BUYS, HOLDS, AND SELLS: THE DISTRIBUTION OF INVESTMENT BANKS' STOCK RATINGS AND THE IMPLICATIONS FOR THE PROFITABILITY OF ANALYSTS' RECOMMENDATIONS

Brad Barber
Graduate School of Management
University of California, Davis
e-mail: bmbarber@gsm.ucdavis.edu

Reuven Lehavy
School of Business
University of Michigan
e-mail: rlehavy@umich.edu

Maureen McNichols
Graduate School of Business
Stanford University
e-mail: fmcnich@leland.stanford.edu

and

Brett Trueman
Anderson Graduate School of Management
University of California, Los Angeles
e-mail: brett.trueman@anderson.ucla.edu

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Abstract

This paper analyzes the distribution of stock ratings at investment banks and brokerage firms and examines their relation to the profitability of analysts' recommendations. Consistent with prior work, we find that the percentage of buy recommendations increased substantially from 1996-2000. Starting in mid-2000, however, the percentage of buys decreased steadily. Our analysis strongly suggests that this is due, at least in part, to the implementation of NASD Rule 2711, which requires brokers' ratings distributions to be made public. Notably, throughout our sample period the difference between the percentage of buy recommendations of the large investment banks singled out for sanction in the *Global Analyst Research Settlement* for alleged conflicts of interest and that of the non-sanctioned brokers is economically quite small. Additionally, we find that a broker's stock ratings distribution can predict the profitability of its recommendations. Upgrades to buy issued by brokers with the smallest percentage of buy recommendations significantly outperformed those of brokers with the greatest percentage of buys, by an average of 50 basis points per month. Conversely, downgrades to hold or sell coming from brokers issuing the most buy recommendations significantly outperformed those of brokers issuing the fewest, by an average of 46 basis points per month.

Buys, Holds, and Sells: The Distribution of Investment Banks' Stock Ratings and the Implications for the Profitability of Analysts' Recommendations

Introduction

This paper analyzes the distribution of stock ratings at investment banks and brokerage firms and examines whether these distributions can be used to predict the profitability of analysts' stock recommendations. Our study comes at a time of increased scrutiny by Congress and securities regulators of potential analyst conflicts of interest. With the percentage of buy recommendations reaching 74 percent of total outstanding recommendations by mid-2000 and the percentage of sell recommendations falling to 2 percent, allegations arose that analysts' recommendations did not reflect their true beliefs. Rather, it was contended that, among other things, the recommendations were intended to attract and retain investment banking business. The steep stock market decline during 2000-2002, whose beginning coincided with peak bullishness on Wall Street, only served to fuel the concerns of regulators and politicians.

As part of its attempt to more closely regulate the provision of research on Wall Street, the National Association of Securities Dealers (NASD) proposed Rule 2711, *Research Analysts and Research Reports*, in early 2002. At about the same time, and with the same goal in mind, the New York Stock Exchange (NYSE) proposed a modification to its Rule 472, *Communications with the Public*. The Securities and Exchange Commission (SEC) approved these proposals on May 8, 2002. Among their provisions, these rules require all analyst research reports to display the percentage of the issuing firm's recommendations that are buys, holds, and

sells.[1] This disclosure requirement was intended to provide investors with information useful in evaluating the quality of brokerage firms' recommendations.[2] Presumably, it was also implicitly meant to pressure those brokers who were consistently issuing a relatively high percentage of buy recommendations to adopt a more balanced ratings distribution.

The regulatory and political focus on brokers' stock ratings distributions and the subsequent requirement that these distributions be disclosed invite a number of interesting questions. First, did the ten large investment banks sanctioned by the SEC and other regulators in 2003 for alleged analyst conflicts of interest, as part of the *Global Analyst Research Settlement*, issue the most favorable recommendations? Second, does a greater proclivity towards issuing buy recommendations imply that a brokerage firm's recommendations have less investment value? In other words, would knowledge of a broker's ratings distribution be useful in predicting the performance of its recommendations? Third, has NASD 2711 had an effect on the distribution of buys, holds, and sells?

To address these, and other, questions, our analysis employs the *First Call* database, which contains over 438,000 recommendations issued on more than 12,000 firms by 463 investment banks and brokerage firms during the 1996-June 2003 time frame. We begin by

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[1]For ease of exposition, the discussion in the remainder of the paper is framed solely in terms of NASD Rule 2711. However, because the modified NYSE Rule 472 has an identical reporting requirement, all conclusions clearly apply to it as well.

[2]The SEC's press release of May 8, 2002, announcing the approval of NASD 2711, states that "These disclosures [regarding brokerage firms' ratings] will assist investors in deciding what value to place on a securities firm's ratings and provide them with better information to assess its research." This objective was echoed in a speech by Mary Schapiro, President, NASD Regulation, to the 2002 SIA Research and Regulation Conference on April 9, 2002, where she remarked that "While there may be good reasons why a firm has assigned a buy or strong buy to 80 percent of the companies it covers, investors have a right to know this information. It suggests a bias in the firm's coverage that investors should take into account in evaluating ratings...Our proposal [NASD 2711] would require firms to disclose this information."

documenting changes in the distribution of stock ratings over time. Consistent with Barber, Lehavy, McNichols, and Trueman (2003), we find that the percentage of buy (including strong buy) recommendations issued by investment banks and brokers increased markedly during the first part of our sample period.[3] Standing at 60 percent of all recommendations at the end of the first quarter of 1996, buy recommendations peaked at 74 percent of the total at the end of the second quarter of 2000. Over the same period, sell (including strong sell) recommendations declined from 4 percent to 2 percent, while holds went from 36 percent to 24 percent. From that point, the number of buys decreased steadily, standing at 42 percent of the total at the end of June, 2003. The percentage of sells increased more than eight-fold, to 17 percent, while the percentage of holds increased to 41 percent.

Among possible explanations for this reversal is the contemporaneous softening in economic conditions and sharp stock market decline, which might have negatively affected analysts' expectations for future firm performance. This could not fully explain the reversal, however, since analysts' ratings continued to deteriorate even as the economy and the stock market began their recoveries. Another potential explanation is the implicit pressure which the implementation of NASD Rule 2711 exerted on brokers. Consistent with this possibility, the reduction in percentage buys is most pronounced in the last half of 2002, which coincided with the implementation of this new rule. During that time buy recommendations decreased from 60 percent to 45 percent, while sell recommendations rose from 5 percent to 14 percent and holds

[3]In the remainder of this paper we use the terms *broker* and *brokerage firm* to refer to any financial institution employing sell-side analysts to provide stock recommendations (including investment banks). The terms *investment bank* or *bank* will be reserved for use in those instances in which we are referring to brokers with investment banking activities.

went from 35 percent to 41 percent.

The recommendations in our sample are then partitioned into those issued by the ten sanctioned banks and those of the non-sanctioned brokers. In contrast to what might have been expected, the difference between the percentage of buys for these two groups of brokers is economically quite small, averaging only 1.7 percentage points. Moreover, in only two of the 30 quarters of our sample period is the difference more than 3 percentage points. Apparently, the proclivity to issue buy recommendations is not limited to the sanctioned investment banks.

We next consider whether a link exists between a broker's stock ratings distribution and the future profitability of its recommendations. Theoretically, a relation should exist as long as the criteria used to classify recommendations into buy, hold, and sell differ across brokers. Differences can arise in one of (at least) two ways. First, some brokers might have a tendency to issue buy recommendations when a hold or sell would be more appropriate (as has been alleged by some), while other brokers would be more forthcoming in their ratings. Second (and more innocuously), the definitions of buy, hold, and sell may differ across brokers. For instance, the threshold expected return necessary for a broker to issue a buy may be higher for some brokers than for others. Regardless of the cause, these differences would imply that, all else equal, the buy recommendations of brokers with a smaller percentage of such ratings should outperform those of brokers who issue buys more frequently. It would also imply that the hold and sell recommendations of brokers who issue such recommendations less often would outperform (experience a greater decline than) those of brokers who issue them more frequently.

The link between ratings distributions and recommendation returns is empirically examined by first calculating, for each quarter, the percentage of each broker's end-of-quarter

outstanding recommendations that are buys. Brokers are then partitioned into quintiles based on this percentage. On average, the firms in the top quintile (descriptively labeled the "most pessimistic" brokerage firms) issued only 45 percent buys, while the firms in the bottom quintile (descriptively labeled the "most optimistic" brokers) gave 79 percent buys.[4] The average buy-and-hold abnormal return to each quintile's subsequent upgrades and downgrades was then computed. Consistent with our conjectures, we find that upgrades to buy from the most pessimistic brokers significantly outperformed those of the most optimistic brokers, by an average of 50 basis points per month. Conversely, the downgrades to hold or sell of the most optimistic brokers significantly outperformed (experienced a steeper decline than) those of the most pessimistic brokers, by an average of 46 basis points per month. These results suggest that brokers do, indeed, vary in their tendency to issue buy recommendations and that knowing the distribution of each brokers' stock ratings would have been useful to investors over this time period.

These differences become statistically insignificant, however, in the quarters after the implementation of NASD 2711. Though drawing strong inferences from such a short time series is difficult, these results indicate that the new rules have tempered the proclivity of some brokers toward issuing buy recommendations. This is likely to be considered a positive development by those regulators who view this as an important goal of NASD 2711.

A number of recent studies have examined the interaction between investment banking activities and various facets of analysts' earnings forecasts and stock recommendations.

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[4]The terms "pessimistic" and "optimistic" do not have a normative meaning in the context of our analysis. They are simply used to refer to brokerage firms that are observed to have a relatively small (large) percentage of buy recommendations outstanding.

Generally, banking activity has not been found to be associated with either less accurate or more optimistic earnings forecasts (see, for example, Lin and McNichols (1998), Jacob et al. (2003), Kolasinski and Kothari (2004), Agrawal and Chen (2004), and Cowen, Groysberg, and Healy (2003)). However, Lin and McNichols (1998) and Dechow et al. (2000) document that long-term growth forecasts for firms with recent equity offerings are more optimistic when coming from analysts at lead underwriters than when issued by other analysts.[5] Iskoz (2003) and Lin and McNichols (1998) compare the performance of recommendations issued by analysts at lead investment banks to the performance of other analysts' recommendations, for firms with recent share offerings. They find no significant difference in returns for either the buy or the hold and sell recommendations.[6] In contrast, Michaely and Womack (1999) document for initial public offerings during the 1990-91 period that the average two-year performance of lead underwriter recommendations is significantly lower than that of other analysts.[7] Barber et al. (2004) compare the performance of the recommendations of analysts at investment banks with those of analysts at independent research firms. They find that the buy recommendations of independent research firms outperform those of investment banks, especially subsequent to equity offerings.

A separate stream of research has sought to identify the factors determining analyst forecast superiority. This work, including Mikhail et al.(1997), Clement (1999), and Jacob et al. (1999), find that analyst experience, the number of firms the analyst follows, and the size of the

[5]In contrast, Agrawal and Chen (2004) find that analysts employed by investment banking firms are more conservative in their long-term growth forecasts than are analysts at independent research firms.

[6]Iskoz does find that the strong buy recommendations issued by analysts at lead underwriters significantly underperform those of non-lead analysts.

[7]Michaely and Womack use a two-year return period for all recommendations, independent of whether they were dropped or changed during that time.

brokerage firm at which the analyst works, all affect an analyst's forecast accuracy.[8]

The plan of this paper is as follows. In section I we give an overview of NASD rule 2711 and in section II provide a description of the data. Section III explores a number of aspects of brokers' ratings distributions. This is followed in section IV by a theoretical discussion of the link between a broker's stock ratings distribution and the subsequent performance of its recommendations. Section V explores this link empirically. Finally, a summary and conclusions appears in section VI.

I. NASD Rule 2711

On February 7, 2002, the National Association of Securities Dealers (NASD) submitted to the Securities and Exchange Commission its proposed Rule 2711, *Research Analysts and Research Reports*.[9] This proposal followed the mid-2001 Congressional hearings, *Analyzing the Analysts: Are Investors Getting Unbiased Research from Wall Street?*, conducted by the Subcommittee on Capital Markets, Insurance and Government-Sponsored Enterprises of the Committee on Financial Services of the U.S. House of Representatives. These hearings were held against a backdrop of a sharp and prolonged stock market decline which began in March 2000 and which resulted in severe losses for many individual investors. This decline began at a time of heightened bullishness on the part of analysts at brokerage firms, whose buy recommendations outnumbered their sell recommendations by more than 35-1. Rule 2711 also

[8]Brown (2001) finds that a predictive model of analyst accuracy based on past accuracy performs at least as well as a model based on the specific analyst characteristics identified by Clement (1999).

[9]According to the NASD web site, the National Association of Securities Dealers is the "...world's leading private sector provider of financial regulatory services...Under federal law, virtually every securities firm doing business with the US public is a member of this private, not-for-profit organization...NASD registers member firms, writes rules to govern their behavior, examines them for compliance and disciplines those that fail to comply."

came in the wake of numerous high-profile corporate scandals (such as those involving Enron, WorldCom, Adelphia, and Tyco), which was an embarrassment to the majority of analysts who maintained buy ratings up until the time that the scandals broke.[10]

Among the provisions of NASD 2711 is a requirement that every brokerage firm disclose in its research reports the distribution of stock ratings across its coverage universe.[11] As stated in paragraph (h)(5) of NASD 2711:

> "***Distribution of Ratings***
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> 1. (A) Regardless of the rating system that a member employs, a member must disclose in each research report the percentage of all securities rated by the member to which the member would assign a 'buy,' 'hold/neutral,' or 'sell' rating...
>
> (C) The information that is disclosed...must be current as of the end of the most recent calendar quarter (or the second most recent calendar quarter if the publication date is less than 15 calendar days after the most recent calendar quarter)."

The SEC approved the rule on May 8, 2002, with an effective date for implementing the disclosure provision of no later than September 9, 2002.

An example of the form that this disclosure takes is the following excerpt from a Merrill Lynch research report dated January 12, 2003:

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[10]Prior to Enron's announcing its $1.2 billion, 3rd quarter 2001 charge against earnings, for example, 13 of the analysts following the company rated the stock a buy, while none rated it a hold or sell. See Budd and Wooden (2002).

[11]A related provision of NASD 2711 is that every brokerage firm must disclose in each of its research reports its definitions for buy, hold, and sell. (These definitions were not commonly disclosed prior to the implementation of NASD 2711.) Other provisions of NASD 2711 include a strict curtailment on the interaction between a broker's research and investment banking departments, a restriction on the extent to which a covered firm can review a research report before publication, a prohibition against direct ties between an analyst's compensation and specific investment banking transactions, a prohibition against a broker offering to provide favorable research on a firm in exchange for other business, and a restriction on an analyst's personal trading in the shares of covered firms. NASD 2711 also requires a number of other disclosures in each research report.

Investment Rating Distribution: Global Group (as of 31 December 2002)

Coverage Universe	Count	Percent
Buy	1110	43.46%
Neutral	1236	48.39%
Sell	208	8.14%

This disclosure reveals not only the ratings distribution, but also that the distribution is calculated with respect to Merrill Lynch's entire coverage universe and is as of the end of the most recent quarter-end (December 31, 2002).

II. Data Description

The source for the analyst recommendations used in this study is Thomson Financial's *First Call* database, whose data is obtained directly from brokerage houses. The recommendations take one of two forms, real time or batch. Real-time recommendations, which constitute the majority of recent years' recommendations, come from live feeds and give the date and time of report publication. Batch reports come from a weekly batch file sent by the brokerage firms; as a consequence, the precise announcement date of the individual recommendations is unknown. For the first part of this study, in which the distribution of analyst recommendations is analyzed, knowing the exact publication date is not important; therefore, we use both the real-time and batch recommendations. For the second part of the study, in which recommendation returns are calculated, we use only real-time recommendations, since the exact date at which to begin measuring returns must be known. Any recommendation that is outstanding in the database for more than one year, whether it be real-time or batch, is dropped at the end of the year, under the assumption that such a recommendation has become stale by that time.

Each database record contains the name of the company covered, the brokerage firm issuing the report, and a rating between 1 and 5. A rating of 1 represents a strong buy; 2, a buy; 3, a hold; 4, a sell; and 5, a strong sell. If an analyst uses some other scale, *First Call* converts the analyst's rating to its five-point scale. The recommendations in this study cover the period from January 1996 through June 2003. In the remainder of this analysis we use the term 'buy' to reflect either a buy or a strong buy recommendation and the term 'sell' to reflect either a sell or strong sell recommendation.[12]

Table 1 provides descriptive statistics for the real-time and batch recommendations in the *First Call* database. During the 1996-June 2003 period, *First Call* recorded over 438,000 recommendations issued by 463 brokerage firms on more than 12,000 different firms. As shown in column 2, the year 2002 has by far the most recommendations of any sample year. This is due, in large part, to the reissuance of recommendations just before September 9, the effective date for implementation of the disclosure requirement of NASD 2711. (See the discussion in the next subsection.) In each of our sample years the number of upgrades to buy (column 3) is less than the number of downgrades to hold or sell (column 4). The difference is particularly pronounced during the bear market years of 2001 and 2002, where the number of downgrades exceeds the number of upgrades by 51 and 67 percent, respectively. Column 5 reveals that, after holding fairly steady for the years 1996-2000, the number of covered firms dropped sharply in 2001 and 2002. Among the possible reasons for this decrease is a fall-off in the number of listed firms (many firms were delisted during this period because they either went bankrupt or otherwise

[12]We combine buys with strong buys and sells with strong sells in our analysis because (i) NASD 2711 requires brokers to categorize recommendations as either buy, hold, or sell and (ii) some brokers are now using just these three ratings, dropping the distinction between buy and strong buy and sell and strong sell.

failed to meet listing requirements, while few new firms joined those listed, due to a slow-down in the new issues market), a tendency by brokers to discontinue coverage of firms whose future prospects are viewed unfavorably, and a general cut-back in the level of brokerage house research services.[13] As reflected in column 7, the average stock rating increased during the 2001-June 2003 period, following a nearly steady decline from 1996-2000.[14]

III. The Distribution of Brokers' Stock Ratings

i. Time Series

Figure 1 illustrates the distribution of stock ratings in the *First Call* database and how it has changed over our sample period. From the end of the first quarter of 1996 to the end of the second quarter of 2000 the proportion of buy recommendations increased from 60 to 74 percent of total recommendations outstanding. Simultaneously, hold recommendations fell from 36 to 24 percent, and sell recommendations decreased from 4 to 2 percent.[15] At that point the trend reversed, as buys monotonically decreased to 42 percent at the end of the second quarter of 2003. Sells increased steadily to 17 percent, while holds also increased fairly steadily, to 41 percent of total recommendations outstanding.

There are at least two possible explanations for this reversal. One is the weakening in

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[13]See McNichols and O'Brien (1997) for evidence that analysts tend to discontinue coverage of stocks with unfavorable prospects rather than issue negative recommendations. The study also finds that these stocks have lower industry-adjusted returns on equity, as compared to firms with continuous coverage. The impact of recently enacted regulations on the provision of analyst research services is discussed by Landon Thomas, Jr. in "An Analyst's Job Used to be Fun. Not Anymore," *The New York Times*, August 17, 2003.

[14]Unless otherwise specified, all averages in this paper are unweighted.

[15]Presumably aware of the asymmetric nature of brokers' ratings distributions, 84% of investment professionals surveyed in 2001 believed that analysts should issue more sell recommendations. See Boni and Womack (2002).

economic conditions during this time, as well as the steep stock market decline, both of which likely had a negative effect on analysts' views of future firm performance. This could not fully explain our findings, though, since analysts' ratings continued to deteriorate even as the economy began its recovery at the end of 2001, and even though the stock market, as measured by the Standard & Poors 500 Index, began turning up in the fourth quarter of 2002 (see Figure 1).[16] Another is the implicit pressure placed on brokers by the increased scrutiny paid to their ratings by regulators and Congress during this period, as well as by the implementation of NASD Rule 2711.[17]

Taking a closer look at the trends in 2002 makes clear that NASD 2711 likely did play a role in analysts' decreasing optimism. Figure 2 is a daily plot of the percentages of outstanding recommendations which were buys, holds, and sells during the year. Over the year's span, the percentage of buys decreased from 60% to 45%, while the percentage of sells increased from 4% to 14%, and the percentage of holds climbed from 34% to 41%. There is no discernable movement around the time that the proposed rule change was publicly announced by the NASD (on February 7) or the date of passage of the rule by the SEC (May 8). However, beginning in the weeks leading up to the September 9 deadline for implementing the ratings distribution disclosure requirement, and continuing for the remainder of the year, the trend toward decreased

[16]The National Bureau of Economic Research determined that the recession which began in March 2001, ended that November.

[17]The heightened scrutiny of analysts during this time and some of the proposed reforms are discussed in Budd and Wooden (2002), "Guidelines Aim to Polish Analysts' Image," by Jeff Opdyke, *The Wall Street Journal*, June 13, 2001, pp. C1-C2, and "Is Wall Street Serious About Reform?," by Shawn Tully, *Fortune*, July 9, 2001, pp. 90-91.

optimism became quite pronounced.[18]

The single biggest change in the ratings distribution came on Sunday, September 8, when the percentage of buys decreased from 57% to 53% and the percentage of sells increased from 8% to 11%. Consistent with these changes, untabulated results show that during the week of September 8, there were 1,535 downgrades to hold, sell, or strong sell, compared to an average of only 278 for each of the prior four weeks. These changes are not entirely surprising, given that NASD 2711 requires brokers to partition their recommendations into just *three* categories – buy, hold, and sell – for disclosure purposes, regardless of the actual ratings systems used by them. Apparently, many brokers took advantage of the September 9 implementation date to simplify their own ratings systems and bring them more in line with that required by the new rule. This necessitated a change in many firms' ratings to fit into one of these three categories.[19]

ii. Sanctioned Banks vs. Non-Sanctioned Brokers

Conflicts of interest can potentially affect analysts at all brokerage firms. Ten of the largest ones, though, have come under particular scrutiny by regulators and the media, resulting in an enforcement action, the *Global Analyst Research Settlement*, entered into by the SEC, NASD, NYSE, New York Attorney General Eliot Spitzer, and other regulators on one side and

[18]We formally test the hypothesis that the implementation of NASD 2711 partly accounted for analysts' decreasing optimism by estimating a simple vector autoregression (VAR) with two dependent variables: the quarterly market return and the end-of-quarter percentage buys. In the VAR, we include four lags of the quarterly market return, four lags of percentage buys, and a dummy variable which takes on a value of one for the four quarters after the adoption of NASD 2711. Untabulated results reveal a coefficient estimate on this dummy variable of -0.055 (with a *t*-statistic of -2.94). This indicates that, after controlling for lagged market returns and the time-series properties of the percentage of outstanding recommendations that are buys, percentage buys after adoption of NASD 2711 are 5.5 percent less than otherwise would have been anticipated.

[19]Many research reports issued on September 8, 2002, explicitly give this as the reason for the ratings changes on that date.

these ten banks on the other. The focus on these sanctioned banks naturally raises the question of whether their percentage buys systematically differ from that of the non-sanctioned brokers. To address this issue, we separately calculate for each group of brokers the percentage of all end-of-quarter outstanding recommendations that are buys.

These percentages are plotted in Figure 3 for all quarters of our sample period. Aside from the last four quarters of the sample period, where the sanctioned banks' percentage buys fall far below that of the non-sanctioned brokers, these percentages track each other quite closely. The average end-of-quarter buy rating percentage is 62.4% for the sanctioned banks and 62.8% for the non-sanctioned brokers – a negligible 0.4 percentage point difference. Even restricted to the quarters prior to the implementation of the NASD 2711 disclosure requirement, the percentages are quite similar – 66.4% for the sanctioned banks and 64.7% for the non-sanctioned brokers. The difference, 1.7 percentage points, is economically very small. Moreover, there are only two quarters in which the difference exceeds three percentage points.

This evidence makes clear that the sanctioned banks did not have a meaningfully greater tendency to issue buy recommendations than did the non-sanctioned brokers. This conclusion, though, does not necessarily imply that regulators inappropriately singled out these ten sanctioned banks for enforcement action, as their stock ratings distributions were not a primary focus of the allegations made against them.

IV. The Relation Between Brokers' Stock Rating Distributions and Their Recommendation Returns - Intuition and an Example

In this section we present a simple example to illustrate that a relation will exist between a broker's stock rating distribution and the future returns to its recommendations whenever the

criteria used to rate covered firms differs across brokers. Differences will arise if some brokers choose to keep covered firms at a buy rating when they truly believe the firms' prospects have dimmed sufficiently to deserve a hold or sell rating (which has been alleged by many regulators and those in the media), while other brokers readily downgrade such firms. (Such differences across brokers are sometimes referred to below as *implicit* differences in criteria.) Differences will also arise in the absence of such deliberate behavior, if brokers simply differ in their definitions of buy, hold, and sell. (These differences are sometimes referred to below as *explicit* differences in criteria.) A quick glance at the ratings definitions of various brokers reveals that explicit differences do exist. For instance, certain brokers classify a firm as a buy if its expected return exceeds a particular *absolute* level, while others classify a buy *relative* to the market. Moreover, these threshold levels differ across brokers.[20]

If brokers differ in the implicit and/or explicit criteria used to rate stocks, then, all else equal, a broker with a greater percentage of buy recommendations is likely to be one who has employed looser (stricter) implicit and/or explicit criteria for classifying a stock as a buy (hold or sell).[21] This immediately implies that the buy recommendations of such a broker would not be

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[20]In a September 11, 2003 research report, BB&T Capital Markets defines a strong buy as an "estimated total return potential greater than or equal to 25%" and a buy as an "estimated total return potential greater than or equal to 10% and less than 25%." In a September 9 report, Morgan Stanley defines overweight (its highest rating) as "[t]he stock's total return is expected to exceed the average total return of the analyst's industry (or industry team's) coverage universe, on a risk-adjusted basis, over the next 12-18 months." Slightly differently, Kaufman Brothers, in a September 11 report, defines a buy as "[w]e believe the stock will outperform its peer group over the next 12 months due to superior fundamentals and/or positive catalysts." Finally, a September 8 Merrill Lynch report defines a buy as a return of "10% or more for Low and Medium Volatility Risk Securities" and "20% or more for High Volatility Risk securities."

[21]By 'all else equal' we mean, in particular, that the unconditional expected return of covered firms does not differ across brokers. If it did, then a broker issuing a higher percentage of buy recommendations might be doing so because the prospects for its covered firms are genuinely more favorable than those of firms covered by other brokers. Note that the assumption of equal unconditional expected returns also implies that brokers do not differ in terms of the criteria employed to begin or drop coverage of a firm.

expected to generate as great a return as those of brokers with stricter criteria for classifying stocks as buys. Conversely, the stocks that the broker rates as sell would be expected to generate a lower return than those of brokers with less-strict criteria for classifying stocks as sells. Note that these conclusions are independent of the reason that brokers differ in their criteria for rating stocks.

The following example makes this intuition more concrete. Consider a stylized risk-neutral setting in which analysts can perfectly predict the one-year ahead return on each of his or her covered firms, and that this return takes one of the values -10%, -5%, +5%, or +10%, with equal probability, ex-ante. There exist two types of brokers, denoted by O (for optimistic) and P (for pessimistic). The O broker has a policy of requiring its analysts to assign a buy rating to each covered firm whose return will be at least -5%, and a sell otherwise. The P broker has a policy of requiring its analysts to assign a buy rating to any covered firm whose return will be +5% or +10%, and a sell otherwise. For purposes of this example, it does not matter whether this reflects an explicit or an implicit difference in classification criterion.

This difference implies that the recommendations of the O brokers will be 75 percent buys, on average, while the P brokers will have an average of 50 percent buys. The mean return on an O broker's buy recommendations will be (-5 + 5 + 10)/3 = 3.33%, while the corresponding average return for a P broker will be (5 + 10)/2 = 7.5%. A sell issued by an O broker will have an expected return of -10%, while the expected return for a P broker's sell recommendations will be (-5 - 10)/2 = -7.5%. As this example illustrates, the more optimistic the broker (in the sense of a higher percentage of buy ratings), the smaller the expected return to its buy recommendations and the more negative the expected return to its sell recommendations.

If investors are rational and know each broker's type with certainty, then they would immediately bid up the price of a stock receiving a buy rating from an O (P) broker by 3.33 (7.5) percent, and would reduce the price of a stock on which an O (P) broker issued a sell recommendation by 10 (7.5) percent. More generally, even if rational investors do not know each broker's type with certainty, they will react less positively to the announcement of a buy recommendation when it comes from a broker with a higher percentage of buy ratings, and will respond more negatively to such a broker's sell recommendations.[22]

V. The Relation Between Brokers' Stock Rating Distributions and the Recommendation Returns - Empirical Evidence

i. Preliminaries

To examine the relation between brokers' stock rating distributions and their recommendation returns, we begin by ranking brokers each quarter in ascending order according to the percentage of their end-of-quarter recommendations which are buys.[23] Brokers are then assigned to quintiles (sometimes referred to as optimism quintiles, below), with the lowest

[22]To illustrate this, assume, as an extension of the previous example, that investors cannot distinguish between broker types; rather, they believe there is an equal chance of a broker being of type O or of type P. Consider a broker that currently has one recommendation outstanding, a buy. Using Bayes' rule, it is straightforward to show that the probability such a broker is of type O is 3/5. If this broker then issues a buy recommendation on another company, investors will revise the probability that the broker is of type O to 9/16. Consequently, the buy recommendation will result in their bidding up the price of the recommended stock by 9/16 x 3.33% + 7/16 x 7.5% = 5.15%. If the broker's recommendation on this other company is a sell, then investors will revise the probability that the broker is of type O to 3/7. Consequently, they will reduce the price of the second stock by 3/7 x 10% + 4/7 x 7.5% = 8.6%. Similar calculations reveal that if the broker originally has one sell recommendation outstanding, the announcement of the second recommendation will drive the stock up by 5.71% if it is a buy and will drive it down by 8% if it is a sell. As this example shows, the higher the initial percentage of buy recommendations, the less positive will be the return to a new buy recommendation and the more negative the reaction to a new sell recommendation.

[23]We start the ranking with the fourth quarter of 1995, so as to take advantage of our first quarter 1996 recommendation data. However, since the number of recommendations is relatively sparse in January 1996, we ignore those issued that month in calculating recommendation returns.

ranked brokers placed in the first quintile, higher ranked brokers placed in higher quintiles, and the highest ranked brokers assigned to the fifth quintile. The buy percentage that serves as the cutoff between adjacent quintiles is set so that the total number of recommendations outstanding at the end of the quarter for the brokers in each quintile is the same (that is, one-fifth of the total number of recommendations outstanding).[24]

Table 2 provides descriptive statistics for these quintiles. As shown in column 2, the brokers in the first optimism quintile (the most pessimistic brokers) had an average quarterly buy recommendation percentage (where each quarter's percentage is calculated as the total number of buys outstanding for all brokers in the quintile at quarter-end divided by the total number of recommendations outstanding) of 45 percent, while the brokers in the fifth optimism quintile (the most optimistic brokers) had an average buy recommendation percentage of 79 percent. The average stock rating of the most pessimistic brokers (the average, over all 30 quarters, of the mean outstanding recommendation at quarter-end in that quintile) is 2.4 (mid-way between a buy and a hold), while the average rating of the most optimistic brokers is 1.8 (between a buy and a strong buy). The number of brokers is greatest in the most optimistic quintile, consistent with our prior finding that the smallest brokers are the most optimistic. The second-highest number of brokers is in the most pessimistic quintile.[25] Supplementary analysis reveals that, along with many large brokers, this quintile has a relatively high number of small brokers. It is not surprising that many small brokers would appear in this quintile since, with fewer

[24]After assigning brokers to quintiles, we check whether any straddle two quintiles. For any such broker, we reallocate all of its recommendations to the quintile in which the majority of them originally fell.

[25]The average quarterly number of brokers across all quintiles is 223. This is approximately equal to the average yearly number of brokers in our entire sample (refer back to Table 1). The discrepancy is due to the fact that some brokers drop out of the database from one quarter to the next and new ones enter.

recommendations, it is more likely that a small broker's buy rating percentage will be at an extreme. As revealed in the last column, the average market value of the covered firms is much smaller for the most optimistic brokers than for those in the other quintiles.

Before presenting our return analysis, we test for the presence of persistence in individual broker optimism and pessimism over time. If there truly are systematic differences across brokers in their explicit and/or implicit criteria for rating stocks, then we should find evidence of persistence in their percentage buys over time. Its absence would strongly suggest that any differences in ratings distributions across brokers are due to random (one-time) factors, and would imply that any relation found between the distribution of stock ratings and recommendation returns is spurious.

To test for persistence, we take the brokers in each quintile *i* and quarter *t* and compute their buy recommendation percentage at the end of each of the next 12 quarters (or until the end of the sample period, whichever is shorter). We then average these percentages over all quarters *t*. The results are presented in Table 3.[26] As the table makes clear, there is some limited reversion to the mean. While the buy recommendation percentages range from 45 percent to 79 percent during the ranking quarter, the range decreases to 53 to 67 percent by the end of three years. Most of the reversion is completed by the end of one year. The percentage buys for the

[26]We alternatively measure persistence by constructing a transition matrix of brokers' quintile rankings from quarter *t* to quarter *t+5*. We choose *t+5* (rather than *t+1*) because any observed persistence in rankings from *t* to *t+1* could be due to stale recommendations that are carried over by brokers from one quarter to the next. Since we drop recommendations from our sample that are more than a year old, any observed persistence in rankings from *t* to *t+5* cannot be due to stale recommendations. In untabulated results we find that the probability that the brokers in the most optimistic quintile in quarter *t* are still in that quintile five quarters later is 47.2 percent, much higher than the 20 percent that would be expected if quintile rankings were random. Brokers in the most pessimistic quintile in quarter *t* have a 64.6 percent chance of being in the most pessimistic quintile five quarters later. These results provide additional evidence of persistence in broker optimism and pessimism.

most pessimistic brokers of quarter *t* increases by just 1 percentage point over the next 8 quarters, while the percentage buys for the most optimistic brokers decreases by just 4 percentage points. The continuing spread between the percentage buys for the most and least optimistic brokers is evidence of underlying differences in the explicit and/or implicit criteria used to rate stocks.[27]

ii. Return Results

This section begins with an examination of whether recommendation announcement day returns differ across broker quintiles. This analysis will provide evidence as to whether investors' initial reaction to newly announced recommendations reflects brokers' stock rating distributions. Our formal analysis deviates slightly from the precise disclosure requirements of NASD 2711. While the new rule allows brokers to disclose their ratings distributions as of the end of the second most recent quarter for report publication dates within 15 calendar days after quarter-end (presumably to give brokers time to compile their distributions), we use the distributions as of the end of the most recent quarter for *all* of the following quarter's recommendations. We do this because, post-September 9, 2002, several brokers have chosen to disclose the most current end-of-quarter distributions in all of their research reports, and because virtually all, if not all, brokers have the ability to do so. In interpreting our results it must be kept in mind that differences in announcement day returns across quintiles will be dampened to the extent that investors are uncertain of brokers' end-of-quarter ratings distributions. Prior to the implementation of NASD 2711 uncertainty was likely to be quite high for all but those

[27]A random check of the published buy definitions of the most optimistic and most pessimistic brokers during the last three quarters of our sample period (when these definitions were required to be disclosed) reveals no significant differences between them. This provides some limited evidence that the observed persistent differences in broker optimism stem from differences in implicit, rather than explicit, rating criteria.

institutional investors who subscribed to either *First Call* or a similar service and who tabulated brokers' ratings distributions.

To begin our analysis we partition our recommendations into four subsamples: (i) upgrades to buy or strong buy, (ii) downgrades to either hold, sell, or strong sell, (iii) initiations or resumptions of coverage with a buy or strong buy, and (iv) initiations or resumptions of coverage with a hold, sell, or strong sell.[28] For the upgrade subsample we run the following regression:

$$ANNR_{iq} = a + b \cdot \ln(SIZE_{iq}) + c \cdot \ln(NREC_{iq}) + \sum_{k=1}^{4} d_k \cdot QUINT_{kiq} + e \cdot UPGRADE_{iq} + \epsilon_{iq} \qquad (1)$$

where:

$ANNR_{iq}$ = recommendation announcement day market-adjusted return for upgraded stock i in quarter q (the stock's gross announcement day return minus the corresponding return on the *CRSP* NYSE/AMEX/Nasdaq value-weighted market index);

$\ln(SIZE_{iq})$ = natural logarithm of the market value of upgraded stock i in quarter q;[29]

$\ln(NREC_{iq})$ = natural logarithm of the number of end-of-quarter q-*1* recommendations outstanding for the broker who issued the upgrade on stock i in quarter q;

$QUINT_{kiq}$ = dummy variable taking the value 1 if the quarter q-*1* optimism quintile of the broker issuing the upgrade for stock i in quarter q is equal to k, k=1,...,4, and 0 otherwise;

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[28]Our focus on changes in analysts' recommendations is consistent with Jegadeesh et al. (2004) who find that changes in recommendations have greater predictive power for returns than do recommendation levels. To the extent that some initiations and resumptions are, in fact, reiterations, return results will be more muted for them.

[29]The market value is determined as of the close on the day prior to the announcement day.

$UPGRADE_{iq}$ = dummy variable taking the value 1 if stock i is upgraded to strong buy in quarter q, and 0 otherwise; and

ϵ_{iq} = regression residual for stock i in quarter q.

For recommendations released after market close (4:00 p.m. Eastern time), the following trading day's market-adjusted return is taken to be the announcement day return. If more than one broker upgrades a particular stock in a given quarter, then that stock will appear multiple times in the regression, once for each upgrade.

In regression (1), the announcement day market-adjusted return of each upgrade is regressed on dummy variables for broker optimism quintile, as well as on several control variables. The first control variable is the log of firm size, whose introduction is motivated by Barber et al. (2001) who find that the initial reaction to recommendations is larger for small firms than for large ones. The second control variable is the log of the number of prior quarter-end recommendations outstanding for the issuing broker, a proxy for broker size.[30] The inclusion of this variable is suggested by Barber et al. (1998) who document that the initial reaction to recommendations is greater for larger brokers. We also include a dummy variable for the upgrade, itself. The coefficient on this variable represents the incremental market-adjusted announcement day return to an upgrade to strong buy relative to an upgrade to buy. Given that the price reaction to an upgrade depends not only on the new rating, but also on the covered firm's previous rating, there is no ex-ante prediction regarding the sign or relative magnitude of this dummy variable. Given the structure of regression (1), the intercept is interpreted as the

[30]Log transformations are employed because the underlying variables are highly positively skewed.

announcement-day market-adjusted return to an upgrade to buy by brokers in the fifth quintile (the most optimistic brokers).

Similar regressions are run for the other three recommendation subsamples. In place of the upgrade dummy, the downgrade regression includes dummies for downgrades to hold and sell, the regression for initiations/resumptions at buy or strong buy includes a dummy for a strong buy recommendation, and the regression for initiations/resumptions at hold, sell, or strong sell includes dummies for hold and sell recommendations. In all regressions, only real-time *First Call* recommendations are used; batch recommendations are excluded because their exact disclosure dates are not known.

The results of these four regressions are presented in Table 4. In each regression, the coefficients on the covered firm and broker size control variables are significantly different from zero and of signs consistent with expectations. The sign on the coefficient of $\ln(SIZE_{iq})$ is opposite to that of the intercept, meaning that the greater the size of the covered firm, the smaller the absolute value of the announcement day price reaction. The sign on the coefficient of $\ln(NREC_{iq})$ is the same as that of the intercept, implying that the larger the broker, the larger the absolute value of the market-adjusted announcement day return.

The coefficient on the upgrade dummy is positive, indicating that the upgrade to strong buy elicits a stronger response that does an upgrade to buy. The incremental one-day market-adjusted return, though, is economically small (only 16 basis points). The coefficients on the downgrade dummies indicate that downgrades to hold evoke a 1¼ percentage point greater negative response than do downgrades to strong sell. The average reaction to downgrades to sell and strong sell, however, are insignificantly different from each other. Initiations/resumptions at

strong buy elicit an approximately 1¼ percentage point greater reaction than do initiations/resumptions at buy. Initiations/resumptions at hold and sell evoke a 90 basis point and 1.35 percentage point less negative reaction, respectively, than do initiations/resumptions at strong sell.

The coefficients on the optimism quintile dummies do not display the predicted pattern in the upgrade regression. Instead of increasing from quintile 4 to quintile 1, they decrease. This suggests that, in their immediate reaction to upgrades, either investors are not appropriately taking into account the nature of the broker making the recommendation, or the lack of widely disseminated information on brokers' ratings distributions precluded them from doing so during much of our sample period. Similarly, the dummy coefficients for the regression of initiations/resumptions at buy or strong buy is inconsistent with the hypothesized pattern. In fact, the coefficients on the quintile dummies are, with one exception, insignificantly different from zero.

The coefficients on the optimism quintile dummies in the downgrade regression evidence a pattern more in line with expectations. All coefficients are significantly positive, indicating that the most negative price reaction to downgrades comes from the most optimistic quintile of brokers (quintile 5). The coefficient on the quintile 1 dummy is the most positive, meaning that the downgrades of the most pessimistic brokers elicit the least negative market response (about 2 percentage points less than the downgrades of the most optimistic ones). This indicates that investors are reacting most strongly to the downgrades of brokers least inclined to issue hold and sell recommendations. A similar, although more muted, pattern exists for the subsample of hold,

sell, or strong sell initiation/resumption recommendations.[31]

To examine whether longer-term recommendation returns differ across broker quintiles, we calculate, for each quintile, the abnormal buy-and-hold returns for each of our four separate recommendation subsamples. To understand how the portfolio returns are calculated, take as an example the upgrade portfolio of the quintile 1 brokers. For each of the brokers in this quintile at the end of quarter *t* we identify the upgrades they made in quarter *t+1*. An upgraded stock enters the upgrade portfolio at the close of trading on the day the upgrade is announced.[32] By waiting until the close of trading, we explicitly exclude the first-day recommendation returns.[33] We do so to reflect that some investors, especially small ones, likely become aware of upgrades only with a delay.[34] If more than one broker upgrades a particular stock, then that stock will appear multiple times in the portfolio, once for each upgrade. Assuming an equal dollar investment in each

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[31]As a robustness check, the quarter *t* broker quintile partition is used to calculate average announcement day market-adjusted returns for the four subsamples of quarter *t+1* recommendations. Untabulated results reveal quite similar patterns to those documented in the regression analysis. We then restricted the upgrade (downgrade) portfolios to stocks receiving an upgrade (downgrade) from at least one broker in each quintile at some point during our sample period. This restriction provides an alternative control for differences in stock coverage across quintiles. Untabulated results show, similar to previous findings, an almost monotonic increase in average market-adjusted returns for upgrades as we move from the most pessimistic to the most optimistic analysts. In contrast, the return pattern across quintiles for downgrades is weaker than previously found. While returns are more negative for the most optimistic analysts than for the most pessimistic ones, as before, the pattern is not at all monotonic as the optimism quintile increases. These weaker results are likely due, at least in part, to a large fraction of the covered firms dropping out of the analysis (firms that may have contributed to the underlying optimism differences across quintiles).

[32]If the upgrade is announced after the market close, it is added to the portfolio at the close of the following trading day.

[33]Including the announcement day returns in our buy-and-hold return calculations does not change our conclusions. Untabulated results reveal that the difference between the abnormal returns of the most pessimistic and most optimistic brokers widens for all our portfolios, except for that of the upgrades (where the difference, while of the expected sign, becomes marginally insignificant).

[34]Returns would be higher for those investors with real-time access to recommendation announcements. Green (2003) estimates that buying (selling) shares at the start of the trading day subsequent to an upgrade (downgrade), rather than waiting until the end of the day to take a position, would increase returns by approximately 1½ (2) percentage points.

upgrade, the portfolio return on date t is given by:

$$\frac{\sum_{i=1}^{n_t} x_{it} \cdot R_{it}}{\sum_{i=1}^{n_t} x_{it}} \tag{2}$$

where R_{it} is the gross date t return on upgrade i, n_t is the number of upgrades in the portfolio, and x_{it} is the compounded daily return of upgraded stock i from the close of trading on the day of the upgrade through day t-1.[35] The upgrade portfolio is updated daily, so that stocks which are downgraded are dropped from the portfolio at the close of trading on the day of the downgrade. This calculation yields a time-series of daily returns for the upgrade portfolio. The daily returns for the remaining three portfolios are determined in an analogous fashion.

Two measures of risk-adjusted performance are calculated for each of our portfolios. The first is the mean daily market-adjusted return, found by subtracting the daily return on the CRSP NYSE/AMEX/Nasdaq value-weighted market index from the daily return of each of our portfolios. The second is the intercept from the four-factor model developed by Carhart (1997), found by estimating the following daily time-series regression for each portfolio j:

$$R_t^j - R_{ft} = \alpha_j + \beta_j(R_{mt} - R_{ft}) + s_j SMB_t + h_j HML_t + w_j WML_t + \epsilon_{jt}, \tag{3}$$

where R_t^j is the daily return on portfolio j, R_{ft} is the daily risk-free rate, R_{mt} is the daily return on the value-weighted market index, SMB_t is the return on a value-weighted portfolio of small stocks minus the return on a value-weighted portfolio of big stocks, HML_t is the return on a

[35]The variable x_{it} equals 1 for a stock upgraded on day t-1.

value-weighted portfolio of high book-to-market stocks minus the return on a value-weighted portfolio of low book-to-market stocks, and WML_t is the return on a value-weighted portfolio of stocks with high recent returns minus the return on a value-weighted portfolio of stocks with low recent returns.[36] The regression yields parameter estimates of α_j, β_j, s_j, h_j, and w_j.[37] The error term in the regression is denoted by ϵ_{jt}. In the discussion below, the intercept α_j is alternatively referred to simply as the abnormal return on portfolio *j*.

The return results appear in Table 5, panels A-D. While the differences between the raw returns (as well as the market-adjusted returns) of the portfolios of the most pessimistic and most optimistic brokers are of mixed significance, the abnormal return differences are uniformly significant. In all cases they are of the expected sign and very similar in magnitude across portfolios.[38] The average daily buy-and-hold abnormal return for upgrades by the most pessimistic brokers is 0.040 percent and 0.016 percent for the most optimistic brokers. The difference is 0.024 percent, or 0.504 percent on a monthly (21-day) basis. Consistent with the existence of underlying differences across brokers in their proclivity to issue buy recommendations, this result implies that upgrades have more information content (or, alternatively stated, are more credible) when issued by brokers who are less prone to giving buy ratings. The average daily buy-and-hold abnormal return for downgrades is -0.022 percent for

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[36]We thank Ken French and James Davis for providing us with daily factor returns. The construction of the size and book-to-market portfolios is identical to that in Fama and French (1993). The *WML* return is constructed as in Carhart (1997).

[37]To address the possibility that nonsynchronous trading affects our results, we also include one lag of each of the independent variables in the regressions (see Scholes and Williams (1977)).

[38]Untabulated results reveal that, for each of the four portfolios, the most pessimistic brokers cover larger stocks than do the most optimistic brokers, as well as stocks with higher book-to-market ratios and lower sensitivity to the market. Except for the downgrade portfolio, they also tend to cover stocks that have performed worse in the past.

the most pessimistic brokers and -0.044 percent for the most optimistic brokers. The difference is 0.022 percent, or 0.462 percent on a monthly basis. Again consistent with there being underlying differences across brokers, downgrades apparently have more information content when coming from brokers who are less likely to issue hold or sell ratings.[39]

The initiation/resumption portfolio returns show a similar pattern. Initiating or resuming coverage with a buy or strong buy yields an average daily abnormal buy-and-hold return of 0.014 percent for the most pessimistic brokers and -0.004 for the most optimistic ones. The difference is 0.018 percent, or 0.378 percent on a monthly basis. For initiations or resumptions of coverage with a hold, sell, or strong sell, the average daily abnormal buy-and-hold return is zero percent for the most pessimistic brokers and -0.035 percent for the most optimistic ones. This yields the largest difference of all the four portfolios, 0.035 percent, or 0.735 percent on a monthly basis.[40]

Overall, these return differences indicate that knowledge of brokers' stock ratings distributions would have been useful to investors in interpreting analysts' research reports over

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[39]*A priori*, an alternative explanation for observed cross-sectional differences in stock ratings distributions is that more optimistic brokers have a greater tendency than less optimistic ones to drop coverage of firms they view unfavorably (rather than a greater proclivity to issue buy recommendations). At best this can only be a partial explanation, since it cannot account for the observed return differences for upgrades across quintiles. Untabulated analysis also reveals that the average abnormal return of the stocks covered by the more optimistic brokers is *lower* than that of the less optimistic ones. This is also inconsistent with more optimistic brokers being more likely to drop coverage of firms expected to perform poorly.

[40]As a robustness check, we use an industry factor model as an alternative measure of risk-adjusted portfolio performance. The first step in this analysis is to construct a series of value-weighted daily returns for each of ten industry segments. Next, each industry segment's excess return (over the risk-free rate) is computed. The industry segments' excess returns then replace the market excess return as independent variables. Untabulated results reveal that the risk-adjusted portfolio performance for each quintile is very similar, both quantitatively and qualitatively, to that reported in Table 5. We alternatively measure the sensitivity of cross-quintile return differences to industry composition by computing the value-weighted daily return to each of the ten industry segments. Using this information and the daily percentage that each of these segments makes up of each quintile's total recommendations, we then calculate the daily return on a portfolio that mimics the quintile's industry composition. Untabulated findings reveal that the daily industry-mimicking portfolio returns are almost identical across quintiles, strongly suggesting that industry composition differences are not a significant determinant of the cross-quintile return differences we document in Table 5.

this time period and provide the NASD and NYSE with some justification for their disclosure requirement. This does not imply, however, that buying the upgraded and downgraded stocks of the most pessimistic analysts and selling short those of the most optimistic analysts is necessarily a profitable strategy. Such a strategy is likely to entail very high portfolio turnover and transactions costs, potentially offsetting any gross trading profits (see Barber et al. (2001)).

Prior research (Barber et al. (2001) and Womack (1996)) has shown that small firms exhibit a greater absolute response to recommendations than do large firms. This is not surprising, since analysts' research reports likely provide more incremental information to the market for small firms. To ensure that covered firm size differences are not driving the variation in returns across broker quintiles, we partition our recommended stocks into small, medium, and large firms, and replicate our analysis for each subsample. The abnormal return results, which appear in Table 6, are notable in two major respects. First, the signs of the return differences for each portfolio and for each size firm are the same as those of the sample as a whole, with only one exception. Second, the magnitude of these differences is generally greatest for the small firms and smallest for the large firms. For the small-firm upgrade portfolio, for example, the difference of 0.060 percent, or 1.26 percent on a monthly basis, is statistically significant and over twice as great as for the sample as a whole. The size of the return difference for the small-firm downgrade portfolio is similar to that of the whole sample; however, it is no longer statistically significant. Initiations and resumptions of coverage at buy or strong buy elicit about the same return difference for small firms as for the whole sample, and is significant. The return difference for initiations and resumptions of coverage at hold, sell, or strong sell is significant and again higher for the small firms than for the sample as a whole (0.043 percent as compared to

0.035 percent). That our return differences are, in general, qualitatively the same for each firm size, and greatest for the small firms, strongly suggests that our findings are not an artifact of differences in the average size of firm covered by the most optimistic and most pessimistic brokers.

If NASD 2711 has had the effect of disciplining brokers (as Figure 1 and the ensuing discussion suggest), then any differences observed in the ratings distribution across brokers in the post-September 9, 2002 period should reflect one-time events, rather than underlying differences in the proclivity to issue buy recommendations. This should manifest itself by a reduction in return differences across broker quintiles during this period. Table 7, panels A and B, documents this reduction. While the differences in one-day market-adjusted returns between the most pessimistic and most optimistic brokers during the period prior to September 9 are very similar to the full-period returns, the post-September 9 return differences are generally much smaller in magnitude, and lacking in significance (panel A). The difference in the one-day return to upgrades, for instance, is -0.655 percent in the period prior to the effective date of NASD 2711, but only 0.104 percent in the ensuing period. Similarly, the difference in the one-day return to downgrades decreases from 2.711 percent to just 0.445 percent.[41] Turning to the longer-term results, differences in abnormal buy-and-hold returns between the most pessimistic and most optimistic brokers for the quarters through September 2002 are very similar to those for the entire sample period. In contrast, abnormal return differences for the subsequent quarters are indistinguishably different from zero. These results provide additional evidence that this new

[41]Untabulated one-day return regression results for the pre- and post-September 9 periods yield similar conclusions.

rule has mitigated differences across brokers in their tendency to issue buy recommendations.

VI. Summary and Conclusions

With the heightened regulatory scrutiny of security analysts as a backdrop, this paper analyzes the distribution of brokers' stock ratings across buys, holds, and sells. Our analysis also sheds light on the effect that NASD Rule 2711 has had on the observed tendency of analysts to issue many more buy than sell recommendations. Consistent with prior work, we find that the percentage of buy recommendations increased substantially from 1996 - 2000, at one point exceeding the number of sell ratings by a ratio of more than 35-1. Notably, the difference between the percentage of buy recommendations of the large investment banks singled out for sanction in the *Global Analyst Research Settlement* and the buy recommendation percentage of the non-sanctioned brokers is economically quite small.

From the middle of 2000 the percentage of buys in our sample decreased steadily; by the end of June 2003, buys exceeded sells by less than a 3-1 ratio. This decrease probably was due, in part, to a worsening economy and a declining stock market. However, our findings strongly suggest that the implementation of NASD Rule 2711, which made brokers' ratings distributions public, also played an important role; the reduction in the percentage of buy recommendations was most pronounced during the last half of 2002, when the new disclosure requirements became effective. During that time the percentage of buy recommendations decreased from 60 to 45 percent, while the percentage of sells rose from 5 to 14 percent.

We also investigate whether the distribution of a broker's stock ratings can predict the profitability of its recommendations. Theoretically, it should have predictive power, as long as

the implicit and/or explicit criteria used to classify recommendations into buys, holds, and sells differ across brokers. The buy recommendations of those brokers who are less inclined to issue buys should outperform those who more readily give them, while their sell recommendations should underperform. Consistent with these conjectures, the upgrades to buy of the brokers issuing the smallest percentage of buy recommendations significantly outperform those of the brokers with the greatest percentage of such recommendations, by an average of 50 basis points per month. Conversely, the downgrades to hold or sell of those issuing the fewest buy recommendations significantly underperform those of the brokers issuing the most such recommendations, by an average of 46 basis points per month. These results suggest that the disclosure of brokers' stock rating distributions, as required by the new rules, would have helped investors in their evaluation of analysts' research reports during this time period. Interestingly, these differences diminish in magnitude and lose their significance in the quarters after the implementation of these regulations. This is additional evidence that they have had an effect in disciplining those brokers who tended to issue more buy recommendations than others. This is good news for those who view this as an important goal of these new regulations.

References

Agrawal, Anup and Mark Chen, 2004, "Analyst Conflicts and Research Quality," working paper, University of Alabama.

Barber, Brad, Reuven Lehavy, Maureen McNichols, and Brett Trueman, 2001, "Can Investors Profit from the Prophets? Security Analyst Recommendations and Stock Returns," *Journal of Finance*, 56, 531-563.

Barber, Brad, Reuven Lehavy, Maureen McNichols, and Brett Trueman, 2003, "Reassessing the Returns to Analysts' Recommendations," *Financial Analysts Journal*, 59, 88-96.

Barber, Brad, Reuven Lehavy, Maureen McNichols, and Brett Trueman, 2004, "Comparing the Stock Recommendation Performance of Investment Banks and Independent Research Firms," working paper, University of California, Davis.

Barber, Brad, Reuven Lehavy, and Brett Trueman, 2000, "Are All Brokerage Houses Created Equal? Testing for Systematic Differences in the Performance of Brokerage House Stock Recommendations," working paper, University of California, Berkeley.

Boni, Leslie and Kent Womack, 2002, "Solving the Sell-Side Research Problem: Insights from Buy-Side Professionals," working paper, University of New Mexico.

Brown, Larry, 2001, "How Important is Past Analyst Forecast Accuracy?," *Financial Analysts Journal*, 57, 44-49.

Budd, Martin and Shawn Wooden, 2002, "Analysts' Conflicts of Interest," *Review of Securities & Commodities Regulation*, 35, 119.

Carhart, Mark, 1997, "On Persistence in Mutual Fund Performance," *Journal of Finance*, 52, 57-82.

Clement, Michael, 1999, "Analyst Forecast Accuracy: Do Ability, Resources, and Portfolio

Complexity Matter," *Journal of Accounting and Economics*, 27, 285-303.

Cowen, Amanda, Boris Groysberg, and Paul Healy, 2003, "What Types of Analyst Firms Make More Optimistic Forecasts?" working paper, Harvard University.

Dechow, Patricia, Amy Hutton, and Richard Sloan, 2000, "The Relation Between Analysts' Forecasts of Long-Term Earnings Growth and Stock Performance Following Equity Offerings," *Contemporary Accounting Research* 17, 1-32.

Fama, Eugene and Ken French, 1993, "Common Risk Factors in the Return on Bonds and Stocks," *Journal of Financial Economics*, 33, 3-53.

Green, T. Clifton, 2003, "The Value of Client Access to Analyst Recommendations," working paper, Emory University.

Iskoz, Sergey, 2003, "Bias in Analyst Underwriter Recommendations: Does it Matter?," working paper, MIT.

Jacob, John, Thomas Lys, and Margaret Neale, 1999, "Expertise in Forecasting Performance of Security Analysts," *Journal of Accounting and Economics*, 28, 51-82.

Jegadeesh, Narasimhan, Joonghyuk Kim, Susan Krische, and Charles Lee, 2004, "Analyzing the Analysts: When do Recommendations Add Value," *Journal of Finance*, 59, 1083-1124.

Kolasinki, Adam and SP Kothari, 2004, "Investment Banking and Analyst Objectivity: Evidence from Forecasts and Recommendations of Analysts Affiliated with M&A Advisors," working paper, MIT.

Lin, Hsiou-wei and Maureen McNichols, 1998, "Underwriting Relationships, Analysts' Earnings Forecasts and Investment Recommendations," *Journal of Accounting and Economics*, 25, 101-127.

Michaely, Roni and Kent Womack, 1999, "Conflict of Interest and the Credibility of Underwriter

Analyst Recommendations," *Review of Financial Studies*, 12, 653-686.

Mikhail, Michael, Beverly Walther, and Richard Willis, 1997, "Do Security Analysts Improve Their Performance With Experience," *Journal of Accounting Research*, 35, 131-166.

McNichols, Maureen and Patricia O'Brien, 1997, "Self-Selection and Analyst Coverage," *Journal of Accounting Research*, 35, 167-199.

Scholes, Myron and Joseph Williams, 1977, "Estimating Betas From Nonsynchronous Data," *Journal of Financial Economics*, 5, 309-327.

Womack, Kent, 1996, "Do Brokerage Analysts' Recommendations Have Investment Value?," *Journal of Finance* 51, 137-167.

Figure 1
End-of-Quarter Distribution of Outstanding Stock Rating and the Level of the S&P 500 Index, March 1996 to June 2003

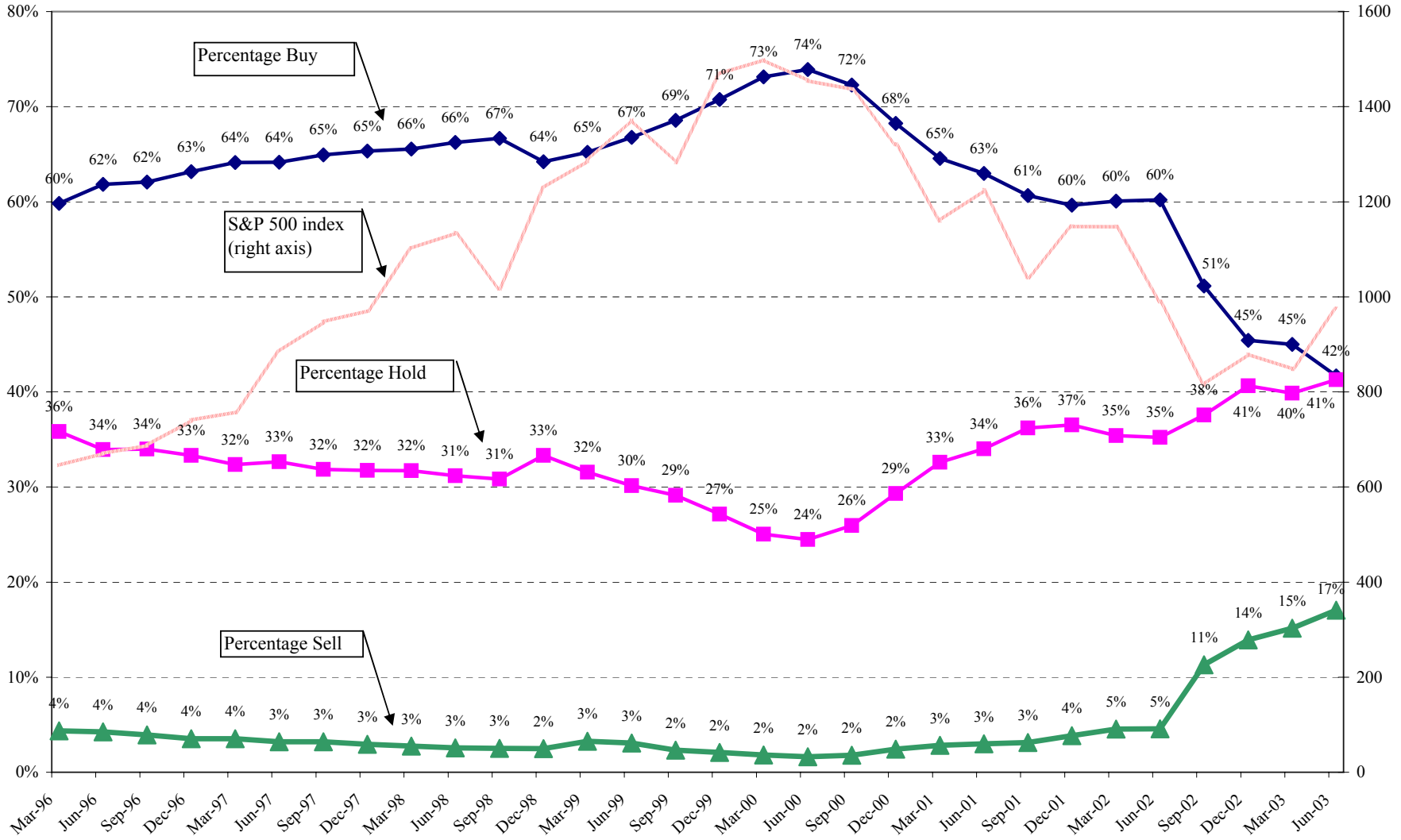

Figure 2
Daily Distribution of Outstanding Stock Ratings, January 1 - December 31, 2002

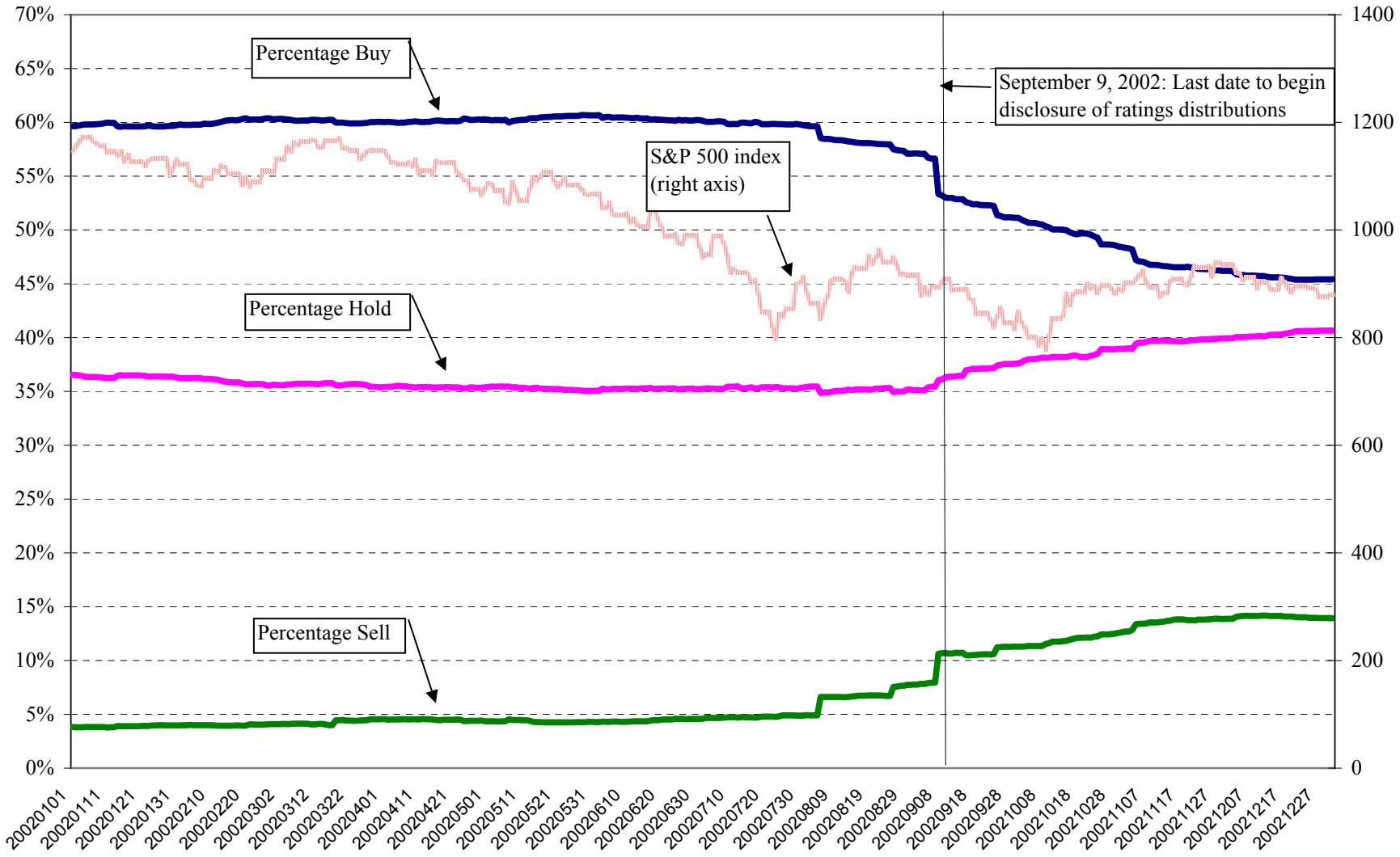

Figure 3
Percentage Buy Recommendations: Sanctioned Banks and Non-sanctioned Brokers

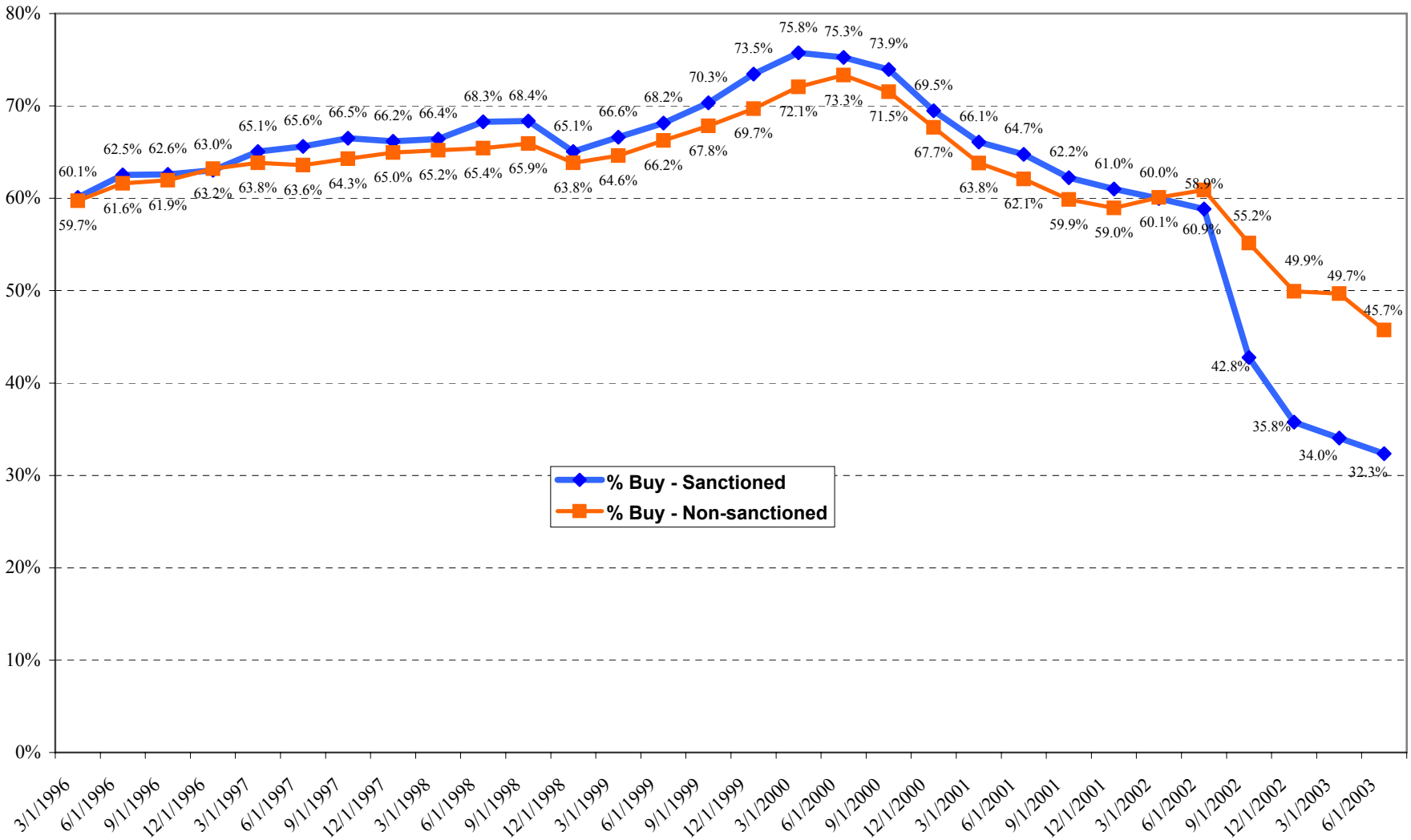

Table 1

Descriptive Statistics on Analyst Stock Recommendations from the *First Call* Database, January 1996 to June 2003

This table presents, by year, the number of recommendations issued, the number of upgrades and downgrades (excluding initiations, resumptions, and iterations of recommendations) the number of firms with at least one report in the *First Call* database, the number of brokers, and the average rating (where strong buy, buy, hold, sell, and strong sell recommendations correspond to the numerical ratings 1 through 5, respectively).

Year	Number of Recommendations	Number of Upgrades	Number of Downgrades	Number of Firms	Number of Brokerage Houses	Average Rating
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1996	47,528	7,870	8,367	6,750	226	2.14
1997	50,785	7,946	8,963	7,261	235	2.09
1998	57,992	9,311	12,029	7,298	254	2.10
1999	64,767	12,657	12,728	7,106	261	2.07
2000	55,608	8,760	11,277	6,854	263	2.02
2001	55,356	8,535	12,865	5,809	247	2.21
2002	84,074	11,166	18,628	5,560	254	2.38
2003 (January-June)	22,029	4,560	6,745	4,229	236	2.63
Overall	438,139	70,805	91,602	12,026	463	2.18

Table 2

Descriptive Statistics by Broker Optimism Quintile

This table reports the average percentage of all end-of-quarter outstanding recommendations which are buys, the average rating, the average number of brokers, the average number of recommendations, and the average market value of firm covered, by broker optimism quintile. Quintile *i's* average end-of-quarter percentage buy recommendations (column 2) is the average of the 30 quarterly ratios of total number of buy recommendations to total number of recommendations outstanding at the end of each quarter. Average rating (column 3) equals the average, over all 30 quarters, of the mean outstanding recommendation in a given quintile at quarter-end. Number of brokers (column 4) is the number of distinct brokers in each quintile at the end of a quarter, averaged over all 30 quarters. Average number of recommendations (column 5) equals the average, over all 30 quarters, of the total number of outstanding recommendation in a given quintile at quarter-end. Average market value of firm covered (column 6) is the mean, over all 30 quarters, of the average quarterly market value of equity of the firms covered by the brokers in a given quintile. Broker optimism quintiles are determined each quarter by ranking brokers in ascending order according to the percentage of their end-of-quarter recommendations which are buys. Brokers are assigned to quintiles so that the total number of end-of-quarter recommendations in each quintile is approximately the same.

Optimism quintile	Average quarterly percentage buy recommendations	Average quarterly rating	Average quarterly number of brokers	Average quarterly number of recommendations	Average market value of firm covered
(1)	(2)	(3)	(4)	(5)	(6)
1 (most pessimistic)	45%	2.4	50	5,137	6,098,450
2	57%	2.2	25	5,043	5,848,713
3	62%	2.1	23	5,122	5,551,187
4	67%	2.0	27	5,130	5,215,182
5 (most optimistic)	79%	1.8	98	5,082	4,115,469

Table 3
Average Percentage Buys in Quarters *t+1* through *t+12* for Brokers in Each Optimism Quintile in Quarter *t*

Over all the brokers in each quintile i at the end of quarter t the percentage of their recommendations which are buys at the end of each of the next 12 quarters (or until the end of the sample period, whichever is shorter) is computed. The numbers presented in the table are the means of these percentages over all quarters t, for each broker optimism quintile. Broker optimism quintiles are determined each quarter by ranking brokers in ascending order according to the percentage of their end-of-quarter recommendations which are buys. Brokers are assigned to quintiles so that the total number of end-of-quarter recommendations in each quintile is approximately the same.

	Broker optimism quintile				
Quarter	1 (pessimistic)	2	3	4	5 (optimistic)
t	45%	57%	62%	67%	79%
t+1	48%	58%	62%	66%	76%
t+2	49%	60%	62%	65%	74%
t+3	51%	60%	62%	64%	72%
t+4	52%	61%	62%	64%	71%
t+5	52%	61%	62%	63%	70%
t+6	53%	61%	62%	63%	69%
t+7	53%	61%	61%	63%	68%
t+8	54%	60%	61%	63%	68%
t+9	54%	60%	60%	62%	68%
t+10	53%	60%	60%	62%	68%
t+11	53%	60%	60%	61%	68%
t+12	53%	60%	60%	60%	67%

Table 4

Regressions of Announcement Day Market-Adjusted Return to Upgrades, Downgrades, Initiations, and Resumptions of Coverage

This table reports results of regressions of recommendation announcement day market-adjusted return on size of firm covered (equal to ln of firm market value), broker size (equal to ln of number of recommendations outstanding by broker in the prior quarter), and dummy variables for broker optimism quintile and the nature of the recommendation. The regression results are presented for upgrades to buy, downgrades to hold or sell, initiations or resumptions of coverage with a buy, and initiations or resumptions of coverage with a hold or sell. The coefficient estimates are presented, along with the corresponding t-statistics for the null that the coefficients equal zero. Only recommendations coded as "real-time" in the *First Call* database are used. Broker optimism quintiles are determined each quarter by ranking brokers in ascending order according to the percentage of their end-of-quarter recommendations which are buys. Brokers are assigned to quintiles so that the total number of end-of-quarter recommendations in each quintile is approximately the same.

	Upgrades to buy		**Downgrades to hold or sell**		**Initiation / Resumption as buy**		**Initiation / Resumption as hold or sell**	
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
Intercept	5.16	17.8	-10.36	-19.4	1.74	10.7	-3.98	-10.4
ln(firm size)	-0.42	-22.8	0.70	22.9	-0.21	-19.9	0.16	8.3
ln(broker size)	0.59	17.2	-0.77	-13.4	0.23	13.5	-0.23	-7.2
Dummy Variable on:								
Quintile 1 (most pessimistic)	-0.70	-6.6	2.02	10.8	0.05	0.7	1.14	9.1
Quintile 2	-0.32	-3.0	1.33	7.0	0.10	1.6	0.75	5.7
Quintile 3	0.11	1.0	0.41	2.2	0.20	3.1	0.57	4.3
Quintile 4	0.16	1.5	1.34	7.4	-0.03	-0.5	0.63	4.8
Dummy Variable on:								
Upgrades to strong buy	0.16	2.3						
Dummy Variable on:								
Downgrades to hold			-1.25	-5.1				
Downgrades to sell			0.29	1.0				
Dummy Variable on:								
Initiation/resumption at strong buy					1.24	31.3		
Dummy Variable on:								
Initiation/resumption at hold							0.90	3.8
Initiation/resumption at sell							1.35	4.8
Adjusted R^2	1.9%		2.0%		1.5%		0.5%	
Number of observations	43,893		43,339		93,895		42,956	

Table 5
Average Daily Portfolio Buy-and-Hold Returns

This table reports the average daily portfolio buy-and-hold raw, market-adjusted, and abnormal returns, for upgrades to buy (panel A), downgrades to hold or sell (panel B), initiations or resumptions of coverage with a buy (panel C), and initiations or resumptions of coverage with a hold or sell (panel D), by broker optimism quintile. The difference in returns between quintiles 1 and 5 is also presented, along with the corresponding t-statistic for the null that the difference is zero. A stock enters a portfolio at the close of trading on the day the recommendation is announced. If more than one broker takes the same action on a particular stock, then that stock will appear multiple times in the corresponding portfolio, once for each broker. Stocks are dropped from the upgrade (downgrade) portfolio when a downgrade (upgrade) is announced, or when the stock is dropped from coverage. Stocks are dropped from the initiation/resumption of coverage portfolios when a new recommendation is issued. Each portfolio's value-weighted return is calculated each day, with the portfolio rebalanced at the end of the day, if necessary. The daily abnormal return is the intercept from a regression of the daily portfolio excess return on (1) the excess of the market return over the risk-free rate, (2) the difference between the daily returns of a value-weighted portfolio of small stocks and one of large stocks, (3) the difference between the daily returns of a value-weighted portfolio of high book-to-market stocks and one of low book-to-market stocks, (4) the difference between the daily returns of a value-weighted portfolio of high price momentum stocks and one of low price momentum stocks, and (5) one-trading day lagged values of each of these four variables. Only recommendations coded as "real-time" in the First Call database are used. Broker optimism quintiles are determined each quarter by ranking brokers in ascending order according to the percentage of their end-of-quarter recommendations which are buys. Brokers are assigned to quintiles so that the total number of end-of-quarter recommendations in each quintile is approximately the same.

Panel A: Upgrade to Buy

Optimism quintile	Raw return	Market-adjusted return	Abnormal return
1 (most pessimistic)	0.085	0.049	0.040
2	0.075	0.039	0.030
3	0.068	0.032	0.023
4	0.069	0.034	0.024
5 (most optimistic)	0.058	0.023	0.016
Difference (1 minus 5)	0.026	0.026	0.024
t-stat	1.74	1.74	2.71

Panel B: Downgrade to Hold or Sell

Optimism quintile	Raw return	Market-adjusted return	Abnormal return
1 (most pessimistic)	0.022	-0.013	-0.022
2	0.018	-0.018	-0.026
3	0.020	-0.015	-0.023
4	0.010	-0.025	-0.032
5 (most optimistic)	-0.007	-0.042	-0.044
Difference (1 minus 5)	0.029	0.029	0.022
t-stat	1.96	1.96	2.19

Panel C: Initiation/Resumption as buy

Optimism quintile	Raw return	Market-adjusted return	Abnormal return
1 (most pessimistic)	0.056	0.021	0.014
2	0.043	0.007	0.000
3	0.054	0.019	0.010
4	0.039	0.003	-0.003
5 (most optimistic)	0.036	0.001	-0.004
Difference (1 minus 5)	0.020	0.020	0.018
t-stat	1.54	1.54	2.12

Panel D: Initiation/Resumption as hold or sell

Optimism quintile	Raw return	Market-adjusted return	Abnormal return
1 (most pessimistic)	0.044	0.008	0.000
2	0.033	-0.002	-0.011
3	0.028	-0.008	-0.018
4	0.028	-0.007	-0.015
5 (most optimistic)	0.004	-0.031	-0.035
Difference (1 minus 5)	0.040	0.040	0.035
t-stat	3.38	3.38	4.18

Table 6
Daily Portfolio Buy-and-Hold Abnormal Returns, by Size of Firm Covered

This table reports the average daily portfolio buy-and-hold abnormal returns, for upgrades to buy (panel A), downgrades to hold or sell (panel B), initiations or resumptions of coverage with a buy (panel C), and initiations or resumptions of coverage with a hold or sell (panel D), by broker optimism quintile and by size of firm covered (small, medium, and large). The difference in returns between quintiles 1 and 5 is also presented, along with the corresponding t-statistic for the null that the difference is zero. A stock enters a portfolio at the close of trading on the day the recommendation is announced. If more than one broker takes the same action on a particular stock, then that stock will appear multiple times in the corresponding portfolio, once for each broker. Stocks are dropped from the upgrade (downgrade) portfolio when a downgrade (upgrade) is announced, or when the stock is dropped from coverage. Stocks are dropped from the initiation/resumption of coverage portfolios when a new recommendation is issued. Each portfolio's value-weighted return is calculated each day, with the portfolio rebalanced at the end of the day, if necessary. The daily abnormal return is the intercept from a regression of the daily portfolio excess return on (1) the excess of the market return over the risk-free rate, (2) the difference between the daily returns of a value-weighted portfolio of small stocks and one of large stocks, (3) the difference between the daily returns of a value-weighted portfolio of high book-to-market stocks and one of low book-to-market stocks, (4) the difference between the daily returns of a value-weighted portfolio of high price momentum stocks and one of low price momentum stocks, and (5) one-trading day lagged values of each of these four variables. Only recommendations coded as "real-time" in the First Call database are used. Broker optimism quintiles are determined each quarter by ranking brokers in ascending order according to the percentage of their end-of-quarter recommendations which are buys. Brokers are assigned to quintiles so that the total number of end-of-quarter recommendations in each quintile is approximately the same.

Panel A: Upgrade to Buy

Optimism quintile	Small	Medium	Large
1 (most pessimistic)	0.092	0.032	0.017
2	0.062	0.027	0.021
3	0.053	0.020	0.015
4	0.045	0.015	0.021
5 (most optimistic)	0.032	0.017	0.002
Difference (1 minus 5)	0.060	0.015	0.015
t-stat	4.01	1.31	1.09

Panel B: Downgrade to Hold or Sell

Optimism quintile	Small	Medium	Large
1 (most pessimistic)	-0.048	-0.015	-0.004
2	-0.060	-0.025	-0.002
3	-0.053	-0.014	-0.007
4	-0.061	-0.025	-0.010
5 (most optimistic)	-0.071	-0.035	0.001
Difference (1 minus 5)	0.023	0.019	-0.005
t-stat	1.39	1.37	-0.34

Panel C: Initiation/Resumption as Buy

Optimism quintile	Small	Medium	Large
1 (most pessimistic)	0.027	0.010	0.012
2	0.013	0.000	-0.003
3	0.028	0.004	0.007
4	0.009	-0.008	-0.003
5 (most optimistic)	0.011	-0.013	0.000
Difference (1 minus 5)	0.017	0.024	0.012
t-stat	1.60	2.38	1.13

Panel D: Initiation/Resumption as Hold or Sell

Optimism quintile	Small	Medium	Large
1 (most pessimistic)	-0.011	0.012	-0.005
2	-0.031	-0.008	0.002
3	-0.029	-0.015	-0.010
4	-0.039	-0.007	-0.002
5 (most optimistic)	-0.054	-0.031	-0.015
Difference (1 minus 5)	0.043	0.042	0.010
t-stat	2.86	3.26	0.89

Table 7
Return to Recommendation Changes, by Broker Optimism Quintile, Pre- and Post-September 9, 2002 (the effective date for NASD rule 2711)

This table reports average one-day market-adjusted returns (panel A) and daily portfolio buy-and-hold abnormal returns (panel B), for upgrades to buy, downgrades to hold or sell, initiations/resumptions of coverage with a buy, and initiations/resumptions of coverage with a hold or sell, by broker optimism quintile for the period prior to and subsequent to September 9, 2002. The difference in returns between quintiles 1 and 5 is also presented, along with the corresponding t-statistic for the null that the difference is zero. A stock enters a buy-and-hold portfolio at the close of trading on the day the recommendation is announced. If more than one broker takes the same action on a particular stock, then that stock will appear multiple times in the corresponding portfolio, once for each broker. Stocks are dropped from the upgrade (downgrade) portfolio when a downgrade (upgrade) is announced, or when the stock is dropped from coverage. Stocks are dropped from the initiation/resumption of coverage portfolios when a new recommendation is issued. Each portfolio's value-weighted return is calculated each day, with the portfolio rebalanced at the end of the day, if necessary. The daily abnormal return is the intercept from a regression of the daily portfolio excess return on (1) the excess of the market return over the risk-free rate, (2) the difference between the daily returns of a value-weighted portfolio of small stocks and one of large stocks, (3) the difference between the daily returns of a value-weighted portfolio of high book-to-market stocks and one of low book-to-market stocks, (4) the difference between the daily returns of a value-weighted portfolio of high price momentum stocks and one of low price momentum stocks, and (5) one-trading day lagged values of each of these four variables. Only recommendations coded as "real-time" in the First Call database are used. Broker optimism quintiles are determined each quarter by ranking brokers in ascending order according to the percentage of their end-of-quarter recommendations which are buys. Brokers are assigned to quintiles so that the total number of end-of-quarter recommendations in each quintile is approximately the same.

Panel A: One-day market-adjusted return

	Pre-September 9, 2002				Post-September 9, 2002			
Optimism quintile	Upgrade to Buy	Downgrade to Hold or Sell	Initiate/ resume as Buy	Initiate/ resume as hold or sell	Upgrade to Buy	Downgrade to Hold or Sell	Initiate/ resume as Buy	Initiate/ resume as hold or sell
1 (most pessimistic)	1.681	-3.861	0.688	-0.930	2.593	-2.805	0.312	-0.444
2	2.462	-5.162	0.771	-1.556	2.004	-3.021	0.601	-0.155
3	2.844	-6.223	0.874	-1.823	3.045	-4.279	0.435	-0.385
4	2.972	-5.461	0.758	-1.829	2.170	-2.889	0.461	-0.237
5 (most optimistic)	2.335	-6.572	0.582	-2.214	2.489	-3.250	0.580	-0.508
Difference (1 minus 5)	-0.655	2.711	0.106	1.283	0.104	0.445	-0.268	0.064
t-stat	-6.1	12.5	1.7	9.1	0.3	1.4	-1.2	0.3

Panel B: Daily portfolio buy-and-hold abnormal returns

	Pre-September 9, 2002				Post-September 9, 2002			
Optimism quintile	Upgrade to Buy	Downgrade to Hold or Sell	Initiate/ resume as Buy	Initiate/ resume as hold or sell	Upgrade to Buy	Downgrade to Hold or Sell	Initiate/ resume as Buy	Initiate/ resume as hold or sell
1 (most pessimistic)	0.043	-0.026	0.015	-0.004	0.012	-0.018	0.003	-0.008
2	0.030	-0.030	-0.003	-0.014	0.023	-0.032	0.034	-0.004
3	0.022	-0.024	0.009	-0.022	0.024	-0.036	0.021	-0.004
4	0.023	-0.035	-0.005	-0.019	0.019	-0.020	0.020	-0.022
5 (most optimistic)	0.016	-0.047	-0.006	-0.042	0.011	-0.034	0.033	-0.019
Difference (1 minus 5)	0.028	0.020	0.022	0.038	0.001	0.016	-0.030	0.011
t-stat	2.8	1.8	2.5	4.2	0.1	0.9	-1.8	0.6