Affiliated Mutual Funds and Analyst Optimism

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Abstract

This paper extends the literature on analyst optimism. Our analysis of a large sample of recommendations issued from 1995 through 2003 indicates that sell-side analysts are likely to assign frequent and favorable ratings to a stock, after the analysts' affiliated mutual funds invest in that stock. Controlling for a number of variables, including the ties between analysts and investment banks, we find that the greater the portfolio weight of a stock in the fund family, the more optimistic the stock ratings from affiliated analysts become when compared with ratings from unaffiliated analysts. Reputation partly restrains the optimism of analyst recommendations. In fact, the presence of other institutional investors among the shareholders of the recommended stock curbs analyst optimism. Nevertheless, from 1999 through 2001, star analysts were most optimistic when recommending stocks in the portfolios of affiliated mutual funds.

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Affiliated Mutual Funds and Analyst Optimism

1. Introduction

The dynamics between a full-service brokerage firm and its sell-side analysts often bears some scrutiny on behalf of investors because it may raise ethical issues. It is well known that sell-side analysts, those employed by a brokerage firm, generally provide favorable research reports not only on newly listed stocks but also on seasoned stocks. From 1995 through 2001, only 4% of all recommendations on seasoned stocks were rated "underperform" or "sell." Most recommendations issued during that period were favorable, up to the rating of "strong buy." Even after 2002 when new NASD and NYSE rules required that, at the end of each report, analysts disclose the past year's ratings assigned to a stock, the analyst tendency toward optimism has persisted and stock recommendations are still upward biased.[1]

Prior studies propose several explanations for analyst optimism on seasoned stocks. The preference of currying favor with management presses brokerage analysts to report when they can "talk up" firms (Francis and Philbrick, 1993). The brokers' objective of generating trading commissions also leads analysts to issue optimistic reports to attract orders from those investors who are subject to short-selling constraints (Hayes, 1998; Irvine, 2001; Jackson, 2005; Cowen, Groysberg, and Healy, 2006). 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 an investment bank, the fear of jeopardizing future underwriting business causes their recommendations about the stock-clients of the investment bank to be more optimistic than those of unaffiliated analysts (Dugar and Nathan, 1995; Lin and McNichols, 1998; Michaely and Womack, 1999).

This paper extends current literature by applying extensive testing to the hypothesis of *mutual fund affiliation* as an additional explanation for analyst optimism about seasoned stocks. 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. Reuter (2006) finds that the fund

[1] Smith, 2003, "Stock analysts still put their clients first." *Wall Street Journal* April 7, C1.

family is usually an important investor who pays a disproportionate share of trading commissions to the affiliated brokerage firm. Mahoney (2004) explains that the fund family often pays sales commissions to the affiliated brokers for marketing its fund shares.[2] This paper conjectures that, *once* a mutual fund family invests in a stock, the affiliated brokerage analysts have an economic incentive to research that stock and also to promote its purchase by awarding positive recommendations. The incentive persists as long as the fund family holds a significant position in the stock. If so, such intra-family dynamics may have regulatory implications that the 2002 analyst rules left out.

Mutual fund managers value unbiased research as a tool 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 raising concerns about the impartiality of sell-side research. In particular, analysts were alleged to have biased some reports to favor their investment bank's clients. Cheng, Liu, and Qian (2006) find that fund managers indeed rely mostly on buy-side research to make portfolio decisions. However, research provided by sell-side analysts can be valuable to fund managers (Groysberg, Healy, Chapman, Shanthikumar, and Gui, 2007) and research provided by the affiliated sell-side analysts can be exceptionally valuable. As shown by Irvine, Simko, and Nathan (2004), affiliated analysts' earnings forecasts are more accurate than other analysts' estimates.

To meet demands for research from their affiliated fund managers, sell-side analysts are motivated to cover those stocks in which the fund family has invested. Even though this research is paid for by commissions to the analyst's trading department (Conrad, Johnson, and Wahal, 2001), such research has a limited potential to generate additional trading business and to positively affect the analyst's compensation that is based on brokerage revenues. To generate the greatest amount of trading business from the research provided to the affiliated fund managers, analysts make their reports available to the public. The objectives of currying favor with management, generating trading business, or supporting investment banking business are expected to provide an analyst with an incentive to release the favorable reports. Here, we hypothesize that the "family" affiliation provides analysts with a further incentive to promptly issue reports with positive

[2] In November 2003, Morgan Stanley paid a $50 million civil penalty as a result of an agreement with the Security and Exchange Commission (SEC) to settle charges of conflicts of interest in selling in-house funds to investors. According to the charges, Morgan Stanley had improperly provided its brokers with incentives to sell Morgan Stanley funds over those run by outside fund companies. These incentives included the widespread use of contests among brokers to promote Morgan Stanley funds. In 2004, the SEC extended the investigation to examine mutual-fund sales practices and, in particular, the payments that fund companies make in exchange for a spot on the "preferred list" of a brokerage firm. See Solomon and Lauricella, 2003, "Morgan Stanley to settle with SEC." *Wall Street Journal* November 17, C9; Simon, 2004, "Why your broker is pushing that fund." *Wall Street Journal* January 14, D1.

prospects on stocks held by affiliated mutual funds and to reluctantly release those with negative prospects. The preference for supporting or the fear of hurting the performance of the fund family would make the affiliated analysts more optimistic than unaffiliated analysts.

Favoritism among the divisions of a full-service brokerage firm is not new to literature. In Ritter and Zhang (2007), 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 management departments. During the Internet bubble period of 1999–2000, some evidence arose that investment banks allocated "hot" IPOs to their affiliated funds specifically 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 brokerage firm; such IPO allocations to affiliated mutual funds help the bank earn more underwriting business. Massa and Rehman (2006) find that, mutual funds selectively increase their holdings in firms that have borrowed from their affiliated commercial bank; as a result of acting on inside information, the affiliated mutual funds report a superior performance. More to the point, Chung and Cho (2005) analyze the links between brokerage analysts and dealers. They find that analysts cover stocks that are handled by the affiliated dealers and issue optimistic reports on them to generate order flow.

This paper thus examines the tie between a brokerage house and its affiliated mutual funds, seeing it as a rationale for explaining analyst optimism about seasoned stocks. While brokerage firms benefit from the higher commissions that optimistic research generates, mutual fund families can benefit from the prompt issue of positive recommendations or from the reluctant release of negative recommendations by affiliated analysts. In fact, the compensation of a money manager is typically a function of fund assets that increase via marketing efforts and fund performance. Sirri and Tufano (1998) document a non-linear relation between fund performance and money inflows: poor fund performers experience nearly no impact on inflows, while top fund performers considerably increase their inflows. As showed by James and Karceski (2006a), retail investors drive the positive relation between past performance and subsequent inflows. Retail investors who are likely to chase mutual fund returns are also most responsive to analyst recommendations (Malmendier and Shanthikumar, 2007).

We measure an analyst's optimism as the analyst's tendency to issue recommendations that upgrade a stock to the "strong buy" list. It is no surprise that an upgrade to the "strong buy" rating represents the greatest level of optimism about a seasoned stock because it exceeds not only the analyst's prior views on that stock but it also often beats the consensus assessment by other analysts. Barber, Lehavy, McNichols, and Trueman (2001) find that an upgrade to "strong buy" on a stock produces, indeed, the greatest market

impact, significantly higher than a reiterated "strong buy." In this paper, we use a duration-analysis model to describe dynamically observable patterns in brokerage research with concomitant changes in mutual fund investments. Rather than analyzing analyst optimism at a single point in time, our approach has the advantage of capturing the *persistence* of analysts' disposition toward seasoned stocks over a long period, the nine years from 1995 through 2003, covering the Internet bubble and its subsequent burst. Data regarding analyst coverage and mutual funds holdings come from IBES and CDA/Spectrum quarterly 13f holdings, respectively.

The larger and more crucial question—one that prior literature has not answered—is, 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, it does, indeed — in several respects. First, mutual fund affiliation affects analysts' decisions about providing research on stocks. We find that brokerage analysts report research on a stock more frequently after the affiliated mutual funds add it in their portfolios. Second, analysts are significantly optimistic about stocks that are held by mutual fund families. To be specific, affiliated analysts are 16% more likely to upgrade a stock to a "strong buy" rating than are unaffiliated analysts. Third, the more the mutual funds invest in a stock, the greater is the affiliated analysts' optimism. When a mutual fund family increases the portfolio weight of a stock investment by 1%, the probability that the affiliated analysts will upgrade that stock to a "strong buy" rating rises 8%, after statistical controls for stock characteristics and performance are applied.

Do reputation risk and career concerns restrain analysts' optimism? Reputation partly curbs analysts' optimism on stocks held by the affiliated mutual funds. 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. However, as predicted by Ljungqvist, Marston, Starks, Wei, and Yan (2007), we also 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 as a strategy to support the interests of the affiliated mutual funds while acquiring no chilling effect on their reputation. The negative relation between analyst optimism on a stock and the institutional presence in that stock frames the mutual fund affiliation as an important explanation for analyst optimism.

Do market participants recognize the bias from the mutual fund affiliation? The answer depends on the size of research departments. In the short run, investors discount the quality of recommendations by analysts working for small research departments, because of analyst incentives to look favorably at stocks

held by the fund family. In contrast, investors seem to assign qualities of superior information to large research departments' recommendations on the stocks in the affiliated fund portfolios. Within large research departments, an upgrade of these stocks to "strong buy" yields a median three-day abnormal return of 2.04% centered on the report day, compared with 1.33% for reports generated by unaffiliated analysts. We find that only the upgrades to a "strong buy" rating by affiliated analysts produce a significantly different price reaction. Downgrades by affiliated analysts are greeted as negatively as downgrades by unaffiliated analysts. Timing can explain this asymmetry in the trade reaction. That is, when analysts cover stocks held by affiliated mutual funds, they appear more eager to release positive ratings than negative ratings.

Over the long run, value accrues to investors acting on the positive recommendations about stocks within an analyst's fund family. Following the methodology in Barber et al. (2001), we find that upgrades to "strong buy" issued by large affiliated departments produce an annualized Fama-French three-factor return of 6.48%, compared with 2.99% from upgrades to "strong buy" by large unaffiliated departments. However, the affiliated analysts' pessimism is less valuable than their optimism. Selling short a stock when an affiliated analyst issues "sell" ratings generates an annualized Fama-French return of 1.99%. When the sells are issued by unaffiliated analysts, the return is higher, 3.87%. Abnormal returns computed by a market model lead to a similar qualitative conclusion: mutual fund affiliation is an element that biases analysts' eagerness to release positive or negative stock reports.

In this study, mutual fund affiliation arises when analysts cover a stock *already* held by the affiliated fund family. Even though our analysis uses one-quarter lagged data for holdings, we also test the inverse causality that analyst optimism affects the affiliated fund holdings, because information flows within a full-service brokerage firm might run in two directions. Irvine et al. (2004) find that optimism of analyst forecasts does not affect the investments by the fund family. Anecdotal evidence suggests that the issue itself of an analyst recommendation is unlikely to influence a money manager's investment decision.[3] Similarly, we find little evidence of simultaneous effects between analyst recommendations and affiliated fund holdings: an upgrade to a "strong buy" rating is not significantly associated with any change in the weight of a stock in the family portfolios, while a downgrade observed in a quarter is associated with a decrease in the stock weight reported at the end of that quarter only at the 15% level of statistical significance. A stock's performance and the size of other institutional investors' holdings better explain the changes in the affiliated

[3] "Occasionally an analyst gives the bankers and their clients the higher ratings they want –often with a tidily positive rating like 'outperform.' But in the candid conversations between analysts and institutional investors, the nuances of an investment are discussed. Official ratings almost never come up. That's because institutional investors don't care about ratings. Fund managers are not schoolchildren looking for instructions on what to buy. They look to analysts for specific information and general insight." See Sernovitz, 2002, "Don't shoot the analyst." *New York Times* November 15, p. 31.

fund portfolios than do revisions in analyst recommendations. Limited by the quarterly update of 13f holdings and naturally lacking access to the information flows inside a brokerage firm, we cannot but conclude that the robustness tests do not refute that mutual fund affiliation is one causal link leading to analyst optimism.[4]

This paper extends the literature on analyst optimism. Few authors have analyzed the important relationships between brokerage analysts and mutual funds.[5] Irvine at al. (2004) conclude from analyses of earnings forecasts, that bundling brokerage research and asset management services produces only positive externalities, such as more accurate analyst estimates, for investors. Our analysis of recommendations, however, lends to a more conservative position. Although, bundling brokerage research and asset management can benefit all investors by giving them a higher amount of timely (though optimistic) research, it appears that bundling reduces analysts' motivation to release pessimistic research. Thus, 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. Just as with insider trading (Leland, 1992; Meulbroek, 1992) and analyst tipping (Irvine et al., 2006), the net effect of bundling brokerage research and asset management is uncertain.

The remainder of the paper is organized as follows. Section 2 introduces the hypotheses and research design of this paper, while Section 3 describes sampling procedures. 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 formal tests of our hypotheses using multivariate duration analysis and other econometric methods to probe the robustness of our results. Section 6 assesses the value of analyst recommendations in presence of mutual fund affiliation. Finally, in Section 7, we summarize our findings and their implications for future research.

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[4] Analysts might tip off the affiliated mutual funds prior to releasing a report on a stock. Using a proprietary dataset, 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. Unfortunately, we cannot observe this practice in our public data. We found one anecdotal case about an analyst tipping off the affiliated fund managers before the release of a downgrade. On July 11, 2002, at lunch, Peter Caruso, a Merrill Lynch star analyst, disclosed information leading a Merrill Lynch institutional sales agent to believe that Caruso was going to downgrade Home Depot. After that meal, the sales agent alerted some money managers, including some at Merrill Lynch's asset management division. By that day's close, Home Depot stock was down 5.6%. In August 2002, Merrill Lynch fired Caruso for violating a firm policy about the disclosure of research reports. In 2004, the NYSE fined Merrill Lynch and suspended the analyst and the sales agent. See Bloomberg news, 2002, "Merrill fires analyst in disclosure dispute." *New York Times* August 22, p. 2.

[5] Business news focuses on these relationships. 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 regarding the fund distributions. Morgan Stanley, on the other hand, has recently acquired several hedge funds. See Berman, 2005, "Citigroup asset-swap talks aim to avoid investor conflict." *Wall Street Journal* June 2, C1; Berman and Smith, 2006, "Merrill is near deal to acquire BlackRock stake." *Wall Street Journal* February 13, A1.

2. Hypotheses and research design

Prior studies and anecdotal evidence have shown that the so-called Chinese walls between investment banking and brokerage departments do not work well, because research is often used as a marketing tool to support the underwriting business. Just as analysts have the capacity to help the affiliated investment bank by reporting favorably on stock-clients, they may also be encouraged to support the affiliated asset-management business by positively recommending mutual fund investments. Following the expositional analogy about the investment banking affiliation, our first two hypotheses are as follows:

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

Hypothesis 2: Brokerage analysts are more likely to provide optimistic coverage on seasoned 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 owns more of that stock. As suggested by Womack (1996), we argue that the preference for supporting or the fear of hurting the performance of the mutual fund family makes analysts more optimistic on the stocks with a significant weight in the family portfolios, because the "costs" of issuing unfavorable recommendations would be greater on these stocks than on other stocks. 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.

To test these three hypotheses, we model analyst coverage and optimism as an analyst's decisions about covering (recommending) a stock again after he or she has decided to cover (recommend) it once. We thus track all the 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 the analyst's affiliation and the stock's weight in the family portfolios. Data come from multiple databases: IBES, SDC, the 13f Institutional and Mutual Funds Holdings databases, the Center for Research in Security Prices (CRSP), and CRSP/Compustat Merged.

Given the focus on seasoned stocks, our research design does not include succeeding coverage initiations, which mostly relate to newly listed companies. Four rationales support this choice. First, Loughran and Ritter (2004) and Mola and Loughran (2004) show that the composition of the equity issuers gradually changed in the mid-1990s: a higher number of young Internet-related firms reporting negative earnings went public or conducted seasoned equity offerings (SEOs). Confining the analysis to the population of stocks covered in 1994 allows us to contain the change in stock characteristics as a factor affecting analysts' decisions. Second, as documented by Ritter and Zhang (2007) and Johnson and Marietta-

Westberg (2005), after an IPO, investment banking affiliation and mutual fund affiliation are likely to work together, making it difficult to disentangle their influence on an analyst's behavior. Third, as reported in O'Brien, McNichols, and Lin (2005) and Bradley, Jordan, and Ritter (2006), an initiation of analyst coverage does not necessarily mark the beginning of a long-lasting relationship between a brokerage house and a newly listed firm. In fact, after receiving the first reports, IPOs experience a drop in coverage, especially by non-underwriter analysts. Fourth, testing Hypothesis 1 implies determining a measure of analyst attention. Focusing on the 1994 covered stocks allows us determining a coverage rate that captures the attention analysts pay to a given set of stocks over time, rather than the productivity analysts achieve by covering all stocks. Nevertheless, as we show later, the choice about subsequent additions to the list of covered stocks does not affect the robustness of our results.

In this study, a decision by analysts to report on a stock is described as a time-to-event in a duration model. We record the occurrences of the event from time 0, defined as when the event has occurred for all cross-sectional units. While the cross-sectional structure of the sample is driven by the arbitrary time selection, results from a hazard regression model are not, because duration analysis explains the occurrences of the event exploiting the time variation in the explanatory variables from the time origin. Moreover, duration analysis has the methodological advantage of capturing causality links and also handling censoring issues in a natural fashion. First, the explanatory factors used to model the event of reporting on a stock can 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.[6] Second, in other techniques, such as panel methods that dummy the occurrences of the event, right-censoring 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 characteristic allows describing –without dealing with complicated right-censoring issues– coverage stops.

3. Data and sampling procedures

Our data comprise all analysts who covered stocks by issuing 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 (2007) show that business relationships at the brokerage

[6] Suppose 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 depend on N_{t-1}. Unlike logit or probit models, duration analysis techniques explicitly stratify the process of N_t conditional on N_{t-1} so that the nature of the estimated relationship between N_t and $\mathbf{X}_t$ will be truly causal.

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

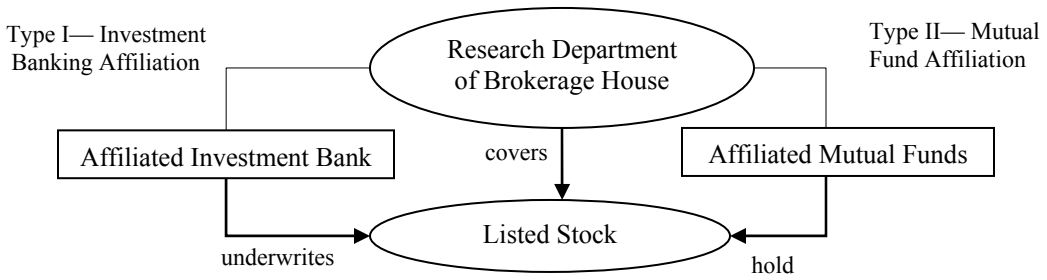
Our sampling procedure lets us identify 16,824 observations as *distinct* relationships between research department i and stock j (i = 1, 2, …, 154, and j = 1, 2, ..., 4,121). From the standpoint of the covering "subject," during 1994, 154 research departments covered up to 976 stocks with an average of 109 stocks. From the standpoint of the covered "object," the average stock received coverage by four research departments in 1994. For example, Goldman Sachs issued research reports on 729 stocks, while Bear Stearns covered 478 stocks. Although some companies such as Intel Corp. were 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 descriptive statistics for the sample of research department-stock observations. Our sample includes almost all stocks in the Standard & Poor's 500 index. Not surprisingly, the 483 large-cap stocks in the S&P 500 are analyzed by considerably more research departments than the average sample stock. Research department-S&P 500 stock observations represent 29% of the sample. Stocks tend to be listed in the main U.S. markets, the NYSE or the Nasdaq, with NYSE-listed companies being the most represented in the sample (59%). Only 2% of the sample observations is traded on the Amex; 10% is traded over-the-counter or on regional exchanges, such as the Boston, Chicago, Cincinnati, Pacific, and Philadelphia stock exchanges. Fewer utility stocks are covered than tech stocks. However, more research departments cover utility stocks than tech stocks. This is consistent with Bhushan (1989) and O'Brien and Bhushan (1990) who document that utilities or stocks in regulated industries attract a higher analyst following. As a result, sample observations include utility stocks and tech stocks in roughly equal proportions (7% for both).

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 covering stock j is affiliated with an investment bank if shares j 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 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 assumed to be weak (Michaely and Womack, 1999; Ellis, Michaely, and O'Hara, 2000; Corwin and Schultz, 2005). Data on investment banking affiliations come from the SDC database.

In our second use of affiliation, research department *i* covering stock *j* is considered affiliated with the 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 department, starting from first quarter 1995, when the 13f holdings are disclosed. The following chart shows the two types of affiliations within a typical full-service brokerage house.



Like the investment banking affiliation, the mutual fund affiliation involves three parties: a listed stock, the mutual funds collectively holding that stock, and the research department covering that stock. In our use of mutual fund affiliation, the fact that a brokerage firm offers asset management services does not result in a mutual fund affiliation unless the stocks held by the broker's mutual funds are also covered by the broker's research department. At the end of 1994, about 21% of our sample received coverage from a research department affiliated with an investment bank that had recently provided underwriting services. More than one-fourth of the sample appears in the portfolios of mutual funds affiliated with the research department. Just 6% of our sample is affiliated with both investment bank and mutual funds.

4. Univariate analysis

This study uses 1) the frequency of coverage as a measure of analyst interest in sample stocks and 2) the proportion of upgrades to a "strong buy" rating as a measure of analyst optimism. Both measures are

determined on a quarterly basis. First, frequency of coverage accounts for a research department's decision about reporting on a stock. 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 disclose their financial statements quarterly, 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*. The quarterly frequency of coverage is defined as the number of observations receiving reports divided by the total number of possible coverage events. In the last quarter of 1994, research departments released reports on less than a third of the sample: the frequency of coverage was 27.87% (that is, 4,689 out of 16,824 potential events). Second, the proportion of upgrades to a "strong buy" rating accounts for a research department's decision to cover a stock optimistically. Analyst ratings range 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 ratings. Recommendations by research departments 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 report issued in that quarter. We regard an upgrade to "strong buy" as the most optimistic rating because it exceeds not only a research department's prior views on that stock but it also beats the consensus expressed by other departments. In the last quarter of 1994, the proportion of upgrades from buys, holds, underperforms, or sells to strong buys was 18.87% (885 of 4,689 issued reports), which is above the 16% proportion in a uniform distribution of changes in analyst ratings.

The last quarter of 1994 is taken as the baseline quarter 0. This study analyzes the 16,824 sample relationships between research departments and stocks over 36 consecutive quarters, from the first quarter of 1995 through the fourth quarter of 2003. These relationships are naturally subject to right-censoring because of the concentration of brokerage firms in the securities industry and/or because of stock delisting. Mergers and acquisitions in the late 1990s significantly reduced the number of brokerage firms.[7] We designate research departments incorporated into an acquiring bank as censored 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 research departments, 86 remained uncensored. Similarly, stock-issuing firms were censored once they merged with other listed companies. At the end of 2003, 1,941 stocks remained of

[7] See the appendix in Corwin and Schultz (2005) and figure 1 in Ljungqvist, Marston, and Wilhelm (2006).

the initial 4,121. Over the nine-year period, the combined censoring effects resulted in 5,920 of 16,824 relationships being uncensored as of the end of the 36th quarter.

Figure 1 plots the frequency of coverage and proportion of upgrades to "strong buy" for the 1995-2003 period. Controlling for censoring in the relationships between research departments and covered stocks, we find that the quarterly frequency of coverage declined from about 20% to 10% throughout the first four years. During the three years 1999–2001, the production of reports on uncensored stocks by uncensored departments remained below 10%. This low production may be explained by the uncertainty characterizing the market during the 1999–2000 bubble and its subsequent burst in 2001. Limits in the research resources within brokerage firms may also explain the reduced interest. During that time, analysts' attention might have been focused more on initiating relationships with the newly listed firms than on cultivating the established relationships with seasoned firms. In 2002, market watchers witnessed a renewal of analysts' interest in the sample stocks. In the third quarter of 2002, the coverage rate jumped to about 23%, even more than the productivity rate recorded at the beginning of 1995. The major rise in September 2002 was temporary. In 2002–2003, the frequency of coverage again averaged around 14% and dropped 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 the summer of 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. 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 SEC proposed the Analyst Certification Rule requiring that any research report include both a certification that any assessments must 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. The provisions of NASD Rule 2711 about the disclosure of rating distributions became effective on September 9, 2002. As described in Cliff (2007), IBES reports a great number of recommendations from Sunday, September 8, to Monday, September 9, 2002. In Figure 1, the dotted line adjusts for the 721 sample reports that were issued on those two days to comply with the new rules.[8]

[8] The 721 compulsory reports issued on September 8 and 9, 2002 did not necessarily reiterate prior ratings. We thus include them in our tests of an analyst's decision to issue optimistic ratings on that stock, while we remove them in our tests of an analyst's decision to cover a stock. Our results are insensitive to this choice.

Also, Figure 1 draws the evolution in the proportion of upgrades to "strong buy" over 36 quarters. This trend is essentially in the opposite direction relative to the quarterly frequency of coverage. During the bubble period, from 1999 to 2000, when research departments seemed to pay little attention to sample firms, they were exceptionally optimistic in their reports. In the first quarter of 2000, when the Nasdaq Composite index reached the all-time high, the proportion of strong buys that upgraded prior ratings exceeded 24%. In the last two years 2002–2003, the surge in the frequency of coverage was accompanied by a drop in optimism. In reaction to the new analyst rules, the upgrades to "strong buy" in the third quarter of 2002 were the lowest point in the sample

4.1. Hypotheses 1 and 2: Frequency and optimism of analyst 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 as well as the optimism expressed in the 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 tend to research high-quality stocks. Large established companies included in benchmark industry indexes are thus likely to be regularly assessed by more analysts. 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 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 reporting on a stock rises as the price of that stock falls, because 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 their 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, analyst coverage is expected to be more frequent. Second, affiliation with other brokerage departments —in particular, with mutual funds— is the explanatory variable of our interest, although it is not supposed to affect decisions about whether a research department will cover a stock. Even before the 2002 regulation enforced 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 nor termination of coverage. Nor does the independence principle imply that a research department's affiliation with mutual funds should affect research productivity or optimism.

First, what stock characteristic appeals to analysts? Panel A of Table 2 assesses the relation between frequency of analyst coverage and the major characteristics of stocks. Data are updated quarterly. During the nine-year period, the average coverage rate of 11.77% for all uncensored observations is taken as a reference point. Not surprisingly, a firm's size appears to affect the frequency of coverage: stocks in the S&P 500 index garner 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 are stocks traded over-the-counter or on regional exchanges. The average utility stock also receives less attention than do tech stocks. Over three subperiods, 1995–1998, 1999–2001, and 2002–2003, all stocks experienced a decline in coverage in the middle period. Interestingly, since 2002, utility stocks have received more coverage than tech stocks.

Panel B of Table 2 reports the proportions of upgrades to "strong buy" ratings categorized by stock characteristics. From 1995 to 2003, the overall proportion of strong buys that revise prior ratings upward is 17.04%. While size appears to drive the frequency of coverage, growth prospects seem to direct analyst optimism. In fact, Nasdaq-listed stocks and tech stocks enjoy an above-average proportion of upgrades to "strong buy." The analysis by subperiods over time confirms the pattern of Figure 1: the favorable disposition toward sample stocks strengthened during the Internet bubble and weakened after its burst. In particular, the high coverage about utility stocks during 2002–2003 did not imply optimism in ratings. In fact, the unfavorable coverage took place in the aftermath of the Enron scandal while major debt issues were offered to finance projects in the newly deregulated energy markets.

Second, which performance indicators attract 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 divided by the closing price at the end of each quarter. 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 lagged by one quarter.

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, the 200-day moving average is regularly examined by technical analysts who 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.

Panel A of Table 3 reports the median operating and financial performance in quarter *t*-1 of firms receiving reports in quarter *t* from 1995 through 2003. Mean values and standard deviations are also reported. The analysis suggests that research departments generally pick good stocks to present in their reports. Stocks in analyst reports are those with higher median MBV ratios, higher quarterly EPS/price, higher ROE or higher dividend yields than stocks that have not been covered. Two-sample Wilcoxon rank-sum tests (two-sample *t*-tests) confirm the significance of the differences in median (mean) performance between stocks receiving coverage and stocks not in each quarter. Subsample results indicate that stocks receiving 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. In the 2002–2003 subperiod, when stock indexes turned south, dividend yields of covered stocks significantly increased. This rise can be related to the increased coverage of utility stocks reported in Panel A of Table 2. Since 2002, as a reaction to the corporate earnings scandals, utilities and other high-yield firms boosted their dividends. The cut of the tax

rate on dividends in early 2003 supported the rise in payouts.[9] Panel B of Table 3 reports performance indicators for stocks receiving upgrades to "strong buy." Consistent with Jegadeesh, Kim, Krische, and Lee (2004), analysts strongly recommend "glamour" stocks with high MBV ratios, high ROE, low leverage ratios, or positive momentum. Although high-yield stocks attract more coverage, they receive fewer upgrades to "strong buy" than do low-yield stocks. This preference for low-yield stocks endures over the 2002-2003 subperiod when there is no significant difference in most performance indicators between upgraded stocks and other stocks.

Third, do research department affiliations affect analysts' behaviors? Table 4 categorizes frequency and optimism of analyst coverage by research department affiliations and subperiods. Both investment banking affiliation and mutual fund affiliation are time-varying. 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 holdings advises us to lag the affiliation assessment by one quarter: when the institutional investor discloses the holding of stock j at the end of quarter t-1, the in-house research department is considered affiliated starting from quarter t.

Both research department affiliations matter. Panel A of Table 4 focuses on the investment banking affiliation. Despite what the analyst independence principle suggests, from 1995 to 2003, research departments cover more frequently stocks underwritten by the affiliated investment banks than stocks underwritten by other investment banks, 13.74% compared with 11.24%. Consistent with prior studies, we find that research departments tend to be favorable on stocks if they are affiliated with investment banks that had provided issuers with underwriting services. Their optimism is expressed by means of *reiterations* of "strong buys" ratings. The high proportion of reiterated strong buys makes these research departments favorable in terms of average recommendation and deviation from consensus assessment.[10] However, stocks

[9] See Smith, 2002, "After Enron, quarterly dividend takes center stage for utilities." *Wall Street Journal* January 15, C1; Bogoslaw, 2002, "In uncertain market, dividends talk. Manager at Eaton Vance emphasizes steady income to ride out slow economy." *Wall Street Journal* September 5, D9; Opdyke, 2003, "Where to look for dividends. As niche mutual funds launch and companies boost payouts, investors face new choices." *Wall Street Journal* October 7, D1; Brown, 2003, "Dividend stocks could become favorites in '04." *Wall Street Journal* December 29, C1.

[10] The consensus, which is defined as the average rating assigned by all analysts to stock j in quarter t, is obtained from IBES as a partly exogenous variable: it considers all the ratings assigned in the analyst industry, including those analysts who initiate coverage and those analysts who already covered 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 valuations are on average more favorable than our sample ratings. On a five-point scale where five is the worst rating, a positive deviation from consensus indicates that the reporting research department agreed that stock j

underwritten by affiliated investment banks receive as many upgrades to the "strong buy" list as other stocks, 17.30% compared with 16.95%. The analysis by subperiods importantly confirms these suggestions about the influence that investment banking affiliation has on analyst coverage. In particular, when all stocks experience a decline in coverage from 1999 to 2001, research departments affiliated with investment banks issue more reports and more strong buys —30.41%, of which 9.78% are reiterations— than do unaffiliated departments. In the latter subperiod, the proportion of strong buys sharply drops —11.97%, of which 4.63% are reiterations— and affiliated departments finally align with unaffiliated departments in their ratings. Similarly, 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.

Portfolio investments by mutual funds also affect affiliated research departments' selection of stocks covered. Panel B of Table 4 focuses on mutual fund affiliation. Over the nine-year period, stocks held by affiliated mutual funds receive a higher coverage (14.17%) but as many upgrades to the "strong buy" list (17.26%) as do other stocks. In spite of this, the analysis by subperiods reveals an interesting pattern in the change of recommendations. From 1995 to 2001, research departments affiliated with mutual funds express their optimism by means of *upgrades* to "strong buy." In particular, in the 1999–2001 subperiod, stocks in affiliated fund portfolios receive the most optimism in terms of awarded strong buys (both upgrades and reiterations). The average deviation from consensus is equal to -0.01, implying that the reporting research department agrees that stock *j* should have a more favorable rating than does the consensus. In the 2002-2003 subperiod, affiliated research departments do not align their optimism with unaffiliated research departments but their recommendations became significantly less favorable on stocks in the affiliated portfolios.

Each October, *Institutional Investor* announces its All-America Research Team, which includes, for each industry, the four sell-side analysts who provided the highest research quality according to money managers and institutions and who are consequently deemed "star" analysts. Stickel (1992) finds that the prestige resulting from being selected as a star analyst by this investor magazine is well deserved. Stars do outperform other analysts for accuracy, frequency, and price impact of their forecasts, earning so their designation. Considering that their reputation is at stake, we expect star analysts to report less optimism in covering stocks held by affiliated mutual funds. Reports by these stars represent 32% of the nine-year sample

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should have a less favorable rating than did the consensus. A deviation equal to zero indicates that the research department confirms the consensus with its recommendation. The average deviation from consensus is equal to 0.08; standard deviation and skewness are 0.8 and 0.2, respectively.

reports issued by research departments affiliated with mutual funds. In the years before 2002, star analysts were the group giving the most positive ratings when they covered stocks held by affiliated mutual funds. Average differences in the star analysts' upgrades to "strong buy" are significant during the 1995–1998 and 1999–2001 subperiods at the 7% and 1% level, respectively. Since 2002, star analysts have become more reluctant to issue an upgrade to "strong buy" than do non-star analysts. Finally, comparing the two panels of Table 4, investment banking affiliation and mutual fund affiliation are associated with frequencies of coverage and upgrades to "strong buy" that are similar in magnitude. However, this similarity cannot be explained by overlaps between the two groups of affiliated research departments: only 6% of the sample is affiliated with both investment banks and mutual funds as of the end of 1994, and this proportion declines over years.

4.2. Hypothesis 3: Frequency and optimism of analyst coverage and portfolio weights

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 quarter t-1 and adjusted as if the stock price has not changed from the end of quarter t-2. Portfolio weight is lagged by one quarter so that it is possible to see whether investment size affects the ratings assigned by affiliated research departments in quarter t, 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). The distribution of portfolio weights is highly right-skewed with a mean value of 0.17%. Table 5 reports frequency and optimism of coverage provided 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 quintile (the smallest portfolio weight) to the fifth quintile (the largest portfolio weight), stocks receive more frequent reports and more optimistic ratings. The relation between weight and optimism indicators, such as strong buys, average rating, and average deviation from consensus, is generally monotonic. The t-tests for differences in frequencies and upgrades to "strong buy" between the highest and the lowest quintile are statistically significant from 1995 through 2001. In particular, during 1999-2001, the negative deviation from consensus indicates that analysts are absolutely optimistic on the seasoned stocks largely held by affiliated funds. The higher optimism on these stocks becomes lower pessimism in 2002-2003.

To sum up, univariate results offer some insight into all three hypotheses. Mutual fund affiliation affects analysts' decisions to cover a stock and cover it optimistically. The more a stock weighs in the affiliated portfolios, the more favorable analysts recommend that stock. Before testing our hypotheses while controlling for other factors, we analyze changes in frequency and optimism of analyst coverage in response to changes in the research department affiliation. If mutual fund affiliation influences analyst coverage, we expect to see a change in analyst coverage around the time a firm is added to an affiliated mutual fund's portfolio. For each research department-stock observation, we identify the quarter when the stock is first added to the affiliated fund portfolio. Suppose that Goldman Sachs mutual funds hold no Alcoa stock at the end of quarter Q_{-1}, while Goldman Sachs analysts have been covering Alcoa. During the following quarter, Goldman Sachs mutual funds net buy Alcoa so that they collectively report holdings of Alcoa at the end of quarter Q_0. We regard the presence of a stock in the affiliated funds as a binary variable, without discriminating among investment amounts. To clearly observe the event effects over time, we confine the analysis to those observations where the affiliated mutual funds have not held the stock for at least four quarters before quarter Q_0 but they have been holding the stock for at least four quarters after quarter Q_0.

For 1,726 uncensored research department-stock observations, Panel A of Table 6 describes the changes in frequency and optimism of coverage as the pressure from mutual fund affiliation is activated in Q_0. In quarter Q_0, there are some suggestions of concurrent effects. While the average consensus assessment is stable at 2.13, affiliated research departments upgrade their prior views so that the average rating improves from 2.23 in Q_{-1} to 2.11 in Q_0, suggesting that mutual funds may follow what their sell-side analysts indicate. However, the quarterly update of our data does not establish which comes first, an analyst's recommendation or a mutual fund's net buying activity. In the quarters after mutual funds first load the stock, Q_{+1}, Q_{+2}, Q_{+3}, and Q_{+4}, the affiliated research departments issue more frequent reports and a higher proportion of strong buys (both upgrades and reiterations) than in the prior quarters, Q_{-1}, Q_{-2}, Q_{-3}, and Q_{-4}. Also, upgrades and reiterations are in larger proportions. The average rating is quite favorable, especially compared with the consensus. Interestingly, in quarter Q_{+2} research departments are exceptionally optimistic on the stocks held by affiliated funds. The average rating of 1.87 is significantly more favorable than the consensus. Notice that this upsurge in optimism occurs in a quarter when the in-house mutual funds are net sellers of the recommended stocks, as the active portfolio weight significantly decreases -0.08%.

Panel B of Table 6 reports event statistics as mutual funds unload a stock during quarter Q_0. Also in this case, we restrict the analysis to 1,627 uncensored observations where the affiliated mutual funds had been holding the stock for at least four quarters before quarter Q_0 but they do not hold the stock for at least

four quarters after Q_0. As long as a stock is in the affiliated portfolios, research departments frequently issue reports on that stock; and the issued reports are generally optimistic in terms of strong buys, upgrades, and average rating. The comparison between the average rating by affiliated research departments and average consensus offers some interesting insights. Although analyst valuations on the stocks held by the affiliated mutual funds worsen, on average, they remain more favorable than the consensus in Q_{-1}. The net selling activity by in-house mutual funds is not significant in Q_{-1}; it becomes significant in Q_0 when a large portion of the stock holdings is unloaded. During Q_0 affiliated analysts issue less numerous but more unfavorable reports than during the prior quarter. They continue to be more pessimistic than the consensus till Q_{-4} when average assessments finally align.

In Panel C of Table 6, we also report the changes in analyst coverage in response to changes in investment banking affiliation. Q_0 marks the quarter when an SEO occurs. Since there are a few events of hiring (replacement) of an investment bank as an underwriter in our sample, we extend the analysis over two years before and after the SEO quarter. In the year before the follow-on, from Q_{-4} through Q_{-1}, analysts affiliated with those investment banks hired to join the managing syndicate of the SEO had released positive recommendations, as indicated by the proportion of upgrades to "strong buy," upgrades, average rating, and average deviation from consensus. For that optimism they might have been hired later on. Conversely, in the year before the offering, analysts affiliated with those investment banks replaced in the SEO syndicate had issued a fair amount of positive recommendations but not enough to beat the consensus. During the SEO quarter, the replaced bank's analysts likely reiterate or downgrade prior views on the former client's stock; and the average rating significantly worsens relative to the consensus.

5. Multivariate Analysis

The choice to cover a stock (and cover it optimistically) can be modeled as dependent or independent from previous choices. We develop two multivariate analyses: duration and probit models. Duration analysis differs in one fundamental way from probit analysis. While a duration model focuses on the *conditional* probability of coverage to persist over time as a function of a set of explanatory variables, a probit model links the *unconditional* probability of coverage at any point in time to a set of explanatory factors, independently of past decisions. In a duration model, in quarter *t* relative to the prior quarter *t*-1, each research department selects 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. In a probit model, in quarter *t,* each research department *i* simply decides either to release a

report or to be silent on stock *j*, regardless of prior decisions. Duration and probit methodologies complement each other in revealing key features of analyst optimism.

5.1. Multivariate duration analysis

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. 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 time 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:

$\lambda\{t/N(t), Z$ (*S&P500 COMPONENT$_t$ dummy, NASDAQ-LISTED$_t$ dummy, AMEX-LISTED$_t$ dummy, OTHER MARKETS-TRADED$_t$ dummy, UTILITY$_t$ dummy, TECH$_t$ dummy, MARKET-BOOK VALUE RATIO$_{t-1}$, EPS/P$_{t-1}$, REVENUES/ASSETS$_{t-1}$, ROE$_{t-1}$, DIVIDEND YIELD$_{t-1}$, LEVERAGE RATIO$_{t-1}$, PRICE ABOVE 200-DAY MOVING*

AVERAGE$_t$ dummy, SEO$_t$ dummy, SEO x INVESTMENT BANKING AFFILIATION$_t$ dummy, INVESTMENT BANKING AFFILIATION$_t$ dummy, MUTUAL FUND AFFILIATION$_{t-1}$ dummy, RESEARCH DEPARTMENT SIZE$_t$, LN(MARKET CAPITALIZATION)$_{t-1}$)}.

The first six covariates relate to firm characteristics. 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 MARKETS-TRADED 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). The next seven covariates measure a firm's operating and financial performance. To avoid a look-ahead bias, all accounting indicators are updated to the end of the prior quarter *t*-1. 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 ABOVE 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. Two dummies, INVESTMENT BANKING AFFILIATION and MUTUAL FUND AFFILIATION, account for research department affiliations. First, INVESTMENT BANKING AFFILIATION has a value of one when the research department is affiliated with an investment bank in the managing syndicate for the stock covered. To separate the long-term effects of investment banking affiliation from its effects at the time of an equity offering, we interact INVESTMENT BANKING AFFILIATION with SEO that is equal to one when the company makes a new equity offering in quarter *t.* Second, MUTUAL FUND AFFILIATION has a value of one when the research department is affiliated with mutual funds that hold, at the end of quarter *t*-1, the stock covered. Finally, we use two variables to control for size: RESEARCH DEPARTMENT SIZE that is defined as the IBES number of analysts working for a research department, and LN(MARKET CAPITALIZATION) that is the logarithm of a firm's market value in million dollars at the end of quarter *t*-1.

Panel A of Table 7 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 in model 1 confirm the results of the univariate analysis. Large-cap stocks reporting good operating and financial performance are persistently covered. In particular, high-dividend yields increase the probability the stock

will be followed. Price momentum also affects a research department's choice of covering a stock.[11] The affiliation between research department and an investment bank largely affects analysts' decisions to provide coverage during the quarter of a client's SEO. Afterward it affects analysts' decisions to provide continuing research on the client's stock to a lower extent. MUTUAL FUND AFFILIATION is directly useful in testing Hypothesis 1. Controlling for other factors, including the investment banking affiliation, we find that mutual fund affiliation significantly drives analysts' decision to continue covering a stock. Although hazard ratios are not reported in Panel A of Table 7, they support a clearer interpretation than do the coefficients. When affiliated mutual funds report holdings of a stock at the end of quarter *t*-1, the probability that stock will be covered in quarter *t* rises by 20%.

In model 2, we include seven more dummies related to changes in a research department's affiliation. When an issuer confirms or hires a new investment bank as underwriter to manage an offering of new securities, the investment bank's research department is very likely to report on the issuer's stock during the SEO quarter. Yet, when an issuer replaces an investment bank that formerly served as an underwriter, the investment bank's analysts are no longer likely to cover that issuer/stock –the coefficient is negative but insignificant. Also, we find that research departments are 30% more likely to issue reports in the quarter *after* the stock is first added in the affiliated fund portfolios; 22% more likely *after* the stock investment by affiliated funds increases; 15% more likely *after* the stock investment decreases. No significant coverage is provided *after* the affiliated mutual funds fully unload the stock from their portfolios. This suggests that, controlling for stock characteristics and performance, sell-side analysts likely provide coverage to meet demands for research from the affiliated asset managers. Similarly, Irvine et al. (2004) find that analysts initiate coverage on a stock after the fund family invests in that stock.

As a robustness check, models 3 and 4 use an extended sample to include stocks whose coverage was initiated after 1994. One may be concerned that the reduction in the number of observations due to right-censoring alters the composition of sample firms over time and that uncensored stocks are larger at the end than at the beginning of the sample period. To address this concern, to the initial 16,824 observations, we add 90,969 observations as relationships between research departments and stocks that emerged after 1994. Most of these new observations relate to initiations on newly listed stocks (61%). The extended sample consists of 107,793 research department-stock pairs that are at risk over the sample period (i.e., a total of 3,988,341 time observations). Using this extended sample, Cox results seem to polarize analyst attention between S&P

[11] When we replace the PRICE ABOVE 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).

stocks and recent IPOs. While ongoing coverage mainly relates to large, well established firms, initiations of coverage cluster during the bubble period when small young firms with negative earnings went public and, shortly after their IPOs, offered new shares. In fact, from the comparison between model 3 and model 1, three coefficients differ in magnitude: S&P500 COMPONENT, DIVIDEND YIELD and SEO dummy. However, model 3 confirms the results in model 1 for the variable of interest: analysts are 14% more likely to cover a stock held by the affiliated mutual funds. As an additional robustness check, we remove, from the extended sample, covered stocks that are always in the affiliated fund portfolios. This can occur when, for example, the fund family offers index funds. Similarly, we remove stocks that are never in the fund portfolios, because the brokerage firm offers no asset management services. Model 4 reports unchanged coefficients for all covariates, except for DIVIDEND YIELD that is now insignificant.

To test Hypothesis 2 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 favorable recommendation. The probability of releasing an optimistic report is explained by the same covariates related to stock characteristics, operating and financial performance, and research department features. In models 1 through 4 of Panel B of Table 7, we alternatively define analyst optimism as the release of 1) a recommendation that is better than that given by the consensus, 2) a "strong buy" rating, 3) an upgrade relative to prior rating, and 4) an upgrade to a "strong buy" rating. In all four models, mutual fund affiliation dummies have positive and significant coefficients. When an investment bank underwrites the stock, the affiliated analysts are more likely than are unaffiliated analysts to look favorably at that stock in their reports during the SEO quarter, but not afterward. Yet, when mutual funds hold a stock, the affiliated research department is 16% to 32% more likely than are unaffiliated departments to persistently provide favorable coverage on that stock. Compared with Panel A of Table 7, the coefficients of LN(MARKET CAPITALIZATION) and DIVIDEND YIELD are here significantly negative. This confirms the suggestion that analysts are more likely to strongly recommend a "glamour" stock than a "value" stock. Moreover, it appears that RESEARCH DEPARTMENT SIZE reduces analyst optimism. Models 5 to 8 focus on the upgrade to "strong buy" as a measure of the strongest optimism. Model 5 includes dummies for changes in research department affiliations. The interaction variable, SEO X REPLACED AFFILIATED INVESTMENT BANK, marks the end of the firm's relationship with an investment bank that was used during a prior equity or debt issue. When an issuer replaces an investment bank to manage an offering of new securities, the probability that the former bank's analysts will issue an upgrade to "strong buy" declines: the coefficient is negative and significant at the 8% level. 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 provide strength of coverage on that stock.

Hypothesis 3 poses the question whether portfolio weight affects optimism of the brokerage research affiliated with mutual funds. Thus model 6 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 MUTUAL FUND AFFILIATION dummy with PORTFOLIO WEIGHT IN AFFILIATED MUTUAL FUNDS and LN(AMOUNT INVESTED BY AFFILIATED MUTUAL FUNDS). PORTFOLIO WEIGHT IN AFFILIATED MUTUAL FUNDS is the percentage of the dollar amount invested in stock *j* by affiliated money managers —as if the stock price has not changed from the end of *t*-2 through quarter *t*-1— divided by all 13f holdings at the end of quarter *t*-1. LN(AMOUNT INVESTED BY AFFILIATED MUTUAL FUNDS) is the logarithm of the millions of dollars invested in stock *j*. We expect a positive coefficient for PORTFOLIO WEIGHT IN AFFILIATED MUTUAL FUNDS, after we control for the investment amount. Model 6 includes three more variables for capturing analyst reputation risk. As in Ljungqvist et al. (2007), 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 number of votes in the *Institutional Investor* poll at stake. The third variable is STAR ANALYST dummy.

Results of model 6 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 the weight of a stock investment by 1%, the probability that the affiliated analysts will issue a recommendation more favorable than the consensus rises 8%. The presence of other institutional investors does moderate analyst optimism, but star analysts are associated with overly optimistic ratings. 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.[12] 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. Models 7 and 8 report similar results for the enlarged sample that includes further initiations. Finally, in models 9 and 10, the dependant variable is the issue of a negative rating. Analysts typically express their pessimism downgrading a stock in the affiliated fund portfolios to a "hold" rating, while they are reluctant to use more negative ratings. In fact, research departments are 3% more likely to issue a "hold" rating (or worse) on stocks held by affiliated mutual funds, but 5% less likely to issue "underperform" or "sell" ratings than unaffiliated departments.

5.2. Multivariate probit analysis

We next apply standard probit methods to the probability that research departments will issue a report on a seasoned stock. Panel C of Table 7 reports probit coefficients and robust *z*-scores for the nine-year period. We find that mutual fund affiliation significantly increases both the probability that a given stock will be covered and the probability that the stock will receive an upgrade to "strong buy." 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 conditional dynamics of the failure events over subsequent periods. Thus we use probit methods because they assume temporal independence of the failure events. Panel C of Table 7 reports probit estimates for the same subperiods used earlier in the paper. Using shorter samples generally implies lower *z*-scores throughout. From 1999 through 2001, investment banking affiliation significantly placed pressure on analysts to issue optimistic ratings on the investment bank's stock-clients. However, their optimism clustered during the SEO quarters and did not persist in other quarters. From 1995 through 2001, mutual fund affiliation made analysts significantly optimistic about stocks in the affiliated fund portfolios. In the latter subperiod, these affiliated analysts issued ratings that are aligned with the ones by unaffiliated analysts: the lower proportion of upgrades to "strong buy" observed in Panel B of Table 4 loses its statistical significance in the multivariate analysis of Panel C of Table 7. Similar results are obtained either by bootstrapping the standard errors of the probit or by estimating a logistic regression.

[12]Anecdotal news suggests that analysts' bonuses are related to how they treat institutional investors. As one research director said: "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 (See Dorfman, 1991, "Analysts devote more time to selling as firms keep scorecard on performance," *Wall Street Journal* October 29, C1).

5.3. Other robustness checks

We apply two robustness checks to our empirical results. First, 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. All other variables of interest maintain the same signs as in Table 7, and most estimated coefficients hardly change value or significance level. Second, we experiment with the random-effects generalized least squares (GLS) models that Ljungqvist et al. (2007) 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 Panel B of Table 7 (model 6). We obtain two distinct sets of GLS coefficient estimates, depending on whether we model research department-level or stock-level unobserved heterogeneity.[13] A larger institutional presence in the firm's equity makes optimism less likely. Yet, star designation makes optimism more likely, whatever the econometric framework.

5.4. Simultaneity issues

Univariate and multivariate models show that the affiliation with mutual funds is associated with a more frequent and favorable analyst coverage. 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 the end of quarter *t*-1 and the end of quarter *t*) in the shares held by affiliated mutual funds is explained by a number of variables, including optimism of the in-house analysts in quarter *t*-1.[14] Under the null hypothesis of no simultaneity (that is, that mutual fund affiliation *causes* analysts' behaviors), we expect that analyst optimism will fail to explain significantly the subsequent

[13] Formally, $Opt^{i,j}_{t}$ is a variable measuring the optimism 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. (2007), we simplify the estimation problem by experimenting with either department and time heterogeneity or stock 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.

[14] The active portfolio weight changes, on average, 0.005%, from the end of quarter *t*-1 to the end of quarter *t*, in case of an upgrade to "strong buy" given in quarter *t*; 0.009%, -0.010%, and -0.003% in case of a reiteration, downgrade, and no rating, respectively. When more reports are issued by research department *i* on stock *j* in quarter *t*-1 (2% of the sample), we examine the change in ratings from the next-to-last report to the last report for the quarter. Later, when more reports are issued by research department *i* on stock *j* in quarter *t*, we examine alternatively the analyst ratings in the first report and those in the last report for the quarter. Results are insensitive to this choice.

portfolio rearrangements for in-house mutual funds.

As reported in columns 1a and 1b of Table 8, past optimism of affiliated analysts fails to explain changes in mutual funds' portfolio weights. We obtain two sets of GLS coefficient estimates, depending on whether we model research department-level or stock-level unobserved heterogeneity. At both levels, changes in stock price, number of shares outstanding, ROE, and other mutual funds' holdings are the main significant explanatory factors. We find no evidence that changes in ratings are followed by any significant change in portfolio weight by in-house mutual funds. Coefficients for upgrades to "strong buy" and downgrades are both insignificant, also when the ratings are issued by a star analyst. The evidence is at odds with a two-way simultaneous feedback and supports instead the idea that affiliation causes analysts to be favorable toward stocks within family portfolios. In columns 2a and 2b of Table 8, we replicate the analysis using variables reflecting the contemporaneous optimism of in-house analysts in quarter *t*. This version of the model reflects the possibility that information may efficiently flow within full-service brokerage firms so that analyst optimism may be reflected in concomitant portfolio changes of the affiliated funds. Random-effects regressions fail again to highlight a significant impact of analyst optimism on mutual fund behavior. The coefficient for a downgrade is negative and significant only at the 15% level. Once more, when the analyst releasing an upgrade to "strong buy" or a downgrade is a star, the affiliated mutual funds will not significantly change their holdings of the covered stock.

6. Value of analyst optimism

6.1. Short-Term Value of Analyst Optimism

What is the value of analysts' optimism? Does their favorable disposition affect stock prices? Table 9 provides 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 by change in the ratings assigned. In Panel A of Table 9, a "strong buy" generates a significantly positive market impact. In particular, the median price impact is the greatest when research departments upgrade a stock in the affiliated mutual funds to a "strong buy" rating (1.59%). This abnormal return is significantly higher than the change reported by stocks receiving upgrades to "strong buy" from unaffiliated research departments, 1.12%. 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 reiterate or downgrade to such a negative rating, stocks display a negative abnormal return; this is also true for stocks rated that way by unaffiliated analysts. The difference between the three-day returns categorized by affiliation is not significant. When affiliated research departments downgrade to even worse ratings, such as an "underperform" or a "sell," the abnormal price reaction is negative but lower than the one produced by unaffiliated research departments downgrading to similar ratings: -0.57%, compared with -1.00%. This asymmetry in market reaction suggests that, even though investors regard recommendations from affiliated research departments as informative, analysts may be more eager to deliver positive news than negative news.

Panels B and C categorize three-day returns by research department size. Large research departments of likely large brokerage firms are expected to generate a greater trade reaction than small research departments, as they have easier access to corporate management, more resources to support research, and more analysts following the same industry. We find that market participants discount the upgrades to "strong buy" released by small affiliated research departments, but attribute superior information to the upgrades to "strong buy" issued by large affiliated research departments. Within large research departments, Panels D and E categorize three-day returns by status of a star analyst. It appears that investors rely on star analysts regardless of their mutual fund affiliation, while they give more credit to non-star analysts when they are affiliated. Prices react significantly more to an upgrade to "strong buy" issued by an affiliated non-star analyst than to an upgrade to "strong buy" issued by an unaffiliated non-star: 1.97%, compared with 1.17%. However, downgrades to "underperform" or "sell" by affiliated non-stars bring about lower three-day returns than those following downgrades by unaffiliated non-stars: -0.47%, compared with -1.29%.

6.2. Long-Term Value of Analyst Optimism

In the long run, value accrues to investors acting upon the positive recommendations on stocks held by the affiliated mutual funds. As in Barber et al. (2001), we form portfolios based on analyst ratings 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.[15] 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

[15] To form the "upgrade to strong buy" portfolio, we follow a variation in the methodology as described in Barber, Lehavy, McNichols, and Trueman (2006). A stock enters a portfolio of "upgrades to strong buy" at the close of trading on the day an upgrade to strong buy is issued. The stock is dropped from the portfolio when a downgrade is announced.

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 10, investing systematically in the upgrades to "strong buy" issued by affiliated analysts produces an annualized unadjusted return of 18.24%, compared with 13.83% from investing in the upgrades to "strong buy" by unaffiliated analysts. However, affiliated analysts' pessimism is less valuable than their optimism. Following underperforms and sells by affiliated analysts produces an annualized unadjusted return of 5.76%, which is about 12% lower than the unadjusted return of the optimistic upgrades-to-strong-buy portfolio. When the negative ratings are issued by unaffiliated analysts, this return is equal to 8.98%, which is about 5% lower than the unadjusted return of the optimistic upgrades-to-strong-buy portfolio. At the 5% level, differences in abnormal returns from the market model and 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. We also categorize by research department size and analyst quality. Interestingly, within large affiliated research departments, strong buys issued by non-star analysts lead to higher returns than the strong buys issued by star analysts.

Panel B of Table 10 reports the annualized returns from mimicking 13f holdings or purchasing mutual fund shares. Following prior literature, we limit our analysis to U.S. equity funds in four objective categories: aggressive growth, growth, growth and income, equity income. Replicating the affiliated portfolio holdings leads to an unadjusted return of 11.08%, compared with 7.17% from replicating the unaffiliated holdings. Like in Grinblatt and Titman (1989), this difference reduces considerably as we adjust returns for risk: the annualized Fama-French three-factor return from the "affiliated" 13f holdings is 1.57%, compared with 0.96% from the "unaffiliated" 13f holdings. As an alternative, an investor can simply purchase shares of the affiliated funds. Mutual fund share prices come from the daily CRSP mutual funds data set, linked to Thomson CDA Spectrum Mutual Funds Holdings. Purchasing affiliated shares produces insignificantly higher returns than purchasing unaffiliated shares: the unadjusted return is 11.71%, compared with 11.38%. Consistent with Grinblatt and Titman (1992) and James and Karceski (2006a), the risk-adjusted returns are much lower and hardly significant. The only significant result, at the 5% level, is that the purchase of unaffiliated shares does generate a negative Fama-French three-factor return of -1.88% to investors. Finally, note that the risk-adjusted returns from purchasing shares are lower than returns from mimicking the 13f holdings. One explanation may be that mutual funds charge fees, possibly in the form of hidden expenses.

7. 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 are significantly optimistic about stocks that are held by affiliated mutual funds. During the 1999–2001 subperiod, star analysts show the most optimism on these stocks. Controlling for several variables, including investment banking affiliation, our results indicate, first, that the greater the affiliated mutual funds weigh a stock in their portfolios, the higher the analyst optimism. The stock that analysts are likely to promote is not only greatly represented in the affiliated fund portfolios but is also less visible to other institutions. Second, promoting stocks with a "strong buy" that upgrades prior views produces a median three-day abnormal return of 1.59% around the report day —2.04% when the promoting analyst works in a large research department and 2.20% when he or she is also a "star." Third, in the long run, value also accrues to investors acting upon the positive ratings on stocks held by affiliated mutual funds. However, mutual fund affiliation alters analysts' eagerness to release negative investment recommendations so that, following an affiliated analyst's issues of "sell" ratings, we observe an annualized Fama-French three-factor return of 1.68%, compared with 3.38%, when the sells are issued by an unaffiliated analyst. Overall, these results suggest that mutual fund affiliation affects the strength of coverage provided by sell-side analysts with a limited cost in analyst reputation.

This paper intends neither to suggest that mutual fund affiliation is a more important pressure on analysts than investment banking affiliation nor to take a normative position on the mutual fund affiliation of sell-side analysts; instead, this paper provides evidence that, within a typical full-service brokerage firm, analysts are subject to multiple 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. The fact that underwriting is a very lucrative business supports this focus. An investment banking affiliation explains analyst optimism in the short run. O'Brien, McNichols, and Lin (2005) and James and Karceski (2006b) find indeed that investment banking affiliation is likely to affect research around the offering of new shares, but the related biases do not persist afterward. Mutual fund affiliation instead explains the persistence of analyst optimism. Our results cast light on the significance of the relationship between sell-side analysts and affiliated portfolio managers, and this relationship is likely to become more important. As a result of the 2002 analyst rules, brokerage firms will be likely to replace the objective of generating underwriting business with the objective of generating trading business. News of mutual-fund trading abuses, which involve large brokerage houses and their favored institutional clients, provides insight into this redirection of goals.

Finally, does mutual fund affiliation produce conflict of interest? Contrary to articles in the financial press, the majority of academic research finds that analyst conflicts of interest have no systematic and persistent impact on investors, when important mechanisms, such as reputation and career concerns, restrain analysts' biases. In their review of the literature on conflicts of interest, Mehran and Stulz (2007) show that investors can benefit from the existence of such conflicts. For example, investors take advantage of more informative reports analysts can write using information flows from other departments of a full-service brokerage firm. In the same way, this paper shows that investors can earn higher returns following an analyst's optimistic recommendations about a stock in the analyst's fund family than following others' positive recommendations. Information flows between sell-side analysts and buy-side analysts likely enhance the content of a "strong buy" rating. However, the reluctance to issue pessimistic recommendations –the other side of analyst optimism– represents a bias that investors who use analyst ratings should take into account.

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Table 1

Descriptive Statistics for the Sample of Research Department-Stock Observations, 1994

	Number of Stocks	Average Number of Research Departments Covering a Stock	% of Sample
Covered Stocks:	4,121	4.08 of 154	100.00%
Stocks in the S&P 500	483	10.11	29.02%
Stocks not in the S&P 500	3,638	3.28	70.98%
NYSE-Listed Stocks	1,764	5.61	58.78%
Nasdaq-Listed Stocks	1,608	3.09	29.54%
Amex-Listed Stocks	129	2.27	1.74%
Stocks Traded OTC or on Regional Exchanges	620	2.70	9.94%
Utility Stocks	180	6.38	6.83%
Non-Utility Stocks	3,941	3.98	93.17%
Tech Stocks	286	4.41	7.49%
Non-Tech Stocks	3,835	4.06	92.51%
Stocks Underwritten by Affiliated Investment Bank	2,261	1.55	20.80%
Stocks Held by Affiliated Mutual Funds	1,843	2.34	25.61%
Stocks Both Underwritten by Affiliated Investment Bank and Held by Affiliated Mutual Funds	874	1.25	6.47%

Our data comprise all research departments that covered stocks by releasing reports during 1994. The sample consists of 16,824 observations defined 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 to a maximum of 976 stocks. 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). A stock is 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). A stock is said to be covered by a research department affiliated with mutual funds when the affiliated mutual funds collectively held that stock at the end of quarter t-1. Data are from IBES, CRSP/Compustat Merged Database, SDC database, and CDA/Spectrum Institutional Money Manager (13f) Holdings.

Table 2

Frequency and Optimism of Analyst Coverage by Stock Characteristics and Subperiods

Panel A: Frequency of Analyst Coverage

	All Periods	Subperiods		
		1995-1998	1999-2001	2002-2003
Number of Research Dept.-Stock Observations with Reports	45,576	30,363	9,097	6,116
Total Number of Uncensored Research Dept.-Stock Obs.	387,259	226,371	111,213	49,675
Frequency of Coverage	11.77%	13.41%	8.18%	12.31%
Frequency of Coverage by Stock Characteristics:				
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%

Panel B: Analyst Optimism defined as a Proportion of Upgrades to Strong Buy

	All Period	Subperiods		
		1995-1998	1999-2001	2002-2003
Number of Reports Upgrading to Strong Buy	7,888	5,491	1,814	583
Number of Research Dept.-Stock Observations with Reports	46,297	30,363	9,097	6,837
Proportion of Upgrades to Strong Buy	17.04%	18.08%	19.94%	8.53%
Proportion of Upgrades to Strong Buy by Stock Characteristics:				
Stocks in the S&P 500	16.51%	18.02%	20.84%	7.39%
NYSE-Listed Stocks	16.68%	17.97%	20.05%	7.85%
Nasdaq-Listed Stocks	18.66%	19.42%	20.20%	10.71%
Amex-Listed Stocks	14.81%	14.73%	17.95%	10.00%
Stocks Traded OTC or on Regional Exchanges	14.92%	14.78%	17.23%	12.26%
Utility Stocks	11.22%	11.94%	17.21%	3.31%
Tech Stocks	18.44%	19.48%	21.74%	6.92%

The frequency of analyst coverage is determined as the number of research department-stock observations with at least one report during the quarter divided by the total number of research department-stock observations at the end of that quarter. Analyst optimism is defined as the proportion of upgrades to a "strong buy" rating. Both frequencies of coverage and upgrades to strong buy control for right-censorship due to concentration in the research industry and/or stock delisting. The 721 reports issued from September 8 to September 9, 2002 to comply with NASD Rule 2711 are removed from the analysis of the frequency of coverage. However, they are included in the analysis of analyst optimism to correctly establish the changes in recommendations. All firm characteristics are time-varying. A stock is covered by a research department affiliated with an investment bank 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. A stock is covered by a research department affiliated with mutual funds when the affiliated mutual funds held that stock at the end of quarter *t*-1.

Table 3

Frequency and Optimism of Analyst Coverage by Performance Indicators and Subperiods

Panel A: Performance Indicators for Stocks Receiving Coverage

		All Periods			Subperiods								
		1995-2003			1995-1998			1999-2001			2002-2003		
		Reports	No Reports	*P*-value	Reports	No Reports	*P*-value	Reports	No Reports	*P*-value	Reports	No Reports	*P*-value
MBV Ratio:	Median	1.19	1.10	0.0000	1.22	1.16	0.0000	1.22	1.03	0.0000	1.04	0.98	0.0000
	Mean	1.68	1.57	0.0000	1.65	1.56	0.0000	1.97	1.68	0.0000	1.40	1.34	0.0002
	Standard deviation	1.56	1.53		1.46	1.42		2.03	1.83		1.21	1.23	
EPS/Price (%):	Median	1.24	1.22	0.0000	1.30	1.26	0.0000	1.10	1.15	0.0000	1.14	1.11	0.0036
	Mean	0.58	-0.01	0.0000	0.79	0.26	0.0000	0.53	-0.17	0.0000	-0.35	-0.90	0.0000
	Standard deviation	4.95	6.76		4.15	5.74		4.91	7.42		7.76	8.97	
Revenues/Assets:	Median	0.21	0.21	0.0107	0.23	0.22	0.0000	0.20	0.21	0.0007	0.16	0.18	0.0000
	Mean	0.25	0.25	0.6108	0.26	0.25	0.0000	0.23	0.24	0.0000	0.21	0.22	0.0000
	Standard deviation	0.19	0.19		0.20	0.20		0.18	0.19		0.17	0.19	
ROE (%):	Median	3.48	3.21	0.0000	3.59	3.34	0.0000	3.51	3.18	0.0000	2.98	2.68	0.0000
	Mean	2.75	1.87	0.0000	2.79	2.02	0.0000	3.16	1.98	0.0000	1.91	0.96	0.0000
	Standard deviation	8.63	9.86		8.49	9.54		8.59	10.15		9.27	10.53	
Dividend Yield (%):	Median	0.94	0.76	0.0000	0.83	0.74	0.0000	1.06	0.76	0.0000	1.32	0.81	0.0000
	Mean	1.61	1.59	0.0453	1.57	1.57	0.7404	1.61	1.63	0.4879	1.83	1.63	0.0000
	Standard deviation	1.20	2.09		2.00	2.06		1.98	2.16		2.03	2.08	
Leverage Ratio:	Median	0.51	0.51	0.3004	0.46	0.47	0.0298	0.56	0.58	0.9590	0.65	0.57	0.0000
	Mean	0.86	0.91	0.0000	0.80	0.84	0.0000	0.95	0.99	0.0429	1.08	1.00	0.0001
	Standard deviation	1.33	1.43		1.28	1.40		1.37	1.48		1.45	1.46	
Stock Price Above 200-Day Moving Average		75.94%	69.24%	0.0000	76.43%	71.15%	0.0000	76.41%	67.22%	0.0000	72.79%	65.39%	0.0000
Number of Research Dept.-Stock Observations		45,576	341,683		30,363	196,008		9,097	102,116		6,116	43,559	

Panel B: Performance Indicators for Stocks Receiving Upgrades to Strong Buy

		All Periods			Subperiods								
		1995-2003			1995-1998			1999-2001			2002-2003		
		Upgraded	Not Upgraded	*P*-value	Upgraded	Not Upgraded	*P*-value	Upgraded	Not Upgraded	*P*-value	Upgraded	Not Upgraded	*P*-value
MBV Ratio:	Median	1.30	1.17	0.0000	1.31	1.20	0.0000	1.37	1.19	0.0000	1.11	1.05	0.4548
	Mean	1.83	1.65	0.0000	1.78	1.62	0.0000	2.07	1.95	0.0224	1.47	1.41	0.2596
	Standard deviation	1.57	1.53		1.59	1.42		2.03	2.03		1.29	1.19	
EPS/Price (%):	Median	1.25	1.24	0.0831	1.31	1.30	0.5867	1.08	1.11	0.5897	1.14	1.15	0.3018
	Mean	0.86	0.53	0.0000	0.94	0.75	0.0028	0.81	0.46	0.0077	0.23	-0.30	0.1111
	Standard deviation	3.81	5.15		3.40	4.29		3.76	5.15		6.60	7.59	
Revenues/Assets:	Median	0.22	0.21	0.0000	0.24	0.23	0.0000	0.20	0.20	0.8943	0.18	0.16	0.0527
	Mean	0.26	0.24	0.0000	0.27	0.26	0.0000	0.23	0.23	0.7974	0.22	0.20	0.0099
	Standard deviation	0.20	0.19		0.20	0.19		0.18	0.18		0.19	0.17	
ROE (%):	Median	3.77	3.42	0.0000	3.89	3.52	0.0000	3.64	3.46	0.0109	3.21	2.98	0.0873
	Mean	3.35	2.63	0.0000	3.32	2.67	0.0000	3.63	3.04	0.0112	2.67	1.99	0.0917
	Standard deviation	7.80	8.74		7.91	8.61		7.36	8.87		7.98	9.04	
Dividend Yield (%):	Median	0.64	1.02	0.0000	0.55	0.90	0.0000	0.79	1.13	0.0000	0.89	1.36	0.0003
	Mean	1.36	1.67	0.0000	1.34	1.62	0.0000	1.36	1.67	0.0000	1.53	1.86	0.0002
	Standard deviation	1.78	2.04		1.79	2.03		1.72	2.04		1.83	2.05	
Leverage Ratio:	Median	0.47	0.51	0.0000	0.44	0.47	0.0294	0.52	0.58	0.0112	0.59	0.66	0.3632
	Mean	0.84	0.87	0.0234	0.80	0.80	0.8381	0.88	0.97	0.0163	1.05	1.08	0.6589
	Standard deviation	1.33	1.33		1.33	1.27		1.30	1.39		1.42	1.44	
Stock Price Above 200-Day Moving Average		79.74%	75.02%	0.0000	79.60%	75.73%	0.0000	81.15%	75.23%	0.0000	76.67%	71.94%	0.0000
Number of Research Dept.-Stock Observations		7,888	38,409		5,491	24,872		1,814	7,283		583	6,254	

All performance indicators, except for the proportion of stocks whose prices exceed the 200-day moving averages, are determined in the quarter prior to the one when the report is released, and are winsorized at the 1% and 99% levels. The market-book value (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. Quarterly earnings per share (EPS) are scaled by stock price at the end of the quarter. Revenues/Assets are quarterly sales divided by total assets. Return on equity (ROE) is determined as earnings divided by the book value of equity. Dividend yield is determined as 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. *P*-values are obtained from two-sample Wilcoxon rank-sum (Mann-Whitney) tests of difference between medians and from two-sample standard *t*-tests of difference between means.

Table 4

Frequency and Optimism of Analyst Coverage by Research Department Affiliations and Subperiods

Panel A: Research Departments Affiliated with Investment Banks

	All Periods			Subperiods								
	1995-2003			1995-1998			1999-2001			2002-2003		
	Affiliated Research Depts.	Unaffiliated Research Depts.	*P*-value	Affiliated Research Depts.	Unaffiliated Research Depts.	*P*-value	Affiliated Research Depts.	Unaffiliated Research Depts.	*P*-value	Affiliated Research Depts.	Unaffiliated Research Depts.	*P*-value
Frequency of Coverage	13.74%	11.24%	0.0000	15.61%	12.82%	0.0000	9.46%	7.83%	0.0000	14.80%	11.65%	0.0000
Upgrades to Strong Buy	17.30%	16.95%	0.3949	18.65%	17.90%	0.1411	20.63%	19.71%	0.3442	7.34%	8.94%	0.0370
- Star Analysts	16.06%	16.20%	0.8564	18.15%	18.43%	0.7976	23.55%	20.64%	0.1324	5.58%	6.74%	0.2608
- Non-Star Analysts	17.80%	17.17%	0.1859	18.82%	17.77%	0.0744	19.48%	19.45%	0.9798	8.87%	10.11%	0.2580
Reiterations of Strong Buy	7.91%	5.39%	0.0000	8.13%	5.76%	0.0000	9.78%	5.38%	0.0000	4.63%	3.67%	0.0745
Strong Buys	25.21%	22.34%	0.0000	26.78%	23.66%	0.0000	30.41%	25.09%	0.0000	11.97%	12.61%	0.4742
Upgrades	31.06%	35.08%	0.0000	32.29%	36.15%	0.0000	35.73%	39.65%	0.0010	19.92%	24.07%	0.0004
Reiterations	27.94%	24.41%	0.0000	26.83%	22.62%	0.0000	23.09%	21.52%	0.1193	38.77%	36.43%	0.0787
Downgrades	41.00%	40.51%	0.3521	40.88%	41.23%	0.5817	41.18%	38.43%	0.0483	41.31%	39.50%	0.1824
Average Recommendation	2.17	2.31	0.0000	2.11	2.29	0.0000	2.05	2.16	0.0000	2.56	2.59	0.1519
Average (Rec. - Consensus)	0.05	0.09	0.0000	0.04	0.09	0.0000	-0.01†	0.04	0.0336	0.18	0.17	0.6941
No. of Res. Dept.-Stock Obs.	11,517	34,780		7,506	22,857		2,239	6,858		1,772	5,065	

Panel B: Research Departments Affiliated with Mutual Funds

	All Period			Subperiods								
	1995-2003			1995-1998			1999-2001			2002-2003		
	Affiliated Research Depts.	Unaffiliated Research Depts.	*P*-value	Affiliated Research Depts.	Unaffiliated Research Depts.	*P*-value	Affiliated Research Depts.	Unaffiliated Research Depts.	*P*-value	Affiliated Research Depts.	Unaffiliated Research Depts.	*P*-value
Frequency of Coverage	14.17%	10.56%	0.0000	15.38%	12.58%	0.0000	10.66%	6.67%	0.0000	17.40%	8.75%	0.0000
Upgrades to Strong Buy	17.26%	16.88%	0.2858	19.27%	17.46%	0.0001	21.61%	18.32%	0.0001	7.40%	10.22%	0.0000
- Star Analysts	16.29%	15.98%	0.6695	19.34%	17.54%	0.0684	23.10%	18.00%	0.0070	6.60%	5.66%	0.3918
- Non-Star Analysts	17.73%	17.07%	0.1168	19.24%	17.45%	0.0007	20.87%	18.37%	0.0094	8.10%	11.66%	0.0001
Reiterations of Strong Buy	5.52%	6.36%	0.0002	5.71%	6.74%	0.0001	7.54%	5.42%	0.0000	3.09%	5.16%	0.0000
Strong Buys	22.78%	23.24%	0.2469	24.88%	24.20%	0.1948	29.15%	23.74%	0.0000	10.49%	15.38%	0.0000
Upgrades	33.99%	34.14%	0.7283	36.65%	34.43%	0.0001	38.92%	38.46%	0.6528	21.82%	24.76%	0.0046
Reiterations	25.94%	24.84%	0.0071	22.91%	24.05%	0.0267	22.17%	21.66%	0.5554	37.76%	35.93%	0.1248
Downgrades	40.07%	41.02%	0.0408	40.43%	41.52%	0.0674	38.91%	39.88%	0.3434	40.42%	39.31%	0.3568
Average Recommendation	2.25	2.29	0.0003	2.19	2.28	0.0000	2.08	2.18	0.0000	2.62	2.54	0.0009
Average (Rec. - Consensus)	0.06	0.10	0.0000	0.03	0.11	0.0000	-0.01†	0.07	0.0000	0.19	0.13	0.0029
No. of Res. Dept.-Stock Obs.	18,992	27,305		10,356	20,007		4,481	4,616		4,155	2,682	

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 quarter *t*, the first rating is the one included. The 721 reports issued from September 8 to September 9, 2002 to comply with NASD Rule 2711 are included in the analysis of optimism to correctly establish the changes in recommendations. Consensus is the average rating assigned by following analysts to a given stock in a quarter. There are 1,860 missing values of the consensus. A research department is regarded as affiliated with an investment bank 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 for the stock covered by that research department. A research department is regarded as affiliated with mutual funds when the affiliated mutual funds held, at the end of quarter *t*-1, the stock covered by that department. Star analysts are identified by using the annual All-American Research ranking issued by *Institutional Investor* every October. The *p*-values for differences within subsample means are from standard *t*-tests. Average deviations from consensus are different from zero at the 1% level except for the ones with a † superscript.

Table 5

Frequency and Optimism of Analyst Coverage by Portfolio Weight Quintiles for Affiliated Mutual Funds

Portfolio Weight Quintiles	Indicators	All Periods	Subperiods		
			1995-1998	1999-2001	2002-2003
1 – Small Portfolio Weight Mid-range point = 0.001%	Frequency of Coverage (a)	10.49%	12.89%	6.61%	10.56%
	Upgrades to Strong Buy (b)	14.67%	16.68%	15.04%	7.34%
	Reiterations of Strong Buy	4.93%	5.17%	5.29%	3.67%
	Strong Buys	19.60%	21.85%	20.33%	11.01%
	Upgrades	34.81%	36.22%	40.11%	24.16%
	Reiterations	25.90%	23.46%	22.28%	38.22%
	Downgrades	39.29%	40.32%	37.61%	37.62%
	Average Recommendation	2.34	2.27	2.20	2.72
	Average (Rec. – Consensus)	0.10	0.09	0.01†	0.24
	Number of Reports	2,737	1,736	556	445
	Number of Uncensored Obs.	26,099	13,473	8,413	4,213
2 Mid-range point = 0.006%	Frequency of Coverage	12.83%	14.96%	9.02%	13.64%
	Upgrades to Strong Buy	15.79%	18.36%	17.65%	5.75%
	Reiterations of Strong Buy	4.27%	4.67%	5.62%	1.47%
	Strong Buys	20.06%	23.03%	23.27%	7.22%
	Upgrades	32.63%	34.43%	37.51%	21.53%
	Reiterations	25.93%	23.37%	23.27%	36.87%
	Downgrades	41.44%	42.20%	39.22%	41.60%
	Average Recommendation	2.31	2.20	2.19	2.78
	Average (Rec. – Consensus)	0.08	0.03†	0.02†	0.29
	Number of Reports	3,347	2,015	758	574
	Number of Uncensored Obs.	26,082	13,467	8,406	4,209
3 Mid-range point = 0.024%	Frequency of Coverage	14.65%	15.42%	11.29%	18.90%
	Upgrades to Strong Buy	15.91%	18.00%	20.88%	6.28%
	Reiterations of Strong Buy	4.47%	3.96%	7.88%	2.23%
	Strong Buys	20.38%	21.96%	28.76%	8.51%
	Upgrades	33.24%	36.49%	38.59%	20.55%
	Reiterations	26.12%	21.87%	23.13%	38.77%
	Downgrades	40.64%	41.64%	38.28%	40.68%
	Average Recommendation	2.30	2.22	2.06	2.72
	Average (Rec. – Consensus)	0.07	0.05	-0.01†	0.23
	Number of Reports	3,821	2,076	949	796
	Number of Uncensored Obs.	26,087	13,467	8,408	4,212
4 Mid-range point = 0.091%	Frequency of Coverage	16.15%	16.64%	13.07%	21.17%
	Upgrades to Strong Buy	16.75%	18.66%	22.84%	6.52%
	Reiterations of Strong Buy	5.46%	5.52%	7.36%	3.39%
	Strong Buys	22.21%	24.18%	30.20%	9.91%
	Upgrades	33.03%	35.90%	40.44%	19.46%
	Reiterations	25.96%	21.59%	20.22%	40.92%
	Downgrades	41.01%	42.51%	39.34%	39.62%
	Average Recommendation	2.27	2.21	2.06	2.61
	Average (Rec. – Consensus)	0.06	0.04	-0.01†	0.17
	Number of Reports	4,213	2,241	1,099	891
	Number of Uncensored Obs.	26,082	13,467	8,406	4,209

continued on next page

Portfolio Weight Quintiles	Indicators	All Periods	Subperiods		
			1995-1998	1999-2001	2002-2003
5 – Large Portfolio Weight Mid-range point = 0.721%	Frequency of Coverage (c)	16.35%	17.00%	13.32%	20.30%
	Upgrades to Strong Buy (d)	18.83%	20.20%	23.72%	9.37%
	Reiterations of Strong Buy	7.72%	7.99%	9.64%	4.68%
	Strong Buys	26.55%	28.19%	33.36%	14.05%
	Upgrades	33.89%	36.31%	37.20%	23.62%
	Reiterations	25.27%	23.41%	22.44%	33.51%
	Downgrades	40.84%	40.28%	40.36%	42.87%
	Average Recommendation	2.17	2.15	2.01	2.41
	Average (Rec. – Consensus)	0.04	0.03†	-0.05	0.13
	Number of Reports	4,261	2,288	1,119	854
	Number of Uncensored Obs.	26,068	13,460	8,401	4,207
	P-value (a) – (c)	0.0000	0.0000	0.0000	0.0000
	P-value (b) – (d)	0.0001	0.0129	0.0005	0.2656

A research department is regarded as affiliated with mutual funds when the affiliated mutual funds held, at the end of quarter t-1, the stock covered by that research department. Portfolio weight is defined as the weight of stock j in the mutual fund portfolios at the end of quarter t-1 and adjusted as if the stock price has not changed from the end of quarter t-2 to the end of quarter t-1, $\frac{p^j_{t-2} \times S^j_{t-1}}{\left(\sum_{J \to 1}^{J-1} p^J_{t-1} \times S^J_{t-1}\right) - S^j_{t-1} \times \left(p^j_{t-1} - p^j_{t-2}\right)}$ (where p and S are stock price and number of shares held at the end of the quarter, respectively). The proportion of sample stocks that are not covered during quarter t is the complement of the frequency of coverage. *P*-values for differences within subsample means are from standard t-tests. Average deviations from consensus are different from zero at the 1% level except for the ones with a † superscript.

Table 6

Frequency and Optimism of Analyst Coverage in Response to Changes in Research Department Affiliations

Panel A: Affiliated Mutual Funds Load Stock *j* during Quarter Q_0

	Affiliated Mutual Funds Do Not Hold Stock *j*				Affiliated Mutual Funds Hold Stock *j*				
	Q_{-4}	Q_{-3}	Q_{-2}	Q_{-1}	Q_0	Q_{+1}	Q_{+2}	Q_{+3}	Q_{+4}
Active Change in Portfolio Weight	-0.01%	--	--	--	+0.11%	+0.05%	-0.08%	-0.01%	-0.00%
Frequency of Coverage	9.39%	10.89%	9.56%	11.01%	13.27%	12.22%	12.34%	12.17%	9.97%
Upgrades to Strong Buy	19.14%	22.34%	22.42%	16.32%	22.27%	23.96%	24.41%	15.24%	20.93%
Reiterations of Strong Buy	6.79%	3.72%	5.45%	7.89%	8.73%	7.29%	17.37%	18.57%	8.14%
Strong Buys	25.93%	26.06%	27.88%	24.21%	31.00%	31.25%	41.78%	33.81%	29.07%
Upgrades	35.19%	40.43%	43.64%	39.47%	45.41%	45.83%	41.31%	31.43%	37.79%
Reiterations	20.99%	18.62%	19.39%	17.89%	27.51%	21.35%	26.76%	30.47%	22.67%
Downgrades	43.83%	40.43%	36.97%	42.63%	27.07%	32.81%	31.92%	38.10%	39.54%
Average Recommendation	2.23	2.17	2.08	2.23	2.11	2.10	1.87	2.04	2.13
Average Consensus	2.17	2.15	2.05	2.13	2.13	2.13	2.04	2.04	2.17
Average (Rec. - Consensus)	0.06†	0.02†	0.03†	0.10	-0.02†	-0.03†	-0.17	-0.01†	-0.04†
Number of Reports	162	188	165	190	229	211	213	210	172
Number of Uncensored Obs.	1,726	1,726	1,726	1,726	1,726	1,726	1,726	1,726	1,726

Panel B: Affiliated Mutual Funds Unload Stock *j* during Quarter Q_0

	Affiliated Mutual Funds Hold Stock *j*				Affiliated Mutual Funds Do Not Hold Stock *j*				
	Q_{-4}	Q_{-3}	Q_{-2}	Q_{-1}	Q_0	Q_{+1}	Q_{+2}	Q_{+3}	Q_{+4}
Active Change in Portfolio Weight	+0.01%	-0.03%	-0.01%	-0.01%	-0.15%	--	--	--	--
Frequency of Coverage	12.91%	12.85%	11.49%	10.69%	6.27%	7.99%	7.25%	7.25%	7.13%
Upgrades to Strong Buy	24.76%	17.70%	22.99%	19.54%	14.08%	16.15%	12.71%	16.10%	18.10%
Reiterations of Strong Buy	7.62%	8.61%	5.88%	5.17%	4.93%	10.77%	5.08%	11.02%	6.90%
Strong Buys	32.38%	26.31%	28.87%	24.71%	19.01%	26.92%	17.79%	27.12%	25.00%
Upgrades	41.42%	33.01%	37.43%	36.78%	28.17%	26.92%	34.75%	32.20%	38.79%
Reiterations	21.90%	29.67%	25.67%	20.12%	21.83%	25.39%	25.42%	24.58%	27.59%
Downgrades	36.38%	37.32%	36.90%	43.10%	50.00%	47.69%	39.83%	43.22%	33.62%
Average Recommendation	2.08	2.20	2.16	2.20	2.37	2.34	2.26	2.22	2.19
Average Consensus	2.13	2.20	2.21	2.24	2.21	2.21	2.21	2.18	2.19
Average (Rec. - Consensus)	-0.05†	-0.00†	-0.05†	-0.04†	0.16	0.13	0.05†	0.04†	0.00†
Number of Reports	210	209	187	174	102	130	118	118	116
Number of Uncensored Obs.	1,627	1,627	1,627	1,627	1,627	1,627	1,627	1,627	1,627

Panel C: Affiliated Investment Bank Hired/Replaced as an Underwriter for Stock *j* during the SEO quarter Q_0

	Affiliated Invest. Bank Did Not Underwrite		Affiliated Investment Bank Underwrites Stock *j*			Affiliated Investment Bank Underwrote		Affiliated Investment Bank Does Not Underwrite Stock *j*		
	Q_{-8}-Q_{-5}	Q_{-4}-Q_{-1}	Q_0	Q_{+1}-Q_{+4}	Q_{+5}-Q_{+8}	Q_{-8}-Q_{-5}	Q_{-4}-Q_{-1}	Q_0	Q_{+1}-Q_{+4}	Q_{+5}-Q_{+8}
Frequency of Coverage	17.24%	16.42%	24.60%	17.16%	16.39%	13.23%	10.40%	12.85%	9.65%	12.00%
Upgrades to Strong Buy	24.32%	28.16%	22.33%	16.54%	14.12%	22.29%	22.22%	7.69%	16.67%	19.30%
Reiterations of Strong Buy	4.95%	9.75%	20.39%	13.24%	9.04%	10.83%	8.19%	19.23%	8.33%	6.14%
Strong Buys	29.27%	37.91%	42.72%	29.78%	23.16%	33.12%	30.41%	26.92%	25.00%	25.44%
Upgrades	43.24%	45.49%	35.92%	26.84%	22.60%	33.76%	42.10%	19.23%	27.08%	33.33%
Reiterations	22.07%	24.55%	47.57%	34.19%	27.68%	26.75%	25.15%	40.38%	34.03%	27.19%
Downgrades	34.68%	29.96%	16.51%	38.97%	49.72%	39.49%	32.75%	40.39%	38.89%	39.48%
Average Recommendation	2.09	1.86	1.77	2.02	2.24	1.99	1.98	2.27	2.24	2.23
Average Consensus	2.02	1.87	1.84	1.96	2.13	2.02	1.91	2.01	2.00	2.06
Average (Rec. - Consensus)	0.07†	-0.01†	-0.07†	0.06†	0.11	-0.03†	0.07†	0.26	0.24	0.17
Number of Reports	225	293	109	290	190	161	178	55	155	123
Number of Observations	1,305	1,784	443	1,690	1,159	1,217	1,712	428	1,606	1,025

In Panel A the event occurs during quarter 0 when the affiliated mutual funds first add stock *j* in their portfolios. The sample is limited to those observations where the affiliated mutual funds have not held the stock for at least four quarters before quarter 0 (i.e., in quarters Q_{-4}, Q_{-3}, Q_{-2}, and Q_{-1}) and they have been holding the stock for at least four quarters after quarter 0 (i.e., in quarters Q_{+1}, Q_{+2}, Q_{+3}, and Q_{+4}). In Panel B the event occurs during quarter 0 when the affiliated mutual funds completely unload stock *j* in their portfolios. The sample is limited to those observations where the affiliated mutual funds have been holding the stock for at least four quarters before quarter 0 (i.e., in quarters Q_{-4}, Q_{-3}, Q_{-2}, and Q_{-1}) and they do not hold the stock anymore for at least four quarters after quarter 0 (i.e., in quarters Q_{+1}, Q_{+2}, Q_{+3}, and Q_{+4}). Active change in portfolio weight is defined as the difference between the adjusted weight of stock *j* in the mutual fund portfolios at the end of quarter *t* —as if the stock price has not changed from the end of quarter *t*-1— and the weight of stock *j* in the mutual fund portfolios at the end of quarter *t*-1, $\frac{p_{t-1}^{j} \times S_{t}^{j}}{\left(\sum_{J \to 1}^{J-1} p_{t}^{J} \times S_{t}^{J}\right) - S_{t}^{j} \times \left(p_{t}^{j} - p_{t-1}^{j}\right)} - \frac{p_{t-1}^{j} \times S_{t-1}^{j}}{\left(\sum_{J \to 1}^{J-1} p_{t-1}^{J} \times S_{t-1}^{J}\right) + \left(p_{t-1}^{j} \times S_{t-1}^{j}\right)}$ (where *p* and *S* are stock price and number of shares held at the end of the quarter, respectively). In Panel C the SEO quarter 0 marks the event when the affiliated investment bank is hired (replaced) as an underwriter for stock *j*. Average deviations from consensus are different from zero at the 1% level except for the ones with a † superscript.

Table 7

Models of the Probability that Research Departments Will (Optimistically) Cover a Stock

Panel A: Cox Proportional Hazards Model for the Probability that a Research Department Will Release a Report

	1	2	3	4
S&P500 COMPONENT$_t$ dummy	0.01	0.01	0.18***	0.17***
NASDAQ-LISTED$_t$ dummy	-0.04**	-0.04**	-0.04***	-0.05***
AMEX-LISTED$_t$ dummy	-0.17**	-0.17**	-0.10***	-0.12***
OTHER MARKETS-TRADED$_t$ dummy	-0.17***	-0.17***	-0.36***	-0.36***
UTILITY$_t$ dummy	-0.10***	-0.10***	-0.05***	-0.09***
TECH$_t$ dummy	0.04	0.04	0.02**	0.02**
MARKET-BOOK VALUE RATIO$_{t-1}$	0.06***	0.06***	0.09***	0.09***
EPS/P$_{t-1}$	1.88***	1.88***	1.43***	1.41***
REVENUES/ASSETS$_{t-1}$	0.26***	0.26***	0.15***	0.21***
ROE$_{t-1}$	0.10	0.11	0.40***	0.32**
DIVIDEND YIELD$_{t-1}$	2.08***	2.09***	0.56**	0.07
LEVERAGE RATIO$_{t-1}$	-0.05***	-0.05***	-0.00***	-0.00
PRICE ABOVE 200-DAY MOVING AVERAGE$_t$ dummy	0.26***	0.26***	0.09***	0.07***
SEO$_t$ dummy	0.06	0.06	0.19***	0.17***
SEO$_t$ x INVESTMENT BANKING AFFILIATION$_t$ dummy	0.76***	--	0.75***	0.75***
SEO$_t$ x CONFIRMED AFFILIATED INVESTMENT BANK$_t$ dummy		0.84***		
SEO$_t$ x HIRED AFFILIATED INVESTMENT BANK$_t$ dummy		0.61***		
SEO$_t$ x REPLACED AFFILIATED INVESTMENT BANK$_t$ dummy		-0.05		
INVESTMENT BANKING AFFILIATION$_t$ dummy	0.06***	0.06***	0.06***	0.04***
MUTUAL FUND AFFILIATION$_{t-1}$ dummy	0.18***	--	0.13***	0.15***
LOAD BY AFFILIATED MUTUAL FUNDS$_{t-1}$ dummy		0.26***		
MORE LOAD BY AFFILIATED MUTUAL FUNDS$_{t-1}$ dummy		0.20***		
LESS LOAD BY AFFILIATED MUTUAL FUNDS$_{t-1}$ dummy		0.14***		
UNLOAD BY AFFILIATED MUTUAL FUNDS$_{t-1}$ dummy		0.02		
RESEARCH DEPARTMENT SIZE$_t$	0.02***	0.02***	0.02***	0.02***
LN(MARKET CAPITALIZATION)$_{t-1}$	0.06***	0.06***	0.02***	0.02***
Late Initiations of Coverage	No	No	Yes	Yes
Always-Affiliated Research Department-Stock Obs.	Yes	Yes	Yes	No
Never-Affiliated Research Department-Stock Obs.	Yes	Yes	Yes	No
Wald χ^2	1,480.82	1,540.47	17,439.06	6,396.46
Prob. > χ^2	0.0000	0.0000	0.0000	0.0000
Number of Failures	41,487	41,487	247,680	94,686
Number of Res. Dept.-Stock Observations at Risk x Quarters	354,501	354,501	2,659,788	926,821

Panel B: Cox Proportional Hazards Model that Research Departments Will Release an Optimistic Report

	Better than Consensus	Strong Buy	Upgrade	Upgrade to Strong Buy					Downgrade to Hold or Worse	Downgrade to Underperform or Sell
	1	2	3	4	5	6	7	8	9	10
S&P500 COMPONENT$_t$ dummy	-0.06	-0.04	-0.04	-0.02	-0.02	-0.10	-0.18***	-0.20***	0.01	0.01
NASDAQ-LISTED$_t$ dummy	-0.08***	-0.17***	-0.09***	-0.15***	-0.15***	-0.27***	-0.13***	-0.22***	0.00	0.10***
AMEX-LISTED$_t$ dummy	-0.07	-0.03	-0.30***	-0.19	-0.19	-0.79	-0.12	-0.27	0.07	0.03
OTHER MARKETS-TRADED$_t$ dummy	-0.13**	-0.14***	-0.15***	-0.19***	-0.19***	-0.31**	-0.34***	-0.45***	0.45***	0.52***
UTILITY$_t$ dummy	-0.07*	-0.22***	-0.07*	-0.07	-0.07	-0.03	-0.12***	-0.08*	0.00	0.24***
TECH$_t$ dummy	0.03	0.08***	0.03	0.03	0.04	0.11	0.01	0.03	-0.06***	-0.00
MARKET-BOOK VALUE RATIO$_{t-1}$	0.06***	0.09***	0.07***	0.09***	0.09***	0.11***	0.13***	0.12***	-0.09***	-0.08***
EPS/P$_{t-1}$	2.26***	3.09***	2.46***	2.75***	2.74***	2.85***	2.83***	2.89***	-0.78***	-0.03
REVENUES/ASSETS$_{t-1}$	0.21***	0.12*	0.22***	0.12*	0.12*	0.29**	0.18***	0.37***	-0.04	-0.10
ROE$_{t-1}$	0.05	0.63***	0.24	0.64***	0.65***	0.10	0.01	0.57*	-0.30*	-0.16
DIVIDEND YIELD$_{t-1}$	-3.00***	-1.00*	-4.69***	-1.95***	-1.97***	-1.25*	-0.65*	-1.86**	1.50***	5.29***
LEVERAGE RATIO$_{t-1}$	-0.05***	-0.03***	-0.05***	-0.03***	-0.03***	-0.00	-0.01	-0.01	0.02***	0.03***
PRICE ABOVE 200-DAY MOVING AVERAGE$_t$ dummy	0.34***	0.42***	0.35***	0.42***	0.42***	0.47***	0.22***	0.23***	-0.52***	-0.78***
SEO$_t$ dummy	0.08	0.24**	0.01	0.16	0.25**	0.31**	0.10**	0.04	-0.08	-0.35**
SEO$_t$ X INVESTMENT BANKING AFFILIATION$_t$ dummy	1.08***	1.10***	0.82***	0.81***	--	0.98***	0.95***	0.93***	-0.03	-0.06
SEO$_t$ X CONFIRMED AFF. INV. BANK$_t$ dummy					0.82***	--	--	--		
SEO$_t$ X HIRED AFF. INV. BANK$_t$ dummy					0.57***	--	--	--		
SEO$_t$ X REPLACED AFF. INV. BANK$_t$ dummy					-0.53*	--	--	--		
INVESTMENT BANKING AFFILIATION$_t$ dummy	-0.02	-0.11**	-0.03	-0.07**	-0.07**	-0.16***	-0.06**	-0.08**	-0.04***	-0.02
MUTUAL FUND AFFILIATION$_{t-1}$ dummy	0.28***	0.20***	0.16***	0.15***	--	--	0.19***	--	0.03***	-0.05***
LOAD BY AFF. MUTUAL FUNDS$_{t-1}$ dummy					0.30***	--		--		
MORE LOAD BY AFF. MUTUAL FUNDS$_{t-1}$ dummy					0.21***	--		--		
LESS LOAD BY AFF. MUTUAL FUNDS$_{t-1}$ dummy					0.05	--		--		
UNLOAD BY AFF. MUTUAL FUNDS$_{t-1}$ dummy					0.03	--		--		
PORTFOLIO WEIGHT FOR AFF. MUTUAL FUNDS$_{t-1}$						0.08***		0.04***		
LN(AMOUNT INVESTED BY AFF. MUTUAL FUNDS)$_{t-1}$						0.06***		0.01*		
HOLDINGS BY OTHER MUTUAL FUNDS$_{t-1}$						-0.01***		-0.00***		
NUMBER OF OTHER MUTUAL FUNDS $_{t-1}$						-0.17***		-0.06***		
STAR ANALYST$_t$ dummy						2.02***		1.53***		
RESEARCH DEPARTMENT SIZE$_t$	-0.00	-0.04***	-0.01	-0.03***	-0.03***	-0.09***	-0.04***	-0.04***	0.03***	0.01***
LN(MARKET CAPITALIZATION)$_{t-1}$	-0.11***	-0.17***	-0.14***	-0.18***	-0.18***	-0.24***	-0.17***	-0.24***	-0.05***	-0.04***
Late Initiations of Coverage	No	No	No	No	No	No	Yes	Yes	Yes	Yes
Always-Affiliated Research Department-Stock Obs.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
Never-Affiliated Research Department-Stock Obs.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
Wald χ^2	1,063.41	1,448.81	1,112.13	929.51	967.16	2,295.31	5,346.48	2,314.05	3,565.93	1,183.17
Prob. > χ^2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Number of Failures	16,844	9,771	14,418	7,268	7,268	2,909	28,911	6,949	22,504	3,453
No. of Res. Dept.-Stock Obs. at Risk x Quarters	354,501	354,501	354,501	354,501	354,501	119,036	2,659,788	459,045	912,819	912,819

Panel C: Probit for Probability that Research Departments Will Release a Report/an Optimistic Report

	Frequency of Coverage				Upgrades to Strong Buy			
		Subperiods				Subperiods		
	All Periods	1995-1998	1999-2001	2002-2003	All Periods	1995-1998	1999-2001	2002-2003
	1	2	3	4	5	6	7	8
S&P500 COMPONENT$_t$ dummy	0.02	0.00	0.02	0.05*	-0.08***	-0.07***	0.02	-0.25***
NASDAQ-LISTED$_t$ dummy	-0.02*	-0.04***	-0.01	-0.01	-0.03	-0.01	-0.10**	0.11*
AMEX-LISTED$_t$ dummy	-0.12***	-0.10**	-0.29**	-0.28**	-0.12	-0.12	-0.11	-0.33
OTHER MARKETS-TRADED$_t$ dummy	-0.00	-0.02	-0.16***	-0.28***	-0.16***	-0.15***	-0.37***	0.11
UTILITY$_t$ dummy	-0.13***	-0.14***	-0.23***	0.00	-0.10***	-0.10**	-0.04	-0.40***
TECH$_t$ dummy	0.03	0.05***	0.01	-0.06	0.03	0.03	0.01	-0.21**
MARKET-BOOK VALUE RATIO$_{t-1}$	0.00	0.00	0.00	-0.02**	0.02***	0.02***	-0.01	-0.02
EPS/P$_{t-1}$	0.58***	0.71***	0.13	-0.21	0.41	0.24	0.32	0.34
REVENUES/ASSETS$_{t-1}$	0.11***	0.15***	0.01	0.05	0.04	0.06	-0.19**	0.17
ROE$_{t-1}$	0.05	0.09	0.07	0.05	0.31**	0.32**	0.28	0.13
DIVIDEND YIELD$_{t-1}$	0.14	0.05	0.89**	1.08**	-4.18***	-4.41***	-5.42***	-2.46
LEVERAGE RATIO$_{t-1}$	-0.01***	-0.01**	-0.00	0.00	-0.01**	-0.02***	-0.02*	0.03
PRICE ABOVE 200-DAY MOVING AVERAGE$_t$ dummy	0.09***	0.06***	0.06***	0.05**	0.12***	0.07***	0.19***	0.15***
SEO$_t$ dummy	0.03	0.01	0.03	0.11*	0.06	0.06	0.01	0.24
SEO$_t$ x INV. BANKING AFFILIATION$_t$ dummy	0.38***	0.37***	0.15	0.16	0.09	0.03	0.87***	0.11
INV. BANKING AFFILIATION$_t$ dummy	0.17***	0.17***	0.19***	0.22***	0.02*	0.04**	0.04	-0.06
MUTUAL FUND AFFILIATION$_{t-1}$ dummy	0.10***	0.06***	0.14***	0.26***	0.10***	0.10***	0.17***	-0.02
RESEARCH DEPARTMENT SIZE$_t$	0.06***	0.03***	0.09***	0.15***	-0.09***	-0.06***	-0.06***	-0.13***
LN(MARKET CAPITALIZATION)$_{t-1}$	0.04***	0.05***	0.08***	0.10***	-0.01***	-0.03***	-0.01	0.06***
Constant	-1.81***	-1.64***	-2.36***	-2.62***	-1.02***	-1.12***	-0.71***	-1.56***
Wald χ^2	2,650.43	1,115.91	1,621.09	2,124.40	627.44	286.71	146.94	181.68
Prob. > χ^2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Pseudo R^2	0.0203	0.0114	0.0451	0.1011	0.0155	0.0106	0.0168	0.0511
No. of Res. Dept.-Stock Obs. x Quarters	354,501	208,027	100,783	45,691	42,143	27,639	8,304	6,200

In Panel A, the failure event is the release of one report on stock *j* by research department *i* during quarter *t*. When a research department releases more than one report on a stock during quarter *t*, the first rating is the one included. Analysis is performed on 36 quarters, from 1995 through 2003. The fourth quarter of 1994 represents time 0. The 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.

$\lambda\{t/N(t), Z(S\&P500$ COMPONENT$_t$ dummy, NASDAQ-LISTED$_t$ dummy, AMEX-LISTED$_t$ dummy, OTHER MARKETS-TRADED$_t$ dummy, UTILITY$_t$ dummy, TECH$_t$ dummy, MARKET-BOOK VALUE RATIO$_{t-1}$, EPS/P$_{t-1}$, REVENUES/ASSETS$_{t-1}$, ROE$_{t-1}$, DIVIDEND YIELD$_{t-1}$, LEVERAGE RATIO$_{t-1}$, PRICE ABOVE 200-DAY MOVING AVERAGE$_t$ dummy, SEO$_t$ dummy, SEO$_t$ x INVESTMENT BANKING AFFILIATION$_t$ dummy, INVESTMENT BANKING AFFILIATION$_t$ dummy, MUTUAL FUND AFFILIATION$_{t-1}$ dummy, RESEARCH DEPARTMENT SIZE$_t$, LN(MARKET CAPITALIZATION)$_{t-1}$,)$\}$

All covariates are time-varying variables. 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. OTHER MARKETS-TRADED is a dummy equal to one when a stock is traded over-the-counter or on a regional exchange, such as Boston, Chicago, Cincinnati, Pacific, and Philadelphia stock exchanges.

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 listed in Loughran and Ritter (2004). Performance indicators refer to the prior quarter, *t*-1; they are all winsorized at the 1% and 99% levels. 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 each quarter. 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 ABOVE 200-DAY MOVING AVERAGE is equal to one when the daily price happens to exceed the 200-day arithmetic moving average during quarter *t*. SEO is a dummy variable equal to one when a stock-firm *j* issues new shares during quarter *t*. INVESTMENT BANKING AFFILIATION has value one when the research department is affiliated with the investment bank serving as a lead-manager or co-lead manager for the covered stock. SEO x INVESTMENT BANKING AFFILIATION is the interaction variable between SEO and INVESTMENT BANKING AFFILIATION. MUTUAL FUND AFFILIATION has value one when the research department is affiliated with the mutual funds holding the covered stock at the end of quarter *t*-1. RESEARCH DEPARTMENT SIZE is the number of analysts working for a given brokerage house (in hundreds). LN(MARKET CAPITALIZATION) is the natural logarithm of market value in million of dollars at the end of the prior quarter. PORTFOLIO 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 and adjusted as if the stock price has not changed between the end of quarter *t*-2 and the end of quarter *t*-1. LN(AMOUNT 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 (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.

In Panel B, the failure event is the release by research department *i* of a recommendation on stock *j* in quarter *t*. The 721 reports issued from September 8 to September 9, 2002 to comply with NASD Rule 2711 are included in the sample.

Panel C reports the probit coefficients for the probability that a research department *i* will issue a report on stock *j* in quarter *t* and for the probability that a research department *i* will upgrade stock *j* to a "strong buy" rating in quarter *t*.

In all models, *z*-statistics are Lin and Wei's (1989) heteroskedasticity-adjusted. Standard errors are adjusted for intra-group correlation among stocks and research departments. *** indicates different from zero at the 1% level, ** at the 5% level, and * at the 10% level.

Table 8

Random-Effects GLS Model of Active Changes in Portfolio Weight in Affiliated Mutual Funds

	Res. Dept. Effects	Firm Effects	Res. Dept. Effects	Firm Effects
	1a	1b	2a	2b
UPGRADE TO STRONG BUY$_{t-1}$ dummy [LAGGED]	0.00 (0.23)	0.00 (0.12)		
DOWNGRADE $_{t-1}$ dummy [LAGGED]	-0.01 (-1.40)	-0.01 (-1.29)		
UPGRADE TO STRONG BUY BY STAR ANALYST$_{t-1}$ dummy [LAGGED]	0.02 (1.29)	0.01 (0.91)		
DOWNGRADE BY STAR ANALYST$_{t-1}$ dummy [LAGGED]	-0.01 (-1.21)	-0.01 (-1.11)		
UPGRADE TO STRONG BUY$_t$ dummy			0.00 (0.55)	0.00 (0.41)
DOWNGRADE $_t$ dummy			-0.01 (-1.48)	-0.01 (-1.49)
UPGRADE TO STRONG BUY BY STAR ANALYST$_t$ dummy			0.01 (0.89)	0.02 (1.16)
DOWNGRADE BY STAR ANALYST$_t$ dummy			-0.01 (-1.20)	-0.01 (-0.74)
CHANGE IN STOCK PRICE$_t$	-0.34***	-0.35***	-0.34***	-0.35***
CHANGE IN NUMBER OF SHARES OUTSTANDING$_t$	0.05***	0.05***	0.05***	0.05***
CHANGE IN MARKET-BOOK VALUE RATIO$_t$	0.00	0.00	0.00	0.00
CHANGE IN EPS/P$_t$	0.04	0.04	0.04	0.04
CHANGE IN REVENUES/ASSETS$_t$	0.03	0.03	0.03	0.03
CHANGE IN ROE$_t$	0.05***	0.05***	0.05***	0.05***
CHANGE IN DIVIDEND YIELD$_t$	0.31	0.30	0.32	0.31
CHANGE IN LEVERAGE RATIO$_t$	-0.00	-0.00	-0.00	-0.00
CHANGE IN HOLDINGS BY OTHER MUTUAL FUNDS$_t$	0.05***	0.05***	0.05***	0.05***
CHANGE IN NUMBER OF OTHER MUTUAL FUNDS$_t$	0.07***	0.07***	0.07***	0.07***
Wald χ^2	9,918.76	9,797.31	9,917.74	9,797.72
Prob. > χ^2	0.0000	0.0000	0.0000	0.0000
R^2 within subjects	0.0797	0.0836	0.0797	0.0836
R^2 between subjects	0.0400	0.0609	0.0386	0.0647
Overall R^2	0.0788	0.0788	0.0788	0.0788
Number of Research Dept.-Stock Observations	114,553	114,553	114,553	114,553

The dependent variable is the active change in the percent portfolio weight held by affiliated mutual funds between the end of quarter t-1 and the end of quarter t. Active change in portfolio weight is defined as the difference between the adjusted weight of stock j in the mutual fund portfolios at the end of quarter t —as if the stock price has not changed during quarter t— and the weight of stock j in the mutual fund portfolios at the end of quarter t-1, $\frac{p_{t-1}^{j} \times S_{t}^{j}}{\left(\sum_{J \to 1}^{J-1} p_{t}^{J} \times S_{t}^{J}\right) - S_{t}^{j} \times \left(p_{t}^{j} - p_{t-1}^{j}\right)} - \frac{p_{t-1}^{j} \times S_{t-1}^{j}}{\left(\sum_{J \to 1}^{J-1} p_{t-1}^{J} \times S_{t-1}^{J}\right) + \left(p_{t-1}^{j} \times S_{t-1}^{j}\right)}$ (where p and S are stock price and number of shares held at the end of the quarter, respectively). A constant intercept is estimated but not reported. CHANGE IN STOCK PRICE, CHANGE IN NUMBER OF SHARES OUTSTANDING, CHANGE IN HOLDINGS BY OTHER MUTUAL FUNDS, and CHANGE IN NUMBER OF OTHER MUTUAL FUNDS are divided by 100. Star analysts are identified by using the annual All-American Research ranking issued by *Institutional Investor* every October. White's heteroskedasticity-adjusted z-statistics for the variables of interest are in parentheses.

Table 9

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

	Upgrades to			Reiterations to			Downgrades to		
	Affiliated Res. Dept.	Unaffiliated Res. Dept.	*P*-value	Affiliated Res. Dept.	Unaffiliated Res. Dept.	*P*-value	Affiliated Res. Dept.	Unaffiliated Res. Dept.	*P*-value
Panel A: All Recommendations									
Strong Buy	1.59% N=3,135	1.12% N=4,684	0.0001	0.28%† N=1,034	-0.15%† N=1,719	0.0403	--	--	
Buy	1.26% N=2,704	1.16% N=3,856	0.0256	0.18%† N=1,675	-0.08%† N=2,581	0.0133	-1.16% N=2,243	-1.00% N=2,732	0.2666
Hold	0.18%† N=418	0.46% N=788	0.3437	-0.07%† N=2,000	-0.03%† N=2,253	0.4487	-1.38% N=4,603	-1.32% N=6,876	0.3675
Underperform or Sell	-1.50%† N=10	0.63%† N=35	0.0560	-0.82% N=131	-0.30%† N=176	0.0783	-0.57% N=811	-1.00% N=1,382	0.0248
All Ratings	1.33% N=6,267	1.06% N=9,363	0.0000	0.04%† N=4,840	-0.09%† N=6,729	0.1069	-1.23% N=7,657	-1.21% N=10,990	0.6232
Panel B: Recommendations from Small Research Departments									
Strong Buy	0.40% N=690	0.97% N=2,659	0.0014	-0.02%† N=257	-0.07%† N=1,035	0.8777	--	--	
Buy	0.36% N=512	0.84% N=1,941	0.0153	-0.13%† N=160	-0.24%† N=1,294	0.4714	-1.28% N=348	-1.27% N=1,522	0.8897
Hold	-0.35%† N=80	0.42%† N=353	0.0399	0.48%† N=243	0.24%† N=918	0.4822	-0.70% N=888	-1.16% N=3,587	0.0006
Underperform or Sell	-1.39%† N=3	-1.38%† N=15	0.8589	-2.70%† N=6	-0.32%† N=96	0.2005	-0.03%† N=137	-0.82% N=676	0.0329
Panel C: Recommendations from Large Research Departments									
Strong Buy	2.04% N=2,445	1.33% N=2,025	0.0002	0.40%† N=777	-0.27%† N=684	0.0204	--	--	
Buy	1.58% N=2,192	1.45% N=1,915	0.0912	0.22%† N=1,515	0.08%† N=1,287	0.1497	-1.09% N=1,895	-0.79% N=1,210	0.0914
Hold	0.33% N=338	0.49% N=435	0.5816	-0.14% N=1,757	-0.26% N=1,335	0.6814	-1.64% N=3,715	-1.50% N=3,289	0.3293
Underperform or Sell	-1.61%† N=7	1.64%† N=20	0.0174	-0.81% N=125	-0.27%† N=80	0.1400	-0.66% N=674	-1.33% N=706	0.0450
Panel D: Recommendations from Star Analysts at Large Research Departments									
Strong Buy	2.20% N=883	1.83% N=625	0.3381	0.53%† N=261	-0.55%† N=185	0.0549	--	--	
Buy	1.73% N=848	1.58% N=651	0.5515	0.22%† N=538	0.40%† N=350	0.9938	-1.48% N=723	-0.24%† N=450	0.0002
Hold	0.65% N=131	1.09% N=159	0.1893	-0.28% N=648	-0.27%† N=314	0.7745	-1.87% N=1,372	-1.73% N=1,081	0.1675
Underperform or Sell	-1.92%† N=3	0.92%† N=2	0.0833	-1.14%† N=62	0.08%† N=23	0.1631	-0.82% N=300	-1.35% N=226	0.6223
Panel E: Recommendations from Non-Star Analysts at Large Research Departments									
Strong Buy	1.97% N=1,562	1.17% N=1,400	0.0002	0.33%† N=516	-0.22%† N=499	0.1454	--	--	
Buy	1.41% N=1,344	1.32% N=1,264	0.1250	0.21%† N=977	-0.07%† N=937	0.1124	-0.86% N=1,172	-0.99% N=760	0.7649
Hold	0.25%† N=207	0.13%† N=276	0.8493	-0.04%† N=1,109	-0.24%† N=1,021	0.5690	-1.53% N=2,343	-1.40% N=2,208	0.9459
Underperform or Sell	0.20%† N=4	1.64%† N=18	0.2334	-0.64%† N=63	-0.45%† N=57	0.3917	-0.47% N=374	-1.29% N=480	0.0195

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 in 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*. There are 451 missing points in the abnormal return. Categorization by size of research departments is based on the quarterly median number of analysts working for a given brokerage firm. Star analysts are identified by using the annual All-American Research ranking issued by *Institutional Investor* every October. 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 a † superscript.

Table 10

Investment Value of Analyst Recommendations Categorized by Mutual Fund Affiliation

Panel A: Annualized Returns from Following Analyst Recommendations

	Affiliated Research Depts.			Unaffiliated Research Depts.			Differences	
	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)
All Recommendations								
Upgrades to Strong Buy	18.24%	7.69%***	5.89%***	13.83%	3.47%*	2.88%	4.22%***	3.01%**
Strong Buys	15.85%	6.04%***	4.72%***	12.01%	2.88%**	2.32%	3.16%***	2.40%**
Strong Buys or Buys	13.02%	5.10%***	3.17%**	9.51%	2.20%**	1.85%	2.90%**	1.32%
Sells or 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%	--	--
Recommendations from Small Research Departments								
Upgrades to Strong Buy	16.06%	5.94%**	4.68%**	12.03%*	3.40%**	2.82%*	2.54%*	1.86%
Strong Buys	14.58%	5.46%**	4.08%**	10.78%*	2.35%*	2.15%*	3.11%**	1.93%*
Strong Buys or Buys	11.59%	4.05%**	2.98%*	8.23%	2.49%**	2.03%	1.56%*	0.95%
Sells or Underperforms	5.36%	1.40%	1.27%	8.67%	2.85%**	2.06%**	-1.45%*	-0.79%
Sells	7.35%	2.29%	1.15%	8.37%	3.88%**	2.69%**	-1.59%*	-1.54%
Recommendations from Large Research Departments								
Upgrades to Strong Buy	20.21%	8.30%***	6.48%***	14.53%	3.73%	2.99%	4.57%**	3.49%**
Strong Buys	18.48%	6.63%***	5.18%***	13.92%	3.07%	2.21%	3.56%**	2.97%**
Strong Buys or Buys	15.60%	5.79%***	3.62%**	10.14%	2.00%	1.37%	3.79%***	2.25%*
Sells or Underperforms	6.09%	2.46%	1.68%	7.48%	4.14%*	3.02%*	-1.68%*	-1.34%
Sells	7.08%	2.70%*	1.99%	9.93%	5.30%**	3.87%**	-2.60%**	-1.88%*
Recommendations from Star Analysts at Large Research Departments								
Upgrades to Strong Buy	17.77%	6.64%**	4.98%**	13.45%	2.85%	2.29%	3.79%**	2.69%**
Strong Buys	14.86%	5.08%***	3.85%***	14.03%	2.97%	2.38%	2.11%**	1.47%*
Strong Buys or Buys	14.28%	4.42%***	3.08%*	10.96%	2.02%	1.55%	2.40%**	1.53%*
Sells or Underperforms	6.10%	2.59%*	1.79%	8.00%	4.21%**	3.18%*	-1.62%*	-1.39%
Sells	7.15%	2.62%**	2.07%	9.96%	4.85%***	3.79%**	-2.23%**	-1.72%*
Recommendations from Non-Star Analysts at Large Research Departments								
Upgrades to Strong Buy	22.09%	9.20%***	8.30%***	16.02%	4.20%*	3.53%	5.00%**	4.77%***
Strong Buys	19.54%	6.67%***	5.89%***	13.58%	3.14%*	2.00%	3.53%**	3.89%***
Strong Buys or Buys	16.47%	6.15%***	4.25%**	9.76%	1.95%	1.31%	4.20%***	2.94%**
Sells or Underperforms	6.06%	2.37%	1.48%	7.05%	3.98%*	2.68%	-1.61%*	-1.20%
Sells	6.89%	2.72%**	1.80%	9.88%	5.48%***	3.98%**	-2.76%**	-2.18%*

Panel B: Annualized Returns from Mimicking Portfolio Holdings and from Purchasing Shares of Mutual Funds

	Affiliated Mutual Funds			Unaffiliated Mutual Funds			Differences	
	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)
13f Holdings	11.08%	2.51%**	1.57%	7.17%	1.47%	0.96%	1.04%	0.61%
Net Asset Values	11.71%	0.42%	-0.49%	11.38%	-1.53%*	-1.88%**	1.95%*	1.39%

Panel A presents the annualized total unadjusted returns and the annualized adjusted returns –computed using the market model and Fama-French three-factor model– from daily investment strategies following analyst recommendations (Barber

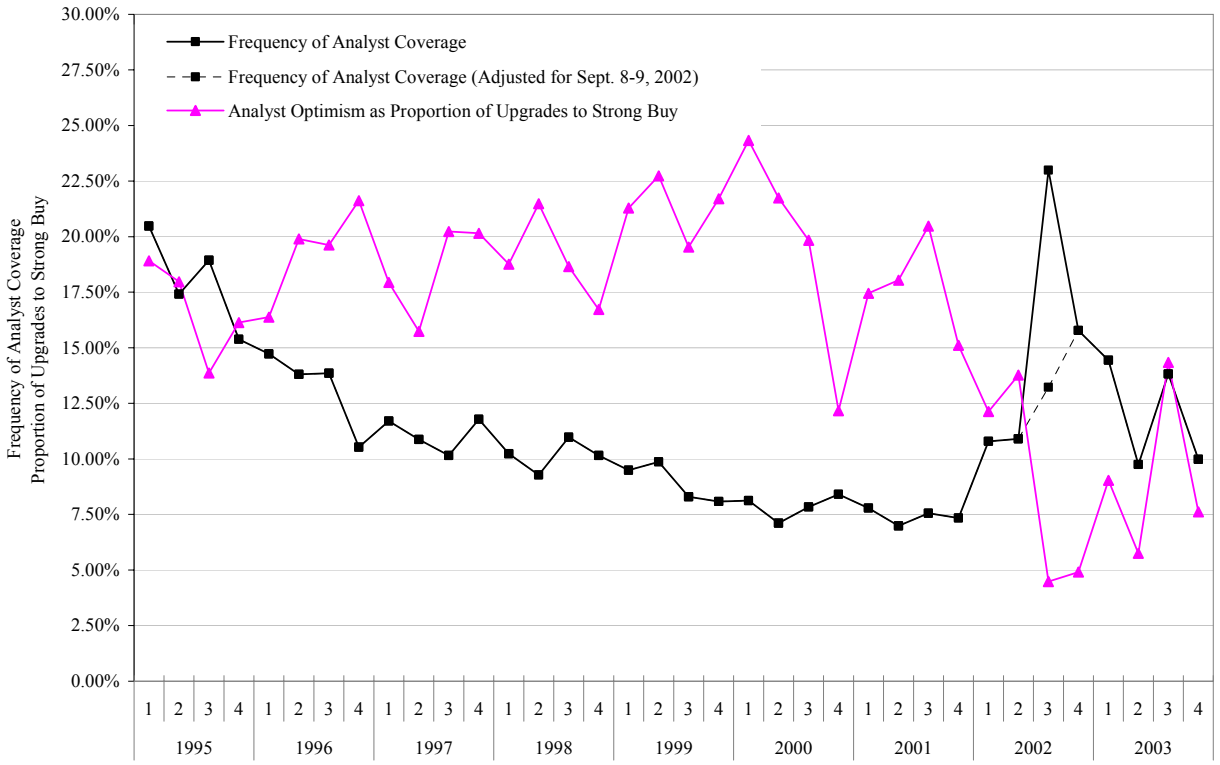
et al., 2001). When strong buys or buys are issued, stocks are purchased in proportion to their market values on the recommendation day. When sells or underperforms are issued, stocks are sold short in proportion to their market values on the recommendation day. "Passive Strategy" returns come from a "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. Also, we form equally-weighted portfolios based on upgrades to a "strong buy" rating (Barber et al., 2006). In particular, on the day a recommendation upgrades a stock to strong buy, we systematically act upon that recommendation, by buying one dollar of each stock that benefits of the upgrade. Categorization by size of research departments is based on the quarterly median number of analysts working for a given brokerage house. Star analysts are identified by using the annual All-American Research ranking issued by *Institutional Investor* every October. The last two columns report differences in the mean adjusted returns between affiliated and unaffiliated analysts. Positive numbers indicate that an investment strategy following affiliated analysts' recommendations produces higher mean adjusted returns than an investment strategy following unaffiliated analysts' recommendations.

Panel B reports the annualized returns from mimicking the 13f mutual fund holdings and from purchasing mutual fund shares. Mutual fund affiliation arises when mutual funds hold, at the end of quarter *t*-1, a stock covered by the affiliated research department. In the 13f row, an investor replicates the value-weighted portfolio of a fund family using the weights assigned to sample stocks. In the Net Asset Value row, we compare the returns from purchasing shares of the affiliated mutual funds with the returns from purchasing shares of unaffiliated mutual funds. Data come from CRSP Mutual Funds Daily Returns database linked to CDA/Spectrum Mutual Funds Holdings and Institutional (13f) Holdings.

In both panels A and B, ***, **, and * indicate that differences in the mean adjusted returns are not equal to zero at the 1%, 5%, and 10% level, respectively.

Figure 1

Quarterly Frequency and Optimism of Analyst Coverage, 1995-2003



The sample consists of 16,824 observations constructed as pairs of research department *i* and stock *j* (*i* = 1, 2, …, 154, *j* = 1, 2, …, 4,121). Each observation represents an ongoing relationship between a research department and a stock. Analysts working for the research department can foster this relationship by releasing a report on that stock. Analysis is of 36 consecutive quarters from 1995 to 2003. Frequency of coverage is determined as the number of research department-stock observations with at least one report during the quarter divided by the overall number of uncensored research department-stock observations at the end of that quarter. For example, in the fourth quarter of 1994 (quarter 0), the frequency of coverage was equal to 27.87%, determined as 4,689 reports divided by 16,824 total number of research department-stock observations. 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 dotted line adjusts for 721 reports that were issued over these two days to comply with analyst regulation. Recommendation scores range from 1 (strong buy) to 5 (sell). Proportion of upgrades to strong buy is determined as number of reports upgrading a stock to a "strong buy" rating divided by the overall reports issued in a quarter. Both frequencies of analyst coverage and upgrades to strong buy control for right-censorship in the observations. Over time some pairs may be right-censored mainly due to concentration in the research industry and/or stock delisting. Companies delisted after merger with other firms are regarded as inactive. Uncensored observations are those pairs of active research departments and active stocks at the end of each quarter. Data are from IBES and CRSP/Compustat Merged Database.