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Affiliated Mutual Funds and Analyst Optimism

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Abstract

Prior studies have shown that investment banking affiliations place pressure on analysts to produce optimistic recommendations on the investment bank's stock-clients. Our analysis of a large sample of recommendations issued from 1995 through 2003 indicates that a mutual fund affiliation also affects analysts' research. That is, analysts are likely to look favorably at stocks held by the affiliated mutual funds. Controlling for a variety of factors including the investment banking affiliation, we find that the greater the portfolio weight of a stock for the affiliated mutual funds, the more optimistic the analyst rating becomes when compared to the consensus. Reputation partly restrains the optimism of analyst recommendations. In fact, the presence of other institutional investors as shareholders of the recommended stocks curbs analyst optimism. Nevertheless, from 1999 through 2001, star analysts report the most optimism when they recommend stocks in the portfolios of affiliated mutual funds.

JEL Classification: G20, G24, G30
Keywords: analyst coverage; ratings; mutual funds

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Affiliated Mutual Funds and Analyst Optimism

1. Introduction

The dynamics between a full-service brokerage firm and its research analysts often bears some scrutiny on behalf of investors because it may raise ethical issues. It is well known that sell-side analysts, employed by a broker, generally provide favorable coverage on seasoned stocks. From 1995 through 2001, only 4% of analyst recommendations were rated "underperform" or "sell." Most recommendations issued during that period were favorable up to "strong buy." Even after 2002, when new NASD and NYSE rules required analysts to disclose at the end of each report the past year's ratings assigned to a stock, analyst tendency toward optimism has persisted, and stock recommendations are still upward biased.

Prior studies propose several explanations for analyst optimism. The preference of currying favor with management presses analysts to report when they can "talk up" firms (Francis and Philbrick, 1993). Brokers' objective of generating trading commissions also leads analysts to issue optimistic reports to attract orders from investors who are subject to short-selling constraints (Hayes, 1998; Irvine, 2001; Jackson, 2005). A great amount of attention among scholars and regulators focuses on the hypothesis that investment banking affiliation acts as an influencing factor. That is, when analysts are affiliated with investment banks, the fear of jeopardizing future underwriting business causes their recommendations to be more favorable than they would be as unaffiliated analysts (Dugar and Nathan, 1995; Lin and McNichols, 1998; Michaely and Womack, 1999).

This paper extends current literature by testing the hypothesis of *mutual fund affiliation* as another explanation for analyst optimism about seasoned firms. As described in Nanda, Wang, and Zheng (2004) and Gaspar, Massa, and Matos (2006), the U.S. asset-management industry is concentrated into a number of mutual fund families. Each fund family is typically affiliated with a brokerage house that provides trading services and sell-side research to investors. This paper conjectures that, when a mutual fund family invests in

a stock, the affiliated brokerage analysts may have an incentive to research that stock and also to promote its purchase by issuing positive recommendations. The incentive may persist as long as the fund family holds a significant position of the stock in its portfolio. If so, such family dynamics may have regulatory implications that the new analyst rules disregard.

Mutual fund managers value unbiased research to form their investment decisions. While buy-side analysts employed by fund managers are not expected to be biased in their estimates, sell-side analysts may be. In the late 1990s, some conflicts of interest involving highly reputable analysts surfaced and raised some concerns about the impartiality of sell-side research. In particular, analysts were alleged to have biased some reports in favor of their investment bank's clients. Cheng, Liu, and Qian (2006) find that fund managers do indeed rely mostly on buy-side research to make portfolio decisions. However, research provided by the affiliated sell-side analysts can be exceptionally valuable to fund managers. As shown by Irvine, Simko, and Nathan (2004), affiliated analysts' earnings forecasts are more accurate than other analysts' estimates.

To meet the demand for research from their affiliated fund managers, sell-side analysts are motivated to cover stocks within fund family. Even though this research is paid for by commissions from the analyst's trading department (Conrad, Johnson, and Wahal, 2001), it has a limited potential to generate added trading business. Reuter (2005) finds that mutual funds usually pay a disproportionate share of commissions to their affiliated brokerage firm and are less likely to trade outside of it. To generate the most trading business out of the research provided to the affiliated fund managers, analysts make their reports available to the public.[1] We hypothesize that the family affiliation may provide analysts with the incentive to issue reports with positive prospects for the stocks held by affiliated mutual funds. The fear of hurting or the preference for supporting the performance of the fund family would make analysts optimistic on seasoned stocks.

Favoritism among divisions of full-service banks is not new in literature. In Ritter and Zhang (2005), the analysis of the ties between investment banks and their affiliated mutual funds during initial public offerings (IPOs) indicates that investment banking departments support the performance of asset

[1] Irvine, Lipson, and Puckett (2006) document abnormally high institutional trading volume beginning five days before "buy" recommendations are publicly released. Their evidence is consistent with institutional traders receiving tips about the contents of forthcoming analysts' reports. The hypothesis of mutual fund affiliation does not exclude tipping prior to the issue of analyst reports.

management departments. During the so-called Internet bubble period of 1999–2000, some evidence arose that investment banks allocated hot IPOs to their affiliated funds to boost the fund performance and attract more money inflows. As shown in Johnson and Marietta-Westberg (2005), benefits are reciprocal within a full-service bank; and the allocations to affiliated mutual funds help earn more underwriting business.[2] More to the point, Chung and Cho (2005) analyze the ties between brokerage analysts and market makers. They find that analysts cover stocks that are handled by the affiliated dealers and issue on them optimistic reports to generate order flow.

This paper thus examines the tie between brokerage analysts and their affiliated mutual funds as a rationale explaining analyst optimism. While brokerage houses may benefit from the higher trading business that optimistic research generates, mutual fund families may benefit from the likely issue of positive recommendations or from the unlikely release of negative recommendations by affiliated analysts. We measure an analyst's optimism as the analyst's tendency to issue recommendations that are more favorable than the consensus. It is no surprise that a "strong buy" rating often beats the consensus assessment of a seasoned stock. We use a duration-analysis model to describe dynamically observable patterns in brokerage research along with concomitant changes in mutual fund investments. Rather than analyzing analyst optimism at a single point in time, this approach has the advantage of capturing the *persistence* of analysts' disposition toward seasoned stocks over a long period, from 1995 through 2003, covering the Internet bubble and its subsequent burst.

The larger question—one that prior literature has not explained—is, then, do a mutual fund's stock holdings affect the research produced by analysts affiliated with that mutual fund? The evidence we collected by assessing a large sample of analyst recommendations says yes, in several respects. First, mutual fund affiliation affects analysts' decisions about providing research on stocks. We find that brokerage analysts cover a stock more frequently when affiliated mutual funds already hold it in their portfolios. Second, analysts are significantly optimistic about stocks that are held by mutual fund families. That is, affiliated analysts are 32% more likely to issue favorable recommendations than are unaffiliated analysts. Like in

[2] Other allocation practices, such as "spinning" and "laddering," imply that investment banks act in the interests of the affiliated brokerage firms (Nimalendran, Ritter, and Zhang, 2005; Griffin, Harris, and Topaloglu, 2005).

Irvine et al. (2004), our robustness tests confirm that the causal link moves from affiliation with mutual funds to analyst optimism, and not vice versa. Third, the more the affiliated mutual funds invest in a stock, the greater is the analysts' optimism. When a mutual fund family increases the portfolio weight of a stock investment by 1%, the probability that the affiliated analysts will issue a "strong buy" recommendation rises 16%, after statistical controls for stock characteristics and performance are established.

Do reputation risk and career concerns restrain analysts' optimism? We find that reputation partly curbs analysts' optimism on stocks held by the affiliated mutual funds. As predicted by Ljungqvist, Marston, Starks, Wei, and Yan (2005), we find that analyst recommendations on stocks highly visible to institutional investors are less likely to be influenced by family pressure. Instead, analysts are more likely to promote stocks that are less visible to other institutions to support the interests of the affiliated mutual funds while retaining no chilling effect on their reputation. The negative relation between analyst optimism on a stock and the institutional presence in that stock holds significantly in the multivariate tests, and it frames the mutual fund affiliation as an important explanation for analyst optimism. Controlling for institutional presence, we find that, from 1999 through 2001, analysts selected by *Institutional Investor* as stars were most optimistic in their reports when they covered stocks held by affiliated mutual funds.

Do market participants recognize the bias from the mutual fund affiliation? In the short run, our tests suggest that investors do not discount the quality of recommendations because of analyst incentives to look favorably at stocks held by the fund family. Investors seem to assign qualities of superior information to analyst recommendations on the stocks in the affiliated fund portfolios. However, consistent with Malmendier and Shanthikumar (2005), we find that only "strong buy" ratings produce a significantly positive trade reaction. When analysts cover stocks held by affiliated mutual funds, they appear eager to release positive recommendations, while they are not so quick to release negative recommendations. Promoting these stocks with a rating of "strong buy" that beats the consensus yields a median three-day abnormal return of 1.20% around the report day. If the issuing analyst is a star, a "strong buy" causes a greater price impact for stocks held by the mutual fund family, a median 1.69%.

In the long run, value accrues to investors following the positive ratings on stocks within an analyst's fund family. "Strong buys" issued by affiliated analysts produce an annualized unadjusted return of 15.85%,

compared to 12.01% from "strong buys" by unaffiliated analysts. However, the affiliated analysts' pessimism is less valuable than their optimism. Following an affiliated analyst's issue of "underperform" or "sell" ratings, we observe an annualized unadjusted return of 5.76%. When these negative ratings are issued by unaffiliated analysts, the return is higher, 8.98%. At the 5% level of statistical significance, abnormal returns computed by market model or Fama-French three-factor model lead to a similar qualitative conclusion. That is, mutual fund affiliation biases analysts' eagerness to release positive or negative stock reports.

This paper extends the literature on analyst optimism. Few authors have analyzed the important relationships between brokerage analysts and mutual funds.[3] The results show that the analyst's connection with a mutual fund family significantly affects his or her choice to continue to cover and rate positively the stocks in the fund portfolios. From analysis of earnings forecasts, Irvine at al. (2004) conclude that bundling brokerage research and asset management services produces only positive externalities for investors, such as more accurate analyst estimates. Unlike their conclusion, our analysis of recommendations lends to a more conservative position. Bundling brokerage research and asset management can benefit all investors with a higher amount of timely (though optimistic) research. However, it appears also that bundling alters analysts' incentives to release pessimistic research. Investors who rely on negative investment recommendations by sell-side analysts affiliated with mutual funds receive lower benefits than those who rely on unaffiliated analysts' assessments. Like insider trading (Leland, 1992; Meulbroek, 1992) and analyst tipping (Irvine et al., 2006), the overall welfare consequences of bundling brokerage research and asset management are uncertain.

The remainder of the paper is organized as follows. Section 2 contains the hypotheses of this paper, while Section 3 describes sampling procedures and reports the frequency of analyst coverage for our sample of seasoned stocks from 1995 to 2003. In Section 4, we present the univariate analysis of mutual fund affiliation as another explanation of analysts' decisions to provide favorable stock coverage. Section 5 shows

[3] Recent business news makes the analysis of these relationships quite timely. In June 2005 Citigroup announced the exchange of its in-house mutual fund business for Legg Mason's brokerage network. Similarly, in February 2006 Merrill Lynch announced the swap of its massive asset management business for a large stake of BlackRock. The spin-off decisions aimed to avoid conflicts of interest in the fund distributions. In the opposite direction, Morgan Stanley has recently acquired several hedge funds.

formal tests of our hypothesis using multivariate duration analysis as well as other econometric methodologies to probe the robustness of our results. Finally, in Section 6, we draw a summary of our findings and of their implications for future research.

2. Hypotheses and research design

Prior studies and recent anecdotal news have shown that the so-called Chinese walls between investment banking and brokerage departments do not work well, since research is often used as a marketing tool to support the underwriting business. As analysts can help the affiliated investment bank by looking favorably at issuer-clients in their research reports, they may also be encouraged to support the affiliated asset-management business by positively recommending mutual fund investments. Following the analogy about the investment banking affiliation, our first two hypotheses are as follows:

Hypothesis 1: Brokerage analysts are likely to provide coverage on stocks held by affiliated mutual funds.

Hypothesis 2: Brokerage analysts are likely to provide optimistic coverage on stocks held by affiliated mutual funds.

This paper explores the optimism of recommendations. Irvine at al. (2004) find that analyst earnings forecasts for a stock become more accurate as the fund family's ownership of that stock rises. We argue that issuing optimistic recommendations on the stocks held by affiliated mutual funds aligns the incentives between the brokerage firm and its mutual fund family. Favorable recommendations are likely to attract order flows to the analyst's trading department (Jackson, 2005). Also, favorable recommendations are likely to boost the short-term fund performance (Womack, 1996), especially, we argue, when they relate to stocks with a significant weight in the family fund portfolios. So, our third hypothesis is as follows.

Hypothesis 3: The greater the weight of a stock investment in the mutual fund portfolios, the more optimistic the recommendations by affiliated analysts on that stock.

Testing these three hypotheses implies modeling analysts' decisions about covering a stock over time. In this study, a decision by analysts to report on a stock is described as a time-to-event in a duration model. To investigate the mutual fund pressure while controlling for the well-documented investment banking pressure on analyst research for newly listed stocks, we focus on seasoned stocks. In particular, we track all the seasoned stocks covered by brokerage analysts at the end of 1994 over a 36-quarter sample

period by taking into account several time-varying features of the "subject" and the "object" of coverage, such as analysts' recommendations on a stock and that stock's weight in the family portfolios. Data come from multiple databases, IBES, SDC, the 13f Institutional Holdings databases, the Center for Research in Security Prices (CRSP), and CRSP/Compustat Merged.

Duration analysis has the methodological advantage of capturing causality links and also handling censoring issues. First, the explanatory factors used to model the event of reporting on a stock may be influenced by past occurrences of the event. Duration analysis conditions on such past occurrences and hence is well-suited to flesh out causal relationships.[4] Second, duration models typically analyze the occurrences of the event from time 0 when the event has occurred for all cross-sectional units, which are left-censored by construction. While one may say that the cross-sectional structure of the sample is driven by the arbitrary time selection, duration analysis explains indeed the occurrences of the event exploiting the time variation in the explanatory variables from the time origin. Also, in other techniques, such as panel regressions that dummy the occurrence of the event, left-censoring and time selection may cause statistical issues; this is not the case in duration models. Hazard regression models incorporate a positive probability that the event may never occur for some of the cross-sectional units. This allows describing –without dealing with complicated right-censoring issues– coverage stops over time.

3. Data and sampling procedures

Our data comprise all analysts who covered stocks by research reports during 1994, a year characterized by an absence of particularly sensitive financial issues or market turbulence. The IBES database identifies the names of analysts covering a given stock, the brokerage house the analyst works for, and the report date. Clarke, Khorana, Patel, and Rau (2005) show that business relationships at the brokerage firm level affect an individual analyst's decision to cover a stock-issuing firm. Thus, we explore the business relationships between stocks and the research departments of brokerage houses (hereafter called *research departments*). The fact that listed companies report their analyst coverage primarily by using the brokerage

[4] If N_t is the number of occurrences of the event up to time t and $\mathbf{X}_t$ is a set of variables which may at most depend on N_{t-1}, then the nature of the estimated relationship between N_t and $\mathbf{X}_t$ will be truly causal since duration analysis techniques explicitly stratify the process of $\underline{N}_t$ conditional on N_{t-1}.

firm name, not often by naming individual analysts, also supports our approach at the research department level.

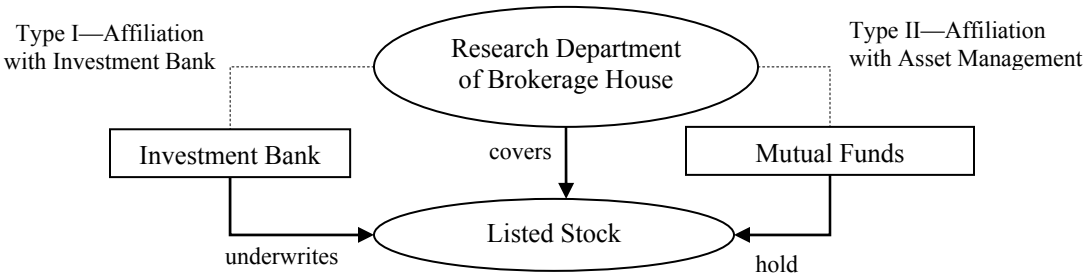
Our sampling procedure lets us identify 16,824 observations as *distinct* relationships between research department i and stock j (i = 1, 2, …, 154, and j = 1, 2, ..., 4,121). During 1994, 154 research departments covered between one and 976 stocks; the average department covered 109.25 stocks. For example, in 1994 Goldman Sachs issued research reports on 729 stocks, while Bear Stearns covered 478 stocks. Although some companies such as Intel Corp. are covered by both brokerage houses, the two relationships, Goldman Sachs-Intel and Bear Stearns-Intel are *distinct*, and generate two separate observations in our data set. It is the relationship between the research department and a covered stock that is at issue.

Table 1 reports the main descriptive statistics for the sample of stocks. Twenty-nine percent of the covered stocks are in the Standard & Poor's 500 index. Stocks tend to be listed in the main U.S. markets, the NYSE, the Nasdaq, or the Amex, with NYSE-listed companies being the most represented (59%). Only 10% are traded over-the-counter or on regional exchanges, such as Boston, Chicago, Cincinnati, Pacific, and Philadelphia stock exchanges. The sample includes utility stocks and tech stocks in roughly equal proportions (7% for both). Utility companies are identified as in the two-digit Standard Industrial Classification (SIC) code of 49; tech companies are defined as in the four-digit SIC codes reported in Loughran and Ritter (2004).

Two types of affiliation can occur in the relationships between research department i and stock j. While the first type of affiliation is commonly defined in the literature on analyst coverage, the definition of the second type is less conventional. The first type of affiliation involves the research department's investment bank. Research department i and stock-issuing firm j are affiliated with an investment bank if firm j's securities were underwritten by the research department's investment bank. In other words, an affiliation exists when the in-house investment bank served as a lead or co-lead manager in the most recent seasoned equity offering (SEO) or debt issue; if there is no SEO or debt issue then an affiliation exists when the in-house investment bank was the lead or co-lead manager at the time of the IPO. A business relationship between the issuer and non-managing syndicate is weak or it is not present (Michaely and Womack, 1999;

Ellis, Michaely, and O'Hara, 2000; Corwin and Schultz, 2005). Data on underwriting affiliations come from the SDC database for use in this research.

In our second less conventional use of affiliation, research department *i* and stock *j* are considered affiliated with asset management when at least one of the affiliated mutual funds already holds stock *j* in its portfolio. For example, Prudential Financial manages several mutual funds. The CDA/Spectrum Institutional Money Manager (13f) Holdings database aggregates the ownership data from individual mutual funds to a family-level on a quarterly basis. As a money manager for the family funds, Prudential reports its holdings of Intel at the end of the fourth quarter 1994. So, we regard the Prudential research department covering Intel as an affiliated researcher, starting from first quarter 1995, when the 13f holdings are disclosed, until the quarter Intel disappears from Prudential's portfolios. The following chart shows the in-house relationships generating these two types of affiliations.



At the end of 1994, about 21% of firms in our sample received coverage from the research department affiliated with the investment bank that had recently provided their underwriting services. More than one-fourth of the firms appear in the portfolios of mutual funds affiliated with the brokerage research department. Just 6% of sample stocks are affiliated with both investment bank and mutual funds.

This study uses the quarterly coverage rate as a measure of research production. Analysts are not obliged by law to report on a regular basis. Generally, an analyst is expected to issue a report on a stock when new information changes his or her valuation. Listed companies are required to quarterly disclose their financial statements, which can make analysts willing to update prior views. Every quarter, research department *i* can decide to issue or to withhold a report on stock *j*. In quarter *t,* the observed occurrence of report-issuing on stock *j* reveals the research department's choice of continuing to cover or of breaking the

silence on a particular stock. The quarterly coverage rate is defined as the number of reports issued divided by the total number of possible coverage events. In the last quarter of 1994, research departments in our sample released reports on less than a third of the stocks. The coverage rate was 27.87% (that is, 4,689 of 16,824 potential reports). The quarterly coverage rate thus defined is the initial productivity rate of the research departments in our sample.

4. Univariate analysis

The last quarter of 1994 is taken as the baseline quarter 0. In this study we restrict analysis to the set of 16,824 relationships between research departments and stocks over 36 consecutive quarters, from the first quarter of 1995 through the fourth quarter of 2003. No other research departments and/or covered stocks are added to our sample. As a result, the relationships are naturally subject to right-censoring because of the concentration of brokerage firms in the securities industry and/or because of stock delisting. Corwin and Schultz (2005) and Ljungqvist, Marston, and Wilhelm (2006) show that mergers and acquisitions in the late 1990s significantly reduced the number of brokerage firms. We designate research departments incorporated into an acquiring bank as inactive from the time of the acquisition, since clienteles and analyst specialties may change after a merger. For example, we removed from our design the Donaldson Lufkin & Jenrette research department in the last quarter of 2000 upon its acquisition by Credit Suisse First Boston, even though individual analysts might have kept working for the acquirer. As of the end of 2003, out of the initial 154, 86 research departments remained active. Similarly, we eliminated stock-issuing firms that were delisted once they merged with other listed companies. At the end of 2003, 1,941 stocks remained out of the initial 4,121. Over the nine-year period, the combined censoring effects resulted in 5,920 of 16,824 relationships being still *active* (i.e., uncensored) as of the end of the 36^{th} quarter.

Figure 1 plots the evolution of the coverage rate for the 1995-2003 period. Controlling for censoring in the relationships between research departments and covered stocks, we find that the quarterly coverage rate declines from about 20% to 10% throughout the first four years. During the three years 1999–2001, the production of reports on active stocks by active departments remains below 10%. This low production may be explained by the uncertainty characterizing the 1999–2000 market bubble and its subsequent burst in

2001. Limits in the research resources within brokerage firms may also explain the reduced productivity. During that time, analysts' attention might have been focused more on initiating relationships with the newly listed bubble firms than on cultivating the established relationships with seasoned firms. In 2002 market watchers witnessed a renewal in research productivity on the sample stocks. In the third quarter of 2002, the coverage rate jumps to about 23%, even more than the productivity rate recorded at the beginning of 1995. The major rise in September 2002 is temporary. In 2002–2003 the coverage rate again averages around 14%, to drop to 10% in the last quarter of 2003.

Changing market conditions and changing regulations explain the spike in the number of reports released in third quarter 2002. In fact, the first changes in analyst regulations were enacted during summer 2002 when the bear market triggered concerns that investors might have been misled by biased analyst research. In July 2002, following the provisions of the Sarbanes-Oxley Act, the NASD and NYSE set new rules (NASD Rule 2711, NYSE Rule 472) restricting communications between investment banking and research functions, requiring analysts to disclose any financial interest in securities recommended and barring analysts from doing personal trading around the time they issue research reports. Analysts since then have been required to disclose the distribution of the ratings assigned to a given stock in the prior 12 months, along with the percentage of buys, holds, and sells assigned to all covered stocks. On August 2, 2002, the Securities and Exchange Commission (SEC) proposed the Analyst Certification Rule, which was released in April 2003. It requires that any research report disseminated include both a certification that any assessments expressed must accurately reflect the analyst's personal views and an account of any compensation received by the analyst to control the appearance, or any suggestion of, a conflict of interest. As described in Cliff (2007), the provisions of NASD Rule 2711 about the disclosure of rating distributions became effective on September 9, 2002. IBES reports a great number of recommendations from Sunday September 8 to Monday September 9, 2002. In Figure 1, the dot line adjusts for 721 sample reports that were issued on these two days to comply with the new rules. Since in these compulsory reports analysts did not necessarily reiterate prior valuations, we remove them in our tests about an analyst's decision to cover a stock, and we include them in our tests about an analyst's decision to issue optimistic ratings on that stock. Nevertheless, the following analyses are insensitive to this choice.

4.1. Hypothesis 1: Research coverage and mutual fund affiliation

In our sample, the average stock receives three reports over a nine-year period. Some stocks receive quite consistent coverage. For example, HSBC James Capel released reports on Louis Vuitton Moët Hennessy in 22 of the 36 quarters between 1995 and 2003. Other stocks see no coverage for long periods, but then regain analysts' attention (e.g., after seven years of silence, in November 2002 Bear Stearns issued a report on May Department Stores). Another group of companies receives no coverage for several years in a row so, at least *ex post,* we would reasonably infer termination of coverage.

Three main factors explain the production of research reports: stock characteristics, firm performance, and research department characteristics.

1. Stock characteristics, such as size, listing exchange, and industry, may affect the probability of a stock's receiving research coverage. Prior studies have examined the stock features affecting the number of analysts who follow a given stock, rather than the frequency of coverage. Chung (2000) claims that, in their duties of providing marketing aids to brokerage firms, analysts research high-quality stocks. Large established companies included in benchmark industry indexes are likely to be regularly assessed by more analysts. Bhushan (1989) finds that the number of analysts following a firm is positively associated with the presence of institutional investors as firm's shareholders. O'Brien and Bhushan (1990) find that the number of analysts following a stock increases as that stock's volatility declines. Analysts are therefore more likely to cover regulated and less concentrated industries.

2. The operating performance of a stock-issuing firm is a likely determinant of coverage decisions. The better the firm's growth prospects, the higher the probability it will attract analyst coverage. Also, Brennan and Hughes (1991) find that price performance is a significant determinant. Their evidence shows that the number of analysts rises as the stock price falls, since brokers have incentive to produce research on low price stocks to generate a greater quantity of trading commissions.

3. Research department characteristics include their size and affiliations. First, the size of research departments may affect continuing release of reports. At the end of 1994, the median department consisted of 38 analysts; interestingly, median department size more than doubled over our nine-year sample period. As research functions are seen as increasingly important within an organization, research coverage is expected to

be more frequent. Second, affiliation with other banking departments is not supposed to affect decisions about whether a research department will cover a stock. Even before the 2002 revised regulation to enforce the separation between investment banks and their research departments, professional codes of conduct prescribed independence as a necessary characteristic of analyst behavior. According to the independence principle, affiliation with an investment bank is one feature of the research department that should cause neither initiation of coverage nor its termination. Nor does the independence principle imply that a research department's affiliation with mutual funds should affect research productivity.

Table 2 assesses the relation between coverage rates and the major characteristics of stocks and research departments. These characteristics and coverage rates are quarterly updated. That is, the affiliation between research departments and investment banks is updated by checking the managing syndicates of the 931 SEOs and the sample's 28,280 convertible and nonconvertible debt issues during the nine-year period. Similarly, a research department's affiliation with mutual funds is updated by analyzing the composition of portfolios quarter-by-quarter. The update of 13f institutional holdings advises us to lag the affiliation assessment and designation by one quarter. When the institutional investor reports the holding of stock j at the end of quarter t, the in-house research department is considered affiliated starting from quarter t+1.

In the nine-year period, the average coverage rate of 11.77% for all active observations is taken as a reference point. Not surprisingly, stocks in the S&P 500 index obtain research coverage at an above-average rate; the same is true for stocks traded on the NYSE. Amex-listed stocks are covered even less frequently than stocks traded over-the-counter or on regional exchanges. The average utility stock also receives less attention than do tech stocks. More importantly, research department affiliation matters. Despite what the analyst independence principle suggests, stocks underwritten by affiliated investment banks receive above-average coverage (13.74%). Portfolio investments by mutual funds also affect affiliated research departments' selection of stocks covered (14.17%). Stocks benefiting from both in-house affiliations receive the highest coverage of all (16.23%). Over three subperiods, 1995–1998, 1999–2001, and 2002–2003, all stocks experienced a decline in coverage in the middle period, 1999–2001. Yet, even in the bubble period, the two types of affiliation are associated with above-average coverage rates. Interestingly, since 2002, utility stocks have received more coverage than tech stocks, although a higher coverage rate does not necessarily

imply optimism in ratings. In fact, the increased coverage took place in the aftermath of the Enron scandal while major debt issues were realized to finance projects in the newly deregulated energy markets.

Which performance indicator attracts analyst attention? To analyze the relation between analyst coverage and firm operating performance, we use the market-book value ratio (MBV), actual earnings per share (EPS), and revenues to measure, respectively, firm growth prospects, profitability, and efficiency. MBV is defined as the sum of the market value of equity and the book value of long-term debt and preferred stock, divided by the book value of total assets. EPS are the quarterly basic earnings per share. Revenues are divided by total assets as a measure of asset turnover. We include three more indicators: return on equity (ROE), dividend yield, and leverage ratio. ROE is calculated as quarterly earnings divided by the book value of equity. The dividend yield is defined as quarterly dividends per share divided by the closing price at the end of each quarter. The leverage ratio is long-term debt divided by the book value of equity. All indicators are quarterly updated. They are also one-quarter lagged.

Stocks receiving coverage reported significantly higher median closing prices at the end of the prior quarter than uncovered stocks. We do not exclude the possibility that the choice of stocks that are reported may be also related to technical analysis or price-momentum considerations. So, we look at the closing prices of stocks covered during quarter *t* exceeding the 200-day moving average in the period. We use the 200-day moving average for three reasons. First, a long period smoothes price trends and makes results less sensitive to short-term volatility. Second, in a bull market, stock prices tend by construction to hover above their shorter moving averages when the last closing price exceeds the 200-day moving average. This phenomenon controls for the times the 200-day moving average is exceeded around the end of the quarter. Third, technicians believe that the lower the percentage of listed stocks that are trading above their 200-day moving average, the more bullish the market will be. In October 2002, NYSE-listed stocks dropped below the 20% threshold. This plunge anticipated the beginning of a bull market in March 2003.

In Table 3, the analysis of the median economic and financial performance in quarter *t*-1 of firms receiving reports in quarter *t* from 1995 through 2003 suggests that research departments generally pick good stocks to present in quarterly reports. Stocks analyzed in analyst reports are those with higher median MBV ratios or significantly higher quarterly EPS than stocks that have not been covered. Two-sample Wilcoxon

rank-sum tests reported in Table 3 systematically confirm the significance of the differences in median performance between stocks receiving coverage and stocks not in each quarter. Subsample results indicate that stocks receiving quarterly coverage perform significantly better by all indicators except for revenues/assets and leverage ratios. Stocks receiving coverage have higher median revenues/assets than the control firms until 1998, when a reversal in the rankings occurs. More indebted firms receive preferential coverage in the latter part of the sample period. All median indicators report a decline over time, except for dividend yield. More importantly, most stocks receiving analyst coverage are underwritten by affiliated investment banks or held by affiliated mutual funds. Affiliation with other in-house departments appears to be a significant determinant of an analyst's decision about which stock he or she reports.

4.2. Hypothesis 2: Optimistic research coverage and mutual fund affiliation

Figure 2 displays the distribution of ratings assigned by research departments on a five-point scale (with 1 = strong buy, and 5 = sell). Bradley, Jordan, and Ritter (2003) note that analyst rating schemes are not standardized, and can vary from one firm to another, so we use the standard IBES recommendations. Analyst recommendations are mapped to one of the five standard values. If research department *i* releases multiple reports on a given stock *j* in quarter *t,* we use the first rating. Rating distributions are categorized by research department affiliations and subperiods.

Consistent with prior studies, we find research departments affiliated with investment banks that had provided issuing companies with underwriting services tend to be favorable on issuer stocks. After the Internet bubble burst, the favorable disposition toward the sample stocks weakens. In Panel A, the distribution is highly right-skewed. In the first two subperiods, the buy recommendation is the mode and the median point. When strong buys and buys are combined, they represent about 67% during 1995 to 2001 and 45% in the last two years. Although the percentage of holds and underperforms rises considerably in the later period, there is no significant increase in the proportion of sells. Kadan, Madureira, Wang, and Zach (2005) find that, after adoption of the new analyst regulations, the likelihood of receiving an optimistic recommendation no longer depends on whether the brokerage house had underwritten an equity offering. Yet analysts, especially whether affiliated, remain reluctant to release pessimistic recommendations. When underperforms and sells are combined, they represent about 3% from 1995 to 2001 and 12% in the last two

years. Panel B reports the rating distributions for research departments that are unaffiliated with investment banks. Proportions of the pessimistic recommendations are slightly higher now, 5% before 2002 and 13% afterwards. The distribution of ratings assigned by research departments affiliated with mutual funds in Panel C of Figure 2 looks the same as the distribution in Panel A. Also, in Panel D, the rating distributions for analysts unaffiliated with mutual funds look similar to those in Panel B. This similarity cannot be explained by overlaps between the two groups of affiliated research departments; only 6% of stocks are affiliated with both investment banks and mutual funds as of the end of 1994, and this proportion declines over years.

To examine analyst optimism in the recommendations, we divide each rating by the consensus, defined as the average rating assigned by all analysts to stock j in quarter t, $\frac{Rating_t^{i,j}}{Consensus_t^j}$. The quarterly consensus is obtained from IBES as a partly exogenous variable, which considers all the ratings assigned in the analyst industry, including those analysts who initiate coverage and those analysts who already cover the sample stocks. As McNichols and O'Brien (1997) suggest, an initial bias in the selection of stocks explains the optimism in the first rating as research coverage is initiated by analysts. Because our sample includes only those research departments that are already covering stocks, the IBES consensus results are on average more favorable than our sample ratings, 2.19 compared to 2.27. Scaling all ratings by consensus helps comparing ratings for stocks being covered by different groups of research departments. We distinguish between *relative* and *absolute* types of optimistic recommendations. We regard optimism as relative when affiliated research departments rate more favorably the covered stocks than the unaffiliated departments. We measure the relative optimism by a *t*-test of the difference between mean ratings sorted by affiliation. Optimism is regarded as absolute when affiliated analysts not only issue more favorable reports than do unaffiliated analysts, but also more favorable reports than the rest of the industry. On a five-point scale where five is the worst rating, a lower-than-one value of the rating indicates that the reporting research department agreed that stock j should have a more favorable rating than did the consensus. A value equal to one indicates that the research department confirms the consensus with its recommendation.

Panel A of Table 4 reports the average rating divided by the consensus over the three subperiods. Ratings are categorized by performance indicators. The market-book value ratio, earnings per share,

revenues, return on equity, dividend yield, and leverage ratio are one-quarter lagged. A performance indicator is regarded as high when it exceeds the median quarterly value. In parentheses, we report also the proportion of ratings better than consensus. Controlling for firm performance, we find that an affiliation with a mutual fund significantly affects average research department ratings. Over 1995–1998, stocks in affiliated fund portfolios unconditionally receive better recommendations than those in unaffiliated funds; that is, research departments following seasoned stocks that are held by affiliated mutual funds are relatively favorable. In the 1999–2001 subperiod, recommendations by affiliated analysts absolutely favored companies reporting less-than-brilliant operating performance. Firms with below-the-median market-book value, earnings per share, revenues, and return on equity or firms that were highly leveraged are assigned better ratings, even more favorable ones than are garnered by the consensus. Over the 2002–2003 period, the disposition of departments affiliated with mutual funds becomes less favorable.

Each October, *Institutional Investor* announces its All-America Research Team, which includes, for each industry, the three sell-side analysts and one runner-up who provided the highest research quality according to money managers and institutions. Stickel (1992) finds that the prestige resulting from being selected as star analysts by the magazine is well deserved. Stars do outperform other analysts for accuracy, frequency, and price impact of their forecasts, earning so their designation. Considering their reputation at stake, we expect star analysts to report less optimism in covering stocks held by affiliated mutual funds. Panel B of Table 4 tests this hypothesis. Reports by stars affiliated with mutual funds represent 14% of the nine-year sample. In the years before 1999 and after 2001, star analysts report as favorably as non-star analysts on firms in which affiliated mutual funds invest. Average differences in the ratings by stars and non-stars are not statistically significant during the 1995-1998 and 2002-2003 subperiods. Conversely, from 1999 through 2001, star analysts are the group giving the most positive ratings when they cover stocks held by affiliated mutual funds. Regardless of the performance indicators for these stocks, both good and poor performers are absolutely favored by star analysts.[5]

4.3. Hypothesis 3: Optimistic research coverage and affiliated fund holdings

[5] We also run a nonparametric Wilcoxon rank-sum test and obtain similar results. Our concern is that the assumptions of *t*-test may not be met, since the ratio of two normal variables is generally non-normal (Marsaglia, 1965; Hinkley, 1969).

What would motivate research departments to issue favorable ratings on stocks held by affiliated institutional investors? We conjecture that brokerage firms may want to support the performance of affiliated mutual funds. If so, we would expect that the more an institutional investor has invested in a stock, the more inflated the analyst rating on that stock. Table 5 tests this hypothesis. Portfolio weight is the percent weight of a stock investment in the affiliated fund portfolios at the end of the quarter. It is also lagged by one quarter so that it is possible to see whether investment size affects the ratings subsequently assigned by affiliated research departments, and not the reverse. From 1995 through 2003, the median stock investment weighs 0.02% of the affiliated mutual funds (i.e., an investment of $4.2 million).

Panel A of Table 5 reports ratings (divided by consensus) assigned by research departments affiliated with mutual funds as portfolio weight rises. Throughout the nine-year period, research departments are more favorably disposed toward stocks held in larger proportions by the affiliated mutual funds. From the first third (the small portfolio weight tercile) to the highest third (the large portfolio weight tercile), stocks generally receive more optimistic ratings. The relation between weight size and positive ratings is generally monotonic. The *t*-tests for differences in mean between the highest and the lowest third are statistically significant since 1999. From 1999 through 2001 analysts are absolutely more optimistic on the stocks largely held by affiliated funds. The higher optimism on these stocks becomes lower pessimism in the 2002-2003 period. Panel B of Table 5 focuses on star analysts. From 1999 to 2001, stars assign ratings more favorable than the consensus to highly weighted stocks. In the last two years, when the new analyst regulation become effective, stars report the most pessimism on those stocks that figure slightly in the portfolios of affiliated mutual funds. In the following section we test our three hypotheses while controlling for other factors.

5. Multivariate Analysis

In quarter *t,* each research department *i* decides either to release a report or to be silent on stock *j*. This choice is not independent of choices that the research department made previously. Relative to the previous quarter *t*-1, in quarter *t* research departments select one of four observable outcomes or behaviors: issuing another research report, switching to silence (reflecting a pause in coverage), continuing to be silent, or breaking the silence with a new report. We define the choice of covering a stock with at least one report as

a failure event that is sampled at a quarterly frequency. Our study of the decision to continue research coverage is framed as a multiple failure-time analysis, also called multivariate duration analysis.

5.1. Multivariate duration analysis

Recurrent event data are frequently encountered in biomedical and economics investigations and, we assert, they are suitable though not traditional in financial analyses. Time-to-event studies arise when two or more events may occur for each observation unit or subject. In our study, the subject is a unique pair consisting of research department *i* and stock *j,* and the "failure" event consists of issuing a report in quarter *t*. We treat the events according to a conditional-risk set model (Prentice, Williams, and Peterson, 1981): a subject is not at risk of precipitating a second event until the first event has occurred, and so on. Thus, the conditional-risk set at time *t* for the event *n* concerns only all subjects under observation that have already experienced event *n*-1. Formally, let Z(*t*) denote the vector of covariates at time $t \geq 0$, and N(*t*) denote the number of failures prior to time *t.* The counting process for N(*t*) is described by a random variable, assumed to be continuous. The hazard or intensity function $\lambda(t)$ is defined as the instantaneous rate of failure at time *t,* given the covariates and counting processes at time *t:*

$$\lambda\{t \mid N(t), Z(t)\} = \lim_{\Delta t \to 0} Pr\{t \leq T_{n(t)+1} < t + \Delta t \mid N(t), Z(t)\} / \Delta t .$$

Intuitively, the hazard function is similar to the instantaneous probability that a research department will provide coverage, conditional on the history of decisions about whether to issue reports or not. In practice, we estimate the following Cox proportional-hazard model: $\lambda\{t \mid Z(t)\} = \lambda_0(t) exp[\ \beta' Z_t\ ]$, where $\lambda\{\cdot\}$ is called the hazard function, and $\lambda_0\{\cdot\}$ is the baseline hazard. We estimate the baseline hazard non-parametrically and the vector β illustrating the explanatory variables Z_t by maximum likelihood. The nonparametric, data-driven estimate of $\lambda_0\{\cdot\}$ makes results considerably robust.

Our sample consists of research departments covering stocks during 1994. The last quarter of 1994 marks date 0, and data are left-censored by construction. We count the initial failure that is common to all stocks in our sample as a zero event. The counting process ranges, then, from zero to 22 failure events over 36 quarters, with 22 being the maximum number of reports written across all stocks. Time-varying covariates for the probability of providing coverage on seasoned stocks are:

$$\lambda\{t/N(t), Z(\textit{Market Return}_t, \textit{S\&P500 Component}_t \textit{ dummy}, \textit{NYSE-Listed}_t \textit{ dummy}, \textit{Nasdaq-Listed}_t \textit{ dummy}, \textit{Amex-Listed}_t \textit{ dummy}, \textit{Utility}_t \textit{ dummy}, \textit{Tech}_t \textit{ dummy}, \textit{LnAssets}_{t-1}, \textit{Market-Book Value Ratio}_{t-1}, \textit{EPS/P}_{t-1}, \textit{Revenues/Assets}_{t-1}, \textit{ROE}_{t-1}, \textit{Dividend Yield}_{t-1}, \textit{Leverage Ratio}_{t-1}, \textit{Price Exceeding 200-Day Moving Average}_t \textit{ dummy}, \textit{SEO}_t \textit{ dummy}, \textit{Research Department Size}_t, \textit{Affiliation with Investment Bank}_t \textit{ dummy}, \textit{Switch of Investment Bank}_t \textit{ dummy}, \textit{Affiliation with Mutual Funds}_{t-1} \textit{ dummy})\}.$$

The first seven covariates relate to market conditions and firm characteristics. MARKET RETURN is determined by using the CRSP value-weighted NYSE/Amex/Nasdaq index. The S&P500 COMPONENT is a dummy equal to one when the stock is in the Standard & Poor's 500 index at the end of each quarter. NASDAQ-LISTED, AMEX-LISTED, and OTHER EXCHANGES are dummies for the listing on the Nasdaq, Amex, and other markets. UTILITY and TECH are dummies equal to one when companies operate, respectively, in the two-digit SIC code of 49, and in the four-digit SIC codes specified in Loughran and Ritter (2004).

To avoid a look-ahead bias, all accounting indicators refer only to the prior quarter *t*-1. LNASSETS is the natural logarithm of total assets. MARKET-BOOK VALUE RATIO is defined as the sum of the market value of equity and the book values of long-term debt and preferred stock, which are then divided by the book value of total assets. EPS/P is defined as earnings per shares divided by price to adjust for stock splits or reverse stock-splits. REVENUES/ASSETS are quarterly sales divided by total assets. ROE is quarterly earnings divided by the book value of equity. DIVIDEND YIELD is quarterly dividends per share divided by the closing price at the end of the quarter. LEVERAGE RATIO is long-term debt divided by the book value of equity. PRICE EXCEEDING 200-DAY MOVING AVERAGE, equal to one when the daily price happens to exceed the 200-day arithmetic moving average in quarter *t,* is intended to capture momentum in the decision to research a firm. SEO is a dummy variable equal to one when the company makes a new equity offering in quarter *t.*

To account for research department characteristics, RESEARCH DEPARTMENT SIZE is defined as the IBES number of analysts working for a research department. AFFILIATION WITH INVESTMENT BANK has a value of one when the research department is affiliated with an investment bank in the managing syndicate for the stock covered. SWITCH OF INVESTMENT BANK is equal to one when the issuing firm selects a new investment bank as a lead or co-lead manager for offering new securities. This dummy variable marks the end to the firm's relationship with an investment bank that was used during a prior equity or debt issue. AFFILIATION WITH MUTUAL FUNDS has a value of one when the research department is affiliated with

mutual funds holding, in quarter *t*-1, the stock covered.

Table 6 reports the coefficients for the Cox regression model. Lin and Wei's (1989) heteroskedasticity-robust *z*-statistics are reported in parentheses. The signs of the coefficients stabilize in regression 4, confirming the results of the univariate analysis. Stocks reporting good accounting and financial performance are persistently covered. Firm size calculated as book value of assets is inversely associated with the probability the stock will be followed. A research department's choice of covering a stock is also affected by the recent occurrence of an SEO and price momentum.[6] The affiliation between research department and an investment bank affects analysts' decisions to continue providing research on a stock. Although hazard ratios are not reported in Table 6, they support a clearer interpretation than do the coefficients. When an issuer selects an investment bank that is a company other than its former underwriter to manage an offering of new securities, the probability that the former underwriter will continue reporting on the issuer's stock declines by 31%. Krigman, Shaw, and Womack (2001) suggest that one reason companies change to a new underwriter for managing an SEO is to get higher-quality research coverage. The flip side of the coin seems to be that, once an investment bank stops being a stock's underwriter, the affiliated research department has no incentive to maintain continuous coverage on that stock. The last regressor in specification 4 is directly useful in testing our first hypothesis. Controlling for other factors including the investment banking affiliation, we find that mutual fund affiliation significantly drives the researchers' decision to continue covering a stock. When affiliated mutual funds have been investing in a stock in quarter *t*-1, the probability that stock will be covered in quarter *t* rises by 20%.

To test our second hypothesis in a multivariate setting, we also estimate Cox regression models that define the "failure" event as the decision of a research department to issue at time *t* a recommendation that is better than that given through the quarterly consensus. The probability of being absolutely favorable toward a stock is explained by the same covariates related to market returns, firm characteristics, accounting and financial performance, and research department features. In regression 1 of Table 7, the coefficient for market return is positive and significant. The momentum indicator drives research optimism. Both affiliation

[6] When we replace the PRICE EXCEEDING 200-DAY MOVING AVERAGE dummy with the stock price at the end of quarter *t*-1, we still find the probability of covering a stock is positively associated with its price level. This result differs from the finding in Brennan and Hughes (1991).

dummies have positive and significant coefficients. When an investment bank underwrites the stock, the affiliated analysts are 5% more likely than are unaffiliated analysts to look favorably at that stock-issuing firm in their reports. Yet, when mutual funds hold a stock, the affiliated research department is 32% more likely than are unaffiliated departments to provide favorable coverage on that stock. Regression model 2 predicts the probability of beating the consensus with a strong buy. The coefficient of DIVIDEND YIELD is not significant anymore, while MARKET-BOOK VALUE RATIO as a proxy for a firm's growth prospects becomes a significant determinant of analysts' decisions of strongly recommending a stock. The affiliated research department is now 21% more likely than are unaffiliated departments to promote a stock with a strong buy.

The question then becomes: what drives (curbs) the optimism of the brokerage research affiliated with mutual funds? Regression model 3 suggests some answers to our third hypothesis. This model focuses on the subsample of relationships between research department *i* and stock *j* that are characterized by affiliation with relationships between that same research department and mutual funds at time *t*-1. In particular, this model replaces the AFFILIATION WITH MUTUAL FUNDS dummy with WEIGHT IN AFFILIATED MUTUAL FUNDS and LNAMOUNT INVESTED BY AFFILIATED MUTUAL FUNDS. While WEIGHT IN AFFILIATED MUTUAL FUNDS is the percentage of the dollar amount invested in stock *j* by affiliated money managers divided by all 13f holdings in quarter *t*-1, LNAMOUNT INVESTED BY AFFILIATED MUTUAL FUNDS is the logarithm of the millions of dollars invested in stock *j*. We expect a positive coefficient for WEIGHT IN AFFILIATED MUTUAL FUNDS, after we control for the investment amount.

Regression 3 includes three more variables for capturing analyst reputation risk. As in Ljungqvist et al. (2005), the first variable, HOLDINGS BY OTHER MUTUAL FUNDS, controls for the institutional presence in a firm's equity. All institutional investors with over $100 million in assets under management must disclose their holdings quarterly. We use CDA/Spectrum to determine HOLDINGS BY OTHER MUTUAL FUNDS as the ratio between shares that are held by all unaffiliated mutual funds at the end of quarter *t*-1 and shares outstanding. NUMBER OF OTHER MUTUAL FUNDS, the second variable, is the number of unaffiliated institutional investors in stock *j*. Like HOLDINGS BY OTHER MUTUAL FUNDS, we expect the NUMBER OF OTHER MUTUAL FUNDS to moderate analyst optimism. The higher the number of unaffiliated institutional investors in stock *j*, the higher the votes in the *Institutional Investor* poll at stake. The third variable is the

STAR ANALYST dummy.

Results of regression 3 suggest that the higher the weight of the stock in the affiliated fund portfolios, the more optimistic the rating assigned. When a mutual fund family increases 1% the weight of a stock investment, the probability that the affiliated analysts will issue a recommendation more favorable than the consensus rises 16%. The presence of other institutional investors does moderate analyst optimism, but star analysts are associated with overly optimistic ratings. Regression 4 reports similar results for the probability of surprising the consensus with a strong buy on a stock. Although analysts build their reputation among institutional investors primarily on their forecasting ability, career achievements also depend on optimism of their recommendations. Controlling for accuracy, Hong and Kubik (2003) find that brokerage firms are likely to reward analysts who promote stocks with ratings bolder than the consensus.[7] Ljungqvist, Malloy, and Marston (2006) show that a number of bold recommendations by stars have recently been "anonymized" from the 1993–2002 IBES tapes. Consistent with our findings, these anonymizations relate to some embarrassing recommendations issued by star analysts who have recently experienced positive career outcomes, while they affect no earnings estimate.

5.2. Robustness checks

This paper applies a number of robustness checks to our empirical results. We verify, first, that our findings on the importance of mutual fund affiliation do not depend entirely on the duration analysis method. We start by applying standard-probit regression methods to the probability that research departments will issue a report on a given stock. While duration analysis models the conditional probability of failure, standard probit assumes independence over time. For our first hypothesis, untabulated results systematically replicate model 4 of Table 6. The correspondence between signs and significance levels for most variables is striking. We find that only three coefficients out of 20 switch signs, NASDAQ-LISTED, LNASSETS and DIVIDEND YIELD, but none of them relate directly to Hypothesis 1, which remains difficult to reject. Mutual

[7]Anecdotal news suggests that analysts' bonuses are related to how they treat institutional investors. "Today analysts are hired not only to research companies and to select stocks. They are also expected to get out there and sell their research to big institutional clients, which then demand a great deal of their time and attention" (*Fortune,* October 1, 1990, p. 195). The *Wall Street Journal* (October 29, 1991, p. C1) reports the words of one research director: "Most of the guys know that they'll be visiting for the Institutional Investor in the spring," that is, making annual pilgrimages to see clients and implicitly lobbying for Institutional Investor votes. "I'm a lonely guy in March and April," shortly before the balloting, he says, because all his analysts are out on the road.

fund affiliation significantly increases the probability that a given stock will be covered. The same results are obtained either by bootstrapping the standard errors of the probit or by estimating a logistic regression. We conclude that our results on the determinants of coverage do not depend on modeling persistence in behavior by duration methods.

Second, we use probit and logit methods to test Hypothesis 2 about the probability that affiliated research departments will assign a rating more favorable than does the consensus. Notice that probit analysis differs in one fundamental way from the Cox regressions in Table 7: while a duration model focuses on the *conditional* probability of optimism to persist over time as a function of a set of explanatory variables, a probit model simply links the *unconditional* probability of optimism at any point in time to the set of explanatory factors, independently of past optimism or pessimism. However, Cox and probit methodologies complement each other in revealing key features of analyst optimism. Table 8 reports probit coefficients and robust *z*-scores for the nine-year period; the intercept constant is estimated but not reported. Although some coefficients experience shifts in sign and *z*-scores generally decline, probit estimates on the relevant variables are similar to Cox results. The estimated coefficients for the last five regressors have the expected signs and they are significant. One might ask how robust the results are across subperiods. In the context of duration analysis, this question is far from natural, because dividing a sample into subperiods would alter the natural structure of the baseline period and the dynamics of the failure events over subsequent periods. Thus we use probit techniques because they assume temporal independence of the failure events. Table 8 reports probit estimates for the same subsamples used earlier in the paper. Using shorter samples generally implies lower *z*-scores throughout. The signs of a few firm- or stock-specific control variables change from Table 7.[8] Once more, our main insights turn out to be robust over time. The positive estimated coefficient for the portfolio weight of a stock in the affiliated fund portfolios is not time-sensitive. The tendency of analysts, especially

[8] From Table 7 to Table 8, a switch in the sign of a coefficient indicates how a variable influences in a different way the persistence of analyst optimism over time and the appearance of optimism at one point in time. For instance, the negative Cox coefficient of LNASSETS_{t-1} indicates that, everything else equal, deteriorating assets reduces the probability that optimism will not persist between two consecutive periods. On the contrary, the positive probit coefficient of LNASSETS_{t-1} indicates that, on average, larger assets significantly induce higher optimism. In Table 8, some sign switches are illusory because the corresponding coefficients fail to be significant at standard size-levels across estimated models. Examples are the negative probit estimates of MARKET RETURNS_t and EPS/P_{t-1} during the later subperiod.

stars, to issue favorable ratings is higher during the bubble period, but remains significant and positive throughout.

Third, we expand the set of variables controlling for business-cycle conditions to include lagged values of the growth rate of standard macroeconomic indicators, such as GDP, inflation (as measured by the CPI), and the federal funds rate. The macro controls are significant, and they show the expected signs, signaling that better general conditions foster optimistic recommendations. Although the quarterly market return loses its significance, all other variables of interest maintain the same sign as in Table 7, and most estimated coefficients hardly change value or significance level.

Finally, we experiment with the random-effects generalized least squares (GLS) models that Ljungqvist et al. (2005) use in a related application. Similarly, we model a continuous indicator of research optimism—defined as the ratio between the rating and the consensus—as a function of firm/stock characteristics and research department features specified in Table 7 (model 3). We obtain two distinct sets of GLS coefficient estimates, depending on whether we model research department- or firm/stock-level unobserved heterogeneity.[9] A larger institutional presence in the firm's equity makes optimism less likely. Yet, star designation makes optimism more likely, whatever the econometric framework.

5.3. Simultaneity issues

Univariate and multivariate models as well as a variety of econometric techniques show that the affiliation with mutual funds is associated with a more continuing and favorable analyst coverage. But these results formally establish no causal link between mutual fund affiliation and analyst research. One might be concerned that a simultaneous effect may be occurring: mutual funds invest in stock *j* upon the analysts' recommendations. If so, a behavioral claim about analyst incentives could not be established. To explore the issue, this study estimates random-effects GLS regressions where the change (between quarter *t*-1 and quarter *t*) in the shares held by affiliated mutual funds is explained by a number of variables, including

[9] Formally, $Opt^{i,j}_{t}$ is a variable measuring the optimism (relative to the consensus) of research department *i* on stock *j* at time *t.* Random-effects panel analysis decomposes the general random error term $\varepsilon^{i,j}_{t}$ into the sum $\upsilon_i + \eta_j + \omega_t$. Each error term represents unobserved heterogeneity of optimism across research departments, stocks, and over time. Following Ljungqvist et al. (2005), we simplify the estimation problem by experimenting with either research department or time heterogeneity or firm and time heterogeneity. Provided the two sets of coefficients are similar, as it turns out to be the case in our results, choosing one or the other assumption will make little difference.

optimism of the in-house analysts in quarter t-1.[10] Under the null hypothesis of no simultaneity (that is, that mutual fund affiliation *causes* analysts' behaviors) and hence affiliation generates a causal relation, we expect that analyst optimism will fail to explain significantly the subsequent portfolio rearrangements for in-house mutual funds.

As reported in columns 1 of Table 9, past optimism of affiliated analysts fails to explain changes in mutual fund holdings. We obtain two sets of GLS coefficient estimates, depending on whether we model research department- or firm/stock-level unobserved heterogeneity. At both levels, change in the institutional presence is the main significant explanatory factor with a positive coefficient. We find no evidence that favorable ratings are followed by any significant change in holdings by in-house mutual funds. We also estimate GLS regression of the change in the shares held by affiliated mutual funds on the change in the optimism of in-house analysts. The coefficient for the change in the ratio between rating and consensus is negative and statistically insignificant (-0.009 with p-value of 0.15). The evidence is at odds with a two-way simultaneous feedback system and supports instead the idea that affiliation causes analysts to be favorable toward stocks within family portfolios.[11]

In columns 2 of Table 9, we replicate the analysis using variables reflecting the contemporaneous optimism (in quarter t) of in-house analysts, and here we find identical results. This version of the model reflects the possibility that information may efficiently flow within full-service banks so that analyst optimism may be reflected in the contemporaneous portfolio behavior of the affiliated funds. Random-effects regressions fail again to highlight any significant impact of analyst optimism on mutual fund behavior. Also, when star analysts release a rating more favorable than the consensus offers, the affiliated mutual funds will not significantly change their holdings in the covered stock.

5.4. Value of analyst optimism

[10] When more reports are issued by research department i on stock j in one quarter, we examine alternatively the analyst ratings in the first report and those in the last report for the quarter. In the second alternative, the mutual funds have a longer time to adjust their portfolios. We find the results are insensitive to this choice.

[11] We collect some evidence of a negative association between favorable analyst ratings and change in portfolio weight. In other words, asset managers are likely to sell stocks in the wake of favorable recommendations. The most important explanatory variables are the changes in market-book value, revenues/assets, and stock price. Overall, evidence shows that mutual funds prefer companies with stronger fundamentals, consistent with the findings in Field and Lowry (2005). Detailed results are available on request.

What is the value of analysts' optimism? Does their favorable disposition affect stock prices? Table 10 suggests answers to these questions in the short run. We use Eventus® for Cross-Sectional Analysis to determine the three-day abnormal returns for each stock that receives coverage. Day 0 marks the report date. Market-adjusted returns are determined using CRSP equally weighted NYSE/Amex/Nasdaq index. To control for dependence of returns, we choose a 255-trading day estimation period starting 46 days before the event date. We categorize the median three-day abnormal returns as an effect of the rating assigned. As reported in Figure 2, underperform and sell ratings represent such low percentages that it would not be informative to report them separately. To control for market expectations, we also categorize by rating position relative to consensus. In fact, Michaely and Womack (1999) suggest that investors expect affiliated analysts to look favorably on the issuing firms so that market participants discount lead underwriter analysts' buy recommendations. Lin and McNichols (1998) report that, in the SEO market, the three-day returns on lead underwriter analysts' hold recommendations are significantly more negative than the three-day returns on unaffiliated analysts' hold recommendations. Investors expect that lead underwriter analysts are more likely to recommend a hold when they mean sell.

Surprising the market with positive ratings is an informative move when research departments are affiliated with mutual funds. Markets react significantly to strong buys reported by these analysts. The median price impact of a strong buy issued by analysts affiliated with mutual funds is 1.20% (the mean is 1.95%). This abnormal return is significantly higher— 0.80% in median (1.51% on average) —than the change reported by stocks receiving strong buys from unaffiliated research departments. However, there is asymmetry in the price reaction when the rating is negative. Consistent with Boni and Womack (2002), a hold recommendation is generally considered bad news. When research departments affiliated with mutual funds issue such a negative rating that is less favorable than the consensus, stocks display a negative abnormal return of -0.83% as well as stocks rated that way by unaffiliated analysts. The difference between the three-day returns categorized by affiliation is not significant. Only recommendations issued by analysts affiliated with mutual funds report this asymmetry, which suggests that, although market participants regard recommendations from affiliated research departments as informative, analysts may be more eager to surprise the consensus with positive news than with negative news. Panels B and C report similar results for

star analysts and non-star analysts, respectively.

In the long run, value accrues to investors following the positive ratings on stocks held by the affiliated mutual funds. As in Barber, Lehavy, McNichols, and Trueman (2001), we form portfolios based on analyst recommendations and examine their long-run performance. In particular, on the day a recommendation is issued on a given stock, we systematically act upon that recommendation, by buying stocks that receive strong buy or buy ratings, and by selling short stocks that receive underperform or sell ratings. Again, as in Barber et al. (2001), the portfolios built are value-weighted, that is, each stock is purchased or sold in a proportion equal to its relative weight on the total market portfolio. Each recommendation is assumed to stop influencing investment behavior after one year from its issue date. We report the raw (unadjusted) returns along with abnormal (adjusted) returns, which are returns in excess of compensation that risk would justify. Measures of abnormal returns correspond to two standard asset pricing models: the market model and the Fama-French three-factor model.

As reported in Panel A of Table 11, investing systematically in the strong buys issued by affiliated analysts produces an annualized unadjusted return of 15.85%, compared to 12.01% from investing in the strong buys by unaffiliated analysts. However, affiliated analysts' pessimism is less valuable than their optimism. Following underperforms or sells by affiliated analysts produces an annualized unadjusted return of 5.76%, which is about 10% lower than the unadjusted return of the optimistic strong-buy portfolio. When the negative ratings are issued by unaffiliated analysts, this return is equal to 8.89%, which is about 3% lower than the unadjusted return of the optimistic strong-buy portfolio. At the 5% level, differences in abnormal returns from market model and Fama-French three-factor model lead to a similar qualitative conclusion. Mutual fund affiliation biases analysts' eagerness to release positive or negative stock reports. Panels B and C of Table 11 report the rating values categorized by affiliation and star status. Interestingly, for investors, returns following strong buys issued by affiliated non-stars are higher than the ones by affiliated stars.

6. Conclusions

What makes an analyst's research on seasoned stocks optimistic? After studying a large sample of recommendations provided by sell-side analysts on seasoned stocks for over 36 quarters, from 1995 to 2003,

we find that analysts' decisions to provide a favorable coverage on seasoned stocks are influenced by their affiliation with mutual funds. Analysts are significantly optimistic about stocks that are held by affiliated mutual funds. In the 1999–2001 subperiod, firms with low growth prospects or modest accounting performance received favorable ratings, and ratings that were even more favorable than the consensus offered them. In particular, star analysts showed the most optimism on these less-than-brilliant stocks in the portfolios of the affiliated funds. Controlling for several factors including investment banking affiliation, our results indicate, first, that the more the affiliated mutual funds weigh a stock in their portfolios, the higher the analyst optimism. Second, promoting stocks with a strong buy that beats the consensus produces a median three-day abnormal return of 1.20% around the report day (1.69% when the promoting analyst is a star).

We argue that analyst optimism aligns the incentives between a mutual fund family and its affiliated brokerage firm. While the short-term performance of the affiliated fund family benefits from the issue of favorable research on a stock that has a significant portfolio weight (Womack, 1996), the analyst's brokerage firm may attract a higher order flow (Jackson, 2005). Also, in the long run, value accrues to investors following the positive ratings on stocks held by affiliated mutual funds. However, mutual fund affiliation may bias analysts' eagerness to release negative investment recommendations.

This paper does not take a normative position on the mutual fund affiliation of sell-side analysts but it provides evidence that, within a typical full-service bank, analysts are subject to different sources of pressure. The analyst regulations of 2002 focus on the affiliation with the investment banking department of a brokerage firm as a main source of biases for analyst research. Yet, the investment banking affiliation explains analyst optimism only in the short run. O'Brien, McNichols, and Lin (2005) and James and Karceski (2006) find indeed that investment banking affiliation is likely to affect research around the offering of new shares, but the related biases do not persist afterwards. Mutual fund affiliation instead explains the persistence of analyst optimism. Our results highlight the significance of the relationship between research departments and affiliated portfolio managers, and its significance is meant to enhance. As a result of the new analyst rules, brokerage firms will be likely to replace the objective of generating underwriting business with the objective of generating trading business. Recent news of mutual-fund trading abuses that involve large brokerage houses and their favored institutional clients provide insight into this

redirection of goals. That is, as *The Wall Street Journal* affirmed in this regard in 2003, “Stock analysts still put their clients first.”

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Table 1

Descriptive Statistics as of End of 1994

	End 1994
Number of Research Departments	154
Number of Covered Stocks	4,121
Average Number of Stocks Covered by Each Research Department	109.25
Proportion of Stocks in the S&P 500	29.02%
Proportion of NYSE-Listed Stocks	58.78%
Proportion of Nasdaq-Listed Stocks	29.54%
Proportion of Amex-Listed Stocks	1.74%
Proportion of Stocks Traded OTC or on Regional Exchanges	9.94%
Proportion of Utility Stocks	6.83%
Proportion of Tech Stocks	7.49%
Proportion of Stocks Underwritten by Affiliated Investment Bank	20.80%
Proportion of Stocks Held by Affiliated Mutual Funds	25.61%
Proportion of Stocks Both Underwritten by Affiliated Investment Bank and Held by Affiliated Mutual Funds	6.04%
Quarterly Coverage Rate	27.87%

At the end of 1994, the sample consists of 16,824 observations as pairs of research department i and stock j (i = 1, 2, …, 154, j = 1, 2, …, 4,121). Each research department covers at least one stock (with a maximum of 976). More research departments may cover the same stock. Utility companies operate in the two-digit SIC industry of 49; tech companies are defined as in the four-digit SIC codes in Loughran and Ritter (2004). Stocks are said to be covered by a research department affiliated with an investment bank when the affiliated investment bank served as the lead or co-lead manager of the most recent seasoned equity offering (SEO) or convertible and nonconvertible debt issue; if there is no equity or debt issue, an investment banking affiliation exists when the affiliated investment bank was the lead or co-lead manager at the time of the initial public offering (IPO). Stocks are said to be covered by a research department affiliated with mutual funds when the affiliated mutual funds hold them in quarter t-1. The quarterly coverage rate is the total number of observations with at least one report during the fourth quarter of 1994 divided by 16,824 sample observations. Data are from IBES, CRSP/Compustat Merged Database, and CDA/Spectrum Institutional Money Manager (13f) Holdings.

Table 2

Average Quarterly Coverage Rate
Categorized by Firm Characteristics and Subperiods

		Subperiods		
	1995-2003	1995-1998	1999-2001	2002-2003
All Active Observations	11.77% N=387,259	13.41% N=226,371	8.18% N=111,213	12.31% N=49,675
Stocks in the S&P 500	13.92%	15.00%	10.63%	17.01%
NYSE-Listed Stocks	12.52%	13.94%	9.11%	13.94%
Nasdaq-Listed Stocks	11.12%	13.22%	7.27%	9.23%
Amex-Listed Stocks	7.04%	9.41%	2.60%	3.13%
Stocks Traded OTC or on Regional Exchanges	8.39%	10.54%	3.64%	4.35%
Utility Stocks	9.63%	10.82%	5.60%	13.33%
Tech Stocks	12.52%	14.96%	8.38%	10.82%
Stocks Underwritten by Affiliated Investment Bank	13.74%	15.61%	9.46%	14.80%
Stocks Held by Affiliated Mutual Funds	14.17%	15.01%	9.95%	17.40%
Stocks Both Underwritten by Affiliated Investment Bank and Held by Affiliated Mutual Funds	16.23%	17.38%	11.44%	20.40%

The average quarterly coverage rate is determined as the total number of observations with at least one report during the period divided by the number of active (i.e., uncensored) observations at the end of that period. 721 reports issued from September 8 to September 9, 2002 to comply with NASD Rule 2711 are removed from the sample. All firm characteristics are time-varying. Utility companies operate in the two-digit SIC industry of 49; tech companies are defined as in the four-digit SIC codes in Loughran and Ritter (2004). Stocks are covered by a research department affiliated with investment banks when the affiliated investment bank served as a lead manager or co-lead manager of the most recent SEOs, debt issues or at the time of the IPO. Stocks are covered by a research department affiliated with mutual funds when the affiliated mutual funds hold them in quarter *t*-1.

Table 3

Median Performance Indicators of Stocks Receiving Quarterly Coverage Categorized by Subperiods

	1995-1998			1999-2001			2002-2003		
	Reports	No Reports	*P*-value	Reports	No Reports	*P*-value	Reports	No Reports	*P*-value
MBV Ratio	1.22	1.16	0.0000	1.22	1.03	0.0000	1.04	0.98	0.0000
EPS	$0.37	$0.33	0.0000	$0.36	$0.32	0.0000	$0.34	$0.28	0.0000
Revenues/Assets	0.23	0.22	0.0000	0.20	0.21	0.0007	0.16	0.18	0.0000
ROE	3.59%	3.34%	0.0000	3.51%	3.18%	0.0000	2.98%	2.68%	0.0000
Dividend Yield	0.83%	0.74%	0.0000	1.06%	0.76%	0.0000	1.32%	0.81%	0.0000
Leverage Ratio	0.46	0.47	0.0297	0.56	0.58	0.9593	0.65	0.57	0.0000
Stock Price	$28.88	$26.69	0.0000	$33.19	$25.69	0.0000	$29.46	$23.94	0.0000
Price Exceeding 200-Day Moving Average	76.43%	71.15%	0.0000	70.11%	67.22%	0.0000	72.79%	65.39%	0.0000
Stocks Underwritten by Affiliated Investment Bank	24.72%	20.70%	0.0000	24.61%	20.97%	0.0000	25.31%	20.64%	0.0000
Stocks Held by Affiliated Mutual Funds	34.11%	29.07%	0.0000	49.26%	36.77%	0.0000	58.21%	38.79%	0.0000
Stocks Both Underwritten by Affiliated Investment Bank and Held by Affiliated Mutual Funds	9.12%	6.57%	0.0000	12.71%	8.44%	0.0000	16.58%	9.24%	0.0000
Number of Active Observations	30,363	196,008		9,097	102,116		6,116	43,559	

All median values are determined in the quarter prior to the one when the report is released. MBV ratio is defined as the sum of the market value of equity and the book values of long-term debt and preferred stock, divided by the book value of total assets. ROE is earnings divided by the book value of equity. Dividend yield is quarterly dividends per share divided by the closing price at the end of each quarter. Revenues/Assets are quarterly sales divided by total assets. Leverage ratio is long-term debt divided by the book value of equity. Stock price is the median price reported at the end of the prior quarter. 721 reports issued from September 8 to September 9, 2002 to comply with NASD Rule 2711 are removed from the sample. *P*-values are for two-sample Wilcoxon rank-sum (Mann-Whitney) tests of difference between medians.

Table 4

Average Rating Categorized by Mutual Fund Affiliation and Performance Indicators

Panel A: Research Departments by Mutual Fund Affiliation

Performance Indicators	1995-1998 Affiliated Research Depts.	1995-1998 Unaffiliated Research Depts.	*P*-value	1999-2001 Affiliated Research Depts.	1999-2001 Unaffiliated Research Depts.	*P*-value	2002-2003 Affiliated Research Depts.	2002-2003 Unaffiliated Research Depts.	*P*-value
High MBV	1.04	1.09	0.0000	1.01	1.05	0.0004	1.10	1.07	0.0420
Low MBV	1.02	1.04	0.0111	0.99	1.03	0.0006	1.08	1.04	0.0034
High EPS	1.03	1.07	0.0000	1.01	1.04	0.0037	1.10	1.07	0.0690
Low EPS	1.03	1.06	0.0004	0.99	1.04	0.0000	1.09	1.05	0.0079
High Revenues	1.03	1.08	0.0000	1.02	1.04	0.1607	1.08	1.06	0.1263
Low Revenues	1.03	1.05	0.0080	0.98	1.05	0.0000	1.11	1.07	0.0034
High ROE	1.04	1.08	0.0000	1.01	1.05	0.0047	1.10	1.07	0.0700
Low ROE	1.03	1.05	0.0033	0.97	1.04	0.0000	1.09	1.05	0.0036
High Dividend Yield	1.02	1.06	0.0000	0.99	1.04	0.0000	1.09	1.06	0.0620
Low Dividend Yield	1.05	1.08	0.0008	1.01	1.05	0.0073	1.11	1.06	0.0084
High Leverage	1.02	1.05	0.0000	0.99	1.04	0.0000	1.09	1.05	0.0052
Low Leverage	1.05	1.08	0.0000	1.01	1.04	0.0031	1.09	1.06	0.0518
All Stocks	1.03 (44.00%) N=10,323	1.07 (40.06%) N=19,344	0.0000 (0.0000)	1.00 (47.73%) N=4,455	1.05 (41.73%) N=4,146	0.0000 (0.0000)	1.10 (36.91%) N=4,105	1.07 (38.52%) N=2,064	0.0028 (0.2174)

Panel B: Mutual Fund Affiliation by Analyst Reputation

Performance Indicators	1995-1998 Non-Star Analysts	1995-1998 Star Analysts	*P*-value	1999-2001 Non-Star Analysts	1999-2001 Star Analysts	*P*-value	2002-2003 Non-Star Analysts	2002-2003 Star Analysts	*P*-value
High MBV	1.04	1.05	0.5581	1.02	0.99	0.0642	1.10	1.11	0.4850
Low MBV	1.02	1.01	0.2464	1.01	0.95	0.0031	1.08	1.08	0.9432
High EPS	1.03	1.03	0.4772	1.02	0.98	0.0076	1.10	1.10	0.6991
Low EPS	1.04	1.03	0.4682	1.00	0.96	0.0252	1.08	1.10	0.1892
High Revenues	1.04	1.02	0.2896	1.03	0.99	0.0279	1.09	1.07	0.2727
Low Revenues	1.03	1.03	0.7267	1.00	0.95	0.0091	1.10	1.13	0.0620
High ROE	1.04	1.03	0.3358	1.03	0.98	0.0036	1.10	1.09	0.3353
Low ROE	1.03	1.03	0.6628	0.98	0.95	0.1699	1.07	1.11	0.0585
High Dividend Yield	1.02	1.01	0.4303	1.00	0.97	0.0212	1.09	1.08	0.4593
Low Dividend Yield	1.05	1.05	0.7012	1.03	0.98	0.0096	1.09	1.13	0.0754
High Leverage	1.03	1.00	0.0621	1.00	0.96	0.0196	1.09	1.10	0.2797
Low Leverage	1.04	1.05	0.4982	1.02	0.98	0.0479	1.10	1.09	0.5798
All Stocks	1.03 (43.99%) N=7,602	1.03 (44.02%) N=2,721	0.4693 (0.0016)	1.01 (45.91%) N=2,997	0.97 (50.34%) N=1,458	0.0000 (0.0054)	1.09 (36.45%) N=2,184	1.10 (37.43%) N=1,921	0.7092 (0.5156)

Recommendations are scaled by quarterly consensus, which is the mean rating assigned by all analysts covering stock *j*, $\frac{\text{Rating}_t^{i,j}}{\text{Consensus}_t^j}$. The recommendation score ranges from 1 (strong buy) to 5 (sell). There are 1,860 missing points for the quarterly consensus. When the same research department releases more than one report on a stock during the quarter *t*, the first rating is the one included. A research department is regarded as affiliated with a mutual fund when the affiliated mutual funds hold, in quarter *t*-1, the stock covered by that department. Performance indicators are called high when higher than the quarterly median. All performance indicators are one-quarter lagged. Star analysts are identified by using the annual All-American Research ranking issued by *Institutional Investor* every October. The proportion of ratings better than consensus is reported in parentheses. The *p*-values for differences within subsample means are from standard *t*-tests.

Table 5

Average Rating and Portfolio Weight by Affiliated Mutual Funds

Panel A: Research Departments Affiliated with Mutual Funds

		Subperiods		
Terciles	1995-2003	1995-1998	1999-2001	2002-2003
Small Portfolio Weight (1)	1.05	1.04	1.02	1.12
Medium Portfolio Weight (2)	1.04	1.03	1.01	1.10
Large Portfolio Weight (3)	1.03	1.03	0.98	1.08
P-value (3) – (1)	0.0013	0.1443	0.0079	0.0105

Panel B: Star Analysts Affiliated with Mutual Funds

		Subperiods		
Terciles	1995-2003	1995-1998	1999-2001	2002-2003
Small Portfolio Weight (1)	1.06	1.03	1.01	1.17
Medium Portfolio Weight (2)	1.04	1.02	0.99	1.11
Large Portfolio Weight (3)	1.02	1.03	0.94	1.07
P-value (3) – (1)	0.0041	0.7673	0.0022	0.0000

Recommendations are scaled by the quarterly consensus, which is the mean rating in the research industry, $\frac{\text{Rating}_t^{i,j}}{\text{Consensus}_t^j}$. The recommendation score ranges from 1 (strong buy) to 5 (sell). When the same research department releases more than one report on a stock during the quarter *t*, the first rating is the one included. A research department is regarded as affiliated with the mutual funds when the affiliated mutual funds hold in quarter *t*-1 the stock covered by the research department in quarter *t*. Portfolio weight is defined as the stock weight in the mutual fund portfolios at the end of the quarter *t*-1. Star analysts are identified by using the annual All-American Research ranking issued by *Institutional Investor* every October. *P*-values for differences within subsample means are from standard *t*-tests. Data are from IBES, CRSP/Compustat Merged Database, and CDA/Spectrum Institutional Money Manager (13f) Holdings.

Table 6

Cox Regression for Probability that Research Departments Will Continue Releasing Reports

	1	2	3	4
MARKET RETURN$_t$	1.82 (47.05)			1.76 (42.75)
S&P500 COMPONENT$_t$ dummy	-0.03 (-2.97)			0.06 (4.42)
NYSE-LISTED$_t$ dummy	1.86 (91.23)			-0.05 (-2.15)
NASDAQ-LISTED$_t$ dummy	1.86 (88.76)			-0.11 (-4.49)
AMEX-LISTED$_t$ dummy	1.63 (30.78)			-0.27 (-4.58)
UTILITY$_t$ dummy	-0.19 (-9.73)			-0.05 (-2.18)
TECH$_t$ dummy	0.01 (0.73)			0.03 (1.61)
LNASSETS$_{t-1}$		-0.06 (-22.87)		-0.08 (-20.92)
MARKET-BOOK VALUE RATIO$_{t-1}$		0.01 (7.57)		0.01 (5.95)
EPS/P$_{t-1}$		2.00 (18.01)		1.95 (17.03)
REVENUES/ASSETS$_{t-1}$		0.24 (11.69)		0.22 (10.38)
ROE$_{t-1}$		0.00 (0.57)		0.00 (0.53)
DIVIDEND YIELD$_{t-1}$		0.09 (1.91)		0.09 (1.81)
LEVERAGE RATIO$_{t-1}$		-0.00 (-2.03)		-0.00 (-2.22)
PRICE EXCEEDING 200-DAY MOVING AVERAGE$_t$ dummy		0.28 (23.16)		0.27 (22.17)
SEO$_t$ dummy		0.31 (8.57)		0.37 (9.43)
RESEARCH DEPARTMENT SIZE $_t$			-0.00 (-5.93)	0.02 (8.24)
AFFILIATION WITH INVESTMENT BANK$_t$ dummy			0.04 (3.38)	0.07 (5.78)
SWITCH OF INVESTMENT BANK$_t$ dummy			0.32 (3.04)	-0.37 (-3.08)
AFFILIATION WITH MUTUAL FUNDS$_{t-1}$ dummy			0.62 (61.11)	0.18 (16.46)
Wald Chi-squared Prob > Chi-squared Number of Failures Number of Observations	11,992.63 0.0000 45,576 605,664	1,787.40 0.0000 41,685 414,300	3,907.64 0.0000 45,576 605,664	4,225.76 0.0000 41,685 414,300

Failure event is the release of one or more reports on stock *j* by research department *i* in quarter *t*. Analysis time is on 36 quarters, from 1995 to 2003, where last quarter 1994 represents time 0. 721 reports issued from September 8 to September 9, 2002 to comply with NASD Rule 2711 are removed from the sample. Cox regression (Breslow method for ties) results are stratified by failure order. The hazard function is as follows.

$\lambda\{t/N(t), Z(\text{MARKET RETURN}_t, \text{S\&P500 COMPONENT}_t \text{ dummy}, \text{NYSE-LISTED}_t \text{ dummy}, \text{NASDAQ-LISTED}_t \text{ dummy}, \text{AMEX-LISTED}_t \text{ dummy}, \text{UTILITY}_t \text{ dummy}, \text{TECH}_t \text{ dummy}, \text{LNASSETS}_{t-1}, \text{MARKET-BOOK VALUE RATIO}_{t-1}, \text{EPS/P}_{t-1}, \text{REVENUES/ASSETS}_{t-1}, \text{ROE}_{t-1}, \text{DIVIDEND YIELD}_{t-1}, \text{LEVERAGE RATIO}_{t-1}, \text{PRICE EXCEEDING 200-DAY MOVING AVERAGE}_t \text{ dummy}, \text{SEO}_t \text{ dummy}, \text{RESEARCH DEPARTMENT SIZE}_t, \text{AFFILIATION WITH INVESTMENT BANK}_t \text{ dummy}, \text{SWITCH OF INVESTMENT BANK}_t \text{ dummy}, \text{AFFILIATION WITH MUTUAL FUNDS}_{t-1} \text{ dummy})\}$

All covariates are time-varying variables. MARKET RETURN is determined by using the CRSP value-weighted NYSE/Amex/Nasdaq index. S&P500 COMPONENT is a dummy equal to one when the stock is in the Standard and Poor's 500 index at the end of each quarter. UTILITY and TECH are dummies equal to one when companies operate, respectively, in the two-digit SIC industry of 49, and in the four-digit SIC codes specified in Loughran and Ritter (2004). Performance indicators refer to the prior quarter, *t*-1. LNASSETS is the natural logarithm of total assets in million of dollars. MARKET-BOOK VALUE RATIO is defined as the sum of the market value of equity and the book values of long-term debt and preferred stock, divided by the book value of total assets. EPS/P is determined as the quarterly earnings per share divided by the price at the end of the quarter. EPS/P variable is winsorized at the 1% and 99% levels. ROE is equal to quarterly earnings divided by the book value of equity. DIVIDEND YIELD is defined as quarterly dividends per share divided by the closing price at the end of each quarter. REVENUES/ASSETS are quarterly sales divided by total assets. LEVERAGE RATIO is long-term debt divided by the book value of equity. PRICE EXCEEDING 200-DAY MOVING AVERAGE is equal to one when the daily price happens to exceed the 200-day arithmetic moving average in quarter *t*. SEO is a dummy variable equal to one when a stock-issuing firm *j* realizes a new equity offering in quarter *t*. RESEARCH DEPARTMENT SIZE is the number of analysts in the department. AFFILIATION WITH INVESTMENT BANK has value one when the research department is affiliated with the investment bank serving as a lead or co-lead manager for the covered stock. SWITCH OF INVESTMENT BANK is equal to one when the affiliated investment bank is no longer selected as a lead or co-lead manager for underwriting new securities. AFFILIATION WITH MUTUAL FUNDS has value one when the research department is affiliated with the mutual funds holding the covered stock. Lin and Wei's (1989) heteroskedasticity-adjusted *z*-statistics are in parentheses.

Table 7

Cox Regression for Probability that Research Departments Will Continue Issuing a Rating More Favorable than the Consensus

	All Research Departments		Research Departments Affiliated with Mutual Funds	
	Any Rating	Strong Buy	Any Rating	Strong Buy
	1	2	3	4
MARKET RETURN$_t$	1.72 (27.57)	2.16 (27.54)	1.29 (13.01)	1.94 (14.73)
S&P500 COMPONENT$_t$ dummy	0.07 (3.23)	0.06 (2.07)	0.18 (5.36)	0.14 (2.92)
NYSE-LISTED$_t$ dummy	-0.02 (-0.49)	-0.02 (-0.39)	0.09 (1.09)	-0.12 (-1.13)
NASDAQ-LISTED$_t$ dummy	-0.12 (-2.72)	-0.18 (-3.37)	-0.02 (-0.20)	-0.36 (-3.39)
AMEX-LISTED$_t$ dummy	-0.12 (-1.22)	-0.08 (-0.70)	-0.46 (-2.04)	-1.10 (-3.06)
UTILITY$_t$ dummy	0.01 (0.38)	0.32 (5.70)	-0.17 (-3.03)	0.21 (2.26)
TECH$_t$ dummy	-0.00 (-0.14)	0.03 (0.72)	0.10 (2.15)	0.13 (2.16)
LNASSETS$_{t-1}$	-0.11 (-18.12)	-0.15 (-18.32)	-0.06 (-4.84)	-0.11 (-6.31)
MARKET-BOOK VALUE RATIO$_{t-1}$	0.00 (0.43)	0.02 (5.94)	0.04 (6.54)	0.06 (7.95)
EPS/P$_{t-1}$	2.16 (11.28)	3.69 (11.93)	1.59 (5.74)	3.65 (6.62)
REVENUES/ASSETS$_{t-1}$	0.15 (4.50)	0.18 (4.83)	0.20 (5.30)	0.22 (4.91)
ROE$_{t-1}$	0.01 (1.32)	0.01 (0.59)	0.02 (1.46)	-0.01 (-0.74)
DIVIDEND YIELD$_{t-1}$	0.17 (2.69)	-0.25 (-0.58)	-1.40 (-2.24)	-3.93 (-4.26)
LEVERAGE RATIO$_{t-1}$	-0.00 (-2.13)	-0.01 (-2.11)	-0.00 (-1.47)	-0.00 (-1.27)
PRICE EXCEEDING 200-DAY MOVING AVERAGE$_t$ dummy	0.33 (16.43)	0.43 (16.09)	0.37 (11.52)	0.51 (10.50)
SEO$_t$ dummy	0.40 (6.61)	0.80 (12.80)	0.20 (2.01)	0.59 (5.26)
AFFILIATION WITH INVESTMENT BANK$_t$ dummy	0.05 (2.51)	0.05 (2.21)	0.07 (2.66)	0.11 (2.92)
SWITCH OF INVESTMENT BANK$_t$ dummy	-0.56 (-2.70)	-0.69 (-3.07)	-0.69 (-2.28)	-0.92 (-2.40)
AFFILIATION WITH MUTUAL FUNDS$_{t-1}$ dummy	0.28 (17.17)	0.19 (8.67)	--	--
WEIGHT IN AFFILIATED MUTUAL FUNDS$_{t-1}$	--	--	0.15 (7.06)	0.15 (5.52)
LNAMOUNT INVESTED BY AFFILIATED MUTUAL FUNDS$_{t-1}$	--	--	0.01 (0.90)	0.01 (0.88)
HOLDINGS BY OTHER MUTUAL FUNDS$_{t-1}$	--	--	-1.53 (-24.99)	-1.34 (-16.27)
NUMBER OF OTHER MUTUAL FUNDS$_{t-1}$	--	--	-0.11 (-13.82)	-0.10 (-9.26)
STAR ANALYST$_{t-1}$ dummy	--	--	2.03 (75.95)	1.87 (49.70)
Wald Chi-squared	1,972.13	1,949.91	6,645.68	3,259.83
Prob > Chi-squared	0.0000	0.0000	0.0000	0.0000
Number of Failures	16,909	9,801	7,417	3,836
Number of Observations	414,300	414,300	126,325	126,325

Failure event is the release by research department *i* of a recommendation better than the consensus on stock *j* in quarter *t* so that $\frac{\text{Rating}_t^{i,j}}{\text{Consensus}_t^j} < 1$. Analysis time is on 36 quarters, from 1995 through 2003, where the last quarter 1994 represents time 0. Cox regression (Breslow method for ties) results are stratified by failure order.

$\lambda\{t/N(t), Z(\text{MARKET RETURN}_t, \text{S\&P500 COMPONENT}_t \text{ dummy}, \text{NYSE-LISTED}_t \text{ dummy}, \text{NASDAQ-LISTED}_t \text{ dummy}, \text{AMEX-LISTED}_t \text{ dummy}, \text{UTILITY}_t \text{ dummy}, \text{TECH}_t \text{ dummy}, \text{LNASSETS}_{t-1}, \text{MARKET-BOOK VALUE RATIO}_{t-1}, \text{EPS}/P_{t-1}, \text{REVENUES/ASSETS}_{t-1}, \text{ROE}_{t-1}, \text{DIVIDEND YIELD}_{t-1}, \text{LEVERAGE RATIO}_{t-1}, \text{PRICE EXCEEDING 200-DAY MOVING AVERAGE}_t \text{ dummy}, \text{SEO}_t \text{ dummy}, \text{AFFILIATION WITH INVESTMENT BANK}_t \text{ dummy}, \text{SWITCH OF INVESTMENT BANK}_t \text{ dummy}, \text{AFFILIATION WITH MUTUAL FUNDS}_{t-1} \text{ dummy})\}$

All covariates are time-varying variables. WEIGHT IN AFFILIATED MUTUAL FUNDS is the percentage of the dollar amount invested in stock *j* by the affiliated money manager divided by all 13f holdings in quarter *t*-1. LNAMOUNT INVESTED BY AFFILIATED MUTUAL FUNDS is the natural logarithm of the millions of dollars invested by affiliated mutual funds in stock *j* at the end of quarter *t*-1. HOLDINGS BY OTHER MUTUAL FUNDS are defined as the percent ratio between the shares held by unaffiliated mutual funds at the end of quarter *t*-1 and total shares outstanding. A 10% holding by other mutual funds is measured as 0.10. NUMBER OF OTHER MUTUAL FUNDS is the number of unaffiliated mutual funds investing in stock *j* at the end of quarter *t*-1. Number of mutual funds is in hundreds. STAR ANALYST is a dummy equal to one when the analyst issuing the report belongs to the All-American Research Team as selected by *Institutional Investor* magazine every October. Lin and Wei's (1989) heteroskedasticity-adjusted *z*-statistics are in parentheses.

Table 8

Probit for Probability that Research Departments Will Issue a Rating More Favorable than Consensus, by Subperiods

	All Period	1995-1998	1999-2001	2002-2003
MARKET RETURN$_t$	0.15 (2.32)	-0.15 (-1.36)	0.37 (3.33)	-1.08 (-7.90)
S&P500 COMPONENT$_t$ dummy	0.05 (2.62)	0.02 (0.66)	0.03 (0.83)	0.03 (0.61)
NYSE-LISTED$_t$ dummy	0.14 (3.60)	0.10 (2.13)	0.48 (4.46)	0.04 (0.28)
NASDAQ-LISTED$_t$ dummy	0.17 (4.26)	0.14 (3.13)	0.50 (4.63)	0.12 (0.81)
AMEX-LISTED$_t$ dummy	-0.01 (-0.05)	0.03 (0.22)	-0.44 (-1.27)	0.18 (0.60)
UTILITY$_t$ dummy	-0.04 (-1.39)	-0.01 (-0.37)	-0.05 (-0.85)	-0.01 (-0.16)
TECH$_t$ dummy	0.08 (3.41)	0.13 (4.19)	0.01 (0.11)	-0.01 (-0.20)
LNASSETS$_{t-1}$	0.02 (4.09)	0.02 (2.18)	0.04 (3.06)	0.07 (4.27)
MARKET-BOOK VALUE RATIO$_{t-1}$	0.01 (3.39)	0.02 (2.57)	0.01 (2.36)	0.01 (0.61)
EPS/P$_{t-1}$	0.09 (0.66)	0.84 (2.94)	-0.51 (-2.26)	-0.53 (-2.18)
REVENUES/ASSETS$_{t-1}$	0.07 (3.69)	0.07 (3.24)	0.02 (0.25)	0.09 (0.88)
ROE$_{t-1}$	0.01 (1.76)	-0.00 (-0.54)	-0.01 (-0.61)	0.13 (2.10)
DIVIDEND YIELD$_{t-1}$	-0.81 (-2.13)	-0.03 (-0.05)	-1.29 (-1.59)	-0.83 (-0.82)
LEVERAGE RATIO$_{t-1}$	-0.00 (-0.89)	-0.00 (-0.89)	-0.00 (-0.57)	-0.01 (-1.84)
PRICE EXCEEDING 200-DAY MOVING AVERAGE$_t$ dummy	0.11 (6.73)	0.11 (4.66)	0.10 (3.06)	0.02 (0.57)
SEO$_t$ dummy	0.06 (1.13)	0.08 (1.03)	0.13 (1.18)	-0.08 (-0.67)
AFFILIATION WITH INVESTMENT BANK$_t$ dummy	0.08 (5.33)	0.08 (3.96)	0.08 (2.74)	0.13 (3.57)
SWITCH OF INVESTMENT BANK$_t$ dummy	-0.18 (-0.98)	-0.04 (-0.15)	-0.19 (-0.57)	-0.42 (-1.09)
WEIGHT IN AFFILIATED MUTUAL FUNDS$_{t-1}$	0.03 (2.04)	0.02 (1.46)	0.07 (2.25)	0.11 (2.79)
LNAMOUNT INVESTED BY AFFILIATED MUTUAL FUNDS$_{t-1}$	0.03 (11.26)	0.02 (5.68)	0.04 (7.32)	0.06 (7.13)
HOLDINGS BY OTHER MUTUAL FUNDS$_{t-1}$	-0.21 (-5.95)	-0.01 (-0.20)	-0.22 (-3.01)	-0.15 (-1.56)
NUMBER OF OTHER MUTUAL FUNDS$_{t-1}$	-0.02 (-4.72)	-0.00 (-0.09)	-0.02 (-2.14)	-0.03 (-2.63)
ALL-STAR ANALYST$_{t-1}$ dummy	1.55 (3.71)	1.49 (2.21)	1.82 (2.93)	1.40 (0.83)
Wald Chi-squared	8,093.78	3,448.89	2,794.05	2,042.91
Prob > Chi-squared	0.0000	0.0000	0.0000	0.0000
Pseudo R^2	0.1392	0.1097	0.1815	0.1981
Number of Observations	126,325	63,099	40,700	22,526

Table 9

Random-Effects GLS of Favorable Ratings on the Change in Holdings by Affiliated Mutual Funds

	1		2	
	Research Dept. Effects	Firm Effects	Research Dept. Effects	Firm Effects
FAVORABLE RATING$_{t-1}$ dummy [LAGGED]	-0.01 (-1.52)	-0.01 (-1.51)	--	--
FAVORABLE RATING FROM STAR ANALYST$_{t-1}$ dummy [LAGGED]	-0.00 (-0.53)	-0.00 (-0.55)	--	--
FAVORABLE RATING$_t$ dummy	--	--	-0.01 (-0.63)	-0.01 (-0.64)
FAVORABLE RATING FROM STAR ANALYST$_t$ dummy	--	--	0.00 (0.59)	0.00 (0.60)
CHANGE IN HOLDINGS BY AFFILIATED MUTUAL FUNDS$_t$	0.06 (7.88)	0.06 (7.85)	0.07 (8.96)	0.07 (8.93)
CHANGE IN HOLDINGS BY OTHER MUTUAL FUNDS$_t$	0.01 (6.24)	0.01 (6.23)	0.01 (6.32)	0.01 (6.28)
CHANGE IN NUMBER OF OTHER MUTUAL FUNDS$_t$	0.00 (1.91)	0.00 (1.90)	0.00 (4.52)	0.00 (4.43)
CHANGE IN NUMBER OF SHARES OUTSTANDING$_t$	0.00 (3.21)	0.00 (3.16)	-0.00 (-0.10)	-0.00 (-0.05)
NUMBER OF REPORTS ISSUED$_{t-1}$	-0.00 (-1.38)	-0.00 (-1.41)	0.00 (1.11)	0.00 (1.05)
CHANGE IN LNASSETS$_t$	0.02 (1.32)	0.02 (1.35)	0.03 (1.28)	0.02 (1.19)
CHANGE IN MARKET-BOOK VALUE RATIO$_t$	0.01 (2.37)	0.01 (2.29)	0.01 (2.15)	0.01 (2.33)
CHANGE IN EPS/P$_t$	-0.00 (-0.25)	-0.00 (-0.27)	0.00 (0.80)	0.00 (0.72)
CHANGE IN REVENUES/ASSETS$_t$	0.11 (1.12)	0.12 (1.23)	0.06 (1.05)	0.05 (0.96)
CHANGE IN ROE$_t$	-0.00 (-0.96)	-0.00 (-0.90)	0.00 (0.07)	0.00 (0.06)
CHANGE IN DIVIDEND YIELD$_t$	0.02 (0.13)	0.02 (0.12)	0.02 (0.14)	0.02 (0.12)
CHANGE IN LEVERAGE RATIO$_t$	0.00 (1.04)	0.00 (1.03)	0.00 (0.16)	0.00 (0.15)
PRICE EXCEEDING 200-DAY MOVING AVERAGE$_t$ dummy	-0.00 (-0.64)	-0.00 (-0.64)	-0.01 (-0.96)	-0.00 (-0.79)
CHANGE IN STOCK PRICE$_t$	0.00 (1.43)	0.00 (1.41)	0.00 (0.65)	0.00 (0.63)
Wald Chi-squared	233.19	233.11	305.81	305.20
Prob > Chi-squared	0.000	0.000	0.000	0.000
Pseudo R^2	0.014	0.013	0.022	0.022
Number of Observations	16,315	16,315	16,315	16,315

Analysis time is on 36 quarters, from 1995 to 2003, with the last quarter 1994 representing time 0. The dependent variable is defined as the change in the portfolio weight held by affiliated mutual funds between quarter *t*-1 and *t*. Random-effects GLS are panel regressions in which the error term is decomposed in a cross-section (illustrating research department or firm-related heterogeneity) and a time series component. A constant intercept is estimated but not reported. Estimation is performed by maximum likelihood. All covariates are time-varying variables. FAVORABLE RATING is a dummy that takes value one when the affiliated analyst issues a recommendation that is more favorable than consensus so that $\frac{\text{Rating}_t^{i,j}}{\text{Consensus}_t^{j}} < 1$. White's heteroskedasticity-adjusted *z*-statistics are in parentheses.

Table 10

Median Three-Day Abnormal Returns around the Report Day by Mutual Fund Affiliation

Panel A: Research Departments by Mutual Fund Affiliation

	More Favorable than Consensus			Less Favorable than Consensus		
Rating	Affiliated Research Departments	Unaffiliated Research Departments	*P*-value	Affiliated Research Departments	Unaffiliated Research Departments	*P*-value
1 = Strong Buy	1.20% N=4,108	0.80% N=6,044	0.0000	--	--	--
2 = Buy	0.37% N=3,738	0.30% N=4,779	0.1546	-0.10%† N=2,347	-0.02%† N=3,271	0.8264
≥ 3 = Hold or Worse	-0.53% N=330	-0.55% N=1,098	0.7482	-0.83% N=7,333	-0.85% N=9,600	0.9703
All Ratings	0.74% N=8,176	0.46% N=11,921	0.0000	-0.67% N=9,680	-0.66% N=12,871	0.7355

Panel B: Star Analysts by Mutual Fund Affiliation

	More Favorable than Consensus			Less Favorable than Consensus		
Rating	Affiliated Stars	Unaffiliated Stars	*P*-value	Affiliated Stars	Unaffiliated Stars	*P*-value
1 = Strong Buy	1.69% N=1,199	1.21% N=987	0.0555	--	--	--
2 = Buy	0.46% N=1,323	0.66% N=946	0.1291	-0.02%† N=712	0.49%† N=526	0.1056
≥ 3 = Hold or Worse	-0.80%† N=130	-0.45% N=272	0.7859	-0.99% N=2,396	-1.00% N=1,738	0.3994
All Ratings	0.91% N=2,652	0.74% N=2,205	0.2213	-0.80% N=3,108	-0.59% N=2,264	0.0932

Panel B: Non-Star Analysts by Mutual Fund Affiliation

	More Favorable than Consensus			Less Favorable than Consensus		
Rating	Affiliated Non-Stars	Unaffiliated Non-Stars	*P*-value	Affiliated Non-Stars	Unaffiliated Non-Stars	*P*-value
1 = Strong Buy	1.02% N=2,909	0.69% N=5,057	0.0008	--	--	--
2 = Buy	0.33% N=2,415	0.21% N=3,833	0.0429	-0.12%† N=1,635	-0.15%† N=2,745	0.8288
≥ 3 = Hold or Worse	-0.49%† N=200	-0.57% N=826	0.8529	-0.75% N=4,937	-0.83% N=7,862	0.2978
All Ratings	0.67% N=5,524	0.39% N=9,716	0.0000	-0.60% N=6,572	-0.67% N=10,607	0.3631

Three-day market-adjusted returns are determined by using the CRSP equally weighted NYSE/Amex/Nasdaq index. Day 0 marks the report date. To control for dependence of returns, a 255-trading day estimation period starting 46 days before the event date is used. Cross-sectional abnormal returns are calculated using *Eventus*® *Software*. Star analysts are identified by using the annual All-American Research ranking by *Institutional Investor*. The *p*-values are for a two-sample Wilcoxon rank-sum (Mann-Whitney) test. All median abnormal returns are different from zero at the 1% level except for the ones with † superscript.

Table 11

Investment Value of Analyst Recommendations by Mutual Fund Affiliation

Panel A: Annualized Returns by Mutual Fund Affiliation

	Affiliated Research Depts.			Unaffiliated Research Depts.			Differences	
Ratings	Unadjusted Returns (a)	Market Model (b)	FF 3-Factor Model (c)	Unadjusted Returns (d)	Market Model (e)	FF 3-Factor Model (f)	(b) - (e)	(c) - (f)
Strong Buys	15.85%	6.04%**	4.72%**	12.01%	2.88%*	2.32%	3.16%**	2.40%*
Strong Buys and Buys	13.02%	5.10%**	3.17%*	9.51%	2.20%*	1.85%	2.90%*	0.32%
Sells and Underperforms	5.76%	2.08%	1.29%	8.98%	3.79%**	2.68%*	-1.71%*	-1.39%
Sells	7.25%	2.55%*	1.68%	9.83%	4.29%**	3.38%*	-1.74%*	-1.70%*
Passive Strategy	9.37%	1.85%	1.49%	9.37%	1.85%	1.49%	--	--

Panel B: All-Star Analysts by Mutual Fund Affiliation

	Affiliated All-Stars			Unaffiliated All-Stars			Differences	
Ratings	Unadjusted Returns (a)	Market Model (b)	FF 3-Factor Model (c)	Unadjusted Returns (d)	Market Model (e)	FF 3-Factor Model (f)	(b) - (e)	(c) - (f)
Strong Buys	13.84%	4.79%**	3.41%*	14.83%	3.30%*	2.24%	1.49%*	1.17%
Strong Buys and Buys	13.40%	3.98%*	2.77%*	12.05%	2.14%	1.80%	1.84%*	0.97%
Sells and Underperforms	6.21%	2.93%*	2.19%	8.94%	4.88%**	3.74%**	-1.95%*	-1.55%
Sells	7.37%	2.55%*	2.24%	10.36%	4.61%**	3.83%**	-2.06%*	-1.59%*

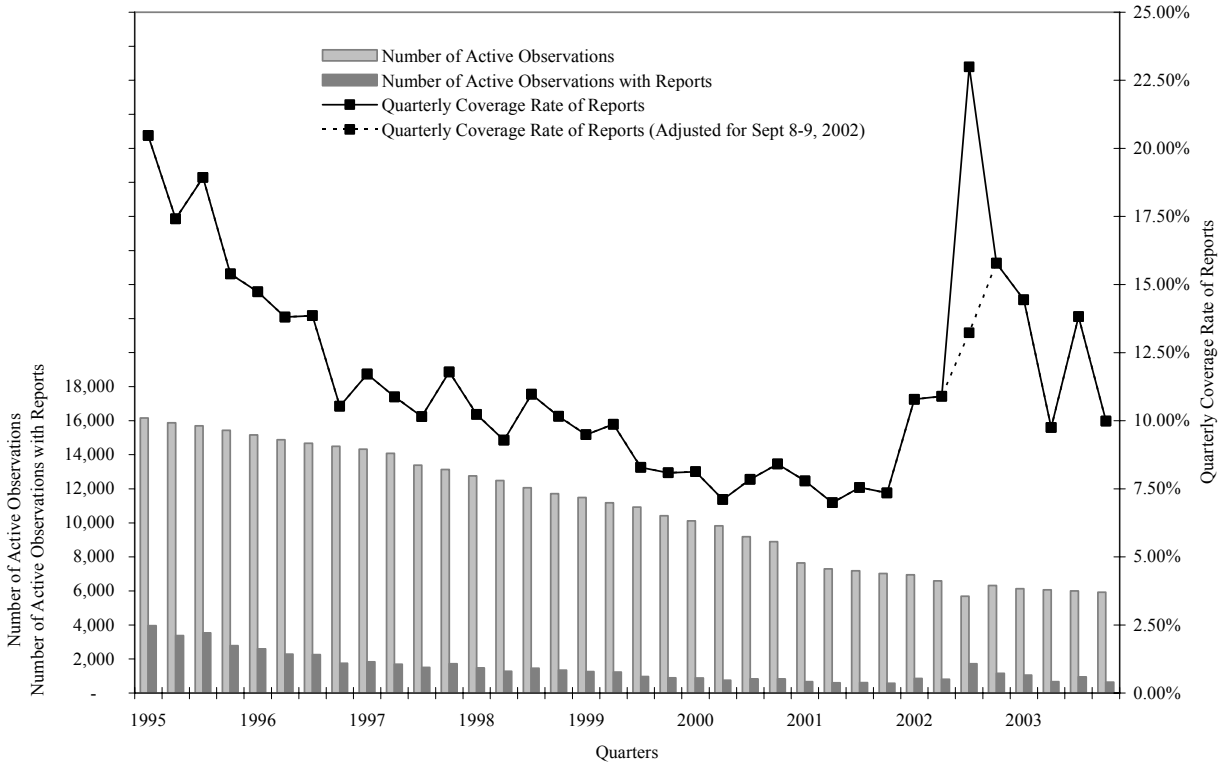
Panel C: Non-All Star Analysts by Mutual Fund Affiliation

	Affiliated Non-All Stars			Unaffiliated Non-All Stars			Differences	
Ratings	Unadjusted Returns (a)	Market Model (b)	FF 3-Factor Model (c)	Unadjusted Returns (d)	Market Model (e)	FF 3-Factor Model (f)	(b) - (e)	(c) - (f)
Strong Buys	17.04%	7.14%**	5.22%**	10.36%	2.29%	1.95%	4.85%**	3.27%**
Strong Buys and Buys	12.39%	6.63%**	3.79%*	8.15%	2.46%*	1.93%	4.17%**	1.86%*
Sells and Underperforms	5.20%	1.56%	1.13%	8.80%	3.05%*	2.20%*	-1.49%	-1.07%
Sells	7.19%	2.23%*	1.10%	8.49%	4.17%**	2.94%*	-1.94%*	-1.84%*

The table presents the annualized total unadjusted returns and the annualized adjusted returns (i.e., market model and Fama-French three-factor model) from daily investment strategies following analyst recommendations. When strong buys or buys are issued, stocks are purchased in proportion to their market values on the recommendation day. When sells or underperforms are issued, stocks are sold short in proportion to their market values on the recommendation day. "Passive Strategy" returns come from a "buy-and-hold" strategy investing in all sample stocks in proportion to their market values. Each recommendation is assumed to stop influencing investment behavior after one year from its emission date. In each Panel, the last two columns report differences in the mean adjusted returns between affiliated and unaffiliated analysts. Positive numbers indicate that strategies following affiliated analysts' recommendations produce higher mean adjusted returns than strategies following unaffiliated analysts' recommendations. ** and * indicate that differences in the mean adjusted returns are not equal to zero at the 1% and 5% level, respectively.

Figure 1

Quarterly Coverage Rate, 1995-2003

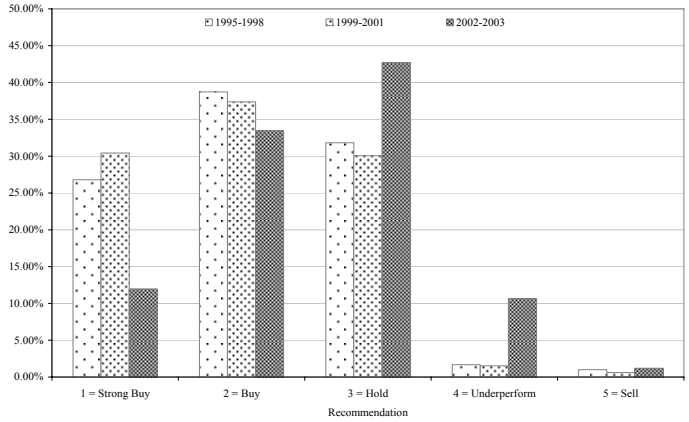


Analysis is of 36 consecutive quarters over 1995-2003. As of the end of 1994, the sample consisted of 16,824 observations constructed as pairs of research department i and stock j (i = 1, 2, …, 154, j = 1, 2, …, 4,121). Over time some pairs may be right-censored mainly due to concentration in the research industry and/or stock delisting. Active (i.e., uncensored) observations are those pairs of active research departments and active stocks at the end of each quarter. Companies delisted after merger with other firms are not regarded as active. The quarterly coverage rate is determined as the number of observations with at least one report during the quarter divided by overall number of active observations at the end of that quarter. Provisions of NASD Rule 2711 (Research Analysts and Research Reports) became progressively effective from July 2002 to May 2003. In particular, NASD members were required to implement the provisions about disclosure of the rating distributions by September 9, 2002. IBES reports an extraordinary number of reports from Sunday September 8 to Monday September 9, 2002. The dot line adjusts for 721 reports that were issued over these two days to comply with analyst regulation. Data are from IBES and CRSP/Compustat Merged Database.

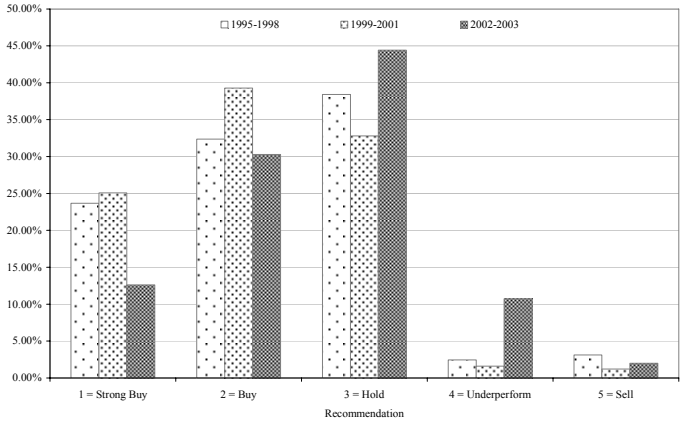
Figure 2

Distribution of Ratings by Research Department Affiliation and Subperiods

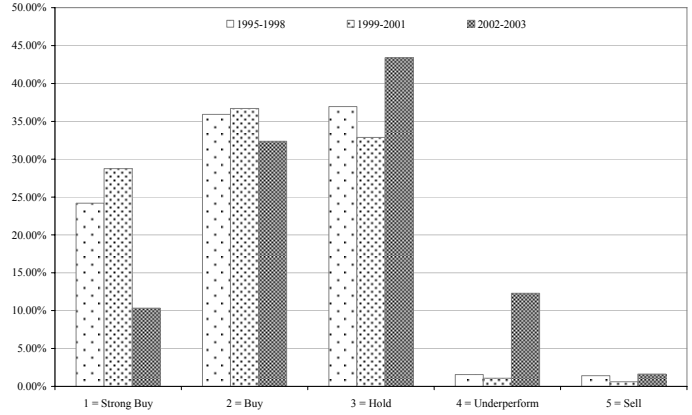
Panel A: Research Departments Affiliated with Investment Banks



Panel B: Research Departments Unaffiliated with Investment Banks



Panel C: Research Departments Affiliated with Mutual Funds



Panel D: Research Departments Unaffiliated with Mutual Funds