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WANG, Rong; Kadan, Ohad; Madureira, Leonardo; and Zach, Tzachi. Conflicts of Interest and Stock Recommendations: The Effects of the Global Settlement and Related Regulations. (2006).

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Conflicts of Interest and Stock Recommendations - The Effects of the Global Settlement and Related Regulations

Ohad Kadan Leonardo Madureira Rong Wang Tzachi Zach*

First version: July 2004
This version: November 2005

Abstract

Prior research has shown that sell-side analysts in general, and especially those facing conflicts of interest driven by investment bank relationships, issue overly optimistic recommendations. This paper studies the effect of regulations on sell-side analysts' research. These regulations – Rule NASD 2711, Rule NYSE 472, and the “Global Analyst Research Settlement” – attempted to mitigate the interdependence between the research and the investment bank departments of US brokerage houses. The results suggest that the regulations have partially achieved their goal of curbing the conflicts of interest's influence over analysts' stock recommendations. After the adoption of the new regulations, the likelihood of receiving an optimistic recommendation no longer depends on whether the firm had undergone IPO/SEO or whether the brokerage house had participated in any such IPO/SEO as an underwriter. However, analysts are still reluctant to issue pessimistic recommendations for IPO/SEO firms, and affiliated analysts are even more reluctant to be pessimistic about these stocks. We also report an overall change in the distribution of recommendations issued by brokerage houses after the new regulations took effect, in which they leaned towards less optimistic recommendations.

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1 Introduction

Over the past decade, academic studies and the financial press have pointed to sell-side research that is tainted by conflicts of interest stemming from the relationship between investment banking (IB) and research departments.¹ In recent years, regulators have expressed concern that analysts were deliberately misleading investors and, during the summer of 2001, the US Congress held hearings titled “Analyzing the Analysts.” Changes in the regulatory environment, however, did not begin until July 2002, when the Self-Regulatory Organizations (SROs) NASD and NYSE issued new regulations on sell-side research. In December 2002, the Global Analyst Research Settlement (“Global Settlement”), involving the sell-side research of the top ten US investment banks (the big 10), was formally announced. The purpose of these regulations was to curb the conflicts of interests that affected analysts’ research by substantially limiting relations between the research and investment banking departments. This study investigates the impact of these regulatory changes on analysts’ behavior. Were the regulations effective in mitigating the effects of the conflicts of interest?

The general view in the academic literature is that analysts are, on average, biased towards providing favorable and positive information regarding the firms they cover.² Moreover, affiliated analysts, whose employer has business relations with the covered firm, are shown to be more biased than unaffiliated analysts. The evidence demonstrating the differential bias of affiliated analysts over unaffiliated analysts is both in the context of Initial Public Offerings (Michaely and Womack, 1999) and Seasoned Equity Offerings (Dugar and Nathan, 1995; Lin and McNichols, 1998).³ The strong academic evidence of conflicts of interest is supported by numerous anecdotes about analysts’ practices. Analysts had been frequently used by investment banks as a tool to attract business (e.g. Krigman, Shaw and Womack, 2001). As a result, analysts’ compensation was tied to the amount of investment banking business they helped generate. Analysts actively participated in road shows and pitches and coverage

¹Examples in the financial press include “Wall Street Grows Treacherous for Analysts Who Speak Out,” Wall Street Journal, April 5, 1990, p. C1; “Merrill Alters a Policy on Analysts,” Wall Street Journal, July 11, 2001, p. C1; “Under Pressure: At Morgan Stanley, Analysts Were Urged to Soften Harsh Views,” Wall Street Journal, March 25, 1992, p. A1; “Incredible Buys: Many Companies Press Analysts to Steer Clear of Negative Ratings,” Wall Street Journal, July 19, 1995, p. A1; “Jack of All Trades: How One Top Analyst Vaults ‘Chinese Walls’ to Do Deals for Firm,” Wall Street Journal, March 25, 1997, p. A1; “Shoot All the Analysts,” Financial Times, March 20, 2001, p. 22; “Where Mary Meeker Went Wrong,” Fortune, May 14, 2001, pp. 68-82; “Outlook for Analysts: Skepticism and Blame,” Wall Street Journal, June 13, 2001, p. C1; “The Real Telecom Scandal,” Wall Street Journal, September 13, 2002, p. A16.

²See Kothari (2001) pp. 152-160 for a review of this literature.

³These studies mainly demonstrate a bias in stock recommendations. The evidence is less conclusive with respect to other research outputs such as earnings forecasts (Dugar and Nathan, 1995; Cowen et al., 2003), price targets (Cowen et al., 2003) and long-term earnings growth forecasts (Lin and McNichols, 1998 find weak evidence while Dechow et al.’s, 2000, evidence is stronger). Other studies of conflicts of interest in sell-side research are Boni and Womack (2002a), Iskoz (2003), Chan, Karceski and Lakonishok (2003), Ljungqvist, Marston, Starks, Wei and Yan (2004), Barber, Lehavy and Trueman (2005) and Agrawal and Chen (2005).

decisions were largely affected by investment banking considerations. In describing the behavior of one of its participants, the Global Settlement states that “pressure on analysts to assist in obtaining investment banking deals and to maintain banking relationships adversely affected the integrity of analysts’ reports (...) regarding companies that were investment banking clients” (Lehman Brothers’ Letter of AWC - Acceptance, Waiver and Consent, p. 3).

The stock market crash of 2000-2001 triggered the concerns that investors were being misled by analysts’ biased research. While these concerns could be dismissed on the grounds that any bias would be adjusted for by rational investors, there is some evidence to suggest otherwise. Theoretically, sophisticated agents might be able to exploit other agents’ naïve behavior (e.g., Gabaix and Laibson, 2004). In the context of this paper, there is evidence that heterogeneous investors use sell-side research differently, with retail investors acting naively by failing to adjust for clear biases in analysts’ stock recommendations (Boni and Womack, 2002b, 2003, Malmendier and Shanthikumar, 2004).

In this paper, we ask whether and how the regulations affected analysts’ practices and how the market reacted to any changes in analysts’ behavior, focusing mainly on the conflicts of interest arising from the relationship between research and investment banking departments. To answer these questions, we analyze stock recommendations and price reactions in the period before the regulations (the *Pre-Reg* period), and the period after the regulations (the *Post-Reg* period). As a main proxy for the presence of conflicts of interest, we use the past underwriting relationship between the brokerage house and the recommended firm. In addition, we also compare recommendations issued for firms that underwent an IPO or an SEO in the recent past with recommendations issued for firms that did not undergo an IPO or an SEO.

Our paper is related to a recent study by Barber, Lehavy and Trueman (2005). They focus on whether the argument made by regulators regarding conflicts of interest affecting stock recommendations was warranted. As a result, their analysis is concentrated on the period prior to the new regulations. In contrast, we investigate whether the new regulations were successful in affecting analysts’ behavior by comparing recommendations in the periods prior to and after the regulations.

We report significant changes in how conflicts of interest influence stock recommendations in the *Post-Reg* period. We corroborate the concerns of regulators by showing that conflicts of interest were in fact associated with excess optimism in the *Pre-Reg* period. *Ceteris paribus*, in the *Pre-Reg* period the odds of issuing an optimistic recommendation increased by 40% for stocks that have undergone an IPO or an SEO in the recent past and by an additional 12% if the recommendation was issued by an affiliated analyst. Both effects largely vanished after the regulations. In the *Post-Reg* period analysts are not more likely to issue optimistic recommendations for IPO or SEO firms and affiliated analysts

are not more likely to issue optimistic recommendations compared to unaffiliated analysts.

In contrast, conflicts of interest might still be influencing the issuance of pessimistic recommendations. In both the *Pre-Reg* and *Post-Reg* periods, analysts are reluctant to issue pessimistic recommendations for IPO/SEO firms, and affiliated analysts are even more reluctant to be pessimistic about these stocks. Furthermore, we document a reversal in the behavior of analysts employed by the brokerage houses that participated in the Global Settlement. While prior to the regulations these brokerage houses were less likely to issue pessimistic recommendations, in the *Post-Reg* period, they are *more* likely to issue such recommendations, compared to the brokerage houses that did not participate in the settlement.

Results on market reactions are consistent with the idea that rational markets should be able to discount biased optimism. Before the regulations, prior studies show that the market recognized the excess optimism associated with the underwriting business by discounting recommendations coming from brokerage houses with potential conflicts of interest at play, but, as in Michaely and Womack (1999), the adjustment for the bias was only partial. After regulations were adopted, and consistent with the elimination of excess optimism linked to underwriting relationships, there are no detrimental effects on market reactions to optimistic recommendations issued by brokerage houses with potential conflicts of interest. In particular, in the *Post-Reg* period, post-event returns do not differ between recommendations issued by analysts with varying conflicts of interest, suggesting that investors have been correctly adjusting at event time for any bias that might persist in the recommendations.

We also report significant changes in the overall distribution of analysts' stock recommendations between the two periods.⁴ Prior to the regulations, 61% of the recommendations were optimistic ("strong buy" and "buy") while pessimistic recommendations ("underperform" and "sell") were very rare (4.2% of the sample). The distribution of recommendations in the *Post-Reg* period is much less skewed. Optimistic recommendations now constitute about 43% of the population, while pessimistic recommendations have almost tripled - to about 12%. The difference between the two periods is even more remarkable for the subsample of recommendations issued by the 10 brokerage houses that were part of the Global Settlement. For them, there is roughly a balanced distribution between optimistic and pessimistic recommendations in the *Post-Reg* period.

The shift in the cross-sectional distribution of stock recommendations could be caused by a change in the way analysts apply optimistic assumptions in their valuation models. A reduction in the use of

⁴These results complement Barber, Lehavy, McNichols and Trueman (2005), who provide evidence regarding the distribution of stock recommendations using data from 1996 to mid-2003. They show that analysts are reluctant to issue bad recommendations, but that this tendency is mitigated starting in 2000. They attribute part of the change to NASD Rule 2711, which requires that brokers' ratings distribution be made public.

optimistic assumptions leads to more moderate valuations, which then shift the stock recommendations' distribution. A second, non-mutually exclusive explanation for the shift in the recommendations' distribution is that brokerage houses reclassified their recommendations. Indeed, many brokerage houses adopted a new rating system at around the time the regulations were put into place. With this new rating system, brokerage houses completely reshuffled their portfolio of stock recommendations in one single day. We show that this reshuffle came about mostly through downgrading the then outstanding recommendations. Based on our results, we believe that both explanations have an empirical validity.

The changes in market reactions to stock recommendations across the periods are consistent with the observed changes in stock recommendations. For example, a decrease in optimism implies that optimistic recommendations in the *Post-Reg* period are restricted to a smaller subset of firms, with relatively better prospects than optimistically-rated stocks in the *Pre-Reg* period. Investors seem to understand this, as event reactions to optimistic recommendations in the *Post-Reg* period are about 80% stronger than those in the *Pre-Reg* period. We also corroborate anecdotal evidence that, prior to the regulations, brokerage houses used to aggregate stocks with pessimistic prospects under the “hold” recommendation level. After the regulations, the big 10 brokerage houses seem to “mean what they say” when they distribute stocks between “hold” and “sell” recommendations, as revealed by market reactions that correctly impose a negative tone solely on the explicitly pessimistic (“sell”) recommendations, but no longer so for “hold” recommendations (for non-Big 10 brokerage houses, “sell” recommendations still seem to be disguised under “hold”). The attainment of correct naming of ratings conforms to the objectives of the regulations - which, for example, prescribe that “definitions of ratings terms also must be consistent with their plain meaning” and that a “‘hold’ rating should not mean or imply that an investor should sell a security” (NASD Rule 472, p. 9). This works in favor of retail investors, given the empirical evidence in Malmendier and Shanthikumar (2004) that these investors were taking recommendations at face value.

Collectively, we view our findings as consistent with a significant effect of the regulations on analysts' practices. First, analysts started using recommendation ratings more judiciously with the adoption of the regulations. For example, “sell” recommendations are no longer disguised under the “hold” umbrella. Second, regarding conflicts of interest linked to IB business, we observe a partial achievement of the regulations' objectives. The regulations were more successful in curbing the issuance of optimistic recommendations by analysts facing potential conflicts of interest. However, we still find evidence that these analysts are reluctant to issue pessimistic recommendations.

The rest of this paper is organized as follows. In section 2, we provide some background on the

regulatory changes. In section 3, we develop our hypotheses, and in section 4, we describe the data used in this study. Section 5 examines general trends in analysts' outputs following the regulations. In section 6, we provide our main results by examining the differential behavior of analysts based on conflicts of interest between research and investment banking departments. We conclude in section 7.

2 Institutional Background - The Regulations

During the summer of 2001, the US Congress held the “Analyzing the Analysts” hearings. Although the congressional initiative did not result in specific outcomes in terms of regulatory practice, it helped draw attention to the issue of conflicts of interests in brokerage house research. For example, Securities and Exchange Commission Acting Chairman Laura Unger emphasized that: “It has become clear that research analysts are subject to several influences that may affect the integrity and the quality of their analysis and recommendations. (...) Analyst practices are now firmly in the spotlight. That spotlight has exposed the conflicts analysts face. This exposure is beneficial for investors. (...) I am hopeful that recent industry initiatives will help to reduce or more effectively manage the conflicts of interest that threaten analysts' fairness and objectivity. I am also optimistic that appropriate amendments to SRO rules, coupled with vigilant enforcement of these rules, will improve disclosure of conflicts of interest by firms and their analysts.”⁵

The hearings were followed by two pieces of closely related regulations. First, new rules were enacted by NASD and NYSE (the SROs), affecting virtually all brokerage houses operating in the United States. The second regulatory intervention was the “Global Settlement” which applies directly only to the 10 top brokerage houses but indirectly affects all other brokerage houses as well. We describe each one of them separately below, and later refer to them collectively “the regulations.”⁶

2.1 The SROs Regulations

In the summer of 2002, new rules for sell-side analysts became effective through NYSE and NASD. July 9, 2002 marked the start of the new rule 2711 in NASD and of the amended rule 472 in NYSE.

⁵See pages 228 to 240 of the Analyzing the Analysts Hearings of the Committee on Financial Services, U.S. House of Representatives, July 14; July 31, 2001, Serial No. 107-25. Documentation on the hearings can be obtained at <http://www.access.gpo.gov>.

⁶The Sarbanes-Oxley Act of July 24th, 2002 also added to the increasing scrutiny of analysts. The Act mandates that the SEC, either directly or indirectly through the SROs, adopt not later than one year after the enactment date of the Act “rules reasonably designed to address conflicts of interest that can arise when securities analysts recommend equity securities in research reports and public appearances, in order to improve the objectivity of research and provide investors with more useful and reliable information” (see SEC Release no. 34-47110 at <http://www.sec.gov/rules/sro/34-47110.htm>).

According to the SEC, “the NASD and NYSE rules, as amended, are substantially identical and are intended to operate identically” (SEC Release No. 45908, p. 5);⁷ they were adopted to complement existing regulations that were both uncoordinated and insufficient to address the growing complaints from the public.

The main purpose of the SRO’s new rules was to sever the ties between investment banking (IB) and research departments. Among other measures, the rules limit the relationships and communications between IB and research personnel, prohibit analyst compensation that is based on specific IB transactions, prohibit the subject company from reviewing a research report before publication (except for checking factual accuracy), and establish quiet periods during which a firm acting as manager or co-manager of a securities offering cannot issue research reports on the company issuing the securities.

The new rules also establish very stringent disclosure requirements for research reports. The disclosure requirements are aimed at providing investors with better information to properly interpret the research output, to be aware of the possibility that the research might be subject to conflicts of interest and to verify, ex-post, its value. For example, along with the research report, a research analyst has to disclose whether she received compensation based on IB’s revenue, whether she holds a position as officer or director in the subject company, or whether the subject company is a client of the firm. Finally, to make research output more meaningful and easily comparable across different analysts and firms, the rules prescribe that every research report must explain the meaning of its rating system, disclose the percentage of all ratings as mapped to “buy,” “hold” and “sell” categories, and provide a price chart that maps past prices of the recommended stock together with the points at which ratings were assigned or reviewed.

2.2 The Global Settlement

In June 2001, the New York Attorney General began investigating Merrill Lynch following a Wall Street Journal article about an alleged misconduct of security analysts. The initial evidence came from a series of e-mail messages that revealed a discrepancy between analysts’ true opinions and their recommendations. Contrary to favorable public reports by analysts about certain stocks, the internal e-mails by those same analysts showed a clear dissatisfaction with the attractiveness of the stocks. Following the Merrill Lynch investigation, the Attorney General conducted an investigation of other investment banks for similar issues. Supposedly, from approximately mid-1999 through mid-

⁷SEC Release No. 45908, describing the approval of new the rules, can be found at www.nasdr.com/pdf-text/02-21-app.pdf. A complete description of NYSE rule 472 can be found at <http://www.nyse.com/pdfs/rule472.pdf>, and a complete description of NASD rule 2711 and its amendments can be found at <http://www.nasdr.com/filings/rf02-21.asp>. Boni and Womack (2002a) provide a good description of the steps leading to the SROs’ new rules as well as a discussion of their main provisions.

2001, investment banks engaged in practices that created or maintained inappropriate influence by investment bankers over research analysts, thereby tainting research with conflicts of interest. These allegations were neither admitted nor denied by the investment banks.

The investigations led to the “Global Settlement” between the SEC, the NYSE, the NASD, the New York Attorney General, and ten of US top investment firms. The principles of the settlement were announced on December 22, 2002, and the final settlement was officially enacted on April 28, 2003 (see NASD 2003).⁸

The Global Settlement’s objectives closely mirrored the SROs’ new regulations passed in the summer of 2002, most importantly with respect to severing the ties between IB and research departments. Like the NASD 2711 and the NYSE 472 regulations, the Global Settlement included measures to restrict the relationship between IB and research departments, and to impose stringent disclosure requirements on the analysts’ research. In a few cases, the Global Settlement goes beyond the SROs’ new rules: for example, it requires that the participants have their IB and research departments physically separated and that the research department have a dedicated legal department.

Besides the regulatory measures on how sell-side research has to operate, the Global Settlement required the ten firms that were included in the settlement to pay fines and penalties totaling roughly \$1.4 billion. Moreover, the settlement included a Letter of Acceptance, Waiver and Consent (AWC) from each participant that documented in rich detail many instances of conflicts of interest, violations of NASD rules and firms’ internal policies, or simply fraudulent reports. Although the settlement guaranteed that “NASD will not bring any future actions against respondent alleging violations based on the same factual findings” contained in the AWC, it also said that the AWC “will become part of Respondent’s permanent disciplinary record and may be considered in any future actions brought by NASD, or any other regulator, against respondent” (J.P. Morgan’s Letter of AWC, p. 1). That is, for the participants of the Global Settlement, misdeeds of the past were settled for the moment, but repetitions of misdeeds in the future might lead to even harsher measures, given the documented precedent to support a legal case.

3 Hypotheses Development

Our hypotheses focus on analysts’ stock recommendations in the period following the enactment of the regulations (9/2002 – 12/2004), referred to as the *Post-Reg* period. We begin this period in September

⁸The ten investment firms included in the “Global Settlement” are: Bear, Stearns & Co. Inc., Credit Suisse First Boston LLC, Goldman, Sachs & Co., Lehman Brothers Inc., J.P. Morgan Securities Inc., Merrill Lynch, Pierce, Fenner & Smith, Inc., Morgan Stanley & Co. Inc., Citigroup Global Markets Inc. f/k/a Salomon Smith Barney Inc., UBS Warburg LLC and U.S. Bancorp Piper Jaffray Inc.

2002, immediately after the first set of rules was enacted. We compare analysts' outputs in the *Post-Reg* period to their outputs in the preceding period (11/2000-8/2002). We label it the *Pre-Reg* period. We begin this period in November 2000 since Regulation FD, which was another substantial regulation influencing analysts, was enacted in October 2000. Our aim is to gauge the effect of the regulations beyond what may have already been achieved due to Reg FD.⁹

Although brokerage houses produce many other pieces of information about stocks they track (general research reports and forecasts on earnings, sales, growth, etc.), we mostly focus on the effects of the regulations on stock recommendations. First, recommendations were always the center point of the complaints about conflicts of interest and of the demand for the regulations discussed above. For example, the SEC describes the purpose of the regulations passed by NYSE and NASD as to "address conflicts of interest that are raised when research analysts recommend securities in public communications" (SEC Release no. 45908, p. 3). Moreover, recommendations seem to represent a research output that is more binding. Elton, Gruber, and Grossman (1986) describe recommendations as "one of the few cases in evaluating information content where the forecaster is recommending a clear and unequivocal course of action rather than producing an estimate of a number, the interpretation of which is up to the user" (p. 699).¹⁰

We provide two sets of hypotheses. The first is a set of general hypotheses dealing with overall trends in recommendations and price reactions. The second set is related to conflicts of interests associated with underwriting relationships.

3.1 General Hypotheses

General Trends. The regulations lowered the ability of investment banks to influence research outputs of analysts. This was done by separating research from investment banking activities, accompanied by an increased threat of penalties. For these reasons we hypothesize that, as in Chen and Marquez (2004), analysts in general are less likely to bias their recommendations upwards in the *Post-Reg* period. In other words, for the same set of facts, an analyst will be less likely to exercise optimism in the *Post-Reg* period, resulting in a less optimistic recommendation. We obtain

H1: Analysts' optimism, as reflected in stock recommendations, will decline in the *Post-Reg* period compared to the *Pre-Reg* period.

⁹We also examine a longer period starting in 1995 with no significant change in the results.

¹⁰Conflicts of interest can also influence analysts' earnings forecasts, but in this case, the influence might occur in more subtle ways, for example, through an outright optimistic forecast or through strategic pessimism in order to avoid earnings disappointments. The literature on the subject presents mixed results, with some reporting an influence of underwriting activities on analysts' forecasts (e.g., Rajan and Servaes (1998), Chan, Karceski and Lakonishok (2003), and Cowen, Groysberg and Healy (2003)), but others do not (e.g., Lin and McNichols (1998) and Agrawal and Chen (2004)).

The above prediction could result from two non-mutually exclusive explanations. First, a decline in analysts’ optimism could lead to lower firm valuations because less optimistic assumptions (e.g. more moderate growth forecasts) are used in valuation models. Lower valuations, in turn, lead to more moderate recommendations and a shift in their cross-sectional distribution. A second story that can explain a shift in stock recommendations after the regulations refers to a redefinition of recommendation categories. That is, the same set of facts can be interpreted with the same degree of optimism by analysts in both the *Pre-Reg* and *Post-Reg* periods, but the mapping of similar valuations into a set of recommendations might be different because of the redefinitions of ratings in the *Post-Reg* period. Rule 472 states that “definitions of ratings terms also must be consistent with their plain meaning” and that “a ‘hold’ rating should not mean or imply that an investor should sell a security” (Rule 472, p. 9). In fact, a survey of buy-side professionals taken before the regulations (Boni and Womack (2002a)) showed that 79% of respondents interpreted a “hold” recommendation as a “sell” recommendation.¹¹ If brokerage houses changed their behavior by agreeing with the regulations’ suggestion that they were issuing a “hold” when they meant a “sell”, a direct impact of the regulations would be an increase in the fraction of pessimistic recommendations. Thus, in general, such redefinition of recommendations would result in an observable change in optimism. Around the beginning of the *Post-Reg* period, many brokers moved from a system of 5-tier recommendations to a system of 3-tier recommendations. Along with this switch, we conjecture that the brokers also redefined their recommendations to comply with the rules that were issued around that time.

Price Reactions. We argue that following the regulations, recommendations should entail different price reactions than in the period prior to the regulations. To get the intuition for this, it is convenient to view recommendations as a discretization of an analyst’s overall estimates. Figure 1 depicts how analysts’ bias affects their recommendations. The figure considers a 3-tier discretization of the analyst’s estimates. There are two cutoff values c_1 and c_2 . If the analyst’s overall estimates fall below c_1 she issues a “sell” recommendation. If her overall estimates are between c_1 and c_2 , she issues a “hold” recommendation, while if the estimates fall above c_1 she issues a “buy” recommendation. As the analyst becomes more optimistic, the cutoff points c_1 and c_2 move to the left. So, for instance, firms whose recommendation would have been a “hold” by an unbiased analyst will be reported as “buy” by a biased one. The figure shows that a regulatory reform that lowers the optimism of the analyst will increase the frequency of negative recommendations.

¹¹Here is how the press viewed the issue in 2001: “In the language of Wall Street, where firms are loath to issue sell recommendations, a neutral rating is tantamount to a sell,” and one brokerage house was already “encouraging its analysts to call a stock a sell instead of hiding behind euphemisms such as neutral or market perform” (“Merrill Alters a Policy on Analysts,” Wall Street Journal, July 11, 2001, p. C1).

Interestingly, such a regulation increases the informativeness of “buy” recommendations but decreases the informativeness of “sell” recommendations. Indeed, when an analyst is highly optimistic (as in the top of Figure 1), “buy” recommendations are issued for a large variety of firms, and hence are not very informative. By contrast, “sell” recommendations are issued only for a small set of very bad firms, and hence convey very negative information. When the analyst becomes less optimistic, as in the lower parts of Figure 1, “buy” recommendations are restricted to a smaller and better subset of firms, and hence become more informative. Thus, we would expect a stronger (more positive) price response to such recommendations. On the other hand, “sell” recommendations now include a larger set of firms, with relatively better prospects than the firms recommended “sell” by a more optimistic analyst. Thus, the interpretation of a “sell” recommendation as signaling poor prospects for a firm becomes weaker when the analyst becomes less optimistic, and the price response to such recommendation is expected to be less negative.

H2a: The price response to “buy” recommendations in the *Post-Reg* period will be stronger (more positive) than the price response in the *Pre-Reg* period.

H2b: The price response to “sell” recommendations in the *Post-Reg* period will be weaker (less negative) than the price response in the *Pre-Reg* period.

As for “hold” recommendations, Figure 1 shows that a regulatory reform that lowers the optimism of analysts moves the set of firms for which a “hold” recommendation is issued to the right. This improvement in the average quality of the firms recommended “hold” should be accompanied by better market reactions than similar recommendations issued by a more optimistic analyst (or, less negative market reactions, since it has been long known that “hold” used to convey negative information). If the analyst is unbiased (bottom of Figure 1), a “hold” recommendation should convey no information and therefore will not be followed by any price movement. We obtain

H2c: The price response to “hold” recommendations in the *Post-Reg* period will be less negative than the price response in the *Pre-Reg* period.

3.2 Differential Bias Hypotheses

Past studies show that affiliated analysts are more optimistic about the future prospects of firms underwritten by their employer than unaffiliated analysts covering the same firms (e.g., Dugar and Nathan (1995), Michaely and Womack (1999), Lin and McNichols (1998)). Two explanations are provided for this empirical result. First, the “selection bias” explanation argues that firms are likely

to choose underwriters whose analysts are more optimistic about their prospects (McNichols and O'Brien (1997)). This is "true" optimism that does not arise from strategic considerations by the analysts. The "strategic bias" explanation argues that research departments issue more optimistic forecasts and recommendations for strategic reasons to increase the likelihood of their firms being hired as underwriters and/or to provide support for previously underwritten companies.

The motivation behind the regulations was to eliminate the dependence between the research and investment banking departments. This is directly aimed at the "strategic bias" explanation for the optimism in sell-side research. The dependence between research and investment banking departments can arise in two ways. First, brokerage houses can express more optimism to reward firms for which they also served as underwriters. Second, brokerage houses can be more optimistic about firms to increase chances of gaining future underwriting business.

To capture the influence of the regulations on the first effect, we test the following hypothesis

H3: When comparing the *Pre-Reg* and *Post-Reg* periods, there will be a decrease in the differential optimism between affiliated analysts and unaffiliated analysts, who possess different degrees of conflicts of interest linked to underwriting business.

Regarding the second effect, we test the following hypothesis

H4: When comparing the *Pre-Reg* and *Post-Reg* periods, there will be a decrease in the differential optimism reflected in stock recommendations issued for firms that raised equity compared to firms that did not.

An alternative interpretation for analysts' general optimism regarding equity-issuing firms is that these firms time the offering to align with periods in which analysts are optimistic about their future prospects (see Baker and Wurgler, 2002). To the extent that the regulations did not affect the market timing behavior of managers, any difference between the periods is attributed to the conflicts of interest explanation.

4 Data

Stock recommendations. We obtain information on stock recommendations from the IBES database. We use recommendations that were issued in the *Pre-Reg* period (November 2000 - August 2002) and in the *Post-Reg* period (September 2002 - December 2004). For firms that issued equity, we identify the recommendations issued during the two years following the equity offering by analysts

who are employed by either its lead underwriter(s) or by the co-managers (s) and label them as recommendations issued by ‘affiliated’ analysts. This definition is consistent with Bradley et al. (2005), who argue that the interests of lead underwriters and co-managers are similar. The recommendations issued by analysts that are not associated with the lead underwriter(s) or the co-manager(s) are labeled ‘unaffiliated.’¹² Some descriptive information about all stock recommendations available for our analysis is provided in Panel A of Table 1.

Brokers. Our data covers all of the brokers issuing stock recommendations and surveyed by IBES. In some of our analyses, we distinguish between the brokers that participated in the Global Settlement and those who did not. We term the first group “big 10” and the second group “non-big 10.” See Footnote 8 for a list of participants in the Global Settlement. Panel B of Table 1 reports some descriptive statistics about the equity offering market during our sample period, stratified by the types of brokerage houses. The table reveals that the big 10 brokerage houses dominate the IPO and the SEO market. They participated as lead or co-lead underwriters in 69% of the equity offerings in the *Pre-Reg* period. These offerings accounted for about 87% of the total proceeds. In the *Post-Reg* period, the participation of Big-10 brokerage houses slightly decreased.

Firms. Our analysis focuses on all US firms with available stock recommendations and long-term growth forecasts in the IBES database. Some of our analyses require a definition of an underwriting relationship between the analyst and the firm being recommended. To achieve that we focus on firms that issued equity, either through an IPO or an SEO. To allow the inclusion of affiliated recommendations that were issued starting in November 2000, we include IPO’s and SEO’s starting from November 1998. We obtain a list of such firms from the SDC database. We exclude all closed-end funds and trusts as well as all unit investment trusts. For each equity offering, we identify the lead underwriter(s) as well as the co-manager(s).

Some descriptive statistics about our sample firms are reported in Panel C of Table 1. We separate the equity offerings into three subperiods. The average proceeds for SEO’s in our sample ranges between \$170 and \$270 million across our sample period. The average IPO proceeds range from \$163 million and \$348 million. The average market capitalization of an SEO firm is about \$4 billion. IPO firms are smaller, on average. Despite that, IPO firms exhibit lower book-to-market ratios, reflecting their larger growth opportunities and their younger age.

¹²We acknowledge that there could be other proxies for the presence of conflicts of interest among analysts. For example, Barber, Lehavy and Trueman (2005) base their distinction on whether the analysts’ employer is a pure research firm or a hybrid of research and investment banking firm.

Stock returns. Some of our tests involve examining stock returns following analysts' recommendations. We obtain stock return information from CRSP. To analyze price reactions and long term returns, we use size- and industry-adjusted returns. Size-adjusted returns for each stock are computed by subtracting from the stock's actual return the return of the CRSP market capitalization decile portfolio corresponding to the stock. Given the prominence of industry benchmarks in the rating systems, we also use industry-adjusted returns. Similar to the approach used by Womack (1996), we compute industry-adjusted returns as follows. First, a size-adjusted return is computed for each stock in the sample as well as for all other stocks from the NYSE and NASDAQ in the same industry, using Fama and French's (1997) 48-industries classification. The industry-adjusted return for each stock is then computed as the difference between the size-adjusted return for the stock and the mean of the size-adjusted returns for the industry-matched stocks.

5 Analysis of General Trends

In this section, we analyze the changes in the overall optimism expressed in analysts' recommendations following the regulations (hypotheses H1 and H2). We start by providing univariate and multivariate tests of the change in optimism. Then we study the price reactions following recommendations.

5.1 Overall Optimism in Recommendations

5.1.1 Descriptive Statistics

Table 2 presents the distribution of recommendations in the *Pre-Reg* and *Post-Reg* periods using a 3-tier rating system.¹³ In the *Pre-Reg* period, 60.7% of the recommendations were optimistic, while only 4.2% were pessimistic. The proportion of neutral recommendations in that period was 35.1%. The distribution of recommendations becomes more balanced in the *Post-Reg* period. Then, the proportion of optimistic recommendations dropped to 42.9%, the proportion of pessimistic recommendations increased to 11.7%, and the proportion of neutral recommendations increased to 45.5%. These results show a decline in optimism, and hence are consistent with H1.

Figures 2 and 3 shed additional light on time trends in analysts' recommendations. The figures describe the monthly distribution of consensus recommendations for the participants of the Global Settlement and for other brokerage houses between January 1998 and December 2004.¹⁴ That is, for

¹³The differences in means of all variables across the periods are statistically significant.

¹⁴We extend the sample period for the purposes of the figure for illustrative purposes. We show that the trends existed even before our sample period began. Some argue that the conflicts of interests were at their peak in the hot market period of the 1990's. To that extent, our analyses may understate the results in the *Pre-Reg* period. All our results hold

each month, we calculate the percentage of consensus recommendations in each rating category, and report them in the figures. The figures differ in the way that the consensus recommendations are calculated. Figure 2 uses a 4-tier rating system, and Figure 3 uses a 3-tier system.¹⁵

Consider first the patterns of the distribution up to mid-2002 – that is, in the period before any of the regulations had taken effect. As we will discuss in the next section, during this period, the vast majority of the brokerage houses were still using the expanded, four- or five-tier rating systems: thus the 4-tier system used in Figure 2 can be deemed appropriate. The pattern of skewness towards optimistic recommendations is striking. Pessimistic recommendations never reach more than 2% of the sample before 2002. The bulk of consensus recommendations is concentrated in the “strong buy” and “buy” categories, together accounting for 60% or more of the firms in the sample. Note the pattern of an increasing fraction of “buy” recommendations, at the expense of a decreasing fraction of “hold” recommendations, up to the year 2000. The period in which “buy” recommendations were so prominent coincides with a hot market period for the underwriting business, and the decline in the presence of “buy” recommendations coincides with the downturn both of the market conditions and of underwriting business conditions. Along the cross-sectional dimension, the figures suggest that there is not much difference in the distribution of consensus recommendations between the groups of big 10 and non-big 10 brokerage houses.

When we turn to the *Post-Reg* period, a different pattern emerges. Now, of course, it is important to take into consideration that many brokerage houses started using the reduced 3-tier system, so inferences are made using both Figure 2 and Figure 3.

First, for big 10 brokerage houses, there is an overall increase in the fraction of firms rated pessimistic. The increase starts in early 2002, when one of the big 10 brokerage houses adopted a new rating system, but really spikes in the second half of the year, most noticeably in September 2002, when five of the brokerage houses adopted new systems. The fraction of firms in the pessimistic category jumps from 3% to about 20%. This occurs at the expense of firms rated as “strong buy” and “buy” (optimistic) categories. After November 2002, the distribution of the consensus recommendations for big 10 brokerage houses presents similar fractions of firms in optimistic and pessimistic categories, with more than 60% of the recommendations concentrated at the hold/neutral category.

Cross-sectional differences also emerge. Although we also observe a decrease (increase) in the fraction of firms rated in the “strong buy” and “buy” (“hold” and “underperform”) categories for

if we extend our *Pre-Reg* sample to begin in January 1998.

¹⁵In order to define the consensus recommendation for a firm in a certain month, we average its outstanding recommendations for that month. Since ratings systems sometimes differ between the pre- and post-regulation periods, we adopt two forms of averaging, one based on the traditional five-tier I/B/E/S ranking and another based on a reduced three-tier rating system. (Details on the averaging are shown in the Appendix.)

non-big 10 brokerage houses, the fractions in the *Post-Reg* period are smaller than the ones presented by the big 10 brokerage houses. Non-big 10 brokerage houses are now more upbeat than the big 10, keeping more of the firms rated as optimistic.

5.1.2 New Rating Systems

One important aspect of the regulations is the stringent disclosure requirements imposed on how information is produced and disseminated by the brokerage houses. The new rules aimed at providing investors with “better information to make assessments of a firm’s research” (SEC Release No. 45908, p. 7), expressing concern about rating systems that were loosely defined and perhaps not properly understood by the research’s clients. By analyzing the IBES dataset, articles in the media and information from each brokerage house’s web-site, we collected information about general characteristics of the rating system in use by each big 10 brokerage house, and whether a new rating system was adopted after 2001.

The analysis indicates a widespread adoption of new rating systems, at least among the biggest brokerage houses, along with the adoption of the new regulations. Eight out of the ten participants in the Global Settlement adopted a new rating system in 2002, and 10 of the next 20 biggest brokerage houses adopted a new rating system starting in 2002.¹⁶

Every new rating system adopted a 3-tier methodology, in contrast with the then traditional 5-tier ratings. The motivation for this change can be linked to the disclosure requirements of the regulations that “regardless of the rating system that a member employs, a member must disclose in each report the percentage of all securities rated by the member which the member would assign a buy, hold/neutral or sell rating” (Rule 2711, p. 7).

Given the widespread adoption of new rating systems, at least among the participants of the Global Settlement, we investigate in more detail the new systems’ adoptions. We report in Table 3 some summary statistics about these events, for all the participants of the Global Settlement that adopted new systems.

There is a concentrated adoption of new systems in September 2002 (five adoptions, four of them on the same day), and only one such adoption occurred before July 2002 (the month when the new NASD and NYSE regulations became effective). The adoption date of most new rating systems coincided with the introduction of the rule that brokerage houses have to disclose the distribution of the outstanding recommendations together with each research report.¹⁷

¹⁶Beyond these 30 brokerage houses, we were able to identify only three other brokerage houses that changed their ratings systems after 2001 and up to the end of 2003.

¹⁷One research professional quoted in a press article before this date voiced the expectation that analysts’ reluctance

All brokerage houses reduced their coverage when they adopted the new rating system: the results reported in the second and third columns of Table 3 indicate an average reduction of 12% in the size of each brokerage house’s portfolios.¹⁸ The next set of columns reports how the new recommendations are distributed among the three rating levels. All but the second brokerage house ended up with the fraction of pessimistic recommendations around 20%; this is particularly remarkable given that all these brokerage houses had, in the day before the new rating systems became effective, less than 2% of their covered firms rated at a pessimistic level.

We turn to analyze the previous classification of the new recommendations in each rating category. First, the new distribution is not achieved by the addition of new firms to the portfolio of tracked firms, as the fraction of initiations of coverage in each category never reaches more than 1% of the final portfolio. Instead, new distributions were obtained by reshuffling – and, for the most part, downgrading – outstanding recommendations. More than 90% of the newly rated pessimistic recommendations were rated at least neutral under the old system, and more than 40% of the new neutral recommendations were at least “buy” or “strong buy” under the old system. On the other hand, less than 5% of the new optimistic recommendations were not already considered as such under the old rating system. These results suggest that during the change in rating systems, brokers also redefined their recommendations and shifted them downwards, creating a more balanced portfolio of recommendations over a short period of time.

We also separately examined (but did not tabulate) the price reactions and long term returns to recommendations issued during that change for the 8 brokers reported in Table 3. For the recommendations classified in an optimistic category, 3-day returns are significantly positive in five out of eight brokerage houses (for another brokerage house, the event returns are significantly negative), but the effect largely disappears after 6 months. For neutral and pessimistic recommendations, both event reactions and long-term returns are typically insignificant. In other words, during the adoption of new ratings systems, classifying a stock, even downgrading it towards a pessimistic rating, did not seem to convey new information to the market.

Because the change in rating systems is a one-time event that has no information content, we excluded from the remaining tests all recommendations associated with that event. In unreported

to issue pessimistic recommendations would be diminished once sell-side firms were forced to display their distribution of rating. See “Should You Trust Wall Street’s New Ratings?” Wall Street Journal, July 17, 2002, p. D1.

¹⁸In unreported results, we analyze for each brokerage house the sample of firms whose coverage was discontinued (dropped firms). Results suggest that the decision to drop a firm was related to size and past performance rather than the firm’s future prospects. Thus, the tendency of analysts to drop firms with unfavorable prospects (e.g., McNichols and O’Brien (1997)) is not revealed here, perhaps unsurprisingly given that the goal of adopting a new ratings system was to achieve a more balanced distribution between optimistic and pessimistic recommendations, which required the presence of firms with unfavorable prospects in the sample of firms with continued coverage.

results, we did include these recommendations, and the conclusions of the study did not change.

5.1.3 Multivariate Tests

A more formal test of H1 can be achieved by quantifying the propensity of brokerage houses to issue recommendations of different types, over time and across brokerage houses. We examine this propensity by a logistic regression, where the dependent variable is a dummy that equals 1 whenever the recommendation is of a specific type (optimistic in one specification and pessimistic in another), and the data points are new recommendations issued during the period under analysis.

We estimate cross-sectional time-series (fixed effects) logistic regressions. Like the traditional panel data regression, the fixed effects logistic regression is equivalent to having one intercept for each firm. This allows controlling for possible firm characteristics that are robustly linked to the likelihood of receiving recommendations of certain types - e.g., institutional ownership; see Ljungqvist et al. (2004). We estimate the following model:

$$\begin{aligned}
 \Pr(REC = type) = & \alpha_1 BIG10 \times PRE + \alpha_2 PASTMKTPERF \times PRE \\
 & + \alpha_3 PASTFIRMPERF \times PRE + \alpha_4 POST \\
 & + \alpha_5 BIG10 \times POST + \alpha_6 PASTMKTPERF \times POST \\
 & + \alpha_7 PASTFIRMPERF \times POST + \varepsilon,
 \end{aligned} \tag{1}$$

where

REC is a dummy variable equal to 1 if the recommendation is of a certain type (optimistic or pessimistic) using a 3-tier system.

BIG10 is a dummy variable equal to 1 if the recommendation was issued by one of the participants of the Global Settlement.

PRE is a dummy variable equal to 1 if the recommendation was issued in the *Pre-Reg* period.

POST is a dummy variable equal to 1 if the recommendation was issued in the *Post-Reg* period.

PASTFIRMPERF is the size- and industry-adjusted cumulative stock return of the recommended firm during the 6 months prior to the recommendation.

PASTMKTPERF is the cumulative market return 6 months prior to the recommendation.

We included *PASTFIRMPER* and *PASTMKTPERF* given the overwhelming evidence that momentum is an important determinant of new recommendations (see Womack (1996) and Jegadeesh et al. (2004)). To quantify the differential likelihood of big 10 brokerage houses issuing optimistic or pessimistic recommendations, we included the *BIG10* dummy. Finally, the controls were interacted with *PRE* and *POST* dummies for whether the recommendation was issued before or after September 2002. In particular, examining the *POST* coefficient allows us to formally test hypothesis H1. Results are presented in Table 4.¹⁹

Model I of Table 4 estimates the likelihood of having a pessimistic recommendation. The strongest determinant of the likelihood is the *POST* dummy; its odds ratio of 4.31 indicates an increase of 331% in the odds of a new recommendation being pessimistic if it is issued after September 2002. In addition, the momentum effect is robust. The coefficients on momentum at the firm level are significantly negative in both the *Pre-Reg* and *Post-Reg* periods, suggesting that a pessimistic (optimistic) recommendation is more likely to be issued following poor (good) stock price performance. The coefficients on market returns is negative and significant in the *Pre-Reg* period, and positive but insignificant in the *Post-Reg* period.

Regarding how the type of brokerage house is linked to this likelihood, the coefficient of *BIG10* \times *PRE* is significantly negative (at the 1% level). Its odds ratio of 0.74 indicates that a recommendation from a big 10 firm issued before September 2002 decreases the odds of it being pessimistic by 26%. On the other hand, the big 10 brokerage houses' propensity to issue more pessimistic recommendations after September 2002 is captured by the significantly positive (at the 1% level) coefficient *BIG10* \times *POST*: Its odds ratio of 1.56 indicates that the incremental effect – after accounting for the fact that the observation is post-September 2002 – of coming from a big 10 brokerage increases the odds of its being pessimistic by 56%.

Model II reports the results of a similar analysis done by modeling the likelihood of the recommendation being optimistic. The results of Model II corroborate the overall patterns seen so far that there were fewer optimistic recommendations in the *Post-Reg* period (in this case, the *POST* coefficient is significantly negative). They both provide support for hypothesis H1 of a decline in analysts' optimism in the period after the regulations were adopted. Moreover, the significant coefficient on the interaction term, *BIG10* \times *POST*, indicates that the Global Settlement component of the regulations is attributed with an additional effect.

¹⁹Our analysis includes all the recommendations in the relevant periods except for the recommendations associated with the change in ratings system. In unreported regressions we included recommendations in a month for a given firm only if this firm had recommendations issued by both a big 10 and a non-big 10 brokerage house in that month. This is intended to control for differences in the characteristics of firms for which big 10 and non-big 10 brokerage houses issued recommendations. The results are similar.

5.2 Price Reactions and Returns Following Recommendations

In this section, we analyze the relevance of recommendations – i.e., whether recommendations convey useful information. Following previous literature (e.g., Barber et al. (2001), Green (2004), Jegadeesh et al. (2004)), we focus on price reactions to newly issued recommendations because they are more likely to indicate investors’ perceptions regarding the value of the recommendation. We analyze price reactions based on size- and industry-adjusted measures of abnormal returns. Our goal here is to test H2a, H2b and H2c.

We examine two return windows. First we study short-term price reactions measured by the three-day return centered around the recommendation announcement date. Second, we study six-month long-term returns, starting at either one day prior to or two days following the announcement date. This allows us to make inferences about the investors’ reaction and the overall value of the recommendations. In all our return analyses, we exclude recommendations issued during the change in rating systems.²⁰

Recall that H2a, H2b, and H2c suggest that following the adoption of the regulations, the price response to optimistic recommendations will be more positive, whereas the price responses to the neutral and pessimistic recommendations will be less negative. This applies to short and long term returns.

To test the hypotheses, we first estimate the following model

$$RET = \alpha_1 OPT + \alpha_2 NEU + \alpha_3 PESS + \varepsilon, \quad (2)$$

where RET is the relevant stock return, and OPT , NEU , and $PESS$ are dummy variables for optimistic, neutral, and pessimistic recommendations. We also estimate a more detailed model, taking into account upgrades, downgrades and reiterations as follows:

$$RET = \alpha_1 UP_OPT + \alpha_2 RE_OPT + \alpha_3 UP_NEU + \alpha_4 DOWN_NEU + \alpha_5 PESS + \varepsilon, \quad (3)$$

where UP_OPT (UP_NEU) are initiations of coverage with optimistic (neutral) recommendations or upgrades to optimistic (neutral) recommendations, RE_OPT includes reiterations of optimistic recommendations, $DOWN_NEU$ includes downgrades to neutral and $PESS$ includes all pessimistic recommendations.²¹

²⁰For the big 10 firms, these are the changes reported in Table 3. We also obtained the date of change in rating systems for smaller brokers, and treated them similarly. In unreported results, we repeated our return analysis without excluding these recommendations. The main results are not changed.

²¹We do not examine reiterations of neutral and include all pessimistic recommendations under one category because each of these sub-categories contains very few observations.

Results are reported in Table 5.²² Panel A shows that the three-day price reaction to optimistic recommendations in the *Post-Reg* period is about 80% greater than it was in the *Pre-Reg* period (2.18% vs. 1.22%). Panel B shows that this result is mostly due to upgrades and initiations. The three-day price reactions to neutral and pessimistic recommendations (Panel A) are significantly less negative than in the previous period. For neutral recommendations, the price reaction is 60% less negative, whereas for pessimistic recommendations, the price reaction is 45% less negative. In particular, Panel B reveals a significant change regarding neutral recommendations. While in the *Pre-Reg* period, investors reacted negatively to both upgrades and downgrades to neutral, in the *Post-Reg* event, reactions to neutral are negative only for downgrades.

We now examine the returns following the initial investors’ reaction to the recommendations, i.e. along the window of [+2,+122]. For the optimistic recommendations, the negative return of -1.48% is significantly more negative than in the *Pre-Reg* period, and it represents a partial reversal of the initial three-day reaction. There is no difference in post-event reactions to neutral and pessimistic recommendations between the two periods.

Finally, we check the overall informativeness of recommendations by looking at their long-term returns, i.e. returns including both the event and the post-event periods. Thus, we examine the return window of [-1,+122]. For optimistic recommendations, we find that returns in the *Post-Reg* period are still significantly positive, but not significantly different from the returns in the *Pre-Reg* period (Panel A). For neutral and pessimistic recommendations, the long-term returns in the *Post-Reg* period are significantly less negative than the corresponding ones in the *Pre-Reg* period.

Recall that the results in Figures 2 and 3 and in Table 4 indicate that the big 10 brokerage houses were much more aggressive in reducing (increasing) the use of optimistic (pessimistic) recommendations. The empirical predictions of different price reactions to the new distribution of recommendations would thus apply more forcefully to these brokerage houses. Accordingly, we repeat the examination in Table 5 constrained to the sample of big 10 recommendations. The results (unreported, available upon request) support this view. They are qualitatively similar to the results in Table 5 but more significant. In addition, both short- and long-term returns following optimistic recommendations are more positive in the *Post-Reg* period. Also, long-term returns following upgrades to neutral are not significantly different from zero – i.e. the meaning of the “hold”/“neutral” rating seems to conform

²²In unreported results, we also use long-term return windows of 1, 3, and 9 months with no difference in results. Ivkovic and Jegadeesh (2005) report that a big fraction (in their sample, 20%) of recommendations are issued around earnings announcements. To avoid the possibility that reactions to earnings announcements are driving the empirical results here, we repeat the sampling procedure after removing recommendations issued around earnings announcement dates: the results reported here are robust to this alternative sampling. Results are also robust to the removal of recommendations issued during quiet periods.

to its naming in the *Post-Reg* period.

In sum, these results support Hypotheses H2a, H2b and H2c. This is true for all recommendations for short term price reactions. For long term returns, results hold for neutral and pessimistic recommendations (and also for optimistic recommendations, in the case of big 10 brokerage houses). Our interpretation of these results is that investors are responding to the regulations and any changes in analysts' behavior that followed. In fact, the investors' short-term reaction to optimistic recommendations in the *Post-Reg* period may have been too strong because it is partially reversed in the subsequent months.

6 Conflicts of Interests Related to Equity Offerings

In this section, we investigate hypotheses H3 and H4, which makes predictions regarding the differential optimism that might result from conflicts of interest linked to underwriting business. We proxy for such conflicts by the presence of an underwriting relationship. Following previous literature (e.g., Lin and McNichols (1998), Michaely and Womack (1999)), we define the underwriting relationship, for each newly issued recommendation, based on whether the brokerage house participated in an equity offering of the firm being recommended prior to the issuance of the recommendation. We define a brokerage house as affiliated with the firm if the brokerage house was a lead underwriter or a co-manager in an IPO or SEO for that firm during the 24-month period prior to the issuance of the new recommendation.²³

6.1 Descriptive Statistics and Univariate Analysis

This analysis focuses on the set of firms that went through an equity offering (IPO or SEO) and on their recommendations in the 24 months following an equity offering. Table 6 reports the frequency of stock recommendations in the two periods for the sample used in this analysis. Panels A and B break the sample by affiliated and unaffiliated analysts. In the *Pre-Reg* period, 70% of affiliated analysts' recommendations were optimistic. In the *Post-Reg* period, the percentage of optimistic recommendations by affiliated analysts declined to 49%. "Hold" recommendations by affiliated analysts account for 28% in the *Pre-Reg* period as opposed to 44% in the *Post-Reg* period. The percentage of pessimistic recommendations by affiliated analysts in the *Pre-Reg* period was 2%, and it grew to 6.5% in the

²³In untabulated tests, we also define affiliation based on shorter windows of 6 and 12 months. In addition, we also used an alternative forward-looking definition based on the existence of an equity offering in the six months before *and after* the recommendation. The results are not sensitive to these alternative definitions.

Post-Reg period. These numbers show that affiliated analysts have drastically changed the mix of their recommendations in the *Post-Reg* period.

The changes for unaffiliated analysts are similar but less dramatic in magnitude. For example, the percentage of “buy” recommendations fell from 64% in the *Pre-Reg* period to 48% in the *Post-Reg* period. The percentage of “hold” recommendations increased from 33% in the *Pre-Reg* period to 43% in the *Post-Reg* period.

Panels C and D break the sample by IPOs and SEOs and draw a similar picture. There is a decline in optimistic recommendations for both IPOs and SEOs in the *Post-Reg* period and a steep increase in pessimistic recommendations.

It is interesting to compare these results with the results in Table 2, which relate to all analyst recommendations, and not just to those that follow an equity offering. Notably, both affiliated and unaffiliated analysts tend to issue more optimistic recommendations following equity offerings. The change in the distribution of recommendations following the regulations is more dramatic for the subsample of equity offerings.

To conduct a more formal analysis of the change in recommendation practices, Table 7 reports some statistics on the distribution of recommendations. An observation in this table is a firm that underwent an IPO or an SEO. We aggregate the recommendations issued in a window of 24 months following the stock issuance. We collect separately the recommendations issued by affiliated and unaffiliated analysts and calculate the mean recommendation in each group. We exclude from the sample firms that did not have at least one affiliated analyst and one unaffiliated analyst during the 24-month period.²⁴ The numbers reported in the tables are the mean of the means, the median of the means, and standard deviation of the means. The levels of recommendations are assigned a numeric value as follows: optimistic (“buy” or “strong buy”)=2, neutral (“hold”)=3 and pessimistic (“underperform” and “sell”)=4.

The mean recommendation in the *Pre-Reg* period for affiliated analysts is 2.28, compared to 2.46 for unaffiliated analysts. In the *Post-Reg* period, the mean recommendation for affiliated analysts increased to 2.60, as compared to 2.48 for unaffiliated analysts. The difference between the mean recommendations of affiliated and unaffiliated analysts is significant in the *Pre-Reg* period (t-stat of 12.13) and significant in the opposite direction in the *Post-Reg* period (t-stat of -7.41). That is, there is some evidence that in the *Post-Reg* period, affiliated analysts expressed lower optimism when compared to unaffiliated analysts.

²⁴Our results are not sensitive to the length of the recommendations window. We obtained similar results for windows of 3, 6 and 12 months following the equity issuance.

To further examine whether the differential optimism between affiliated and unaffiliated analysts has changed between the two periods, we define the *DIFF* statistic as follows. For each sample point (an IPO or an SEO), we calculate the mean affiliated recommendation and the mean unaffiliated recommendation. *DIFF* is then defined as the difference between the two, deflated by the average recommendation during the relevant period (*Pre-Reg* or *Post-Reg*). Note that *DIFF* is typically negative because affiliated analysts are expected to issue more optimistic recommendations. Thus, a larger (less negative) *DIFF* in a period means that the wedge between affiliated and unaffiliated analysts in that period is smaller.

Table 7 reports the average *DIFF* for the *Pre-Reg* and *Post-Reg* periods. In the *Pre-Reg* period, *DIFF* is significantly negative (t-stat of -13.73), whereas in the *Post-Reg* period, *DIFF* is significantly positive (t-stat of 8.21). Table 7 also reports the results of a t-test comparing *DIFF* across the two periods. The results show that *DIFF* is significantly less negative in the *Post-Reg* period compared to the *Pre-Reg* period, indicating that the differential bias has indeed declined.²⁵ Again, the evidence suggests that affiliated analysts are issuing more pessimistic forecasts in the *Post-Reg* period.

The results for the *Pre-Reg* period are consistent with the findings of Dugar and Nathan (1995), Lin and McNichols (1998), Michaely and Womack (1999), and Bradley, Jordan and Ritter (2003), showing a differential bias by affiliated analysts. Consistent with H3, the results for the *Post-Reg* period suggest that the regulations decreased this differential bias. Our results suggest that this differential bias may have even flipped directions. However, we do not emphasize the direction flip because in the multivariate tests that follow, this result disappears.

6.2 Multivariate Analysis

6.2.1 Cross-sectional analysis

Next, we provide a multivariate test for H3 and H4. In this test, we look at individual recommendations rather than focusing just on aggregate recommendations. We estimate an expansion of the panel data

²⁵As we see from table 1, the types of firms going through IPO/SEOs have changed over time. To distinguish between changes resulting from regulations versus simply a change in the types of firms in the sample, we conducted a robustness check for the *Pre-Reg* and *Post-Reg* periods. In this test, we matched firms with similar market capitalization and book-to-market ratio and compared the differential bias of affiliated versus unaffiliated analysts for these matched pairs. The results show a significant decrease in the affiliated analysts' recommendation bias in the *Post-Reg* period and are consistent with the main results.

logistic model (1) examined in Section 5.1.3:

$$\begin{aligned}
\Pr(\text{REC} = \text{type}) = & \alpha_1 \text{AFF} \times \text{PRE} + \alpha_2 \text{SEOIPO} \times \text{PRE} + \alpha_3 \text{BIG10} \times \text{PRE} \\
& + \alpha_4 \text{PASTFIRMPERF} \times \text{PRE} + \alpha_5 \text{PASTMKTPERF} \times \text{PRE} \\
& + \alpha_6 \text{POST} + \alpha_7 \text{AFF} \times \text{POST} + \alpha_8 \text{SEOIPO} \times \text{POST} + \alpha_9 \text{BIG10} \times \text{POST} \quad (4) \\
& + \alpha_{10} \text{PASTFIRMPERF} \times \text{POST} + \alpha_{11} \text{PASTMKTPERF} \times \text{POST} + \varepsilon
\end{aligned}$$

The new variables in this model are *AFF* and *SEOIPO*. *AFF* is an indicator variable equal to 1 if the recommendation was issued by an affiliated broker, and *SEOIPO* is an indicator equal to 1 whenever the recommendation was issued for a firm that underwent IPO/SEO during the previous 24-month period. Notice, thus, that the model allows the inclusion of all the recommendations, not only the ones issued for IPO/SEO firms. The incremental effect on the level of optimism of a new recommendation being issued for a firm that had recently undergone IPO/SEO will be captured by the *SEOIPO* coefficients, and the differential optimism of affiliated vs. unaffiliated analysts will be reflected in the *AFF* coefficients. The other variables are as in Section 5.1.3. As before, the models also include firm fixed-effects to control for firm characteristics.

Table 8 presents the results of different specifications of this basic model. Models (1), (2), (4), and (5) include only firms that have undergone an IPO/SEO, while models (3) and (6) include all firms and allow a comparison between IPO/SEO firms and non-IPO/SEO firms. Focusing first on the results of models (3) and (6), using all observations including those of firms that did not undergo an IPO/SEO, we observe the same effects of the *POST* and *BIG10* dummies and of the performance variables as in Table 4. For example, the coefficient on *POST* is significantly negative in model (3) and significantly positive in model (6). This reiterates that analysts in general are less likely to issue positive recommendations and more likely to issue negative recommendations in the *Post-Reg* period.

Our main interest in these models is in the proxies for the presence of conflicts of interest, i.e. the *AFF* and *SEOIPO* dummies. First, the coefficients of *AFF* \times *PRE* and *SEOIPO* \times *PRE* are significantly negative in the pessimistic model and significantly positive in the optimistic model. This suggests the presence of two layers of excess optimism during the *Pre-Reg* period. First, the *SEOIPO* \times *PRE* coefficient suggests that analysts were more optimistic (i.e. more likely to issue an optimistic recommendation and less likely to issue a pessimistic recommendation) with respect to firms that had undergone an IPO/SEO, independent of whether an analyst was affiliated or not. Beyond this overall optimism toward IPO/SEO firms, the *AFF* effect reflects the incremental optimism of affiliated analysts vis a vis unaffiliated analysts. We can quantify these effects based on the coefficients' odds ratios. In the optimistic formulation, the odds ratio of 1.40 for the *SEOIPO* \times *PRE* dummy reflects

an increase in 40% in the odds of a recommendation being optimistic when it is issued for a firm with a recent IPO/SEO offering; besides, if that recommendation comes from an affiliated analyst, there is an additional increase of 12% in the odds of optimism.²⁶

The $AFF \times PRE$ effect is consistent with the claim that affiliated analysts were more optimistic in the *Pre-Reg* period, a concern that was very often raised during the discussion of the new regulations. For example, most of the evidence on conflicts of interest, expressed in the e-mails that initiated the investigations that led to the Global Settlement and documented in the Letters of AWC for their participants, were based on analysts being overly optimistic for firms whose equity offering they had managed. The results on $SEOIPO \times PRE$ reveal that an analyst was in general more optimistic for a firm that had recently undergone IPO/SEO, even if the analyst had not directly participated in the equity offering.

Moving to the *Post-Reg* period in the optimistic model (5), we observe that the excess optimism expressed by affiliated analysts disappears as the interaction term, $AFF \times POST$, is no longer significant, and the hypothesis that $AFF \times PRE$ is equal to $AFF \times POST$ is rejected at the 5% level.²⁷ This provides for a direct examination of H3, i.e., the wedge or differential bias between affiliated and unaffiliated analysts indeed has decreased in the *Post-Reg* period.²⁸ When all observations are included in model (6), we find that the excess optimism towards SEO/IPO firms disappeared in the *Post-Reg* period. The coefficient on $SEOIPO \times POST$ is no longer significant, providing support for H4. The reduction in the significance level for the test examining whether $AFF \times PRE$ is equal to $AFF \times POST$ is likely due to inclusion of non-IPO/SEO firms, for which all recommendations are considered unaffiliated, thus providing no variation in the variable AFF . This is likely to reduce the power of significance tests for the AFF variable.

The pessimistic model tells a different story. In model (3), the $AFF \times POST$ and $SEOIPO \times POST$ coefficients are significantly negative, that is, analysts are still less likely to issue pessimistic recommendations in the *Post-Reg* period. We also cannot reject the hypothesis that $AFF \times PRE$ and $AFF \times POST$ are equal in both models (2) and (3).

The results also suggest a major difference between the firms that participated in the Global

²⁶Notice that the odds ratio effects are multiplicative; hence the overall increase in the odds of a recommendation being optimistic for affiliated analysts is 56%, i.e. $1.40 \times 1.12 = 1.56$.

²⁷These results are slightly sensitive to the definition of affiliation. When we define affiliation based only on the lead underwriter, there is still a propensity of affiliated analysts to issue more optimistic recommendations in the *Post-Reg* period. The rest of the results in Table 8 are not sensitive to the definition of affiliation.

²⁸Notice the need to control for brokerage house attributes. The $AFF \times POST$ coefficient is significantly negative in model (4), but this happens because the model does not include the *BIG10* dummy. That is, one can erroneously infer that affiliated analysts were significantly less likely to issue optimistic recommendations in the *Post-Reg* period if she does not control for the decrease in optimism expressed by the participants of the Global Settlement in this period.

Settlement and those that did not. Examining models (5) and (6) we see that prior to the regulation the big 10 brokerage houses were as likely to issue optimistic recommendations as other brokerage houses. In contrast, after the regulation, the odds of a big 10 brokerage house issuing an optimistic recommendation are significantly lower as reflected by the coefficient of the $BIG10 \times POST$.

With respect to pessimistic recommendation we observe a reversal in the behavior of big 10 brokerage houses. Prior to the regulation these brokerage houses were significantly less likely to issue pessimistic recommendations ($BIG10 \times PRE$ is significantly negative in models (2) and (3)). In the *Post-Reg* period, big 10 brokerage houses are significantly more likely to issue pessimistic recommendations ($BIG10 \times PRE$ is significantly positive in models (2) and (3)).

Overall, the panel data results suggest that analysts changed their behavior in the period when the regulations are in place, but they changed it in an asymmetric way. When deciding whether to post an optimistic recommendation, affiliated and unaffiliated analysts, and even analysts issuing recommendations for non-IPO/SEO firms, now behave similarly. On the other hand, when deciding whether to post a pessimistic recommendation, these three types of analysts still behave very differently: analysts in general are less pessimistic towards IPO/SEO firms, and among analysts posting recommendations for firms with recent underwriting business, affiliated analysts are less pessimistic than unaffiliated ones. These changes are even more pronounced among those brokerage houses that participated in the Global Settlement.

6.2.2 *Time-series analysis*

A potential concern is that some exogenous macroeconomic factors like stock market behavior and GDP growth influence the decline in differential optimism by affiliated analysts. For instance, it may be that in a period of high stock returns and fast economic growth, affiliated analysts tend to be extremely optimistic, or that in periods of extremely low stock returns and low economic growth, affiliated analysts feel a strong need to support the stocks that their investment bank issued. To address these concerns, we create a monthly version of *DIFF*. Namely, for each month we calculate *DIFFM* as the difference between recommendations of affiliated and unaffiliated analysts issued during the month for IPOs and SEOs that took place in the previous 24 months. We then estimate the following model:

$$DIFFM = \alpha + \beta_1 PASTMKTPERF + \beta_2 GDP + \beta_3 PROCEEDS + \beta_4 POST + \varepsilon. \quad (5)$$

PASTMKTPERF, as defined before, is a proxy for the performance of the stock market. We then include proxies for the overall economic conditions (*GDP* is the annualized growth in GDP in that

month) and for the conditions of the underwriting market (*PROCEEDS* is the logarithm of the total dollar raised in IPO's or SEO's in previous month). As before, *POST* is a dummy variable equal to 1 for months belonging to the *Post-Reg* period. Table 9 reports results of different specifications of this model.

Notice first that when all variables are included, the coefficients on GDP growth and on the underwriting market conditions are significantly negative, suggesting that good economic conditions and hot markets tend to increase the wedge between affiliated and unaffiliated analysts. H3 suggests that we observe a positive and significant coefficient β_4 . In fact, all specifications show a significantly positive β_4 (at the 1% level for two specifications, and at the 5% level for two other specifications – all with Newey-West standard errors). This reinforces the view offered by H3 that the regulations led to the reduction of the differential bias between affiliated and unaffiliated analysts.

In summary, we conclude that following the adoption of the regulations, there is a reduction in the differential optimism of affiliated analysts. Our analyses suggest that affiliated analysts no longer issue optimistically-biased recommendations for firms that used the analyst's employer as a lead underwriter or as a co-manager in their IPO or SEO, and that the overall optimism towards IPO/SEO firms was also eliminated. Differences still persist among analysts, though, with respect to pessimistic recommendations.

6.3 Price Reactions and Returns Following Recommendations

In our final analysis, we ask whether and to what extent the market recognizes the excess optimism linked to the presence of underwriting relationships and whether its recognition differs across periods. To accomplish that, we examine price reactions to three types of recommendations: (1) recommendations issued for firms that did not undergo an IPO/SEO in the previous 24 months (non-IPO/SEO recommendations); (2) recommendations issued by affiliated analysts for firms that have undergone an IPO/SEO in the previous 24 months (affiliated recommendations); and (3) recommendations issued by unaffiliated analysts for firms that have undergone an IPO/SEO in the previous 24 months (unaffiliated recommendations).

If the market believes that conflicts of interest are driving the optimism in recommendations coming from affiliated analysts, it should discount the usefulness of the signal provided by their recommendations. We test how the market reacts to the excess optimism by examining the event (three-day) reactions to affiliated, unaffiliated and non-IPO/SEO recommendations. Further, we examine longer term returns to evaluate whether the market fully adjusts for the excess optimism. If so, there will be no difference in subsequent performance of recommendations coming from different analysts.

For these tests, we estimate a regression similar to equation (3), but in this case, we interact each recommendation classification with the dummies for the recommendation origin (affiliated, unaffiliated or non-IPO/SEO recommendation). The regressions are estimated separately for the *Pre-Reg* and *Post-Reg* periods, and with the dependent variable *RET* being either the event (3-day) or long-term (6-month ahead) size and industry-adjusted returns. The results are presented in Table 10.

6.3.1 *The Pre-Reg period*

We focus first on results for reactions to recommendations in the *Pre-Reg* period. Recall from Table 8 that there was an excess optimism for recommendations issued for firms that underwent an IPO or an SEO, and, among those recommendations, an additional excess optimism for those coming from affiliated analysts. Therefore, the question is whether and to what extent these layers of optimism were recognized by market participants.

Event reactions reported in Panel A suggest that recommendations issued for IPO/SEO firms were significantly discounted by investors in the *Pre-Reg* period. For example, the average market reaction to optimistic recommendations issued for non-IPO/SEO firms was +1.25%, which was economically and statistically bigger than the reactions to recommendations issued for IPO/SEO recommendations (either affiliated or unaffiliated). The same pattern of larger (i.e. less negative) market reactions to non-IPO/SEO recommendations applies to neutral and pessimistic recommendations as well.

Among the recommendations issued for IPO/SEO firms, the excess optimism of affiliated analysts is only partially reflected in the event reactions: investors discounted affiliated neutral recommendations but not affiliated optimistic and pessimistic recommendations. Therefore, prior to the regulations, the market acted as if at least part of the optimism expressed towards IPO/SEO firms in general was not warranted. However, the market did not seem to react differently to affiliated recommendations compared to unaffiliated recommendations (except for neutral recommendations).

However, Panel B shows that in the *Pre-Reg* period, the market has not fully adjusted for the excess optimism. Post-event returns to recommendations issued by affiliated and unaffiliated analysts are all significantly negative. That is, investors discounted recommendations issued to IPO/SEO firms at event time, but they should have discounted them even more. There is not much difference in post-event returns between affiliated and unaffiliated recommendations, with the exception of a significantly larger post-event underperformance of optimistic recommendations coming from unaffiliated analysts. In unreported results, we find that this result is sensitive to the definition of affiliated analysts and disappears if the affiliation is defined based only on the lead underwriter. An underreaction is also observed for recommendations issued to non-IPO/SEO firms, as their post-event returns are still

significantly positive.

6.3.2 *The Post-Reg period*

We now examine price reactions to recommendations in the *Post-Reg* period. In contrast with the *Pre-Reg* period, the market no longer discounts optimistic recommendations of IPO/SEO firms relative to non-IPO/SEO firms. The reactions to neutral and pessimistic recommendations issued for IPO/SEO firms are still significantly more negative, suggesting that the market seems to take into account that recommendations issued for IPO/SEO firms are still less likely to be pessimistic. More importantly, unlike the *Pre-Reg* period, during the *Post-Reg* period, there is no difference in post-event returns among affiliated, unaffiliated, and non-IPO/SEO recommendations, suggesting that investors have been adjusting at event time for any bias that might still exist in recommendations.

Since there is no evidence of excess optimism coming from underwriting business in this period, one should not expect differential price reactions to underwriter recommendations. Consistent with this view, and in contrast to the *Pre-Reg* period, event reactions to optimistic recommendations do not differ between affiliated and non-IPO/SEO recommendations. Among IPO/SEO firms, we notice no difference between the reactions to affiliated and unaffiliated optimistic and pessimistic recommendations. Affiliated recommendations are still accompanied by larger negative reactions to neutral recommendations compared to unaffiliated analysts (-3.01% vs. -1.76%). This is consistent with the results in Table 8, showing that affiliated analysts are still reluctant to issue pessimistic recommendations in the *Post-Reg* period.²⁹

7 Conclusion

In this paper we investigate the effects of regulations on sell-side analysts' research. The regulations – Rule NASD 2711, Rule NASD 472, and the Global Settlement – were aimed at curbing the conflicts of interest between investment banking and research departments. Using stock recommendations as a proxy for sell-side research output, we investigate whether and how sell-side research changed in response to the regulations, and how investors reacted. Our main proxy for conflicts of interest is the presence of an underwriting relationship between the brokerage house and the firm being recommended. For this, we look at affiliated analysts, those working for brokerage houses that had participated as lead underwriters or co-managers in a recent equity offering of that firm. We also use firms that had

²⁹Notice, though, that there is no direct prediction regarding whether affiliated analysts changed their behavior regarding neutral recommendations; the logistic regressions in Table 8 do not examine directly the likelihood of issuing neutral recommendations.

undergone an IPO or SEO as proxies for the presence of conflicts of interest.

We show that conflicts of interest were an important determinant of stock recommendations prior to the regulations. Analysts were significantly more (less) likely to issue optimistic (pessimistic) recommendations for firms that had undergone a recent IPO or SEO. Among recommendations issued for such firms, analysts that had been lead underwriters or co-managers of the IPO/SEO were even more (less) likely to issue optimistic (pessimistic) recommendations. Moreover, we find that investors did not adjust fully for this bias. This corroborates other studies' findings. For example, Boni and Womack (2002b, 2003) suggest that institutional investors "are able to de-bias the brokerage research they receive," while more naïve retail investors, "who lack the awareness or education necessary to adequately filter the recommendations," are left disenfranchised. Along this line, anecdotal evidence around 2001 indicated that individual investors "unaware of Wall Street semantics often take ratings at their face value" ("Merrill Alters a Policy on Analysts," Wall Street Journal, July 11, 2001, p. C1). Malmendier and Shanthikumar (2004) confirm these concerns by showing empirically that retail investors indeed used to take analysts' stock recommendations at face value and failed to adjust for their biases. Collectively, our results and these findings shed some light on the motivations behind the regulatory initiative.

Did the regulations achieve their objectives? We conclude that the regulations were at least partially successful in curbing the influence of the conflicts of interest over analysts' stock recommendations. *Ceteris paribus*, the likelihood of receiving an optimistic recommendation no longer depends on whether the firm had gone IPO/SEO or whether the brokerage house had participated in any such IPO/SEO. However, even after the regulations were adopted, analysts have been reluctant to issue pessimistic recommendations for IPO/SEO firms, and affiliated analysts are even more reluctant to be pessimistic about these stocks.

We also report other differences in the way recommendations are issued under the new regulatory regime. We find a significant shift in the overall distribution of stock recommendations, from a distribution skewed towards optimistic recommendations to a more balanced one. The change is even more dramatic for the "big 10" brokerage houses that participated in the Global Settlement. This shift may be partly due to a change in optimism originating from a reclassification of the recommendations' categories, whereby analysts shifted their interpretation of the ratings and reduced what was considered a misuse of some of the ratings categories. For example, market reactions indicate that the aggregation of stocks with negative prospects under the "hold" rating was prevalent before the new regulations, but it no longer occurs, especially for the big 10 brokerage houses. The shift could also be due to a reduction in use of optimistic assumptions in valuation models, resulting in more modest firm values

and, as a result, less optimistic recommendations.

We expect changes in optimism due to reclassifications of recommendations to be universal, i.e. these changes will be effective for both affiliated and unaffiliated analysts as well as for analysts issuing recommendations to non-IPO/SEO firms. To the extent that our expectations are correct, the change in the behavior of affiliated analysts vis a vis unaffiliated analysts, and in general of analysts issuing recommendations for IPO/SEO firms vis a vis non-IPO/SEO firms, indicates that at least some of the change in optimism reflects analysts' reluctance to add an optimistic view to the assumptions underlying their valuation models.

Our results shed light on prior literature regarding analysts' optimism and underwriting relationships. One explanation for affiliated analysts' optimism is a strategic bias originating from the analysts' conflicts of interest. The second explanation for the observed optimistic bias refers to the selection mechanism: firms choose their underwriters based on analysts' opinions, and naturally, a firm is more likely to choose analysts who are already optimistic about the firm's prospects. Given that the regulations' foremost motivation was to curb conflicts of interest and that there is no apparent reason for them to influence the mechanism by which firms select their underwriters, the reduction in observed optimism following the regulations is consistent with the first explanation for the bias. On the other hand, analysts' reluctance to issue pessimistic recommendations after the regulations is consistent with the second explanation. That is, a firm is still likely to avoid analysts who are truly pessimistic about its future prospects.

In summary, following the adoption of the new regulations, we observe two changes that are consistent with the regulations' objectives. First, there has been a significant reduction in excess optimism resulting from conflicts of interest between research and investment banking departments. Second, we observe a more meaningful use of rating levels by analysts. Both changes may provide a more leveled playing field between retail and institutional investors.

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Appendix

To define the consensus recommendation for a firm in a certain month, some form of averaging of outstanding recommendations among different brokerage houses must be adopted. Here, the issue of changing ratings systems has to be taken into consideration. The question is how to compare the distribution of recommendations if the types of recommendations that are issued differ, both over time for each brokerage house that trimmed its rating levels when it adopted a new system, and across brokerage houses, since not all of them trimmed their rating levels.

We analyze two approaches that can be used to define the inputs to the computation of the consensus. One relies on the I/B/E/S mapping of each brokerage house's classification into the five-tier I/B/E/S ranking. This certainly works well for the recommendations issued before 2002 – when the vast majority of the brokerage houses used a five-tier ratings system. However, as brokerage houses

started using fewer tiers, one has to be cautious about inferences. For example, if there is only one tier for the optimistic recommendations, there is not much sense in analyzing how a brokerage house spreads upbeat recommendations between “strong buy” and “buy” categories.

The alternative is to use a reduced three-tier ratings system. A natural, direct mapping between I/B/E/S classification and the three-tier system is readily available: “strong buy” and “buy” are translated to optimistic, “hold” is translated to neutral, and “underperform” and “sell” are translated to the pessimistic tier. Of course, this mapping is trivial for the recommendations issued by brokerage houses that adopted three-tier systems. However, some brokerage houses were still using four- or five-tier systems recently, as most of them did in the period before 2002. For recommendations coming from these brokerage houses, the drawback of using the reduced system to analyze the pattern of distribution is that information can be lost - e.g., no distinction is made between “strong buy” and “buy” categories if they are all treated simply as optimistic.

In this paper, we do not take stands for one or another alternative. Since the objective here is to understand how brokerage houses used recommendations, we try to use both methods of reporting time-series distribution of recommendations. Consensus recommendations for each stock are thus computed using two methods. For the alternative of relying on I/B/E/S classification, we first average its outstanding recommendations at the end of the month, according to the convention [1=“strong buy”, 2=“buy”, 3=“hold”, 4=“underperform”, and 5=“sell”], from each group of brokerage houses (either big 10 or non-big 10). In the second step, we define the consensus recommendation using the following convention on the resulting average: $4.2 \leq \text{average} < 5$ implies “sell”; $3.2 \leq \text{average} < 4.2$ implies “underperform”; $2.2 \leq \text{average} < 3.2$ implies “hold”; $1.2 \leq \text{average} < 2.2$ implies “buy”; and $\text{average} < 1.2$ implies “strong buy”.³⁰

For the consensus based on the reduced three-tier model, we first map I/B/E/S classification of the outstanding recommendations into a three-tier method using the direct mapping explained above. Then, for each stock we average its outstanding recommendations using the convention [2=“buy”; or “strong buy”; 3=“hold”; 4=“sell” or “underperform”]. In the last step, the consensus recommendation is established according to the following rule on the resulting average: $3.2 \leq \text{average} < 4$ implies pessimistic; $2.2 \leq \text{average} < 3.2$ implies neutral; and $\text{average} < 2.2$ implies optimistic.

³⁰The general patterns on the distribution of monthly consensus recommendations are robust (1) to using an alternative definition of consensus recommendation, e.g., setting $4.4 \leq \text{average} \leq 5$ is “sell”; $3.4 \leq \text{average} < 4.4$ is “underperform”; $2.4 \leq \text{average} < 3.4$ is “hold”; $1.4 \leq \text{average} < 2.4$ is “buy”; and $\text{average} < 1.4$ is “strong buy”, (2) to an alternative definition of consensus recommendation based on the median instead of mean recommendation, and (3) to whether we expand the sample to include not only companies that have consensus recommendations available in the month from both groups of big 10 and non-big 10 brokerage houses, but rather all the companies in the database. For brevity, we do not present results using these alternatives.

Figure 1: Recommendation and Bias

This figure describes analysts' recommendation outcomes as a function of their bias. The cutoff points – c_1 and c_2 – are the determinants of what recommendation will be issued. Their position is a function of the analysts' level of optimism. As an analyst becomes more optimistic, the cutoff points shift to the left.

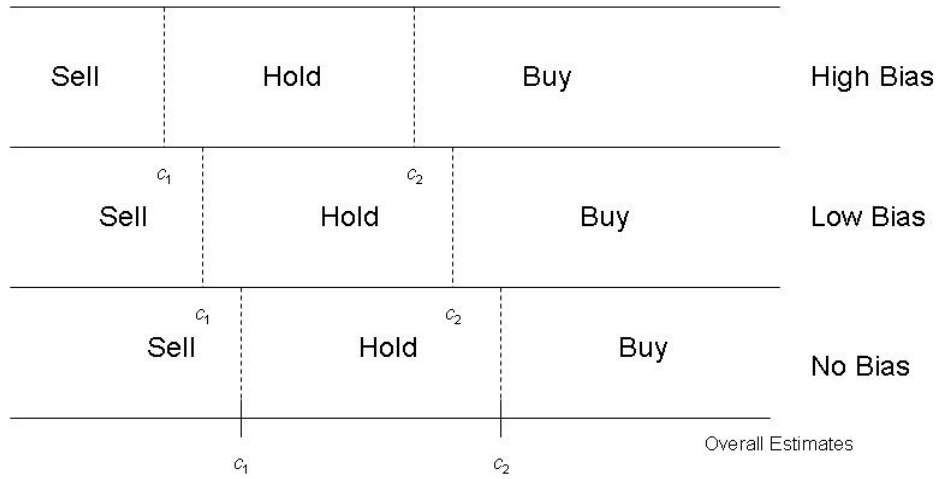
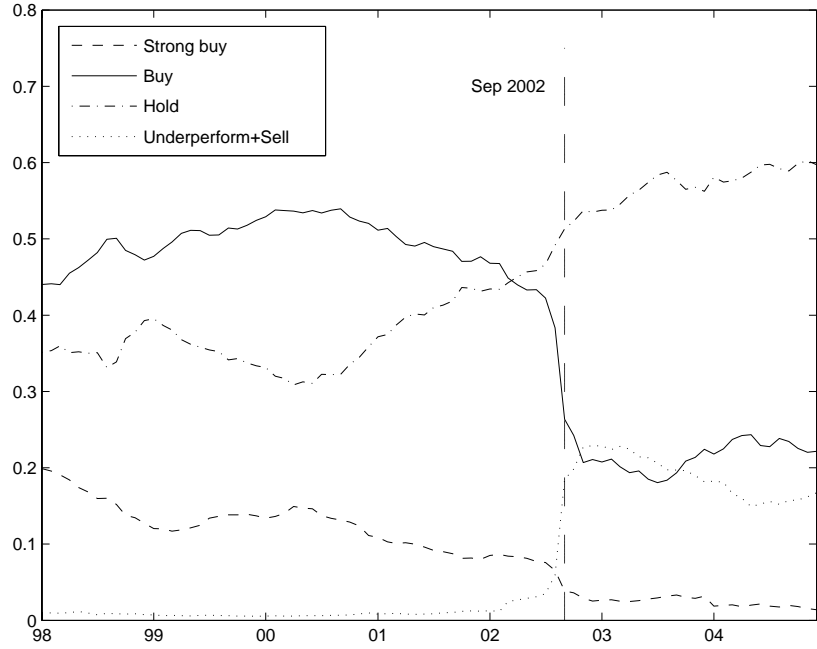


Figure 2. Monthly Distribution of Consensus of Outstanding Recommendations for Big 10 and Non-Big 10 Brokerage Houses (Using a Five-Tier Ratings System)

These figures present the monthly distribution of consensus of outstanding recommendations from big 10 and non-big 10 brokerage houses regarding US common stocks using a five-tier rating system. Big 10 brokerage house are those who participated in the Global Settlement. At the end of each month, the outstanding recommendations of each stock are averaged (according to the convention: 1=strong “buy”; 2=“buy”; 3=“hold”; 4=“underperform”; and 5=“sell”) for each group of brokerage houses. We define the consensus recommendation according to the resulting average (using the convention: $4.2 \leq \text{average} \leq 5$ is “sell”; $3.2 \leq \text{average} < 4.2$ is “underperform”; $2.2 \leq \text{average} < 3.2$ is “hold”; $1.2 \leq \text{average} < 2.2$ is “buy”; and $\text{average} < 1.2$ is “strong buy”). Figure (a) plots the monthly distribution of the consensus recommendation for the group of big 10 brokerage houses and (b) for the group of non-big 10 brokerage houses. Results are reported for the period January 1998 through December 2004.

(a) Monthly distribution of consensus for big 10 brokerage houses



(b) Monthly distribution of consensus for non-big 10 brokerage houses

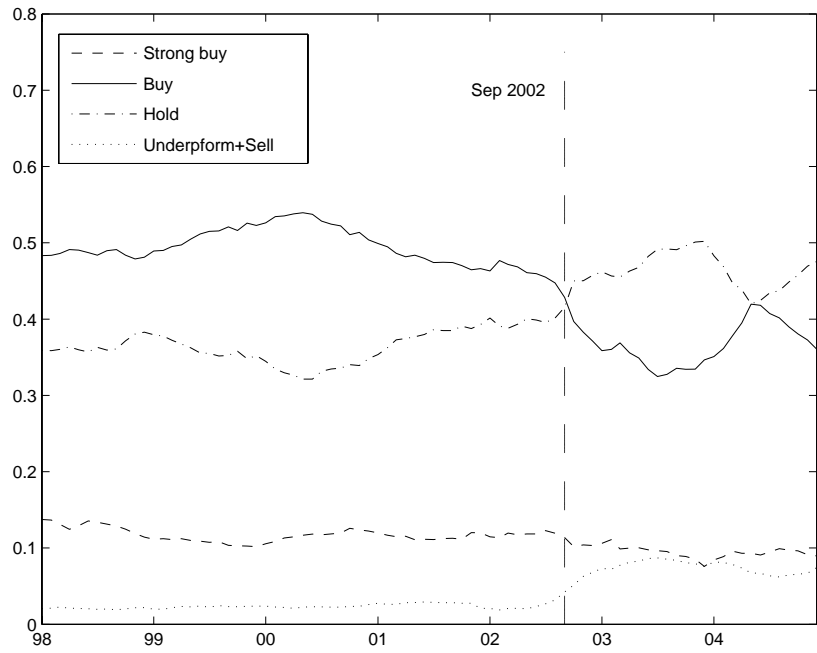


Figure 3. Monthly Distribution of Consensus of Outstanding Recommendations for Big 10 and Non-Big 10 Brokerage Houses (Using a Three-Tier Ratings System)

These figures present the monthly distribution of consensus of outstanding recommendations from big 10 and non-big 10 brokerage houses regarding US common stocks using a three-tier rating system. Big 10 brokerage houses are those who participated in the Global Settlement. At the end of each month, the outstanding recommendations of each stock are averaged (according to the convention: 2="buy" or "strong buy"; 3="hold"; 4="sell" or "underperform") for each group of brokerage houses. We define the consensus recommendation according to the resulting average (using the convention: $3.2 \leq \text{average} < 4$ is pessimistic; $2.2 \leq \text{average} < 3.2$ is neutral; $\text{average} < 2.2$ is optimistic). Figure (a) plots the monthly distribution of the consensus recommendation for the group of big 10 brokerage houses and (b) for the group of non-big 10 brokerage houses. Results are reported for the period January 1998 through December 2004.

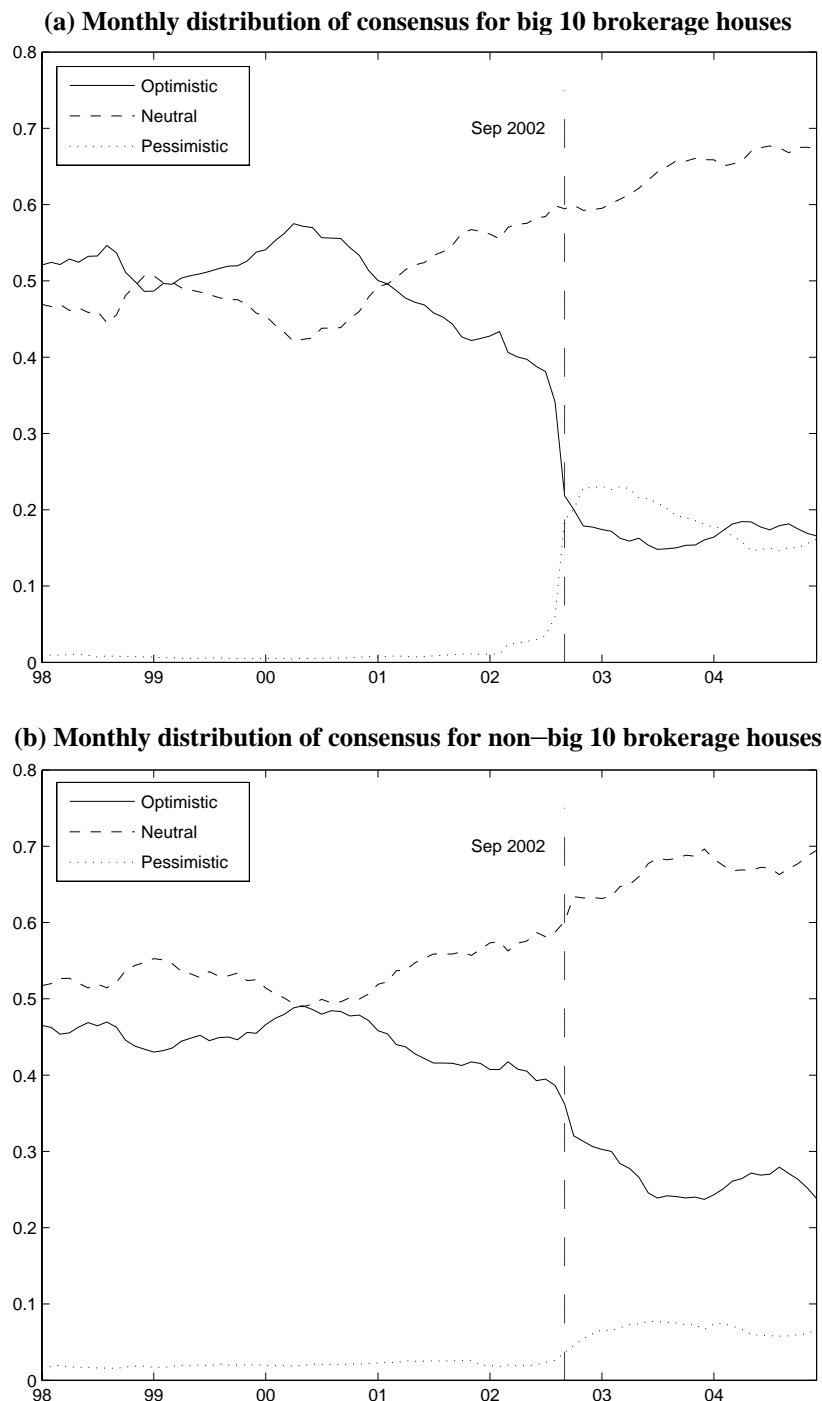


Table 1. Summary Statistics on Recommendations, Brokerage Houses and Equity Offerings

This table presents summary statistics on stock recommendations, brokerage houses and equity offerings during our sample period (November 2000 – December 2004). *Pre-Reg* is the period between November 2000 and August 2002. *Post-Reg* is the period between September 2002 and December 2004. **Panel A** reports the number of stock recommendations, their mean, and their standard deviation. When calculating the mean and standard deviations, we assign stock recommendations a numeric value as follows: “strong buy” and “buy”=2, “hold”=3, “underperform” and “sell”=4. The hypothesis that there is no difference in means across periods is rejected at a significance level of less than 1%. **Panel B** presents summary statistics on brokerage houses’ participation in equity offerings. We report results aggregated for the big 10 brokerage houses that participated in the Global Settlement as well as for the 20 next biggest brokerage houses (non-big10). For this purpose, the size of brokerage house is proxied by the number of recommendations issued throughout the period for US common stocks. We consider a brokerage house to have participated in an equity offering if it was a lead underwriter in the offering. If there are joint lead underwriters, the participation variables (offerings and proceeds) are divided proportionally among all lead underwriters. Equity offerings include all IPO’s and SEO’s. **Panel C** reports summary statistics of various variables for sample firms that underwent an IPO or an SEO during the years 1998-2004. We report statistics about the proceeds received in the equity offering (in millions of Dollars), the market capitalization as of the end of the fiscal year of the IPO or SEO (in millions of Dollars) and the book-to-market ratio defined as book value of equity divided by market capitalization.

Panel A: Stock Recommendations				
	Post-Reg		Pre-Reg	
N	89,029		64,383	
Mean	2.69		2.44	
Std.	0.67		0.57	

Panel B: Brokerage houses and equity offerings				
	% of all Equity Offerings		% of all proceeds in equity offerings	
	Big 10	Non-big 10	Big 10	Non-big 10
2000	58%	16%	78%	10%
2001	71%	14%	87%	9%
2002	63%	19%	85%	10%
2003	60%	21%	80%	15%
2004	61%	24%	79%	17%

Table 1. Summary Statistics (Continued)

Panel C: Equity offerings						
	2003-2004	2001-2002	1998-2000	2003-2004	2001-2002	1998-2000
	IPO's			SEO's		
N	123	107	331	541	430	365
Proceeds (Mil \$)						
Mean	216.1	348.6	162.70	170.4	199.9	271.1
Median	96.0	114.0	72.30	98.1	110.1	147.4
Std.	380.3	898.1	412.86	252.7	281.4	377.4
Market Capitalization (Mil \$)						
Mean	976.9	1777.9	2135.84	3264.1	3038.7	5799.8
Median	444.3	489.9	693.57	1119.1	826.8	1136.3
Std.	1682.0	6118.1	6149.35	18515.9	7650.5	26164.4
Book-to-market ratio						
Mean	0.33	0.45	0.33	0.42	0.58	0.37
Median	0.31	0.36	0.22	0.37	0.49	0.28
Std.	0.23	0.35	0.38	0.27	0.49	0.59

Table 2. Distribution of Recommendations

This table reports the frequency of stock recommendations taken from IBES Detail file during two time periods. The periods examined are: *Pre-Reg* (November 2000 - August 2002) and *Post-Reg* (September 2002 – December 2004). In addition, the table reports the number of recommendations as well as their mean and standard deviation. When calculating the mean and standard deviations, stock recommendations are assigned a numeric value as follows: “Optimistic”=2, “Neutral”=3, and “Pessimistic” =4. The hypothesis that there is no difference in means across periods is rejected at a level of less than 1%.

	Post-Reg	Pre-Reg
Optimistic	42.9%	60.7%
Neutral	45.5%	35.1%
Pessimistic	11.7%	4.2%

Table 3. Summary Statistics on Events of Changes of Ratings Systems

This table reports summary statistics on the events of change in ratings system for the eight brokerage houses among the big 10 that changed their system in 2002. For each event, the table shows the date it occurred, the number of stocks whose coverage was discontinued at the event, and the number of stocks with continued coverage. For each group of stocks, we report the percentage of stocks that were pessimistic, neutral or optimistic before the change, based on the ratings they received after the new ratings system was put into place (pessimistic, neutral or optimistic). Optimistic recommendations are “strong buy” and “buy”; Neutral recommendations are “hold”; and pessimistic recommendations are “underperform” and “sell.”

Recommendations after the change →				Pessimistic					Neutral					Optimistic				
Date of Change	# of Discontinued Coverage	# of Stocks Covered after Change	% of Total	Recommendation before the change				Recommendation before the change				Recommendation before the change						
				Initiated (%)	Pessimistic (%)	Neutral (%)	Optimistic (%)	Initiated (%)	Pessimistic (%)	Neutral (%)	Optimistic (%)	Initiated (%)	Pessimistic (%)	Neutral (%)	Optimistic (%)			
Broker 1	9-8-02	136	1019	20	0	4	80	15	38	1	0	60	40	42	0	0	2	98
Broker 2	9-8-02	143	946	5	0	96	2	2	47	0	0	87	13	48	1	0	0	99
Broker 3	9-8-02	80	916	28	0	8	77	15	38	0	1	37	62	34	0	0	3	97
Broker 4	3-17-02	70	768	21	0	5	85	10	46	1	0	57	42	33	1	0	3	96
Broker 5	9-25-02	128	743	26	1	4	71	24	45	0	0	33	67	29	0	0	1	98
Broker 6	11-4-02	141	736	21	0	11	71	18	56	0	0	40	60	24	1	0	2	97
Broker 7	8-4-02	97	791	27	0	2	78	20	40	0	0	28	72	33	0	0	2	98
Broker 8	9-8-02	119	639	18	1	7	66	26	44	0	0	44	56	38	1	0	2	97
Total		914	6,558	20%	0.2	9	73.5	17.3	0.3	0.1	49.9	49.8	0.5	0	1.8	97.7		
									44%					36%				

Table 4. Panel Data Logistic Regressions to Explain Optimistic and Pessimistic Recommendations

The table presents results of panel data logistic regressions with the dependent variable equaling 1 when a recommendation is optimistic (pessimistic) in model I (model II). Optimistic recommendations are “strong buy” and “buy”, and pessimistic recommendations are “underperform” and “sell.” **BIG10** is an indicator variable equal to 1 if the recommendation is issued by an analyst who belongs to one of the big 10 brokerage houses that were part of the Global Settlement. **PRE** and **POST** are indicator variables equaling 1 when the recommendation is issued in the *Pre-Reg* or *Post-Reg* periods, respectively. *Pre-Reg* is the period between November 2000 and August 2002, and *Post-Reg* is the period between September 2002 and December 2004. **PASTFIRMPERF** is the size and industry-adjusted firm’s stock return in the six months prior to the recommendation. **PASTMKTPERF** is the cumulative market return in the six months prior to the recommendation. Standard errors are presented in parentheses. All models are run with firm fixed-effects. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.

	Model I		Model II	
	Dependent Variable: Prob (Rec=Pessimistic)		Dependent Variable: Prob (Rec=Optimistic)	
	Coeff	Odds Ratio	Coeff	Odds Ratio
BIG10*PRE	-0.299*** (0.061)	0.74	-0.016 (0.022)	0.98
PASTMKTPERF*PRE	-1.583*** (0.332)	0.21	0.125 (0.122)	1.13
PASTFIRMPERF*PRE	-0.890*** (0.088)	0.41	0.675*** (0.032)	1.96
POST	1.461*** (0.048)	4.31	-0.877*** (0.019)	0.42
BIG10*POST	0.443*** (0.030)	1.56	-0.404*** (0.020)	0.67
PASTMKTPERF*POST	0.033 (0.109)	1.03	0.521*** (0.069)	1.68
PASTFIRMPERF*POST	-0.276*** (0.042)	0.76	0.172*** (0.023)	1.19
Firm fixed effects	Yes		Yes	
Observations	92,943		114,246	
Pseudo R²	0.07		0.05	

Table 5. Price Reactions to Recommendations

Panel A reports regression results of the basic regression:

$$RET = \alpha_1 * OPT + \alpha_2 * NEUT + \alpha_3 * PESS + e,$$

while Panel B reports regressions of an expanded model,

$$RET = \alpha_1 * UP_OPT + \alpha_2 * RE_OPT + \alpha_3 * UP_NEU + \alpha_4 * DOWN_NEU + \alpha_5 * RE_NEU + \alpha_6 * DOWN_PESS + \alpha_7 * RE_PESS + e.$$

The dependent variable, RET, is the size and industry-adjusted return measured over three different windows: (1) a three-day period centered around the issuance of the stock recommendation; (2) a six month window starting two days after the issuance of a recommendation and ending six months (121 trading days) after; (3) a period combining the previous two periods. In Panel A, the indicator variables equal 1 as follows: OPT=1 for “buy” and “strong buy”; NEU=1 for “hold”; PESS=1 for “underperform” and “sell”. In Panel B, the indicator variables are UP_OPT=1 initiations of upgrades towards “strong buy” or “buy”; RE_OPT=1 for reiterations of “strong buy” or “buy”; UP_NEU=1 for initiations or upgrades to “hold”; DOWN_NEU=1 for downgrades towards “hold”; and PESS=1 for “underperform” or “sell.” Each model is run separately for the *Pre-Reg* and *Post-Reg* periods. *Pre-Reg* is the period between November 2000 and August 2002 and *Post-Reg* is the period between September 2002 and December 2004. The P-value column reports p-values of tests of differences between the coefficients in the *Pre-Reg* and *Post-Reg* periods. Robust standard errors are in parentheses. *, **, *** represent significance of 10%, 5% and 1% respectively.

Panel A: Basic regression

	Event return over [-1,+1]			Post-event return over [+2,+122]			Long-term return over [-1,+122]		
	Post-Reg	Pre-Reg	P-value	Post-Reg	Pre-Reg	P-value	Post-Reg	Pre-Reg	P-value
OPT	0.0218*** (0.0005)	0.0122*** (0.0007)	<0.0001	-0.0148*** (0.0020)	-0.0058*** (0.0020)	0.0019	0.0099*** (0.0021)	0.0070*** (0.0020)	0.3189
NEU	-0.0200*** (0.0005)	-0.0506*** (0.0009)	<0.0001	-0.0135*** (0.0022)	-0.0136*** (0.0027)	0.9802	-0.0391*** (0.0022)	-0.0591*** (0.0028)	<0.0001
PESS	-0.0398*** (0.0010)	-0.0746*** (0.0027)	<0.0001	0.0048 (0.0042)	0.0041 (0.0082)	0.9331	-0.0456*** (0.0043)	-0.0667*** (0.0084)	0.0247
Observations	61,490	48,515		54,183	47,139		54,154	47,123	
R²	0.07	0.08		0.002	0.001		0.008	0.011	

Panel B: Expanded regression

	Event return over [-1,+1]			Post-event return over [+2,+122]			Long-term return over [-1,+122]		
	Post-Reg	Pre-Reg	P-value	Post-Reg	Pre-Reg	P-value	Post-Reg	Pre-Reg	P-value
UP_OPT	0.0250*** (0.0006)	0.0151*** (0.0007)	<0.0001	-0.0126*** (0.0022)	-0.0043* (0.0022)	0.0077	0.0160*** (0.0023)	0.0110*** (0.0022)	0.1205
RE_OPT	0.0014 (0.0014)	-0.0041** (0.0017)	0.0103	-0.0279*** (0.0055)	-0.0141*** (0.0052)	0.0675	-0.0271*** (0.0057)	-0.0156* (0.0053)	0.1356
UP_NEU	0.0018** (0.0007)	-0.0200*** (0.0014)	<0.0001	-0.0136*** (0.0030)	-0.0089** (0.0041)	0.3480	-0.0116*** (0.0031)	-0.0266*** (0.0041)	0.0033
DOWN_NEU	-0.0440*** (0.0008)	-0.0745*** (0.0012)	<0.0001	-0.0134*** (0.0032)	-0.0173*** (0.0036)	0.4143	-0.0706*** (0.0033)	-0.0851*** (0.0037)	0.0030
PESS	-0.0400*** (0.0010)	-0.0746*** (0.0027)	<0.0001	0.0048 (0.0042)	0.0041 (0.0082)	0.9331	-0.0456*** (0.0043)	-0.0667*** (0.0084)	0.0245
Observations	61,490	48,515		54,183	47,139		54,154	47,123	
R²	0.10	0.10		0.002	0.001		0.012	0.014	

Table 6. Distribution of Recommendations for Affiliated and Unaffiliated Analysts

This table reports the frequency of stock recommendations in various groups of firms during the *Pre-Reg* and *Post-Reg* periods. *Pre-Reg* is the period between November 2000 and August 2002, and *Post-Reg* is the period between September 2002 and December 2004. Panel A reports recommendations of affiliated analysts for IPO and SEO firms. Panel B reports recommendations by unaffiliated analysts for IPO and SEO firms. Affiliated analysts are employed by the lead underwriter(s) or the co-manager(s) of the equity offering. For IPO's and SEO's, we report stock recommendations that are issued in the window of 24 months after the IPO or SEO date. The IPO's and SEO's reported occurred in the period starting in November 1998 and ending in December 2004. We extend the beginning of the sample period to November 1998 for the IPO's and SEO's to allow for inclusion of recommendations in the *Pre-Reg* period that refer to IPO's and SEO's that occurred before November 2000.

Panel A: Affiliated analysts		
	Post-Reg	Pre-Reg
Buy (%)	49.0	69.6
Hold (%)	44.5	28.3
Sell (%)	6.5	2.1
Panel B: Unaffiliated analysts		
	Post-Reg	Pre-Reg
Buy (%)	48.0	63.9
Hold (%)	42.8	32.7
Sell (%)	9.2	3.4
Panel C: IPO		
	Post-Reg	Pre-Reg
Buy (%)	56.0	64.8
Hold (%)	39.4	32.4
Sell (%)	4.6	2.8
Panel D: SEO		
	Post-Reg	Pre-Reg
Buy (%)	46.6	65.7
Hold (%)	44.2	31.2
Sell (%)	9.0	3.1

Table 7. Univariate Statistics on Stock Recommendation by Affiliated and Unaffiliated Analysts

This table reports the average stock recommendations issued by analysts for firms that have issued equity in an IPO or an SEO. Stock recommendations are assigned a numeric value as follows: “strong buy” or “buy”=2, “hold”=3, “underperform” or “sell”=4. The stock recommendations were issued in the *Pre-Reg* or *Post-Reg* periods. *Pre-Reg* is the period between November 2000 and August 2002 and *Post-Reg* is the period between September 2002 and December 2004. Affiliated analysts are employed by the lead underwriter(s) or the co-manager(s) of the equity offering. Stock recommendations are issued in the window of 24 months after the IPO or SEO date. The table also reports: (1) t-statistics for difference in means, the test comparing the mean recommendation of affiliated and unaffiliated analysts within each period; (2) DIFF, the average difference between affiliated and unaffiliated recommendations in each period deflated by the overall mean recommendation for that period; and (3) the p-value of test that compares the percentage difference between affiliated and unaffiliated recommendations across periods.

	Post-Reg	Pre-Reg
Affiliated analysts		
Number of offerings	1147	1227
Mean	2.60	2.28
Median	2.55	2.14
Std	0.43	0.35
Unaffiliated analysts		
Number of offerings	1147	1227
Mean	2.48	2.46
Median	2.46	2.43
Std	0.39	0.39
T-statistics for difference in means	-7.41	12.13
DIFF	5.0%	-7.6%
	(8.21)	(-13.73)
P-values of tests of differences in DIFF between periods		
Post-Reg vs. Pre-Reg	<0.0001	

Table 8. Panel Data Logistic Regressions Relating Optimism/Pessimism and Underwriting Relationships

The table presents results of logistic regressions with the dependent variable equaling 1 when a recommendation is pessimistic (optimistic) in model I (model II). All models use firm fixed-effects. Optimistic recommendations are “strong buy” and “buy”, and pessimistic recommendations are “underperform” and “sell.” **AFF** is an indicator variable equal to 1 if the brokerage house issuing the recommendation was a lead underwriter or a co-manager in an equity offering for the firm in the 24 months prior to the recommendation announcement date. **SEOIPO** is an indicator variable equaling 1 if a firm has gone through an IPO or an SEO in the 24-months period prior to the recommendation. **BIG10** is an indicator variable equal to 1 if the recommendation is issued by an analyst who belongs to one of the big 10 brokerage houses that were part of the Global Settlement. **PASTFIRMPERF** is the size and industry-adjusted firm’s stock return in the six months prior to the recommendation. **PASTMKTPERF** is the cumulative market return in the six months prior to the recommendation. **PRE** and **POST** are indicator variables equaling 1 when the recommendation is issued respectively in the *Pre-Reg* or *Post-Reg* periods. *Pre-Reg* is the period between November 2000 and August 2002 and *Post-Reg* is the period between September 2002 and December 2004. Standard errors are presented in parentheses. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table Appears on the next page.

Table 8. (Continued)

	Model I						Model II					
	Prob (Rec=Pessimistic)						Prob (Rec=Optimistic)					
	(1)		(2)		(3)		(4)		(5)		(6)	
	Coeff	Odds Ratio	Coeff	Odds Ratio	Coeff	Odds Ratio	Coeff	Odds Ratio	Coeff	Odds Ratio	Coeff	Odds Ratio
AFF*PRE	-0.692** (0.160)	0.50	-0.568*** (0.170)	0.57	-0.450*** (0.153)	0.64	0.195*** (0.055)	1.22	0.195*** (0.058)	1.22	0.119** (0.52)	1.12
SEOIPO*PRE					-0.389*** (0.074)	0.68					0.333*** (0.031)	1.40
BIG10*PRE			-0.331** (0.140)	0.72	-0.289*** (0.058)	0.75			0.020 (0.049)	1.02	-0.010 (0.021)	0.99
PASTMKTPERF*PRE	-1.897** (0.787)	0.15	-1.893** (0.787)	0.15	-3.047*** (0.343)	0.05	0.855*** (0.305)	2.35	0.872*** (0.305)	2.39	0.646*** (0.130)	1.91
PASTFIRMPERF*PRE	-0.512*** (0.191)	0.60	-0.508*** (0.190)	0.60	-0.819*** (0.083)	0.44	0.875*** (0.074)	2.40	0.873*** (0.073)	2.40	0.715*** (0.031)	2.04
POST	1.704** (0.131)	5.50	1.475*** (0.136)	4.37	1.555*** (0.051)	4.73	-1.241*** (0.055)	0.29	-1.129*** (0.057)	0.32	-0.848*** (0.020)	0.43
AFF*POST	-0.142 (0.088)	0.87	-0.389*** (0.095)	0.68	-0.348*** (0.084)	0.71	-0.150*** (0.048)	0.86	0.041 (0.052)	1.04	0.038 (0.046)	1.04
SEOIPO*POST					-0.229*** (0.059)	0.80					0.037 (0.033)	1.04
BIG10*POST			0.604*** (0.085)	1.83	0.440*** (0.030)	1.55			-0.511*** (0.050)	0.60	-0.408*** (0.020)	0.66
PASTMKTPERF*POST	-0.029 (0.336)	0.97	-0.067 (0.337)	0.94	-0.190 (0.116)	0.83	0.345* (0.192)	1.41	0.371* (0.193)	1.45	0.654*** (0.075)	1.92
PASTFIRMPERF*POST	-0.228** (0.102)	0.80	-0.233** (0.102)	0.79	-0.281*** (0.041)	0.75	0.165*** (0.057)	1.18	0.166*** (0.057)	1.18	0.172*** (0.023)	1.18
Firm fixed effects	Yes		Yes		Yes		Yes		Yes		Yes	
Observations	14,141		14,141		98,677		23,060		23,060		121,365	
Pseudo R²	0.05		0.06		0.08		0.04		0.05		0.05	
Hypothesis (p-values)												
AFF*PRE=AFF*POST	0.0023		0.3504		0.5557		<0.0001		0.0432		0.2344	
BIG10*PRE=BIG10*POST			<0.0001		<0.0001				<0.0001		<0.0001	

Table 9. Time Series Regression of the Differential Bias of Affiliated Analysts

This table reports the results of the monthly time-series regression:

$$DIFFM_t = \alpha + \beta_1 PASTMKTPERF + \beta_2 GDP_t + \beta_3 Proceeds_t + \beta_4 REG + e_t .$$

The dependent variable, **DIFFM**, is the average difference between affiliated and unaffiliated recommendations (for IPO and SEO firms) during month *t* deflated by the average recommendation during that month. **PASTMKTPERF** is the cumulative market return in the six months preceding month *t*, **GDP** is the annualized growth in GDP in the quarter of month *t*, **PROCEEDS** is the natural logarithm of the total proceeds raised in IPO or SEO in the preceding month, **POST** is an indicator variable equal to 1 for months belonging to the *Post-Reg* period (September 2002 – December 2004). Newey-West standard errors are in parentheses. ***,** and * indicate the significance level at 1%, 5% and 10%, respectively.

	(1)	(2)	(3)	(4)
Intercept	-0.0322*** (0.0087)	-0.0254*** (0.0077)	0.072 (0.0462)	0.1079** (0.0523)
PASTMKTPERF	-0.0071 (0.2622)			0.6341* (0.3443)
GDP		-0.0050** (0.0019)		-0.0081*** (0.0026)
PROCEEDS			-0.0109** (0.0051)	-0.0128** (0.0054)
POST	0.0226** (0.0104)	0.0344*** (0.0121)	0.0219** (0.0100)	0.0300** (0.0114)
Observations	50	50	50	50
R²	0.08	0.14	0.13	0.21

Table 10. Price Reactions to Recommendations Based on Underwriting Relationships

This table presents tests of difference in price reactions, measured by size and industry-adjusted returns, to recommendations based on whether the analyst issuing the recommendation faced potential conflicts of interest. Panel A analyzes event reactions, i.e. returns over a three-day period centered around the issuance of the stock recommendation; Panel B analyzes post-event returns, i.e. returns over a six-month window starting two days after the issuance of a recommendation and ending six months (121 trading days) after that issuance. In each panel, returns are reported separately for the *Pre-Reg* and *Post-Reg* periods. *Pre-Reg* is the period between November 2000 and August 2002, and *Post-Reg* is the period between September 2002 and December 2004. In addition, three groups of recommendations are analyzed: (1) Recommendations for firms that have raised equity in the last 24 months and that were issued by affiliated analysts, i.e. analysts employed by a lead underwriter or a co-manager of the offering, (2) Recommendations for firms that have raised equity in the last 24 months and that were not issued by affiliated analysts, (3) Recommendations for non-IPO/SEO firms, i.e. firms that did not raise equity in the last 24 months. The p-value columns report p-values of tests of differences between the returns of affiliated and non-affiliated analysts, for IPO/SEO firms, and the returns of affiliated analysts and non-affiliated analysts for non-IPO/SEO firms. *, **, *** represent significance of 10%, 5% and 1% respectively.

	Post-Reg					Pre-Reg				
	IPO/SEO firms		Non-IPO/SEO firms	P-value		IPO/SEO firms		Non-IPO/SEO firms	P-value	
	Affiliated (1)	Unaffiliated (2)	(3)	(1)=(2)	(1)=(3)	Affiliated (1)	Unaffiliated (2)	(3)	(1)=(2)	(1)=(3)
Panel A: Event returns (window [-1,+1])										
Optimistic	0.0169** (0.0016)	0.0152*** (0.0012)	0.0196*** (0.0005)	0.3798	0.1012	-0.0014 (0.0023)	0.0021 (0.0013)	0.0125*** (0.0007)	0.1981	<.0001
Neutral	-0.0301*** (0.0018)	-0.0176*** (0.0013)	-0.0182*** (0.0005)	<.0001	<.0001	-0.1047*** (0.0035)	-0.0714*** (0.0018)	-0.0373*** (0.0009)	<.0001	<.0001
Pessimistic	-0.0501*** (0.0042)	-0.0422*** (0.0026)	-0.0323*** (0.0009)	0.1113	<.0001	-0.1008*** (0.0129)	-0.0800*** (0.0055)	-0.0533*** (0.0027)	0.1375	0.0003
Obs.		59,675					47,474			
Panel B: Long-Term Returns (window [+2,+122])										
Optimistic	-0.0017*** (0.0065)	-0.0165*** (0.0049)	-0.0182*** (0.0020)	0.9628	0.8490	-0.0280*** (0.0070)	-0.0836*** (0.0040)	0.0153*** (0.0021)	<.0001	<.0001
Neutral	-0.0235*** (0.0075)	-0.0227*** (0.0053)	-0.0181*** (0.0020)	0.9306	0.4797	-0.1069*** (0.0107)	-0.1241*** (0.0056)	0.0128*** (0.0027)	0.1535	<.0001
Pessimistic	-0.0275 (0.0174)	0.0013 (0.0109)	-0.0159*** (0.0038)	0.1613	0.5172	-0.0808** (0.0402)	-0.1124*** (0.0172)	-0.0030 (0.0083)	0.4696	0.0413
Obs.		52,647					46,167			