers provides evidence of such naiveté.[3] Investors appear to be "credulous" and not to discount enough for the incentives of firms to manipulate the signal. The question of whether selection or conflict of interest explains analyst overoptimism is partially analyzed in McNichols and O'Brien [1997], Lin, McNichols and O'Brien [2003] and Kolasinski and Kothari [2004]. Finally, our paper relates to the market microstructure literature on trading reactions. We employ the modified Lee and Ready [1991] algorithm to classify trades as buyer- or seller-initiated [following Odders-White 2000] and measure trade reaction as in Lee [1992], Hvidkjaer [2001], and Shanthikumar [2003].

The remainder of the paper is organized as follows. Section 2 describes the research question and research design. In Section 3, we show the differences in recommendation and forecast optimism between affiliated and unaffiliated analyst. Section 4 examines the trade reactions of small and large investors to recommendations and earnings forecasts. Section 5 evaluates the timing and the within-analyst correlation of recommendation and forecast optimism. Section 6 presents additional analyses on the relation between the level of coverage and recommendation overoptimism. Section 7 concludes.

II. Empirical Strategy

1. Analyst Behavior

Analysts may issue upward-biased stock recommendations for two reasons. The first explanation is selection. Security analysts typically have some say in the choice of stocks they cover, at least beyond the largest cap stocks. They are likely to choose companies whose investment prospects they judge favorably, hoping that those are of most interest

[3] For an overview see Daniel, Hirshleifer, and Teoh [2002], esp. pp. 177 ff.

to their buy-side clients. Analysts may also find it more exciting and motivating to research companies where they see great potential. If analysts do not account for the endogenous selection, their recommendations will be affected by winner's curse and will be too positive on average. The positive distortion might be exacerbated for affiliated analysts. The investment bank's decision to finance a company implies a fundamentally positive view on that company, which may affect the analyst. Vice versa, it is possible that a very positive assessment of an analyst encourages the corporate finance division to seek out underwriting business with the given firm. In either direction of causality, the winner's curse is likely to be strongest for the analysts with an underwriting affiliation.

The second explanation for recommendation optimism is misaligned incentives. Analysts may bias their recommendations upwards since buy recommendations are more likely to generate trading business than sell recommendations, given short-selling constraints. In addition, analysts are exposed to pressure from the management of the company they are covering. In order to increase the shareholder value of their company, management often calls up analysts and complains about ratings that are "too low" and even tends to "freeze out" analysts who do not give positive recommendations (Francis, Hanna and Philbrick [1997]). Similarly, buy-side clients may push sell-side analysts to maintain positive recommendations on stocks they hold.[4] Affiliated analysts have additional reasons to distort recommendations upward. Favorable recommendations are generally viewed as a as an implicit condition of existing underwriting contracts.[5] Analysts whose brokerage firm is associated with an investment bank are likely to be exposed to pressure (and monetary incentives) from corporate finance departments to support underwriting business with positive recommendations. As a result, analysts weigh the reputational advantages of providing reliable security analyses against the incentive to generate portfolio transactions and, in the case of affiliation with an investment bank, the incentive to support underwriting business.

Analysts have, however, more than one mode of communicating their view of a stock. One mode is stock recommendations, another one earnings forecasts. If the audiences for these types of information vary, the optimal distortion may vary as well. Sup-

[4] Boni and Womack [2002] cite several press reports and the testimony of the (then) acting SEC chairman Laura Unger to the House Subcommittee on July 31, 2001.

[5] See Bradley, Jordan, and Ritter [2003].

pose, for example, that individual investors respond to recommendations while institutional investors respond to forecasts. Since sophisticated institutional investors are more likely than individual investors to detect upward bias, the upside of distorting is more limited for earnings forecasts than for recommendations. In addition, institutional investors play a larger role in evaluating analysts, for example through the high profile annual "All-Star Analyst" list of Institutional Investor Magazine. Thus the potential reputational cost is more severe with institutional investors. Consistent with this argument, Mikhail, Walther and Willis [1999] provide evidence that relative earnings forecast accuracy affects analyst turnover while returns to stock recommendations do not.

The different audiences allow us to distinguish between the selection and the conflict-of-interest explanation for analyst overoptimism. If recommendations are not subject to strategic distortion and any overoptimism is merely a result of selection, then the same has to hold for earnings forecasts. In that case, any upward bias in recommendations, reflecting the analyst's true overoptimism about a firm and its future cash flows, should be positively correlated with upward bias in earnings forecasts. If, instead, the benefits of strategic distortion are large enough to affect recommendations, earnings forecasts do not need to be affected by the distortion. Given the heightened risk of detection by sophisticated investors, analysts may rather choose to build up a reputation as knowledgeable and accurate. As a result, overoptimism in recommendations may have no or even negative correlation with overoptimism in forecasts. A negative correlation could be reinforced if affiliated analysts attempt to please the management for which they have cautious earnings forecasts with bullish recommendations, or even by biasing forecasts downwards to allow management to beat their earnings forecasts. Thus, if recommendation bias is due to strategic distortion, the correlation with forecast bias is likely to be more negative for affiliated analysts, given that they face the largest incentives to distort.

2. Empirical measures

In order to distinguish the above hypotheses empirically, we evaluate recommendation and forecast distortion and employ empirical proxies for the sophistication of investors. To test whether analysts address individual investors with recommendations and institutional investors with forecasts, we measure individual and institutional trade reaction.

Distortion benchmarks. Our proxies for distortion are based on the difference between an analyst's forecast or recommendation and the existing analyst consensus at the time. For annual (quarterly) earnings forecasts, the consensus calculation is based on forecasts made during the year (quarter), following the prior annual (quarterly) earnings announcement. For example, if an annual earnings announcement is expected to be made in February of 2000, we start from the set of all earnings forecasts made after the February 1999 earnings announcement. For any given firm on any given day, we then use the most recent earnings forecast of each analyst and define the consensus as the average of these outstanding forecasts. The calculation of the recommendation consensus is similar. The key difference is that recommendations do not apply to any specific time period. We thus calculate four variations of the consensus, using 1 month, 2 months, 6 months and 12 months of prior recommendations. Both calculations closely resemble consensus calculations made in practice, e.g. by IBES (for forecasts) and on *Yahoo! Finance*.

The "distortion" or optimism/pessimism of the analyst is the difference between the earnings forecast or recommendation and the relevant consensus. Since earnings forecasts are measured in earnings-per-share, i.e. in dollars and cents, the difference is normalized by share price on the date of the earnings forecast.[6] The difference between recommendation and consensus is not normalized, since the scale is identical for all firms.

Affiliation. Our empirical measures of analyst affiliation are based on the underwriting relationship of the analyst's brokerage house with the firm the analyst is reporting on. Following previous literature,[7] we identify analysts as affiliated if their investment bank was the lead underwriter of an initial public offering (IPO) of the recommended stock in the past five years or of a seasoned equity offering (SEO) in the past two years or if it was a co-underwriters over the same respective periods. We further examine two possible sources of underwriting bias that have not been explored in the previous literature. The first source is future affiliation, i.e. banks underwriting an SEO in the next one or two years. There are several potential sources of incentives for future underwriters to issue higher recommendations, including attempts to gain the future business, pressure to increase the potential offer price of the future security offering and winner's curse. The

[6] As a robustness check, we replicate our optimism analyses dividing the difference between earnings forecast and consensus by the absolute value of the consensus, creating a percentage measure.

[7] Lin and McNichols [1998]; Michaely and Womack [1999].

number of additional firms we capture with this measure is small since most future underwriters are in previous underwriting relationships. The second underexplored type of affiliation is bond underwriting, in particular lead underwriting of bonds in the past year. If positive coverage is part of an implicit agreement between underwriter and equity issuer, then there is no obvious reason this should be different for bond issuance.

Investor type. We separate small and large investors by trading size. Following the analysis of Lee and Radhakrishna [2000], we choose dollar cutoffs rather than share-based cutoffs in order to minimize noise in separating individuals from institutions. We also incorporate their suggestion to use two cutoffs, with a buffer zone between small and large trades. Specifically we choose the cutoffs based on results for three-month TORQ sample from 1990-91, in which actual information on the identity of traders was available to check the accuracy of the trade-size based classification method. The lower cutoff of $20,000 splits small and medium trades, and the higher cutoff of $50,000 splits medium and large trades.[8] Malmendier and Shanthikumar (2007) show that this is an effective measure for our sample period.

Trade Reaction. To capture the reaction of small and large investors to analyst recommendations, we employ measures of "directional trade" (trade initiation). These measures, first developed by Lee and Ready [1991], are market microstructure algorithms that aim at capturing the buy and sell pressure exerted by traders. They exploit the fact that most trades take place when one side of the transaction demands immediate execution. Accordingly, trades are classified as "buyer-initiated" if the buyer demands immediate execution and as "seller-initiated" if the seller demands immediate execution. An abnormally high balance of buyer-initiated trades indicates buy pressure; an abnormally high balance of seller-initiated trades indicates sell pressure. In general, the side of a trade demanding faster execution represents a market order, i.e. an order to be executed immediately at the current market price. For example, investors who have received positive information about a firm and who believe that the stock price will rise would not place a limit order to buy. That limit order might never be filled. Instead, they would place a market order, and demand to buy immediately – before the price goes up further.

[8] The results are robust to variations in cutoff; see Panel B of Table IX.

We use the modified version of the Lee and Ready [1991] algorithm, developed in Odders-White [2000], to determine which side initiated the trade. The algorithm matches a trade to the most recent quote that precedes the trade by at least 5 seconds. If a price is nearer the bid price it is classified as seller initiated, and if it is closer to the ask price it is classified as buyer initiated. If a trade is at the midpoint of the bid-ask spread, it is classified based on a "tick test." The tick test categorizes a trade as buyer-initiated if the trade occurs at a price higher than the price of the previous trade (uptick), and as seller-initiated if the trade is on a downtick. We drop trades at the bid-ask midpoint, which are also the same price as in preceding trades.[9]

We consider three proxies of buy pressure. The net number of buy-initiated trades for firm *i*, investor type *x*, and date *t* is defined as

$$NB_{i,x,t} = buys_{i,x,t} - sells_{i,x,t} \tag{1}$$

The raw trade imbalance measure for firm *i*, investor type *x*, and date *t* is calculated as

$$TI_{i,x,t} = \frac{buys_{i,x,t} - sells_{i,x,t}}{buys_{i,x,t} + sells_{i,x,t}} \tag{2}$$

Finally, we normalize this measure by subtracting off the firm-year mean, and dividing by the firm-year standard deviation, separately for each investor type, as in Shanthikumar [2003]:

$$TI^{abnormal}_{i,x,t} = \frac{TI_{i,x,t} - \overline{TI}_{i,x,year(t)}}{SD(TI_{i,x,year(t)})} \tag{3}$$

The adjustments are made by year to account for changes in trading behavior over time. We also adjust by firm because the trading behavior for various firms may have consistent differences. These normalizations allow us to compare trading behavior over time and among firms and replace year- and firm-fixed effects in the regression framework. Dividing by the standard deviation controls for systematic differences in the volatility of large and small trades or of the stocks large and small traders invest in. The normalization makes small and large investors' trade reaction comparable and rules out the possibility that a seemingly more extreme reaction is just the result of higher volatility in trade imbalances over time.

[9] The original Lee-Ready algorithm employs a "zero-tick" in the case that a trade is at the bid-ask midpoint and the same price as the previous trade. Because of its low accuracy (about 60% according to Odders-White, 2000) the "zero-tick" is left out in the modified Lee-Ready algorithm.

III. Optimism in Recommendations and in Forecasts

We start our empirical analysis by evaluating analyst optimism in recommendations and in forecasts, separately for unaffiliated and affiliated analysts. In particular, we test whether the relative overoptimism of the two types of analysts is identical across different types of information they provide.

1. Data

We obtain analyst recommendations, annual and quarterly earnings forecasts, and LTG forecasts as well as information about the analyst identities and brokerage firms from I/B/E/S. The recommendations data are available starting from October 29, 1993. During the first three months, however, the I/B/E/S data contains an unusually high number of recommendations and forecasts.[10] We thus choose the February 1994 as the start of our sample period, but replicate all results for the full period, in both cases until the end of 2002. We also analyze separately a shorter period, through July 2001 to exclude the potential "scandal effects" from 2001 and 2002. Our primary sample, from February 1994 through December 2002, contains 2,515 securities for 2,485 firms, as measured by 8- and 6-digit cusips respectively. The shorter period, from February 1994 through July 2001, contains 2,363 securities for 2,338 firms.

I/B/E/S converts the recommendation formats of different brokerage houses into one uniform numerical format. Like other authors [Jegadeesh, Kim, Krische and Lee, 2004], we reverse the original I/B/E/S coding to the following, more intuitive scheme: 5=strong buy, 4=buy, 3=hold, 2=sell, 1=strong sell. A "higher" recommendation is better, and an "upgrade" translates into a positive change in the numerical value.

I/B/E/S reports earnings forecasts in earnings-per-share (EPS), and includes the realization of earnings reported by the company at the end of the period. Since earnings can be reported in many different ways, for example including extraordinary items or leaving them out of the calculation, I/B/E/S communicates with analysts in an attempt to ensure that each earnings forecast includes similar items, and the announced value reported in I/B/E/S coincides with the given definition of earnings. I/B/E/S also adjusts the

[10] While the number of recommendations per year – and even per month – is fairly uniform during the period from February 1994 through 2001, the first two months and three days contain a multiple of observations. While this may have to do with large layoffs in the securities industry during that time, it also leaves room for concerns about data consistency within the I/B/E/S sample.

reported forecasts and announcement values for stock splits, and we use the split-adjusted values. We focus on earnings forecasts of the next annual earnings figure. We eliminate observations relating to earnings announcements which occur outside of the SEC mandated reporting window of 0-90 days after the end of the fiscal year. We include earnings forecasts which occur between the prior earnings announcement date and the date of the earnings announcement to which the forecast relates. We focus on earnings forecasts occurring at least 10 days prior to the earnings announcement and at most 80 days prior to the earnings announcement when directly comparing optimism in forecasts and recommendations, to focus on a sub-period for which incentives to bias forecasts (upwards just after an earnings announcement and downwards just before) will be reduced. For most of our analyses, we limit the forecast sample to those forecasts with an identified analyst, but this eliminates less than two percent of the forecasts, eliminating 6,468 forecasts of the 460,990 forecasts meeting the timing requirements.

We also perform all analyses for quarterly earnings forecasts and for LTG forecasts. However, while recommendations and annual forecasts are comparable in terms of time frame (one-year perspective), quarterly forecasts follow a different, quarterly schedule. LTG forecasts, on the other hand, are more difficult to categorize in terms of target audience, as discussed above. All analyses are in the Appendix.

I/B/E/S reports recommendations and earnings forecasts in separate files, with slightly different notations. In order to match an analyst's buy/sell recommendation with the same analyst's earnings forecast, we use the analyst identity files corresponding to each dataset. The recommendations database uses the "amaskcd" variable and the forecast database uses the "analyst" variable as numeric analyst identification codes, which then map to names. The IBES documentation is not clear about whether these two numeric variables correspond, so to ensure a proper match, we used the analyst identity files and a combination of programmed name-matching and hand-matching to ensure a perfect match, and confirm that the two numeric codes do in fact coincide.

We use the SDC New Issues database to obtain underwriting data from 1987 to 2002. We link I/B/E/S broker firms and SDC underwriters with the company names provided by the I/B/E/S recommendation broker identification file and the SDC database. We improve the match using company websites and news articles, in particular to deter-

mine subsidiary relationships and corporate name changes. Finally, we use the mapping from Kolasinski and Kothari [2004] to identify additional matches.[11]

2. Analysis

We first examine the summary statistics of recommendations and earnings forecasts for the recommendations in the IBES-SDC merged dataset. In Columns 1-8 in Panel A of Table I, we display the distribution of recommendations both for the full set of analysts and for affiliated analysts, further subdivided by the type of underwriting relationship. Strikingly, the vast majority of recommendations fall into the top three categories, "hold", "buy" and "strong buy." Fewer than 5% of all recommendations are "sell" or "strong sell." The recommendations are even more positive for analysts whose brokerage houses have an underwriting relationship with the covered firm. The proportion of "buy" and "strong buy" recommendations is higher for analysts with an underwriting relationship, and the proportion of "sell" and "strong sell" is even lower than for the unaffiliated analysts. Using the numerical coding of recommendation levels (from 1 to 5), we find that the mean recommendation is significantly higher for affiliated than for unaffiliated analysts.

The upward shift in recommendations is most pronounced for future equity underwriting, and least pronounced for bond underwriting, but is present for all five categories we examine. Analysts whose brokerage houses do not underwrite any security issuance during the 1987-2002 period ("Never Affiliated") have the least positive recommendations and the most sell and strong sell recommendations.

We test whether the difference in recommendation level may be driven by sample differences between firms covered by affiliated and unaffiliated analysts. For example, the (additional) upward shift in recommendations of affiliated analysts might be due to better prospects of firms that access the capital market for external financing. To test this hypothesis, we calculate the distribution for the subsample of firms that have issued stock in an SEO during the past 2 years or an IPO during the past 5 years, or that have issued bonds during the past one year (In Panel B). We find that the mean difference is virtually identical and highly significant. As in the full sample in Panel A, there is a clear upward

[11] We are very grateful to Adam Kolasinski and S.P. Kothari for providing us with their mapping, which uses corporate websites, news articles from LexisNexis, Hoover's Online, and the Directory of Corporate Affiliations to refine the matches.

shift in recommendations when an analyst has an underwriting relationship, also within the subsample of firms that *can* have affiliated analysts.

Turning from recommendations to earnings forecasts, we find that the pattern fully reverses. In Columns 9-14 of Panel A of Table I, we show summary statistics for forecasts of annual earnings-per-share, pertaining to the announcement following the earnings forecast date. The average earnings forecast is $1.67 per share, and the earnings forecasts tend to be positive in general, with even the 25th percentile being $0.78. This is consistent with the predominance of non-negative earnings announcements. In sharp contrast to the recommendations, the earnings forecasts are lower for affiliated analysts than for unaffiliated analysts, with the exception of bond underwriting affiliated analysts. The earnings forecasts are lowest for IPO and SEO lead underwriters and future SEO underwriters. In fact, the mean earnings forecast of affiliated analysts is significantly lower for all categories other than bond underwriting. (The difference is also significant for all categories of affiliated analysts considered together, including bond underwriters.) Moreover, the distribution of earnings forecasts of affiliated analysts display less variance.

As shown in Panel B, these patterns also hold when the sample is limited to recent security issuers. In fact, while the average earnings forecast of affiliated analysts remains (by definition) the same, the difference to unaffiliated forecasts almost double. The results regarding future SEO underwriters are particularly noteworthy. If analysts of future underwriting firms were overly optimistic about the firms, we would expect them to have higher earnings forecasts. Similarly, if they were using positive earnings forecasts to try and win underwriting business, we would expect higher earnings forecasts. Instead, we see the reverse.

In Appendix Table 1, we show similar statistics for forecasts of quarterly earnings-per-share, pertaining to the announcement following the earnings forecast date. As with annual earnings, equity-underwriting affiliated analysts issue significantly lower forecasts than unaffiliated analysts. The earnings forecasts are in general positive, at levels which are roughly one quarter of the annual earnings-per-share forecasts. The earnings forecasts are significantly higher for bond-underwriting affiliated analysts than for unaffiliated analysts, but for IPO and SEO lead and co-underwriters, and for future SEO underwriters, the earnings forecasts are significantly lower than for unaffiliated analysts.

Panel B again shows the statistics for the sample limited to recent security issuers. Holding constant the sample of firms, unaffiliated earnings forecasts are significantly higher.

The recommendation sample statistics suggest that affiliated analysts issue more positive recommendations and more negative earnings forecasts (with the exception of bond-underwriters) than unaffiliated analysts. We replicate those findings in a regression framework, controlling for the timing of recommendations within the fiscal year. We compare recommendation levels to the average recommendation over the preceding month, and regress this difference on indicators for the analyst's affiliation category, including "never affiliated" and on the number of days until the next annual and the next quarterly earnings announcements (Table II). We restrict the sample to those firms with recent stock or bond issuances, to reduce the impact of any heterogeneity in the stocks that "affiliated" and "unaffiliated" analysts cover. We find that the recommendations of any type of affiliated analyst typically lie significantly above the consensus while the recommendations of "never affiliated" analysts are always significantly lower than the consensus.

The second column of Table II displays a similar analysis for annual forecasts. Here we compare earnings forecasts to the existing consensus. As earnings forecasts are in units of earnings per share, we normalize the difference by share price on the date of the forecast. We again limit the sample to recent stock or bond issuers to ensure that affiliation is possible for all the included stocks. We regress the measure of forecast optimism (forecast minus consensus normalized by stock price on forecast date) on indicators for affiliation category, as well as controls for expected time to earnings announcement. The regression results show that IPO lead-, SEO lead- and equity co-underwriters issue annual forecasts that are significantly lower than the consensus relative to unaffiliated forecasts. SEO lead underwriters and equity co-underwriters are significantly more pessimistic than unaffiliated analysts in their annual forecasts, while their recommendations are significantly more optimistic. For IPO lead underwriters the results are slightly less clear. But even for this group, the contrast between earnings forecast and recommendation behavior is sharp – with zero or negative differences on earnings forecasts and significantly positive differences on recommendations. Interestingly, future equity underwriters issue more positive annual and quarterly earnings forecasts relative to the consen-

sus than unaffiliated analysts, and recent bond underwriters issue more positive annual earnings forecasts.

As a robustness test, we alternatively define forecast optimism as the forecast minus the consensus normalized by absolute value of consensus, rather than normalized by share price. Using this measure we again find that SEO lead- and equity co-underwriters are significantly more pessimistic relative to unaffiliated analysts, in both their annual and quarterly earnings forecasts. With coefficients of -0.035 and -0.012 for SEO- and Co-underwriting annual forecasts, compared to an intercept of -0.069, and coefficients of -0.011 and -0.007 compared to an intercept of -0.040 for quarterly forecasts, the increased pessimism amounts to 16-51% of the intercept, comparable to the 14-42% range we find using normalization by price. The coefficients on IPO lead-underwriting are insignificant, with t=1.59 for annual earnings forecasts, compared to t=2.23 for our primary measure. Using this measure, future underwriters continue to issue more positive forecasts relative to the consensus. However bond underwriters do not: both coefficients are small and insignificant.

The results from comparing recommendations to the consensus levels confirm the implications of the sample statistics for the subsample of recent issuers, in the case of recommendations, and earnings forecasts for IPO-, SEO- and Co- underwriting affiliated analysts. However future underwriters and bond underwrites optimism or pessimism for earnings forecasts appears qualitatively different. Given that prior literature focuses on past equity affiliation, and the results for these three groups are more consistent, we will focus on past equity affiliation (SEO- and IPO- lead- and co-underwriting) in our remaining tests.

Both of the recommendation and the forecast comparisons to the consensus are hard to reconcile with the selection story, as we would expect these analysts to have a more positive view of the firm than other analysts, and thus issue higher earnings forecasts, if there was an underwriting winner's curse. (In Section V we will examine an alternate explanation for affiliated analysts issuing more negative earnings forecasts, within the subset of strategic/biased behavior – that they want to provide the firm with a lower benchmark to create a positive earnings surprise.)

IV. Trade Reaction

1. Data

The raw trading data is collected from the New York Stock Exchange Trades and Quotations database (TAQ). The TAQ database reports every round-lot trade and every quote from January 1, 1993 onwards on the New York Stock Exchange, American Stock Exchange and NASDAQ. We examine ordinary common shares traded on the NYSE, excluding certificates and depository receipts. We also exclude foreign companies, Americus trust components, closed-end fund shares and REITs. The final trading sample includes 2,801 securities for 2,723 firms, as defined by 8-digit and 6-digit CUSIPs, respectively.

2. Analysis

To begin our analysis, we explore which type of investors reacts to which type of information issued by security analysts. In particular, we would like to test whether small, individual investors and large, institutional investors display no significant difference in their reaction to recommendations and forecasts, or whether in fact small investors react to recommendations but less to earnings forecasts. If this were the case then analysts may indeed be able to satisfy their clients' demand to issue more positive predictions about the firm through the recommendations, while maintaining their reputations with more sophisticated investors through their earnings forecasts. In the next section, we will examine analyst behavior.

We examine trade reactions to both buy/sell recommendations and earnings forecasts. Table I displays sample statistics for the buying and selling patterns of small and large traders. Panel A displays statistics for the full trading sample, for all stocks in our recommendations and forecast samples, while Panel B shows statistics for recommendation event days, and Panel C reports statistics for earnings forecast event days. Small traders tend to make more trades than large traders, making over twice as many on a standard day. The gap is smallest on earnings forecast dates when small traders make only 50% more trades than large traders. Both trade-size groups increase their buying and their selling on recommendations and earnings forecast event days, with both the number of trades and the dollar value traded increasing in both groups.

Table II displays trading reactions to buy/sell recommendations and Table III reports trading reactions to earnings forecasts. Table II, Panel A, shows that small investors react more positively to analyst buy/sell recommendations than large traders do. Replicating the results of Malmendier and Shanthikumar [2007], we find that large investors discount recommendations while small investors follow them literally. For example, large investors have a negative reaction to a hold recommendation, but the reaction of small investors is not significantly different from zero. Small investors react as strongly to a buy recommendation as large investors do to a strong buy, and small investors react over twice as positively to a strong buy as large traders. In addition, large traders shift recommendations downwards when an analyst is affiliated, to the point that large traders have a slightly negative coefficient on affiliated strong buy recommendations. In contrast, small traders make almost no adjustment if the analyst is affiliated. In additional regressions (not reported), we find that small investors react significantly more strongly to buy/sell recommendations even when we control for prior recommendations, possible front-running, analyst firm-size and various other factors.

Panel B shows a regression format that is more comparable to the one we use for earnings forecasts. Both small and large traders exhibit significantly positive slope coefficients – indicating that they do buy more when a buy/sell recommendation level is higher. Small traders exhibit a significantly higher sensitivity to the level of recommendation for affiliated recommendations than for unaffiliated recommendations. Small traders also have higher intercepts for both groups than large traders, buying more regardless of the level of recommendation.

Table III reports reactions of both small and large traders to earnings forecasts made by affiliated and unaffiliated analysts, and the results are again very different. Panel A displays results for annual earnings forecasts. Large traders react significantly positively to annual earnings forecast revisions made by both unaffiliated and affiliated analysts, with a statistically significantly more positive reaction to affiliated analysts than to unaffiliated analysts. Moreover, we observe a huge difference in economic significance. Large investors react about 64 times as strongly to forecasts of affiliated analysts than to those of unaffiliated analysts. In contrast, small traders display no significant reaction to earnings forecasts made by unaffiliated analysts. The estimated coefficient for small trade reaction to affiliated analysts is negative, although it is not statistically significant. Panel

B displays a similar analysis of quarterly earnings forecasts. Large traders react significantly positively to quarterly earnings forecast revisions by unaffiliated analysts. While their reaction to affiliated analysts is not significantly positive, the coefficient estimate is slightly higher than for unaffiliated analysts. In contrast, the estimated coefficients for small trade reaction are negative.

These results show that in general, large traders react much more strongly to earnings forecasts than small traders do, with the differences being significant for annual forecasts of both unaffiliated and affiliated analysts and quarterly forecasts of affiliated analysts. In addition, the results show that large traders react even more strongly to annual earnings forecasts made by affiliated analysts. Both sets of results support the idea that analysts can target large traders with their earnings forecasts and small traders with their buy/sell recommendations – the investor responses to these statements allow for rational targeting on the part of analysts.

V. Timing and Within-Analyst Correlation

Recommendation Updating. In order to further pin down "distortions" in the recommendations of affiliated analysts, we consider the timing of the different types of recommendations and earnings forecasts. It is conceivable that part of the upward bias is due to quicker reactions of affiliated analysts to news about the company. They may issue a "strong buy" as soon as they receive indications of future growth prospects, even if they have to revise it soon after. We find, however, that affiliated analysts update their recommendations more slowly, waiting 50 more days on average, and that this difference is entirely driven by positive recommendations (Table IX, Panel A). While affiliated analysts are faster to update negative and hold recommendations, they preserve their positive recommendations about 70 days more than unaffiliated analysts. A similar picture emerges if we divide recommendations into upgrades and downgrades as shown in the lower portion of Panel A. Affiliated analysts wait about two and a half months longer than unaffiliated analysts before downgrading a stock. (The regression analysis in Panel B shows that the differences in timing are significant.)

Note that the difference in the speed of upgrading and downgrading in itself is consistent with both the selection and the moral-hazard explanations. If affiliated analysts truly have an overly optimistic view of the company they cover, they will also put more

weight on positive news, which are consistent with their prior, than on negative news (see Daniel, Hirshleifer and Subrahmanyam [1998] for a discussion of the relevant literature and an application to investor behavior). If affiliated analysts strategically distort recommendations, they may stick to positive recommendations longer than to negative ones. This updating strategy is useful to "hide in the crowd": rather than deviating visibly from the recommendations of unaffiliated analysts they simply do not adjust to negative information as fast as unaffiliated analysts, and they are, instead, particularly fast to adjust to positive information. However, if the selection argument applies, we would expect similar differences in the persistence of earnings forecasts.

That's the motivation for the next set of results. We present empirical evidence on (1) comparison of recommendations to the consensus upon issuance (2) conditional on recommendation level of strong buy, buy, etc. We find that affiliated analysts issue positive recommendations when other analysts are issuing positive recommendations as well, but then maintain these recommendations significantly longer than unaffiliated analysts.

We compare recommendation levels to the average recommendation over the preceding 1 to 12 months, and regress this difference on indicators for the analyst's affiliation category, including "never affiliated" (Table VII, Panel A).

Over a two-month horizon the recommendations of any type of affiliated analyst still lies significantly above the consensus while the recommendations of "never affiliated" analysts are always significantly lower than the consensus. However, the effect gets weaker for IPO lead-underwriters and equity co-underwriters the farther backwards the consensus is constructed. This implies that affiliated analysts tend to issue their generally positive recommendations when the consensus is gradually declining. However, conditional on a level of recommendation, affiliated analysts are deviating less from the current consensus than unaffiliated analysts (Panel B). In other words, affiliated analysts issue their positive recommendations when the consensus is high – in fact, when the consensus is higher than the level at which unaffiliated analysts issue positive recommendations. These results suggest that affiliated analysts are "hard to detect in the crowd." Rather than identifying the optimistic view when other analysts are more cautious, they wait until the majority view is positive before they increase their rating. As we will see in the next subsection, the affiliated analysts then simply do not downgrade as fast as their unaffiliated colleagues. The effect gets weaker for IPO lead-underwriters and equity co-

underwriters the longer backwards the consensus is constructed. This implies that affiliated analysts tend to issue their generally positive recommendations when the consensus is gradually declining. However, conditional on a level of recommendation, affiliated analysts are deviating less from the current consensus than unaffiliated analysts (Panel B). In other words, affiliated analysts issue their positive recommendations when the consensus is high – in fact, when the consensus is higher than the level at which unaffiliated analysts issue positive recommendations. These results suggest that affiliated analysts are "hard to detect in the crowd." Rather than identifying the optimistic view when other analysts are more cautious, they wait until the majority view is positive before they increase their rating. As we will see in the next subsection, the affiliated analysts then simply do not downgrade as fast as their unaffiliated colleagues.

Forecast Updating

Table VI displays similar statistics for the timing of annual earnings forecasts. (Similar statistics for the timing of quarterly earnings forecasts are in Appendix Table A5.) While there is a significant difference between affiliated analysts' recommendation timing and unaffiliated analysts' recommendation timing, we do not find a significant difference for earnings forecasts. Affiliated analysts update forecasts which are equal to the consensus more quickly than unaffiliated analysts, but update forecasts below the consensus or above the consensus at almost exactly the same speed as unaffiliated analysts, for both their annual and quarterly earnings forecasts. In contrast to the recommendations, which affiliated analysts issue less frequently than unaffiliated analysts, the forecast frequency is almost identical for affiliated and unaffiliated analysts. The key difference occurs for annual earnings forecasts which are followed by an earnings-per-share estimate decrease, and in this case affiliated analysts do hold the forecast longer than unaffiliated analysts. While this does point to some shift in the incorporation of negative information, the results are still in sharp contrast to recommendations behavior, which shows a drastic shift in timing using virtually every measure.

While the lack of a difference in the forecast updating behavior of affiliated and unaffiliated is striking, the different nature of annual earnings forecast certainly plays some role. In particular, companies release earnings news every quarter. Analysts may

feel compelled to react to these news events in a timely manner. However, this does not rule out significantly different updating behavior of affiliated and unaffiliated analysts, and there is no similar regular news item to force quarterly forecast updating. In particular, for both quarterly and annual earnings forecasts, affiliated analysts could well exploit more of the 90-day interval between quarterly announcements. Thus the discrepancy between the updating decision in the case of recommendations and in the case of earnings forecasts gives evidence of another way in which analysts can strategically choose to bias recommendations upwards.

Direct Relationship Between Recommendation Optimism and Forecast Optimism. The most immediate test of the two explanations for positive recommendations is a direct comparison of recommendation optimism and earnings forecast optimism. It appears that recommendations are more optimistic when an analyst has an underwriting affiliation with a covered firm, while earnings forecasts are more pessimistic. In order to test whether the same analyst who is issuing a more positive recommendation abstains from issuing a more positive earnings forecast, we directly link the recommendations and forecasts made by a given analyst. We compare the "optimism" of the forecasts and recommendations measured by the difference between the recommendation or forecast and the existing consensus variables at the time of the earnings forecast.

The results are reported in Table XII. The sample is limited to earnings forecasts which occur between 15 and 70 days before the relevant earnings announcement, to exclude earnings forecasts which are most likely to be subject to adverse incentives, those just before or just after an earnings announcement.[12] The sample is also limited to recent issuers, as above. Panel A displays the relationship between recommendations and annual earnings forecasts. We find that for unaffiliated analysts there is roughly a zero relation between forecast optimism and recommendation optimism, with a positive but insignificant coefficient estimate. In contrast, for affiliated analysts there is a significantly negative coefficient for the regression of forecast optimism on recommendation optimism. A negative relation means that the more positive an affiliated analyst's recommendation

[12] Richarson, Teoh and Wysocki [1999] summarize examples and articles from the popular press and regulators regarding the earnings forecast "walk-down" and provide additional empirical evidence that this occurs for annual earnings. They find that analysts tend to issue overly optimistic forecasts near the beginning of the year and overly pessimistic forecasts nearer the time of the annual earnings announcement.

relative to the existing consensus, the more negative his earnings forecast will be, relative to the existing consensus. In addition, the difference between the unaffiliated and affiliated analyst relations between recommendation and forecast optimism is statistically significant, with the relation going from insignificantly positive to significantly negative, and the difference being significant with a t-statistic of 2.62. Particularly given that the intercept estimates are virtually identical for the two groups, this implies that affiliated analysts will issue lower earnings forecasts for the same recommendation level. This evidence points strongly towards the "incentive conflict" explanation of affiliated analysts' recommendations and forecasts rather than the "winner's curse" story. With the "winner's curse" story, we would expect optimism in both forecasts and recommendations for the affiliated analysts, or at least independence between the two. An explicit negative relationship suggests that the different incentives described in Section II.1 are influencing the two issuances. Panel B displays the relationship between recommendations and quarterly earnings forecasts. For unaffiliated analysts, there is a significantly positive relationship between forecast and recommendation optimism, while there is an insignificant negative coefficient for affiliated analysts. The difference between the two slope coefficients is marginally significant, at the 10% level. There is a strong significant difference between the intercepts for the two groups of analysts in addition. The intercept is significantly more negative for affiliated analysts than unaffiliated analysts, so while they are not explicitly issuing more positive recommendations and more negative earnings forecasts together, they are issuing more negative forecasts in general, independent of their recommendation levels. Both the annual and quarterly earnings forecast results show a significant difference between how affiliated and unaffiliated analysts issue directly related earnings forecasts and buy/sell recommendations.

Positive and Negative Forecast Errors – Comparing the Forecasts Prior to Earnings Announcements With the Realization. While the pessimism of affiliated analyst earnings forecasts clearly is in contrast with the optimism of their buy/sell recommendations, casting doubt on the "winner's curse" explanation of affiliated analyst recommendation optimism, there is still a question of why analysts would be more pessimistic for earnings forecasts – as opposed to simply having similar earnings forecasts. One possible explana-

tion is that lower earnings forecasts are actually one manifestation of analyst bias, in that they help the firm achieve a positive earnings surprise (Richardson, Teoh, and Wysocki, 1999). To test this, we examine whether the last earnings forecast by an analyst before the firm's earnings announcement is above or below the achieved value of earnings announced by the firm.[13] If the forecast is above, we say the analyst has a positive forecast error and if the forecast is below, we say the analyst has a negative forecast error. If affiliated analysts are issuing lower earnings forecasts specifically to help management achieve positive earnings surprises, affiliated analysts should experience a higher likelihood of negative forecast errors. We run a logit analysis of the 0/1 variable taking a value of 1 if the forecast error is positive, on indicators for affiliation type and controls for the expected time to the next annual earnings announcement. Table XV presents the results. The first column presents the results for annual earnings, using our entire sample period. The second column presents the results for quarterly earnings, using our entire sample period. Since the attention on analysts after the "scandal period" of 2001/2002 may affect their strategic behavior when affiliated, we repeat the analysis limiting the sample to the pre-scandal period. We use August 1, 2001 as a cutoff. In August 2001, media coverage of analysts' conflicts of interest skyrocketed after Morgan Stanley settled a suit against the high-profile analyst Henry Blodget and additional suits were filed against Morgan Stanley's "star technology analyst" Mary Meeker (Financial Times, 2001).

The results show that IPO-lead-underwriter affiliated analysts are significantly likely to issue final forecasts below the realization in 3 of the 4 columns – for both annual and quarterly earnings over the full period and for quarterly earnings in the pre-scandal period. The coefficient for annual earnings in the pre-scandal period is negative, but insignificant (t=1.66). For SEO-lead-underwriters there is no significant evidence that they are more likely to issue final forecasts either above or below the realization. However, equity co-underwriters are significantly more likely to issue final forecasts below the realization in the pre-scandal period (but not the full period). Bond underwriters, despite issuing earnings forecasts that are on average higher than unaffiliated forecasts (see Tables V and VI), and quarterly forecasts that generally do not differ from the consensus com-

[13] In a concurrent paper, Baik and Yi [2006] ask a similar question, and find that firms are able to meet or beat the consensus of forecasts from affiliated analysts (analysts with an equity underwriting relationship in the last 2 years) at a higher rate than they are able to meet or beat the consensus of forecasts from unaffiliated analysts.

pared to unaffiliated analysts (see Table VIII), are more likely to have a final quarterly forecast before the earnings announcement that is below the realization – both during the pre-scandal period and the full sample. While not every group of affiliated analysts is significantly more likely to issue final forecasts below the realization, we find strong evidence for IPO lead-underwriters, equity co-underwriters and bond-underwriters with respect to quarterly forecasts, that affiliated analysts issue final forecasts below the realization at a higher rate than unaffiliated analysts. This suggests that even the more pessimistic forecasts of affiliated analysts may in fact be strategically designed to "please management," and be part of the affiliated analysts' biased behavior.

V. Market Response

In this section, we examine whether affiliated analysts reduce the optimism of their recommendations when there is more unaffiliated analyst coverage of the firm – i.e. when there is more competition for investor attention and more unbiased (or at least less biased) analysts with which to compare the affiliated analyst.

Consumer biases affect not only consumption decisions, but also market organization. Profit-maximizing firms have incentives to tailor their product design and information provision to take advantage of consumers' systematic deviations from optimal decision-making. In the case of stock market recommendations, it is profitable for investment banks to entertain a brokerage branch issuing distorted investment advice and, in particular, to unify brokerage and corporate finance under one roof since investors systematically neglect analyst distortions.

How stable is the interaction between biased consumers and rational firms? Specifically, can we identify circumstances under which firms would cease issuing distorted recommendations?

Our data allows us to shed light on this question. We can exploit variation in coverage of stocks and ask whether increased coverage reduces the distortion of recommendations. The more analysts are covering the same stock, the more each of them is competing for the attention of investors. Do analysts compete for clients by providing more accurate recommendations? Given that, almost always, the affiliated brokerages are cover-

ing the stock, increased competition implies an increased number of non-affiliated analysts. Since unaffiliated analysts tend to bias their recommendations less, one may expect that competition will also moderate the distortion in affiliated recommendations. The empirical variation in coverage reflects, of course, heterogeneity of the covered stocks, both in the cross-section and over time, such as market capitalization, recent and long-term performance, volatility, ownership structure (broad or narrow). We do not have a clean natural experiment that varies coverage for exogenous reasons. However, if stocks that attract more analyst coverage also received less distorted recommendations, there would be potential for increased competition to alleviate the adverse welfare effects of naiveté for small investors. Such a result would leave room for the hypothesis that less intrusive policy measures such as removing barriers to entry and competitive disadvantages for unaffiliated analysts (as, for example, intended with Regulation FD) may be sufficient.

To analyze the effect of increased coverage on the distortion of recommendation levels we calculate for each recommendation the difference between the recommendation and the consensus (average recommendation level) over the last month as well as the number of analysts who have made a recommendation on the same stock in the past month. The summary statistics are in Panel A of Table XIV. We then relate the "deviation" from the consensus to affiliation and to the number of analysts covering the stock. Columns 1 and 3 of Panel B show that, as expected, affiliated recommendations tend to lie above the average recommendation, recommendations of independent analysts below. Increased coverage, however, does not mitigate the effect. The number of analysts enters insignificantly. Moreover, the opposite appears to be the case for affiliated analysts. As shown in Column (2), the interaction of the affiliation dummy and the number of analysts is positive and significant. Column (4) shows that SEO lead-underwriter affiliation appears to contribute most to the upward bias, though the effect is not precisely estimated. While the mechanism behind the correlation of higher coverage and more upward bias of affiliated analysts cannot be deduced from this regression, the results are a first indication that competition may not remedy informational distortion among analysts.

The reaction of small investors to these recommendations is consistent with competition failing to influence affiliated analysts towards more accurate recommendations. In untabulated regressions, we compare the trade reactions for the quartile of recommendations with the highest number of other analysts with reactions to the quartile with the

lowest number. We find that the small traders react slightly more positively to affiliated buy and strong buy recommendations, relative to unaffiliated positive recommendations, when the competition is highest.

VI. Conclusion

In this paper, we provide evidence on the cause of optimism bias in analyst recommendations. We show that affiliated analysts issue more positive recommendations on average but do not display the same optimism in their forecasts. Instead, affiliated analysts issue similar or more negative forecasts, compared to unaffiliated analysts. In fact, optimism in recommendations and optimism in annual earnings forecasts appear to be more negatively correlated for affiliated analysts than for unaffiliated analysts. For annual earnings forecasts, we find a significant negative correlation for affiliated analysts, compared to an insignificant positive correlation for unaffiliated analysts, and for quarterly earnings forecasts we find an insignificantly negative correlation for affiliated analysts compared to a significantly positive correlation for unaffiliated analysts. Our findings suggest that affiliated analysts strategically choose to display optimism about the firms they cover in one outlet: recommendations, which we show are consumed most directly by small investors, while they abstain from doing so in another outlet: earnings forecasts, which we show are consumed most directly by large investors. The trade reaction of small and large investors is consistent with this hypothesis. Large investors strongly react to earnings forecasts, in particular those of affiliated analysts, while they discount the recommendation level of affiliated analysts. The opposite is true for small investors, who react similarly or even more strongly to the recommendations of affiliated analysts, while displaying at most a negative reaction to earnings forecast updates, and not differentiating between the forecasts of affiliated and unaffiliated analysts. While unaffiliated analysts, who display overoptimism in their recommendations, may thus be expressing their truly overoptimistic view, affiliated analysts appear to react to incentive misalignment towards investors.

Our findings also have implications for the policy debate about the appropriate regulations to be imposed on brokerage houses. Given the contrast in behavior for recommendations and earnings forecasts, our results suggest that the question is not how to "help" affiliated analysts overcome winner's curse, but rather how to ensure that they abstain from strategic distortion.

The problem analyzed in this paper may have more general applicability. Broadly speaking, it is one example where allowing an informed agent to communicate "in different tongues," i.e. using more or less complex language, with uninformed but heterogeneous agents may harm the less sophisticated among them. To the extent that policy makers would like to ensure that the decision-making of less sophisticated investors is, if not informed, at least not based on misleading information, they may want to restrict differentiated information transmission of financial intermediaries.

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Figure 1. Distribution of analyst forecast-recommendation pairs above/below consensus

The figure displays the percent of observations falling in each of the four categories above/below forecast consensus and above/below recommendation consensus, seperately for affiliated and unaffiliated forecasts. Observations for which recommendation or forecast is equal to the consensus are excluded.

		Unaffiliated Recommendations		Affiliated Recommendations	
		Above Consensus	Below Consensus	Above Consensus	Below Consensus
Forecasts	Above Consensus	19.16%	16.06%	25.49%	13.73%
	Below Consensus	34.35%	30.43%	43.53%	17.25%

TABLE I. Sample of Recommendations and Annual Earnings Forecasts

Earnings Forecasts are reported in earnings-per-share dollars. The sample is limited to forecasts pertaining to the closest following annual earnings announcement, and to earnings announcements that occur during the SEC mandated window of 0-90 days after the end of the relevant fiscal year.

Panel A: Entire Sample	Recommendations								Annual Earnings Forecasts					
		Percentage by category					Numerical translation[1]							
	Sample size	Strong Sell	Sell	Hold	Buy	Strong Buy	Mean	Standard Deviation	Sample size	Mean	Standard Deviation	Percentile 25th	Percentile 50th	Percentile 75th
All	112,694	1.65	2.92	36.33	33.30	25.81	3.79	0.92	460,936	1.68	1.73	0.78	1.42	2.27
Unaffiliated	104,811	1.72	3.01	37.11	32.86	25.30	3.77	0.92	450,753	1.68	1.73	0.79	1.43	2.27
Affiliated	7,883	0.75	1.67	25.97	39.13	32.47	4.01	0.85	10,183	1.58	1.81	0.70	1.25	2.10
IPO lead-underwriting (past 5 years)	1,039	0.67	1.44	23.97	38.31	35.61	4.07	0.84	954	1.16	1.10	0.58	1.05	1.63
SEO lead-underwriting (past 2 years)	1,095	0.46	1.64	22.37	38.63	36.89	4.10	0.83	1,303	1.29	1.13	0.60	1.18	1.72
Co-underwriting equity[2]	3,854	0.99	1.69	26.62	38.74	31.97	3.99	0.86	5,623	1.41	1.98	0.60	1.12	1.80
Future SEO (next 2 years)	627	0.23	10.11	32.16	28.75	28.75	4.26	0.70	778	1.24	1.03	0.61	1.15	1.75
Bond lead underwriting (past year)	1,929	0.62	1.97	28.56	38.57	30.27	3.96	0.85	2,388	2.32	1.71	1.14	1.99	3.25
Never Affiliated[3]	6,250	3.76	4.32	36.70	28.35	26.86	3.70	1.03	183,212	1.72	1.76	0.80	1.45	2.32

Panel B: Subsample of firms with an IPO in the past 5 years, an SEO in the past 2 years or a bond issue in the past year	Recommendations								Annual Earnings Forecasts					
		Percentage by category					Numerical translation[1]							
	Sample size	Strong Sell	Sell	Hold	Buy	Strong Buy	Mean	Standard Deviation	Sample size	Mean	Standard Deviation	Percentile 25th	Percentile 50th	Percentile 75th
All	50,504	1.49	2.54	34.48	34.11	27.38	3.83	0.91	199,289	1.79	1.68	0.81	1.49	2.45
Unaffiliated	42,842	1.61	2.68	35.96	33.24	26.50	3.80	0.92	189,391	1.80	1.67	0.82	1.50	2.46
Affiliated[4]	7,662	0.77	1.72	26.21	38.98	32.32	4.00	0.85	9,898	1.59	1.83	0.69	1.25	2.10

Sample period is 2/01/1994 to 12/31/2002.

[1] The numerical translation scheme is 1=strong sell, 2=sell, 3=hold, 4=buy, 5=strong buy.

[2] We exclude co-underwriters who are also lead underwriters of SEO or IPO issuances to eliminate the large number of double-counts in this particular category.

[3] A brokerage firm is "Never Affiliated" if it does not have any (lead or co-underwriter) equity or bond underwriting affiliation during the entire sample period.

[4] "Affiliated" summarizes the same categories as in Panel A (IPO in the past 5 years, SEO in the past 2 years, IPO/SEO co-underwriting over the same horizons, future underwriting in the next 2 years, and bond underwriting in the next year).

TABLE II. Comparison to Consensus

The Column Recommendations shows an OLS regression of the difference between individual analyst recommendations and the consensus (average analysts recommendations over the past month) on affiliation dummies. The Column Annual Earnings Forecasts shows an OLS regression of the difference between individual analyst forecasts and the consensus normalized by share price. For both, a positive difference indicates that the analyst is more optimistic relative to the consensus. For recommendations, the sample is limited to stocks with at least one recommendation in the prior month and full data availability for the prior month. For forecasts, the sample is limited to stocks with a share price of at least $5. For both, the sample is also limited to stocks for which past affiliation is possible, i.e., stocks with an IPO in the past 5 years, SEO in the past 2 years or bond issuance in the past 1 year. The sample period is 2/01/1994 to 12/31/2002. Standard errors (in parentheses) are robust to arbitrary heteroskedasticity and within-date correlation.

	Recommendations	Annual Earnings Forecasts
Type of Affiliation		
IPO lead-underwriter (past 5 yrs)	0.03609	-0.00112
	(0.01415)	(0.00088)
SEO lead-underwriter (past 2 yrs)	0.07618	-0.00087
	(0.01944)	(0.00034)
Co-underwriter	0.03533	-0.00044
	(0.00885)	(0.00018)
Future underwriter (next 1 yr.)	0.09037	0.00128
	(0.02204)	(0.00045)
Bond underwriter (past 1 yr.)	0.06285	0.00067
	(0.01278)	(0.00015)
Never Affiliated (to any firm)	-0.03490	0.00000
	(0.01363)	(0.00006)
Expected time to annual earnings announcement		0.00757
[in thousandths]		(0.00043)
Expected time to next quarterly announcement		0.00078
[in thousandths]		(0.00086)
Constant	-0.01043	-0.00312
	(0.00344)	(0.00013)
Number of Observations	50,504	186,588
R^2	0.0019	0.0036

TABLE III. Measures of Trade Reaction: Summary Statistics

Sample period is 2/01/1994 through 12/31/2002.

Panel A. Summary Statistics Daily Trading for Sample Firms

	Sample Firms, All Dates			Sample Firms, on Recommendation Event Dates			Sample Firms, on Annual Earnings Forecast Event Dates		
	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.
Number of small buy-initiated trades	49.67	15	93.38	112.41	47	153.83	105.52	44	146.09
Number of large buy-initiated trades	24.27	3	68.90	73.94	23	132.31	72.35	22	130.52
Number of small sell-initiated trades	43.25	15	80.28	95.06	42	132.64	88.05	39	124.59
Number of large sell-initiated trades	20.06	3	56.73	61.02	19	110.15	58.85	19	106.77
otal number of small buy/sell-initiated trade	92.92	31	170.90	207.47	91	281.79	193.57	84	266.31
otal number of large buy/sell-initiated trade	44.33	7	124.73	134.96	42	240.56	131.20	42	235.52
Δ(buy-sell) initiated small trades	6.42	1	33.54	17.34	5	55.74	17.46	5	52.95
Δ(buy-sell) initiated large trades	4.21	0	19.29	12.92	2	37.54	13.50	2	37.46
Dollar value small buy-initiated trades	388,698	116,856	755,416	920,187	396,875	1,244,425	874,726	372,000	1,197,966
Dollar value large buy-initiated trades	5,989,505	438,688	23,500,000	21,400,000	4,226,063	58,900,000	20,400,000	4,173,028	54,000,000
Dollar value small sell-initiated trades	339,368	114,575	647,712	781,451	356,664	1,065,532	731,891	331,009	1,010,196
Dollar value large sell-initiated trades	4,945,342	391,450	19,000,000	18,300,000	3,599,225	59,800,000	16,900,000	3,521,013	50,200,000
llar value total small buy/sell-initiated trade	728,066	237,644	1,383,074	1,701,638	769,713	2,272,189	1,606,617	712,225	2,173,989
llar value total large buy/sell-initiated trade	10,900,000	945,788	41,600,000	39,700,000	8,176,861	116,000,000	37,400,000	8,065,381	102,000,000
Dollar value of (buy-sell) small trades	49,329	4,813	259,760	138,736	37,281	452,836	142,835	37,750	430,131
Dollar value of (buy-sell) large trades	1,044,164	0	9,914,168	3,125,555	242,431	23,800,000	3,476,123	258,794	21,400,000
N	*3,586,144*			*109,939*			*460,936*		

TABLE IV. Trade Reaction: Regression Results

Trade reaction is measured by abnormal trade imbalance. Large traders represent trades of at least $50,000; small traders represent trades of less than $20,000. Recommendation update is the difference between the given recommendation level (1 for strong sell, 2 for sell, 3 for hold, 4 for buy and 5 for strong buy) and the prior recommendation by the same analyst for the same firm. Forecast update is the difference between the given forecast and the prior forecast, normalized by share price. The sample period is 2/01/94-12/31/02. Standard errors (in parentheses) are robust to arbitrary heteroskedasticity and within-day correlation.

		Recommendations			Annual Earnings Forecasts		
		Large Traders	Small Traders	Difference (S-L)	Large Traders	Small Traders	Difference (S-L)
Unaffiliated	Update	0.0497	0.0447	-0.0050	0.6033	-0.3681	-0.9714
		(0.0035)	(0.0035)	(0.0050)	(0.1436)	(0.1226)	(0.1889)
	Constant	0.0103	0.0495	0.0391	0.0112	0.0692	0.0580
		(0.0069)	(0.0072)	(0.0100)	(0.0052)	(0.0061)	(0.0080)
	N	71,686	71,686		311,168	311,168	
	R^2	0.0042	0.0030		0.0002	0.0001	
Affiliated	Update	0.0426	0.0740	0.0314	0.7197	-0.3832	-1.1030
		(0.0136)	(0.0146)	(0.0200)	(0.4834)	(0.4851)	(0.6849)
	Constant	0.0231	0.0807	0.0576	0.0124	0.0972	0.0847
		(0.0167)	(0.0165)	(0.0235)	(0.0138)	(0.0152)	(0.0205)
	N	3,616	3,616		5,070	5,070	
	R^2	0.0026	0.0070		0.0004	0.0001	

TABLE V. Timing of Recommendations

Panel A. Sample Statistics

	Mean (median) number of days until new recommendation (same stock, same analyst)							
		Conditional on Level of Recommendation					Relative to Next Update	
	Overall	Strong Sell	Sell	Hold	Buy	Strong Buy	Before Increase	Before Decrease
Unaffiliated	323.7	167.5	184.1	340.7	314.8	340.1	309.1	335.5
	(188)	(90)	(105)	(189)	(186)	(211)	(174)	(203)
Affiliated (IPO, SEO, co-underwriters)	370.9	118.0	82.8	307.9	363.7	431.1	304.8	410.2
	(234)	(57)	(57)	(195)	(235)	(274)	(183)	(269)

Sample Period is 2/01/1994 to 12/31/2002.

Panel B. Days until new forecast

OLS regression of the number of days until the new recommendation of a given analyst for a given stock on recommendation-type and affiliation dummies. Excludes recommendations that are reiterations of the prior recommendation. The sample period is 2/01/1994 to 12/31/2002. Standard errors (in parentheses) are robust to arbitrary heteroskedasticity and within-date correlation.

Panel C. Comparison to Consensus

OLS regression of the difference between individual analyst recommendations and consensus (average analyst recommendations over the past month) on recommendation-type and affiliation dummies. The sample is limited to stocks for which past affiliation is possible, i.e., stocks with an IPO in the past 5 years, SEO in the past 2 years or bond issuance in the past 1 year. The sample period is 2/01/1994 to 12/31/2002. Standard errors (in parentheses) are robust to arbitrary heteroskedasticity and within-date correlation.

	(1)	(2)	(1)	(2)
Strong Sell, Sell, Hold	320.10	320.13	-0.37	-0.373217
	(4.66)	(4.66)	(0.01)	(0.01)
Buy	314.84	314.97	0.05	0.051752
	(4.18)	(4.18)	(0.00)	(0.00)
Strong Buy	340.08	340.12	0.46	0.457304
	(4.43)	(4.43)	(0.01)	(0.01)
(Strong Sell, Sell, Hold)* (Any Affiliation)	-31.58		0.14	
	(14.06)		(0.01)	
(Strong Sell, Sell, Hold)* (IPO Affiliation)		-30.79		0.154249
		(33.56)		(0.03)
(Strong Sell, Sell, Hold)* (SEO Affiliation)		-8.35		0.139762
		(32.51)		(0.03)
(Strong Sell, Sell, Hold)* (Co-Affiliation)		-37.40		0.128066
		(16.28)		(0.02)
(Buy)* (Any Affiliation)	48.89		-0.06	
	(11.49)		(0.01)	
(Buy)* (IPO Affiliation)		16.83		-0.05351
		(23.52)		(0.01)
(Buy)* (SEO Affiliation)		87.58		-0.01179
		(30.08)		(0.02)
(Buy)* (Co-Affiliation)		42.96		-0.069043
		(13.42)		(0.01)
(Strong Buy)* (Any Affiliation)	91.03		-0.13	
	(14.36)		(0.01)	
(Strong Buy)* (IPO Affiliation)		150.08		-0.14626
		(34.46)		(0.02)
(Strong Buy)* (SEO Affiliation)		55.91		-0.0979
		(29.39)		(0.03)
(Strong Buy)* (Co-Affiliation)		77.92		-0.124432
		(17.78)		(0.01)
Number of Observations	59,229	59,229	50,504	50504
R^2	0.4181	0.4182	0.3380	0.33805

TABLE VI. Timing of Annual Earnings Forecasts

Panel A. Sample Statistics

	Mean (median) number of days until new forecast (same stock, same analyst)					
		Relative to consensus			Relative to next update	
	Overall	Less than	Equal to	Greater than	Before Increase	Before Decrease
Unaffiliated	63.7	60.4	89.6	65.7	65.0	62.6
	(54)	(50)	(76)	(57)	(57)	(52)
Affiliated (IPO, SEO, co-underwriters)	65.2	60.1	89.0	67.5	64.8	65.5
	(56)	(50)	(76)	(59)	(58)	(54)

Sample Period is 2/01/1994 to 12/31/2002.

Panel B. Days until new forecast

OLS regressions of the number of days until the new forecast on dummies for forecasts greater tha, equal to, and less than the consensus and for affiliations. Excludes forecasts that are reiterations of the prior forecasts. The sample period is 2/01/1994 to 12/31/2002. Standard errors (in parentheses) are robust to arbitrary heteroskedasticity and within-date correlation.

	(1)	(2)
Greater than Consensus	65.75	65.74
	(0.39)	(0.39)
Equal to Consensus	89.58	89.55
	(0.74)	(0.74)
Less than Consensus	60.36	60.36
	(0.40)	(0.40)
(Greater than Consensus)* (Any Affiliation)	1.72	
	(1.05)	
(Greater than Consensus)* (IPO Affiliation)		3.89
		(3.00)
(Greater than Consensus)* (SEO Affiliation)		-2.42
		(2.54)
(Greater than Consensus)* (Co-Affiliation)		2.49
		(1.23)
(Equal to Consensus)* (Any Affiliation)	-0.56	
	(3.51)	
(Equal to Consensus)* (IPO Affiliation)		9.42
		(6.72)
(Equal to Consensus)* (SEO Affiliation)		-3.08
		(9.66)
(Equal to Consensus)* (Co-Affiliation)		-1.74
		(4.42)
(Less than Consensus)* (Any Affiliation)	-0.27	
	(0.93)	
(Less than Consensus)* (IPO Affiliation)		1.07
		(2.69)
(Less than Consensus)* (SEO Affiliation)		0.42
		(2.35)
(Less than Consensus)* (Co-Affiliation)		-0.85
		(1.06)
Number of Observations	324,682	324,682
R^2	0.6311	0.6311

TABLE VII. Relationship Between Forecast Optimism and Recommendation Optimism

The dependent variable is Annual Forecast Optimism, defined as the difference between forecast and consensus forecast, divided by the stock price on the forecast date. The sample is limited to earnings forecasts within 10-80 days before the earnings announcement to exclude confounding effects of strategic earnings forecast behavior just prior to the earnings announcement and just after the preceding quarterly announcement. The sample is also limited to stocks with prices of at least $5 and for which affiliation is possible (forecasts made within 2 years of an SEO, 5 years after an IPO or 1 year after a bond issuance) to increase homogeneity across the two samples. Recommendation Optimism is the difference between an outstanding recommendation for a given stock minus the current recommendation consensus (over the past month) at the time of the earnings forecast. Affiliation is a binary variable and equal to one if the analyst's brokerage house is affiliated with an investment bank with a past SEO- or IPO- (co- or lead-)underwriting relationship. The sample period is 02/01/1994-12/31/2002. Standard errors (in parentheses) are robust to heteroskedasticity and arbitrary within-analyst correlation.

Panel A. Prior/Current Recommendation

	Whole Sample	Affiliated	Unaffiliated	Whole Sample
Recommendation Optimism	0.00011	-0.00136	0.00016	0.00016
	(0.00009)	(0.00076)	(0.00009)	(0.00009)
Affiliation				-0.00018
				(0.00054)
Affiliation*(Recommendation Optimism)				-0.00152
				(0.00076)
Constant	-0.00243	-0.00260	-0.00241	-0.00241
	(0.00010)	(0.00054)	(0.00010)	(0.00010)
Number of Observations	13860	405	13455	13860
R2	0.0001	0.0111	0.0002	0.0007

Panel B. Next Recommendation

	Whole Sample	Affiliated	Unaffiliated	Whole Sample
Before Announcement * Recommendation Optimism	0.00005	0.01962	0.00002	0.00002
	(0.00058)	(0.00950)	(0.00059)	(0.00059)
Before Announcement * Affiliation				-0.00691
				(0.00930)
Before Announcement * Affiliation*(Recommendation Optimism)				0.01960
				(0.00939)
Before Announcement * Constant	-0.00159	-0.00845	-0.00154	-0.00154
	(0.00065)	(0.00950)	(0.00064)	(0.00064)
After Announcement * Recommendation Optimism	-0.00029	0.00050	-0.00032	-0.00032
	(0.00015)	(0.00068)	(0.00016)	(0.00016)
After Announcement * Affiliation				0.00009
				(0.00096)
After Announcement * Affiliation*(Recommendation Optimism)				0.00081
				(0.00068)
After Announcement * Constant	-0.00211	-0.00202	-0.00211	-0.00211
	(0.00018)	(0.00096)	(0.00018)	(0.00018)
Number of Observations	3746	129	3617	3746
R2	0.0568	0.0940	0.0569	0.0583

TABLE VIII. Earnings Forecasts: Positive or Negative Forecast Error

The table presents results from estimation of a logit model, where the dependent variable takes the value of 1 if the corresponding earnings forecast is greater than the earnings realization, and 0 otherwise. The sample is limited to the last forecast of a given analyst for a particular firm's fiscal period. Expected time to annual (quarterly) earnings announcements is based on the dates of the previous year's earnings announcements. The sample period is 10/29/1993 to 12/31/2002 for the "full period" estimations and 10/29/1993 to 7/31/2001 for the "pre-scandal period." Standard errors (in parentheses) are robust to arbitrary heteroskedasticity and within-analyst correlation.

	Full Period	Pre-Scandal Period	Full Period	Pre-Scandal Period
Type of Affiliation				
IPO lead-underwriter (past 5 yrs)	-0.3328	-0.2567	-0.2992	-0.2310
	(0.1500)	(0.1595)	(0.1470)	(0.1580)
SEO lead-underwriter (past 2 yrs)	0.0715	-0.0311	0.0773	-0.0242
	(0.1112)	(0.1380)	(0.1115)	(0.1386)
Co-underwriter	-0.0623	-0.1499	-0.0530	-0.1454
	(0.0548)	(0.0629)	(0.0542)	(0.0628)
Future underwriter (next 1 yr.)	-0.0376	0.0817	-0.0635	0.0252
	(0.1717)	(0.2232)	(0.1748)	(0.2240)
Bond underwriter (past 1 yr.)	-0.0426	-0.0853	-0.0452	-0.0762
	(0.0948)	(0.1046)	(0.0963)	(0.1059)
Never Affiliated (to any firm)	-0.0056	-0.0121	-0.0086	-0.0177
	(0.0171)	(0.0194)	(0.0173)	(0.0192)
Expected time to annual earnings announcement	0.0029	0.0028	0.0028	0.0028
[in thousandths]	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Expected time to next quarterly announcement	0.0002	0.0000	0.0002	0.0000
[in thousandths]	(0.0002)	(0.0002)	(0.0001)	(0.0002)
Forecast optimism relative to consensus,			-0.8862	-1.6592
normalized by share price			(0.4293)	(0.9579)
Constant	-0.9403	-0.8993	-0.9495	-0.9086
	(0.0165)	(0.0172)	(0.0164)	(0.0178)
Number of Observations	133,952	107,024	131,021	104,744
χ^2	1,413	1,164	1,452	1,160
Pseudo R^2	0.0136	0.0131	0.0135	0.0130

TABLE IX. The Effect of Coverage on Recommendation Bias

Panel A. Summary Statistics

Recommendation Consensus is the average of all analyst recommendations on a specific stock over the last month. Analysts (#) is the number of analysts who have issued a recommendation for the specific stock during the last month.

	Mean	Median	25%	75%	St.Dev.
Recommendation Consensus	3.84	3.87	3.50	4.17	0.51
Difference Recommendation to Consensus	-0.06	0.00	-0.75	0.67	0.95
Analysts (#)	1.5	1.00	0.00	2.00	1.85

Panel B. Regression Analysis

OLS regression of the difference between a recommendation and the consensus (average recommendation in the past month) on dummies for affiliation and a dummy for "never affiliated" analysts, a dummy for whether there are at least 5 analysts covering the firm, and its interactiona with the affiliation and never affiliated dummies. The sample period is 2/01/1994-7/31/2001. Standard errors (in parentheses) are robust to arbitrary heteroskedasticity and within-analyst correlation.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	-0.013	-0.013	-0.013	-0.013	-0.013	-0.022	-0.027	-0.022
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.006)	(0.019)	(0.006)
Affiliation	0.133	0.132			0.132	0.112	0.111	0.097
	(0.023)	(0.023)			(0.023)	(0.022)	(0.022)	(0.022)
IPO Affiliation			0.136	0.134				
			(0.054)	(0.055)				
SEO Affiliation			0.233	0.224				
			(0.048)	(0.049)				
Co-underwriter Affiliation			0.100	0.102				
			(0.028)	(0.029)				
Never Affiliated	-0.174	-0.164	-0.174	-0.164	-0.166	0	0.000	0.000
	(0.042)	(0.042)	(0.042)	(0.042)	(0.042)	0	0.000	0.000
I(At least 5 analysts)	0.030	0.039	0.030	0.039	0.038	0.046	0.045	0.050
	(0.019)	(0.020)	(0.019)	(0.020)	(0.020)	(0.019)	(0.019)	(0.018)
I(At least 5 analysts)*Affiliation		0.014			0.008	-0.017	(0.022)	(0.032)
		(0.094)			(0.095)	(0.085)	(0.085)	(0.085)
I(At least 5 analysts)*IPO Affiliation				0.058				
				(0.188)				
I(At least 5 analysts)*SEO Affiliation				0.308				
				(0.159)				
I(At least 5 analysts)*Co-underwriter Affiliation				(0.036)				
				(0.112)				
I(At least 5 analysts)*(Never Affiliated)		-0.145		-0.145	-0.147	-0.072	-0.072	-0.111
		(0.098)		(0.098)	(0.097)	(0.093)	(0.093)	(0.095)
Year Dummies	no	no	no	no	yes	no	yes	-
Brokerage Dummies	no	no	no	no	no	yes	yes	-
Year-Brokerage Dummies	no	no	no	no	no	no	no	yes
Sample size	52,979	52,979	52,979	52,979	52,979	52,979	52,979	52,979
R-squared	0.002	0.0021	0.0022	0.0022	0.0021	0.0005	0.0007	0.0004

TABLE A1. Sample of Quarterly Earnings Forecasts and Long Term Growth Forecasts

Earnings forecasts are reported in earnings-per-share dollars. The quarterly earnings forecast sample is limited to forecasts pertaining to the closest following quarterly earnings-per-share announcement, and to earnings announcements which occur during the SEC mandated window of 0-45 days after the end of the relevant fiscal year.

Panel A: Entire Sample	Quarterly Earnings Per Share						Long Term Growth Forecasts					
	Sample		Standard	Percentile					Standard	Percentile		
	size	Mean	Deviation	25th	50th	75th	Sample size	Mean	Deviation	25th	50th	75th
All	412,447	0.40	0.50	0.17	0.34	0.57	460,936	1.68	1.73	0.78	1.42	2.27
Unaffiliated	403,592	0.40	0.50	0.17	0.34	0.57	450,753	1.68	1.73	0.79	1.43	2.27
Affiliated	8,855	0.40	0.46	0.15	0.32	0.57	10,183	1.58	1.81	0.70	1.25	2.10
IPO lead-underwriting (past 5 years)	696	0.28	0.33	0.12	0.25	0.44	954	1.16	1.10	0.58	1.05	1.63
SEO lead-underwriting (past 2 years)	1,204	0.32	0.30	0.15	0.30	0.46	1,303	1.29	1.13	0.60	1.18	1.72
Co-underwriting equity[2]	4,485	0.34	0.48	0.12	0.28	0.47	5,623	1.41	1.98	0.60	1.12	1.80
Future SEO (next 2 years)	745	0.32	0.31	0.14	0.27	0.51	778	1.24	1.03	0.61	1.15	1.75
Bond lead underwriting (past year)	2,494	0.57	0.47	0.26	0.51	0.78	2,388	2.32	1.71	1.14	1.99	3.25
Never Affiliated[3]	156,828	0.41	0.51	0.17	0.35	0.59	183,212	1.72	1.76	0.80	1.45	2.32

Panel B: Subsample of firms with an IPO in the past 5 years, an SEO in the past 2 years or a bond issue in the past year	Quarterly Earnings Per Share						Long Term Growth Forecasts					
	Sample		Standard	Percentile					Standard	Percentile		
	size	Mean	Deviation	25th	50th	75th	Sample size	Mean	Deviation	25th	50th	75th
All	179,576	0.44	0.46	0.19	0.37	0.63	199,289	1.79	1.68	0.81	1.49	2.45
Unaffiliated	171,019	0.44	0.46	0.19	0.37	0.63	189,391	1.80	1.67	0.82	1.50	2.46
Affiliated[4]	8,557	0.40	0.46	0.15	0.32	0.57	9,898	1.59	1.83	0.69	1.25	2.10

Sample period is 2/01/1994 to 12/31/2002.

[1] The numerical translation scheme is 1=strong sell, 2=sell, 3=hold, 4=buy, 5=strong buy.

[2] We exclude co-underwriters who are also lead underwriters of SEO or IPO issuances to eliminate the large number of double-counts in this particular category.

[3] A brokerage firm is "Never Affiliated" if it does not have any (lead or co-underwriter) equity or bond underwriting affiliation during the entire sample period.

[4] "Affiliated" summarizes the same categories as in Panel A (IPO in the past 5 years, SEO in the past 2 years, IPO/SEO co-underwriting over the same horizons, future underwriting in the next 2 years, and bond underwriting in the next year).

TABLE A2. Comparison to Consensus

OLS regression of the difference between individual analyst forecast and the consensus normalized by share price. A positive difference indicates that the analyst is more optimistic relative to the consensus. The sample is limited to stocks with a share price of at least $5 and to stocks for which affiliation is possible, i.e., stocks with an IPO in the past 5 years, SEO in the past 2 years or bond issuance in the past 1 year. The sample period is 2/01/1994 to 12/31/2002. Standard errors (in parentheses) are robust to arbitrary heteroskedasticity and within-date correlation.

	Quarterly Earnings Forecasts	Long Term Growth Forecasts
Type of Affiliation		
IPO lead-underwriter (past 5 yrs)	-0.00009	-0.70036
	(0.00022)	(0.79295)
SEO lead-underwriter (past 2 yrs)	-0.00032	0.29904
	(0.00009)	(0.83532)
Co-underwriter	-0.00009	-0.46065
	(0.00006)	(0.26154)
Future underwriter (next 1 yr.)	0.00033	1.42847
	(0.00013)	(0.83557)
Bond underwriter (past 1 yr.)	0.00008	-0.02788
	(0.00005)	(0.22382)
Never Affiliated (to any firm)	0.00001	-0.17017
	(0.00002)	(0.08405)
Expected time to annual earnings announcement [in thousandths]		
Expected time to next quarterly announce [in thousandths]	0.00692	
	(0.00042)	
Constant	-0.00071	-0.26587
	(0.00004)	(0.06449)
Number of Observations	165,134	30,073
R^2	0.0036	0.0004

TABLE A3. Measures of Trade Reaction: Summary Statistics

Sample period is 2/01/1994 through 12/31/2002.

Panel A. Summary Statistics Daily Trading for Sample Firms

	Sample Firms, on Quarterly Earnings Forecast Event Dates			Sample Firms, on Long Term Growth Forecast Event Dates		
	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.
Number of small buy-initiated trades	111.87	47	150.96	104.03	22	145.27
Number of large buy-initiated trades	76.24	23	138.05	73.93	38	133.23
Number of small sell-initiated trades	93.80	42	129.23	87.83	18	124.71
Number of large sell-initiated trades	62.17	19	113.31	60.81	82	110.63
tal number of small buy/sell-initiated trades	205.66	90	275.85	191.86	41	265.76
otal number of large buy/sell-initiated trades	138.42	43	249.61	134.74	4	242.09
Δ(buy-sell) initiated small trades	18.07	5	53.71	16.19	2	51.80
Δ(buy-sell) initiated large trades	14.07	3	38.59	13.12	364987.5	37.04
Dollar value small buy-initiated trades	927,249	396,559	1,250,248	874,644	4,172,619	1,208,533
Dollar value large buy-initiated trades	21,400,000	4,275,563	55,600,000	20,800,000	330,144	52,800,000
Dollar value small sell-initiated trades	779,525	351,566	1,062,852	740,976	3,501,088	1,029,601
Dollar value large sell-initiated trades	17,800,000	3,609,809	51,200,000	17,400,000	707,188	49,900,000
lar value total small buy/sell-initiated trades	1,706,774	758,241	2,279,375	1,615,620	8,074,275	2,203,485
llar value total large buy/sell-initiated trades	39,100,000	8,260,322	105,000,000	38,200,000	33,625	101,000,000
Dollar value of (buy-sell) small trades	147,724	40,144	435,887	133,667	271,575	431,176
Dollar value of (buy-sell) large trades	3,639,670	269,813	21,700,000	3,453,232	0	21,000,000
N	*433,050*			*71,339*		

TABLE A4. Trade Reaction: Regression Results

Trade reaction is measured by abnormal trade imbalance. Large traders represent trades of at least $50,000; small traders represent trades of less than $20,000. Update is the difference between a given forecast and the prior forecast, normalized by share price. Long-Term Growth Forecast Update is the difference between the forecast and the consensus of forecasts over the prior 6 months. Sample period 2/01/94-12/31/02. Standard errors (in parentheses) are robust to arbitrary heteroskedasticity and within-day correlation.

			Quarterly Earnings Forecasts			Long-Term Growth Forecasts		
			Large Traders	Small Traders	Difference (S-L)	Large Traders	Small Traders	Difference (S-L)
Unaffiliated	Update		1.4210	-0.8837	-2.3047	0.0020	-0.0004	-0.0023
			(0.4858)	(0.5265)	(0.7164)	(0.0007)	(0.0007)	(0.0010)
	Constant		0.0016	0.0614	0.0598	0.0143	0.0498	0.0355
			(0.0064)	(0.0071)	(0.0096)	(0.0072)	(0.0080)	(0.0108)
		N	135,001	135,001		44,868	44,868	
		R^2	0.0002	0.0001		0.0002	0.0000	
Affiliated	Update		1.0993	1.4729	0.3736	0.0094	0.0036	-0.0058
			(2.4767)	(2.5195)	(3.5329)	(0.0066)	(0.0056)	(0.0086)
	Constant		-0.0350	0.0766	0.1116	0.0087	0.0130	0.0043
			(0.0241)	(0.0253)	(0.0349)	(0.0447)	(0.0407)	(0.0605)
		N	1,777	1,777		564	564	
		R^2	0.0001	0.0002		0.0046	0.0007	

TABLE A5. Persistence of Quarterly Earnings Forecasts

Panel A. Sample Statistics

	Mean (median) number of days until new forecast (same stock, same analyst)					
		Relative to consensus			Relative to next update	
	Overall	Less than	Equal to	Greater than	Before Increase	Before Decrease
Unaffiliated	39.6	38.5	44.5	39.2	39.3	39.7
	(38)	(36)	(47)	(37)	(37)	(39)
Affiliated (IPO, SEO, co-underwriters)	40.2	39.1	42.5	40.2	41.2	39.6
	(41)	(40)	(44)	(38)	(42)	(39)

Sample Period is 2/01/1994 to 12/31/2002.

Panel B. Days until new forecast

All independent variables are binary. Excludes forecasts which are reiterations of the prior forecast for the same stock by the same analyst. Sample Period is 2/01/1994 to 12/31/2002. Standard errors (in parentheses) are robust to arbitrary heteroskedasticity and within-date correlation.

		(1)	(2)
Greater than Consensus		39.23	39.23
		(0.30)	(0.30)
Equal to Consensus		44.50	44.49
		(0.29)	(0.29)
Less than Consensus		38.47	38.47
		(0.33)	(0.33)
(Greater than Consensus)*	(Any Affiliation)	1.04	
		(1.05)	
(Greater than Consensus)*	(IPO Affiliation)		5.95
			(3.03)
(Greater than Consensus)*	(SEO Affiliation)		-0.35
			(2.34)
(Greater than Consensus)*	(Co-Affiliation)		0.82
			(1.24)
(Equal to Consensus)*	(Any Affiliation)	-2.03	
		(1.53)	
(Equal to Consensus)*	(IPO Affiliation)		-0.69
			(4.08)
(Equal to Consensus)*	(SEO Affiliation)		-0.01
			(3.25)
(Equal to Consensus)*	(Co-Affiliation)		-2.56
			(1.86)
(Less than Consensus)*	(Any Affiliation)	0.57	
		(1.00)	
(Less than Consensus)*	(IPO Affiliation)		5.54
			(3.17)
(Less than Consensus)*	(SEO Affiliation)		-2.26
			(2.24)
(Less than Consensus)*	(Co-Affiliation)		0.28
			(1.16)
	Number of Observations	99,012	99,012
	R^2	0.7447	0.7447

TABLE A6. Persistence of Long-Term Growth Forecasts

Panel A. Sample Statistics

	Mean (median) number of days until new forecast (same stock, same analyst)					
		Relative to consensus			Relative to next update	
	Overall	Less than	Equal to	Greater than	Before Increase	Before Decrease
Unaffiliated	281.3	283.5	355.9	274.1	272.7	288.2
	(151)	(153)	(219)	(146)	(140)	(158)
Affiliated (IPO, SEO, co-underwriters)	386.1	392.2	565.0	363.0	311.6	430.0
	(239)	(250)	(468)	(218)	(195)	(283)

Sample Period is 2/01/1994 to 12/31/2002.

Panel B. Days until new forecast

All independent variables are binary. Excludes forecasts that are reiterations of the prior forecasts for a given stock by the same analyst. Sample Period is 2/01/1994 to 12/31/2002. Standard errors (in parentheses) are robust to arbitrary heteroskedasticity and within-date correlation.

		(1)	(2)
Greater than Consensus		274.11	274.12
		(4.63)	(4.63)
Equal to Consensus		355.89	355.89
		(11.93)	(11.93)
Less than Consensus		283.50	283.60
		(4.63)	(4.64)
(Greater than Consensus)*	(Any Affiliation)	88.92	
		(27.30)	
(Greater than Consensus)*	(IPO Affiliation)		-7.50
			(50.90)
(Greater than Consensus)*	(SEO Affiliation)		64.62
			(45.83)
(Greater than Consensus)*	(Co-Affiliation)		106.81
			(35.61)
(Equal to Consensus)*	(Any Affiliation)	209.11	
		(113.68)	
(Equal to Consensus)*	(IPO Affiliation)		203.11
			(11.93)
(Equal to Consensus)*	(SEO Affiliation)		275.11
			(11.93)
(Equal to Consensus)*	(Co-Affiliation)		205.58
			(126.89)
(Less than Consensus)*	(Any Affiliation)	108.70	
		(22.95)	
(Less than Consensus)*	(IPO Affiliation)		165.87
			(78.97)
(Less than Consensus)*	(SEO Affiliation)		127.88
			(57.13)
(Less than Consensus)*	(Co-Affiliation)		77.47
			(22.17)
	Number of Observations	42,709	42,709
	R^2	0.3913	0.3913

TABLE A7. Relationship Between Quarterly Earnings Forecast Optimism and Recommendation Optimism

The dependent variable is Quarterly Forecast Optimism, defined as the difference between forecast and consensus, divided by the stock price on the forecast date. The sample is limited to earnings forecasts made within the last 10 to 80 days before the earnings announcement to exclude confounding effects of strategic forecast behavior just prior to or after earnings announcements. To increase homogeneity across subsamples, the sample is limited to stocks for which affiliation is possible, i.e., within 5 years after an IPO, 2 years after an SEO, or 1 year after a bond issuance. Recommendation Optimism is the difference between an analyst's outstanding recommendation for a given stock minus the consensus (over the past month) at the time of the earnings forecast. Affiliation is an indicator variable equal to 1 if the analyst's brokerage house belongs to an investment bank with a past SEO- or IPO- (co- or lead-)underwriting relationship. The sample is limited to forecasts for which price is at least $5. The sample period is 02/01/1994-12/31/2002. Standard errors (in parentheses) are robust to heteroskedasticity and arbitrary within-analyst correlation.

Panel A. Prior/Current Recommendation

	Whole Sample	Affiliated	Unaffiliated	Whole Sample
Recommendation Optimism	0.00004	-0.00017	0.00005	0.00005
	(0.00003)	(0.00015)	(0.00003)	(0.00003)
Affiliation				-0.00036
				(0.00017)
Affiliation*(Recommendation Optimism)				-0.00022
				(0.00016)
Constant	-0.00051	-0.00086	-0.00050	-0.00050
	(0.00003)	(0.00017)	(0.00003)	(0.00003)
Number of Observations	60130	1653	58477	60130
R^2	0.0001	0.0008	0.0001	0.0004

Panel B. Next Recommendation

	Whole Sample	Affiliated	Unaffiliated	Whole Sample
Before Announcement * Recommendation Optimis	-0.00014	0.00031	-0.00015	-0.00015
	(0.00011)	(0.00025)	(0.00011)	(0.00011)
Before Announcement * Affiliation				0.00013
				(0.00038)
Before Announcement * Affiliation*(Recommendation Optimism)				0.00046
				(0.00027)
Before Announcement * Constant	-0.00069	-0.00056	-0.00069	-0.00069
	(0.00010)	(0.00036)	(0.00010)	(0.00010)
After Announcement * Recommendation Optimisn	-0.00003	0.00007	-0.00004	-0.00004
	(0.00002)	(0.00011)	(0.00002)	(0.00002)
After Announcement * Affiliation				-0.00037
				(0.00020)
After Announcement * Affiliation*(Recommendation Optimism)				0.00011
				(0.00011)
After Announcement * Constant	-0.00036	-0.00072	-0.00035	-0.00035
	(0.00004)	(0.00020)	(0.00004)	(0.00004)
Number of Observations	16768	538	16230	16768
R^2	0.0103	0.0304	0.0100	0.0107

TABLE A8. Relationship Between Optimism in Long Term Growth Forecasts and in Recommendations

The dependent variable is Long-Term Growth Forecast Optimism, defined as the difference between forecast and consensus forecast over the past 6 months. The sample is limited to stocks for which affiliation is possible, i.e., within 5 years of an IPO, 2 years after an SEO, or 1 year after a bond issuance. Recommendation Optimism is the difference between an analyst's recommendation for a given stock minus the consensus (over the past month) at the time of the earnings forecast. Affiliation is a binary variable, equal to 1 if the analyst's brokerage house belongs to an investment bank with a ast SEO- or IPO- (co- or lead-)underwriting relationship. The sample period is 02/01/1994-12/31/2002. Standard errors (in parentheses) are robust to heteroskedasticity and arbitrary within-analyst correlation.

Panel A. Prior/Current Recommendation

	Whole Sample	Affiliated	Unaffiliated	Whole Sample
Recommendation Optimism	0.48424	0.71719	0.48037	0.48037
	(0.05336)	(0.36235)	(0.05405)	(0.05405)
Affiliation				-0.18064
				(0.37113)
Affiliation*(Recommendation Optimism)				0.23682
				(0.36658)
Constant	-0.38545	-0.56261	-0.38198	-0.38198
	(0.07812)	(0.36356)	(0.07944)	(0.07945)
Number of Observations	19433	445	18988	19433
R^2	0.0046	0.0071	0.0046	0.0047

Panel B. Next Recommendation

	Whole Sample	Affiliated	Unaffiliated	Whole Sample
Recommendation Optimism	0.11472	0.32337	0.10902	0.10902
	(0.11053)	(0.42384)	(0.11294)	(0.11296)
Affiliation				0.48603
				(0.59484)
Affiliation*(Recommendation Optimism)				0.21435
				(0.43572)
Constant	0.01138	0.48569	-0.00034	-0.00034
	(0.12191)	(0.58742)	(0.12406)	(0.12408)
Number of Observations	5306	125	5181	5306
R^2	0.0004	0.0035	0.0003	0.0005