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Strength of analyst coverage following IPOs ☆

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Abstract

Firms with poor aftermarket performance are given higher target prices and are more likely to receive strong buy recommendations, especially by analysts affiliated with the lead underwriter. This favorable coverage is relatively short lived, typically lasting less than six months. Controlling for the quantity of coverage received, stock prices of newly public firms increase more when the target price ratio is high and recommendation is a strong buy. These results suggest that when a firm goes public, underwriter-affiliated analysts provide protection in the form of "booster shots" of stronger coverage if the firm experiences poor aftermarket stock performance.

JEL classification: G14; G24

Keywords: IPO; Underpricing; Target price; Stock recommendation; Security analysts

1. Introduction

Both prior academic research and anecdotal evidence suggest that, at least until recently, analysts affiliated with the underwriters of an initial public offering (IPO) provide favorable coverage. For example, Bradley et al. (2003) show that when coverage is initiated, it is almost always favorable. In addition, Michaely and Womack (1999) find that lead analysts issue slightly more strong buy and buy recommendations in the year

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following the IPO than do other analysts, and that firms recommended by lead analysts have poorer stock price performance both before and after the recommendation compared to firms recommended by other analysts.

With respect to anecdotal evidence, investment bank pitch books and recent SEC investigations suggest a pre-commitment to provide favorable coverage. For example, as part of the presentation to the board of directors of Viasource (a telecommunications company that went public in August 2000), Donaldson, Lufkin, and Jenrette (DLJ) promised to provide "initiation of coverage with an investment rating and summary opinion as soon as possible."[1] Moreover, the allegation that underwriter-affiliated analysts committed to provide favorable coverage is at the center of the recent settlement between ten of the largest U.S. securities firms, the SEC, and various state attorney generals regarding allegations of bias by research analysts.[2]

Previous work such as Cliff and Denis (2004), Aggarwal et al. (2002a), Chen and Ritter (2000), and Rajan and Servaes (1997) builds upon the observation of favorable analyst coverage and shows that underpricing is positively related to the likelihood and amount of subsequent analyst coverage.[3] However, the relation between underpricing and coverage strength has received much less attention. In this paper, we examine the relation between the strength of analyst coverage and an IPO firm's stock price performance in the aftermarket.

The link between strength of coverage and stock price performance may reflect the influence of several factors however, including the nature of the analyst's commitment to provide coverage, the impact of coverage strength on future investment banking business, and the relation between coverage strength and the brokerage business of the analyst's firm. Consider the nature of the analyst's commitment, if any, to provide coverage. In the absence of a commitment to provide coverage, high stock returns following an IPO may create information momentum, leading analysts to view the stock more favorably (Aggarwal, et al., 2002a). As a result, strength of coverage may be positively related to prior stock returns. Alternatively, a commitment by affiliated analysts to always provide favorable coverage coupled with other analysts initiating coverage only when they are optimistic implies that, while the quantity of coverage increases with underpricing, strength of coverage is unrelated to initial returns. Yet another alternative is that analysts pre-commit to provide *more* than a favorable recommendation. As Michaely and Womack (1999) suggest, analysts may commit to provide a "booster shot" by increasing the strength of their recommendation in the face of an unfavorable market response to the IPO. This

[1]See DLJ's Presentation to Viasource, dated January 25, 2000. The first-day return for Viasource was zero. True to their word however, at the end of the quiet period DLJ issued a strong buy recommendation and set a target price at 2.85 times the stock price at the time coverage was initiated. Other examples of pre-IPO assurances of favorable coverage prior to an IPO can be found in financial press reports concerning the April 28, 2003 settlement of conflict of interest charges involving investment banking firms. See also Smith et al. (2003) and the Stock Fraud Newswire at http://www.stockfraudnewswire.com.

[2]The April 28, 2003 settlement requires a "clear" separation of stock research from investment banking, including limits on analyst participation in road show presentations. Terms of the settlement, which were approved by the court on October 31, 2003, are available at http://www.sec.gov/litigation/litreleases/lr18438.htm.

[3]One possible reason for the positive relation between analyst coverage and underpricing is that underpricing is used to compensate the lead and perhaps the managing underwriters for committing their analysts to provide post-IPO coverage. As Cliff and Denis (2004) point out, since most underwriting spreads are 7% (see Chen and Ritter, 2000), underpricing and the attendant benefits that underwriters receive can provide underwriters a method to recoup the costs of providing coverage.

argument suggests a negative relation between strength of affiliated coverage and stock price performance. Which of these hypotheses best describes the strength of analyst coverage may depend on the returns prior to coverage. For example, momentum may drive the strength of coverage up for deals that do extremely well while analysts provide booster shots for stocks that perform poorly in the aftermarket.

If the likelihood of future investment banking business depends on the strength of coverage, then the prospects for future business may yield a relation between strength of coverage and stock returns that is similar to the one that would obtain if analysts pre-committed to provide favorable coverage. However, prospects for future business will influence affiliated as well as some unaffiliated analysts, leading both groups to provide more favorable coverage in the face of poor aftermarket performance.

On the surface, pre-committing to provide favorable to win future investment banking business appears to be at odds with the interests of the analyst's brokerage clients, who presumably prefer unbiased stock research. This argument suggests that reputation concerns may limit analyst optimism or lead to favorable coverage being short lived. However, in the case of deals that perform poorly, reputation concerns may be temporarily mitigated by the desire of brokerage clients to receive price support for the stocks they own. In particular, if underwriters allocate IPO shares to their best brokerage clients and these clients still own some shares at the end of the quiet period, the clients may prefer that the analyst give favorable coverage to support the IPO firm's stock price.[4] It seems reasonable that the pressure on the lead analyst to support the stock will be highest when aftermarket performance has been poor, since the brokerage clients will have a loss on their investment so far in the stock in this case. Consequently, the incentives for the lead analyst to provide strong coverage should be greatest when the IPO firm performs poorly in the aftermarket, to the extent that its brokerage clients continue to own shares of the IPO firm in the aftermarket. In contrast, in a broken deal where the investment bank wants to stabilize the issuer's share price in the aftermarket, it is possible that the investment bank will repurchase the brokerage clients' shares of the IPO firm. In this case, these clients would no longer push for a booster shot from the bank's analyst. However, a direct conflict of interest may arise to the extent that the affiliated analyst's recommendation and target price are designed to limit the investment bank's loss exposure. The point here is that there are alternative explanations for a negative relation between strength of coverage and aftermarket returns besides pre-commitment on the part of affiliated analysts.

We examine the strength of coverage by affiliated and unaffiliated analysts for a sample of 1,355 IPOs from November 1996 through August 2000. We extend previous research on analyst coverage of IPOs in several ways. First, we measure the strength of coverage along two dimensions, namely the buy/sell recommendation and the target price relative to the stock price just prior to the analyst report (we call this the target price ratio). Brav and Lehavy (2003) show that the target price ratio provides a more finely tuned measure of the analyst's estimate of expected firm value. Given the informativeness of target prices (Brav and Lehavy, 2003) and the lack of variation in recommendations when coverage is initiated, target price ratios have the potential to provide a more refined measure of the

[4]Reuter (2004) provides evidence that allocations of IPOs favor investors who direct brokerage business to the lead underwriter. Aggarwal et al. (2002a) find that institutional clients receive more shares when the IPO has strong premarket demand. Of course, the best brokerage clients are likely to receive the most underpriced IPOs, thus reducing the need for a booster shot.

strength of analyst coverage.[5] Indeed, target prices may be the principal way to provide additional support for deals with strong buy recommendations.

Second, we separate strength of analyst coverage by (i) the length of time between the offer date and the day coverage is initiated, (ii) the stock price performance of the IPO firm prior to the initiation of coverage, and (iii) analyst affiliation. "Lead analysts" are analysts that work for the research arm of the lead or co-lead underwriter. Similarly, "co-manager analysts" are analysts of co-managing underwriters and "unaffiliated analysts" are analysts that work for a firm that was not a managing underwriter. If the role of the investment bank in the IPO affects strength of coverage, then recommendations and target price ratios should vary with analyst affiliation. Strength of coverage may also vary by the length of time between the IPO date and coverage initiation, as well as by the stock price performance of the company prior to the initiation of coverage. For example, if affiliated analysts support IPOs to fulfill pre-IPO agreements with issuers and/or to avoid alienating institutional clients who were allocated IPO shares, one would expect affiliated analysts to provide earlier and more optimistic coverage (in terms of stronger recommendations and higher target price ratios) than unaffiliated analysts for IPOs that perform poorly in the aftermarket.

Finally, we examine how strength of coverage changes over time. While affiliated analysts may attempt to boost share prices of poorly performing offerings by initiating favorable coverage as soon as possible after the IPO, how long they maintain this support is unknown. If continued favorable coverage is one way to ensure being retained in follow-on offerings with the issuing firm, as Krigman et al. (2001), Cliff and Denis (2004) and others suggest, then the strength of lead analyst coverage should change little over time. Alternatively, career concerns and reputation effects may lead to a quick convergence of affiliated analyst recommendations with those of other analysts. We examine how analysts' recommendations and target price ratios change during the year following the IPO.

We find that lead analysts provide significantly more favorable recommendations and higher target price ratios than co-manager and unaffiliated analysts. Controlling for timing differences, we find no significant difference between recommendations and target price ratios from co-manager analysts versus unaffiliated analysts. This result is consistent with Michaely and Womack (1999) and Chen (2004) who find evidence that affiliation bias is strongest for analysts affiliated with lead and co-lead underwriters. However, this result is also consistent with the view that lead underwriters are selected in part because they place a higher value on the firm compared to other potential underwriters.

While, on average, lead analysts provide more favorable recommendations for all IPOs, the biggest differences in strength of coverage between lead versus other analysts obtain for "broken deals", that is, deals for which first-day returns are less than or equal to zero or when the IPO firm trades at or below the IPO offer price at the time coverage is initiated. In our sample, we find that when initial returns are less than or equal to zero, the average target price ratio at initiation of coverage 1.74 for lead analysts versus 1.59 for unaffiliated analysts. However, for IPOs with positive first-day returns, the average target price ratio is about 1.48 for both analyst groups.

In contrast to previous findings that the *likelihood* of coverage is positively related to first-day IPO returns, we find that the *strength* of coverage is negatively related to IPO

[5]Over 95% of recommendations in Bradley et al. (2003) sample in the five-day period surrounding the end of the quiet period are strong buy or buy recommendations.

returns. This relation is most pronounced for coverage by lead analysts. For broken deals, a one percentage point decline in stock price is associated with an increase in the lead analyst's target price of more than one percentage point. This result is consistent with affiliated analysts providing a booster shot in the face of poor initial performance by increasing their target price estimate. Although lead analysts may be selected because they place the highest valuation on the IPO firm, it is not clear why this valuation difference between the lead and other analysts would be largest for broken deals. The likelihood of a strong buy recommendation by lead and co-manager analysts is also negatively related to post-IPO returns. However, for unaffiliated analysts, we find no relation between the likelihood of a strong buy recommendation and returns prior to coverage.

The unusually strong support by lead analysts appears to be short lived. For broken deals, lead analysts revise target price ratios downward from an average of 1.82 at initiation to 1.36 by the fourth target price posted, which occurs on average 467 calendar days on average after the initiation of coverage. Moreover, at the end of the first year following the IPO, the average affiliated analyst target price ratio (1.57) is slightly lower than the average unaffiliated analyst target price ratio (1.60). We find a similar pattern for changes in recommendations over time.

Consistent with Bradley et al. (2003), we find that the market reacts positively to strong buy recommendations. The market also reacts favorably to higher target prices. Consistent with Chen (2004), we find that the market discounts strong buy recommendations and high target price ratios issued by lead affiliated analysts relative to non-lead affiliated analysts. This discount is greater for broken deals. Indeed, when only lead affiliated analysts provide coverage in broken deals, there is no statistically significant relation between the strength of analyst coverage and abnormal returns around coverage initiation. However, the market does react to favorably to high target price ratios from unaffiliated analysts in broken deals. Thus, the market completely discounts any booster shot when the lead analyst acts alone.

Our results indicate that affiliated analysts provide especially strong support for IPOs that perform poorly in the aftermarket. While support for broken deals is strongest and most frequent among affiliated analysts, non-lead affiliated analysts also provide stronger support for broken deals. Overall, our results are consistent with the argument that prospects for future investment banking business and a commitment to brokerage clients leads analysts to provide booster shots for deals with poor aftermarket stock performance.

The rest of the paper proceeds as follows. Section 2 describes our data and our sample of IPO firms. Section 3 examines the relations among strength of coverage, analyst affiliation, and stock price performance leading up to the initiation of analyst coverage. Section 4 examines how the strength of analyst coverage changes over time. Section 5 examines the relation between the stock market's reaction to coverage initiation and the strength of the coverage. Section 6 concludes.

2. Data and sample description

2.1. Data

Target prices and analyst recommendations for our sample of IPO firms come from the Thomson Financial *First Call* database. Coinciding with the beginning of target price

coverage on *First Call*, our sample period starts in November 1996 and runs through August 2000. We identify IPOs during this period using Thomson Financial's Securities Data U.S. Common Stock Initial Public Offerings (SDC) database and Jay Ritter's IPO database. We use SDC to identify the lead, co-lead, and co-managing underwriters of the IPO. A firm is included in the sample if its IPO is reported in Ritter's database and we can match it with an IPO in SDC. Reverse LBOs, unit offerings, spinoffs, and ADRs are excluded from the sample. We also exclude IPOs of banks, REITs, and S&Ls.[6] This procedure generates 1,355 sample IPOs. Of these, *First Call* reports target prices in the year following the IPO for 1,189 (87%) firms. We obtain returns and share price information from CRSP.

To determine whether coverage is initiated by an analyst affiliated with the lead, co-lead, or co-managing underwriter, we match SDC-identified IPO underwriters with the affiliation of analysts providing coverage as reported in *First Call*. We divide analysts into three groups: (1) those affiliated with the lead or co-lead investment bank, (2) those affiliated with a co-managing investment bank, and (3) those affiliated with other IPO syndicate members or unaffiliated with any syndicate members. To determine whether an analyst is affiliated with a managing underwriter, we account for mergers between investment banks during the sample period. Consider the case in which an investment bank that was part of the underwriting syndicate subsequently merged with another bank. If an analyst affiliated with the newly merged bank provided coverage within a year of the IPO, we assign an analyst affiliation based on the most active role played by either of the merging banks in the IPO. For example, Credit Suisse First Boston (CSFB) acquired DLJ in 2000. If DLJ served as the lead underwriter in a 1999 IPO, post-merger coverage in 2000 by a CSFB analyst would be classified as affiliated with the lead underwriter.

We measure strength of coverage using two proxies, the buy/sell recommendation and the target price ratio. Recommendations are based on *First Call*'s numerical rating system, where "1" corresponds to the most favorable recommendation ("strong buy") and "5" corresponds to the least favorable recommendation ("sell"). However, an obvious problem with analyst recommendations is their subjective nature. The same rating by different analysts may have different meanings for firm value or expected future stock performance. To address this shortcoming, we also measure strength of coverage by the analyst's target price relative to the price of the stock on the day preceding the date of the analyst report.[7] We drop all target prices that are not identified as "real-time" by *First Call*, and we also drop all target price observations that *First Call* does not confirm. The target price ratio represents the analyst's expected or forecasted return for the stock, usually over the following 12 months, and is arguably a less ambiguous measure of the analyst's assessment of future performance than the buy/sell recommendation. Brav and Lehavy (2003) find that both recommendations and target prices have separate explanatory power in explaining stock price reactions to new analyst reports.

[6]These IPOs are traditionally excluded because the degree of uncertainty over pricing is likely to be much less than for other IPOs due to a public operating history (in the case of reverse LBOs), regulatory oversight (in the case of banks and S&Ls), or the fact that the issuer is publicly traded (in the case of ADRs and spinoffs).

[7]For a general discussion of how target prices are established, see Asquith et al. (2005). For a description of how target prices are determined in the context of IPO firms, see Houston et al. (2006).

2.2. Summary statistics

Panel A of Table 1 provides descriptive statistics for the 1,189 firms for which *First Call* reports at least one analyst target price within one year of the IPO offer date. To compare the factors that affect strength of coverage and the likelihood of coverage, Panel B provides information for the 166 firms with no analyst coverage.

Not surprisingly, firms with coverage are significantly larger in terms of assets, sales, and market capitalization, and are older than firms that do not receive analyst coverage within one year of going public. Consistent with Cliff and Denis (2004) and Bradley et al. (2003), IPO firms with coverage are significantly more underpriced than IPO firms that do not receive analyst coverage. Part of this variation is due to timing differences, since underpricing and the likelihood of coverage both increase toward the latter half of our sample period. For example, 54% of our sample IPO firms that receive coverage did so during the 1999–2000 IPO bubble period when underpricing was extraordinarily high. However, these two years account for only 32% of our sample of IPO firms that did not receive coverage. Nevertheless, the positive relation between underpricing and coverage exists after controlling for time period. For instance, in 1999 and 2000, IPO firms not covered by analysts in the first year were significantly less underpriced than firms receiving coverage (first-day returns of 27% versus 72%). Coverage is also related to stock price performance during the 25-calendar-day quiet period. Mean and median returns during the quiet period for firms that did not receive coverage are negative. In contrast, the mean and median quiet period returns for firms receiving coverage are 9.14% and 1.60%, respectively.

On average, slightly more than four analysts initiate coverage within one year of the offer date, with an average of approximately two analysts providing coverage within 30 calendar days of the IPO.[8] Consistent with previous studies, initiated coverage is predominately favorable. For example, the mean and median recommendation is about 1.5, and the mean target price ratio is 1.55. By comparison, Brav and Lehavy (2003) report an average target price ratio of 1.28 for all (mostly seasoned) firms. Of course, higher target price ratios and more favorable recommendations upon the initiation of coverage for IPO firms do not necessarily imply that analysts are overly optimistic. For instance, IPO firms are likely to have better growth prospects than older, more established firms, possibly justifying higher expected returns.

Consistent with prior studies, sample firms that receive coverage use more highly rated lead underwriters and employ more co-managing underwriters than do firms that do not receive coverage. The effect of underwriter rank on the likelihood of coverage is significant. Almost all IPO firms (96%) underwritten by a top-ranked underwriter [those with a Carter and -Manaster (1990) ranking of greater than eight] receive coverage, but only 68% of IPO

[8]In addition to investigating the likelihood of any analyst initiating coverage, we also examine the factors affecting the likelihood of multiple analysts initiating coverage. First, we estimate a multinomial logit model, where the dependent variable equals the number of analysts that initiate coverage in the first year, with a maximum value of four. The results are similar to those we present in Panel C of Table 1. In particular, coverage in the first year is increasing in IPO underwriter rank, initial return, age, and firm size. Second, we investigate whether, conditional on coverage, the likelihood of multiple analysts initiating coverage is related to underwriter rank, the number of managers, firm characteristics, and IPO performance. In this model, the likelihood of multi-analyst coverage is positively and significantly related to the number of managers, the return during the quiet period, and firm size. The coefficient on underwriter rank is positive but not statistically significant.

Table 1
IPO firm summary statistics and the likelihood of analyst coverage

The sample is 1,355 IPO firms that went public from November 1996 to August 2000, 1,189 of which had analyst coverage reported by *First Call* within one year of the offer date. IPO data are from Jay Ritter's IPO database and the Thomson SDC Platinum database. Analyst recommendations and target prices are from *First Call*. *Assets* and *Sales* are for the fiscal year prior to the IPO. *Age* is the number of years since the company was founded. *Market Capitalization* is the market value of outstanding common stock using the closing price at the end of the first trading day. *Number of Managers* is the number of lead, co-lead, and co-managing underwriters involved in the offering. *Lead Underwriter Rank* is based on Jay Ritter's updated Carter-Manaster ranking, where nine is the highest rank and one is the lowest rank. *InitialReturn* is the stock return from the offer price to the first-day closing price. *Quiet Period Return* is the stock return from the first-day closing price to the closing price 24 calendar days after the IPO. *Average Target Price Ratio at First Coverage* is the target price divided by the stock price on the day before the target price is announced, averaged across all analysts covering the firm on the first day of coverage. *Average Recommendation at First Coverage* is the recommendation on a one-to-five scale (one is a strong buy and five is a sell), averaged across all analysts covering the firm on the first day of coverage. Panel C reports the estimated logit coefficients and corresponding *t*-statistics in parentheses, where the dependent variable equals one when the firm receives coverage within one year (30 days) of the offer date, and zero otherwise.

	Mean	Median	High	Low
Panel A: IPO firms with coverage in the first year ($N = 1,189$)				
Asset ($ millions)	406.7	31.7	230,624	0.50
Sales ($ millions)	204.0	25.8	51,058	0.07
Market capitalization ($ millions)	797.5	305.4	3,080	12.88
Age (years)	11.62	6	145	0.5
Number of managers	3.22	3	13	1
Lead underwriter rank	8.09	9	9	2
Initial return	47.12%	20.08%	605%	−42.20%
Quiet period return	9.14%	1.60%	293.4%	−67.26%
Number of analysts initiating coverage within one year of the IPO	4.23	3	23	1

Number of analysts initiating coverage within 30 days of the IPO	2.04	2	12	1
Number of days to first coverage	34.25	27	363	1
Return to first coverage	60.40%	16.70%	1,475.80%	−66.61%
Average target price ratio at first coverage	1.55	1.49	3.00	1.00
Average recommendation at initiation	1.41	1.33	3.00	1.00
Panel B: IPO firms without coverage in the first year (N = 166)				
Assets ($ millions)	46.2	9.5	843	0.1
Sales ($ millions)	34.4	9.6	1,116	0.01
Market capitalization ($ millions)	240.6	54.1	4,890	6.16
Age (years)	7.74	5	84	0.5
Number of managers	2.16	2	7	1
Lead underwriter rank	4.93	4	9	1
Initial return	17.52%	6.25%	250%	−43.7%
Quiet period return	−0.59%	−2.44%	100%	−58.6%

	N	Constant	Initial return	Quiet period return	Lead underwriter rank	Number of managers	Log assets	Age	Pseudo R^2
Panel C: Logit models, where the dependent variable equals one if a firm receives analyst coverage and zero otherwise									
Coverage within one year	1,355	−3.30	0.49	0.65	0.51	0.15	0.28	0.01	0.33
		(−9.15)	(2.01)	(1.60)	(8.78)	(1.31)	(3.34)	(1.86)	
Coverage within 30 days	1,355	−3.01	0.20	0.47	0.35	0.40	0.00	0.09	0.17
		(−9.84)	(1.69)	(1.90)	(7.61)	(4.46)	(0.01)	(1.75)	

firms underwritten by firms with Carter-Manaster ranks of eight or below received coverage in the first year.

Firm characteristics, underwriter rank, and IPO stock price performance are all potentially related. To examine the incremental contribution of each of these factors to the likelihood of coverage, we estimate a logit regression that relates whether an IPO firm receives coverage to firm characteristics, the number of managers, lead underwriter rank, initial return (underpricing), and quiet period return. Panel C of Table 1 reports the results. Consistent with Cliff and Denis (2004), the likelihood of coverage is positively and significantly related to the rank of the lead underwriter. To examine the economic significance of this effect, we compare the estimated probability of coverage at the sample mean (Carter-Manaster rank of 8.09) to the probability associated with the maximum rank of nine. Moving from an average underwriter to a top-ranked underwriter increases the likelihood of coverage by 5%.

The likelihood of coverage within the first year is also related to initial return, firm size (as measured by assets), and the age of the company at the time of the offering.[9] Krigman et al. (2001) argue that one reason to increase the number of co-managers is to increase the likelihood and amount of analyst coverage. However, we find no significant relation between the likelihood of coverage in the first year following an IPO and the number of co-managers used in the IPO syndicate.

To investigate whether the determinants of analyst coverage vary by when coverage is initiated, we separately examine the determinants of coverage within 30 calendar days of the IPO. While underwriter rank, age, and initial return remain positively and significantly related to the likelihood of coverage, asset size is no longer significant. Consistent with Bradley et al. (2003), the likelihood of coverage at the end of the quiet period is positively and significantly related to the number of co-managers that participate in the IPO.[10] Thus, the number of managers appears to affect the timing but not the likelihood of coverage.

Broken deals are less likely to receive coverage than IPOs that trade above the offer price. In particular, 89% of IPOs with positive first-day returns receive coverage in the year following the IPO, while only 83% of IPOs with zero or negative first-day returns receive coverage. The most important factor for whether or not a broken deal receives coverage is the rank of the lead underwriter. Virtually all (96%) of the 85 broken deals underwritten by a top-ranked underwriter receive coverage. In contrast, only 53% of broken deals underwritten by less prestigious underwriters receive coverage. The percentage of IPOs underwritten by top-ranked underwriters that receive coverage does not differ significantly by whether or not the IPO is a broken deal. In contrast, broken deals underwritten by less prestigious underwriters are significantly less likely to receive coverage than successful IPOs underwritten by less prestigious underwriters (t-statistic $= -3.68$). Thus, one reason to use a top-rated underwriter appears to be a higher likelihood of analyst support if returns are poor in the aftermarket.

[9]We measure firm size using assets rather than market value of equity since the latter is likely to be correlated with the initial returns.

[10]Panel C of Table 1 shows that having more co-managers does not have a statistically significant effect on the probability of receiving coverage within the first year. Bradley et al. (2005) come to a similar conclusion when interpreting their Table 7 results. There is no evidence that adding co-managers influences the likelihood of receiving coverage after the end of the quiet period.

Other than differences in the prestige of the lead underwriter, there are no other apparent differences between broken deals that receive coverage and those that do not.[11]

For example, the average initial return for broken deals that receive coverage is –4.99% versus −4.98% for broken deals that do not receive coverage. Moreover, the lowest initial return for broken deals that receive coverage (−44% for DevX Energy) is slightly lower than the lowest initial return for broken deals not receiving coverage (−43% for Echapman.com).[12]

3. Strength of coverage by analyst affiliation

3.1. Hypotheses

Our first hypothesis is that underpricing creates momentum that leads in turn to stronger coverage. Aggarwal et al. (2002a) argue that IPO underpricing may generate "information momentum" to attract investor attention, which makes it easier for analysts to issue stronger recommendations and higher target prices, and thereby to maximize the firm's stock price at the end of the 180-day lock-up period. Under the information momentum hypothesis, analysts provide stronger recommendations for IPO firms that perform well in the secondary market.

Second, Michaely and Womack (1999) suggest that affiliated analysts may agree to support an issuer's stock in the aftermarket by providing "booster shots" in the form of strong recommendations and higher target price ratios if the firm's stock performs poorly in the secondary market. The booster shot hypothesis predicts that affiliated analysts provide particularly favorable coverage when firms experience poor stock price performance in the aftermarket. If booster shots are mostly given to IPO firms that experience negative aftermarket returns, then we expect an asymmetric negative relation between prior returns and target price ratios, such that the relation is more negative for broken deals than for other deals.

Unaffiliated analysts may also provide more favorable coverage for broken deals either because they expect some form of mean reversion in prices or because they seek to obtain future investment banking business from the issuer. Nevertheless, if affiliated analysts provide booster shots as part of a formal or informal commitment to provide coverage, one would expect that on average, affiliated analysts provide more favorable coverage in broken deals than do unaffiliated analysts.

Our third hypothesis, the anchored target price ratio hypothesis, is based on the idea that prior to the IPO, the underwriting team and its analyst essentially pre-commit to a certain target price ratio and recommendation before the stock begins trading. That is, target price ratios and recommendations are fixed at a particular level. For example, if analysts decide to always set target prices equal to a 45% premium over the current stock

[11]We estimate the same logit model as in Panel C of Table 1 for broken deals only. The only variable that is statistically significant at the 5% level for this subsample is underwriter rank. The coefficient estimates for the underwriter rank variable are 0.486 and 0.334 for all initiations and initiations within 30 days, respectively.

[12]It is not surprising that Echapman.com did not receive coverage. Echapman.com is an on-line brokerage company that was underwritten by its majority shareholder, the investment bank Chapman Company (with a Carter–Manaster rank of five). DevX Energy was a small-cap energy company underwritten by Friedman Billings Ramsey (FBR) Group. Analyst coverage for DevX Energy was initiated by FBR about two months after the offering.

price at the time the analyst report is written, then regardless of what happens to the stock price in the aftermarket, the target price ratio will always be 1.45. In this case no relation is expected between the strength of coverage and prior returns.

Our fourth hypothesis is that analysts are anchored on a particular pre-offer valuation. In other words, when the offer price is set, the target price has also been determined, but its value is not revealed until the analyst report is issued. As a result, there will be a mechanical negative relation between the target price ratio and aftermarket returns. If the aftermarket return is unexpectedly very high, the current stock price at the time the analyst report is issued may be higher than the pre-determined target price. Analysts rarely set target prices lower than the current price of the stock. Consequently, analysts will probably not literally anchor on a pre-determined target price value if the firm's stock price moves higher than this target price. In this case, the analyst will set a lower-than-normal target price ratio for such an unexpectedly successful deal. The prediction of this anchored target price level hypothesis differs from the booster shot hypothesis in that much less asymmetry is expected when broken deals are separated from remaining deals. In other words, the relation between target price ratios and aftermarket performance should be negative but similar in magnitude for both broken deals and successful deals.

Even in the absence of a commitment to provide favorable coverage, affiliated analysts may provide more favorable coverage because investment banks that value the IPO firm most highly tend to be awarded the role of lead underwriter. However, while such selection bias may result in affiliated analysts providing more favorable coverage on average, it does not suggest a large asymmetry for broken deals. In other words, if the lead underwriter consistently places the highest value on the IPO firm, the difference between the target price ratios of the lead analyst versus other analysts should be the same regardless of whether the firm's stock price goes up or down in the aftermarket.

A commitment by lead and co-lead analysts to provide coverage, especially for broken deals, implies that recommendations and target prices of affiliated analysts are likely to be biased upwards relative to those of unaffiliated analysts. Given this affiliation bias, market participants may discount the favorable recommendations and target price ratios of affiliated analysts. If so, we expect the stock price reaction to the initiation and strength of coverage given by affiliated analysts to be less positive than to coverage provided by unaffiliated analysts.

Finally, pre-commitment to provide favorable coverage appears to conflict with an analyst's interest to preserve and promote their reputation with brokerage clients. Moreover, this conflict appears to be largest for broken deals. However, this conflict is mitigated by two factors. First, there is evidence that lead underwriters allocate IPOs to their best brokerage clients (see Reuter, 2004; Aggarwal, et al., 2002b). Thus, if the analyst's best clients have a stake in the IPO, they are likely to take a dim view of an unfavorable but honest appraisal of the stock's value, particularly if the stock is currently trading below the price at which it was purchased. Second, Malmendier and Shanthikumar (2004) find evidence that large institutional traders, presumably the brokerage house's best clients, recognize and account for the upward bias in security analyst recommendations and exert a less than normal trade reaction to strong buy recommendations. These clients at least partly see through the affiliation bias, so they take such strong recommendations to be just "cheap talk" (see Farrell and Rabin, 1996).[13]

[13]In Malmendier and Shanthikumar (2004), "all-star" analysts are identified based on *Investment Dealer Digest* polls of institutional investors. These polls suggest that analyst recommendation or earnings forecast accuracy are

Which of these hypotheses best describes the strength of analyst coverage may depend on the returns prior to coverage. For example, affiliated analysts may provide booster shots for stocks that perform poorly in the aftermarket, whereas for stocks that perform well, they may attempt to add to the momentum by issuing strong recommendations and setting high target prices. Given this possibility, we examine whether the relation between strength of coverage and prior returns varies with the level of aftermarket return.

3.2. Univariate analysis of strength of coverage

To investigate which hypothesis best describes strength of coverage for IPO firms, Panel A of Table 2 reports the average target price ratio, recommendation, and number of days between the IPO date and coverage initiation, sorted by whether the analyst is affiliated with the lead or co-lead, with a co-manager, or with an unaffiliated underwriter. To investigate whether strength of coverage varies with stock price performance, IPO firms are grouped by initial returns and by what we refer to as return to coverage—the stock return calculated from the offer price to the price the day before coverage is initiated. Although we use raw returns when measuring stock price performance, results are qualitatively similar when using market-adjusted returns.

On average, lead analysts provide more favorable recommendations than other analysts (1.44 versus 1.53 and 1.62 for co-manager and unaffiliated analysts, respectively). Analysts affiliated with co-managing underwriters also provide more favorable recommendations than unaffiliated analysts. Bradley et al. (2003) and Cliff and Denis (2004) find that lead analysts issue more favorable recommendations, and Lin and McNichols (1998) find a similar result for seasoned offerings. However, we find no significant difference in target price ratios by analyst affiliation. Target price ratios are all very close to 1.50 and differ by only a few percentage points across the different analyst groups. One interpretation of this result is that because recommendations are inherently more subjective, affiliated analysts are more comfortable issuing a favorable recommendation rather than a particular valuation as reflected in the target price.

Regardless of analyst affiliation, target price ratios and recommendations are higher for broken deals than for successful IPOs. For example, co-manager analysts give an average target price ratio of 1.61 for IPO firms with zero or negative initial returns, but assign an average target price ratio of 1.46 for firms that realize positive initial returns (the difference is statistically significant at the 1% level). Recommendations are also more favorable for broken deals, although the difference is only significant when return to coverage is used as a measure of whether or not the deal is broken. Surprisingly, unaffiliated analysts also provide more favorable coverage for broken deals. Both target price ratios and recommendations are substantially higher for broken deals, and these differences are statistically significant at the 1% level.

Differences in strength of coverage by analyst affiliation are most pronounced for broken deals. Lead analysts post much higher relative target prices for IPO firms that have nonpositive initial returns and for firms that trade at or below the IPO offer price when

(*footnote continued*)
among the least important analyst attributes when deciding which analysts become all-stars. The most important characteristics of analysts in the rankings are industry knowledge and accessibility. See "What Investors Really Want," *Investment Dealer Digest*, October 2004, p. 8.

Table 2
Strength of coverage by post-IPO performance and analyst affiliation

Mean and median values for three measures of analyst strength of coverage are provided for all analyst reports reported by *First Call* within one year of the offer date for 1,189 IPO firms between November 1996 and August 2000. Lead Analysts are analysts affiliated with the lead or co-lead underwriter for the IPO. Co-Managing analysts are analysts affiliated with a co-managing investment bank for the IPO. Unaffiliated Analysts are analysts that are not affiliated with either the lead, co-lead, or co-managing investment bank. *Initial Return* is the stock return from the offer price to the first-day closing price, *Return to Coverage* is the stock return from the offer price to the closing price the day before the analyst report date, *Target Price Ratio* is the target price divided by the stock price on the day before the target price is announced, *Recommendation* is the analyst rating on a one-to-five scale (one is a strong buy and five is a sell), and *Days to Coverage* is the number of calendar days from the IPO to when coverage is initiated.

	Lead analysts						Co-manager analysts						Unaffiliated analysts					
	Target price ratio		Recommendation		Days to coverage		Target price ratio		Recommendation		Days to coverage		Target price ratio		Recommendation		Days to coverage	
Analyst reports	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Panel A: Analyst initiations within one year of the offer date																		
All initiations	1.53	1.44	1.44[a]	1	52	27	1.49	1.39	1.53	1	56	28	1.51	1.42	1.62*	2*	177*	182*
N	847		812		948		1,204		1,159		1,339		2,182		2,324		2,624	
Initial return ⩽ 0	1.74[a]	1.68[a]	1.24[a]	1	39	27	1.61	1.51	1.50	1	60	29	1.59	1.53	1.52	1	156*	140*
N	147		149		166		202		199		228		231		252		278	
Initial return > 0	1.48	1.40	1.48[a]	1[a]	54	27	1.46	1.37	1.54	2	56	28	1.50	1.41	1.63*	2*	179*	186*
N	700		663		782		1,002		960		1,111		1,951		2,072		2346	
Return to coverage ⩽ 0	1.82[a]	1.79[a]	1.27[a]	1	36	27	1.68	1.60	1.38	1	53	29	1.69	1.63	1.51*	1*	158*	142*
N	166		153		180		227		211		243		309		265		324	
Return to coverage > 0	1.46	1.39	1.48[a]	1[a]	55	27	1.44	1.36	1.56	2	57	28	1.48	1.40	1.63	2	179*	187*
N	681		659		768		977		948		1,096		1,873		2,059		2,300	
Panel B: Analyst initiations within 30 days of the offer date																		
All initiations	1.53	1.44	1.36	1	26	26	1.47	1.38	1.47	1	26	27	1.53	1.44	1.46	1	25	26
N	674		603		706		837		668		883		393		392		432	
Initial return ⩽ 0	1.74[a]	1.72[a]	1.19[a]	1	25	26	1.63	1.56	1.43	1	26	26	1.68	1.61	1.37*	1	25	26
N	126		121		134		124		121		130		66		60		70	
Initial return > 0	1.48	1.41	1.31[a]	1	25	26	1.44	1.36	1.48	1	26	27	1.49	1.41	1.49	1	25	26
N	548		482		572		713		547		753		327		332		362	
Return to coverage ⩽ 0	1.80[a]	1.74[a]	1.26	1	25	26	1.69	1.63	1.37	1	26	27	1.70	1.65	1.37	1	25	26
N	127		118		127		123		120		135		67		59		72	
Return to coverage > 0	1.46	1.40	1.38[a]	1	25	26	1.43	1.35	1.49	1	26	27	1.49	1.40	1.47	1	25	26
N	547		485		579		714		548		748		326		333		360	

[a]Significantly different from *Co-Manager* and *Unaffiliated Analysts* at the 1% level.
*Significantly different from *Co-Manager* and *Lead Analysts* at the 1% level.

coverage is initiated. For these broken deals, lead analyst target price ratios are on average more than 26 and 36 percentage points higher than target price ratios for firms with zero or negative initial returns or for firms with nonpositive return to coverage. Lead analysts are also more optimistic relative to other analysts in broken deals in their recommendations as well. The average lead analyst target price ratio for broken deals is 14 percentage points higher than the average target price ratio set by other analysts.

Overall, stronger coverage by lead analysts in broken deals is consistent with the booster shot hypothesis and the anchored target price level hypothesis, but it contradicts the information momentum hypothesis and the anchored target price ratio hypothesis. While the strongest support comes from lead analysts, co-manager analysts and unaffiliated analysts also provide more favorable coverage for broken deals.[14]

Co-manager analysts may give more favorable coverage to broken deals than to successful IPOs because of some kind of agreement to support the stock as part of the underwriting process. However, it is unclear clear why unaffiliated analysts provide more favorable recommendations and higher target prices for broken deals as well. One explanation is that some unaffiliated analysts may also provide booster shots as well. This may arise from unaffiliated analysts participating in the syndicate even though they do not play a role as a bookrunner or manager. Alternatively, unaffiliated analyst support may stem from a pre-commitment with one of the managing underwriters to provide analyst coverage. Anecdotal evidence from a recent settlement between the SEC and five large securities firms hints towards such an arrangement. In the settlement, the SEC alleged that lead underwriters made payments out of underwriting fees to other securities firms to provide coverage. These firms are not necessarily part of the IPO syndicate. Their research reports contained no mention of side payments, which were described in the settlement as "research guarantees" or "guaranteed economics of research."[15]

The results in Panel A of Table 2 indicate that the timing of coverage varies by analyst affiliation and the stock price performance of the IPO. Coverage is initiated more quickly by lead and co-manager analysts than by unaffiliated analysts. For example, the median time to coverage for lead and co-manager analyst is less than 30 days, whereas the median time to coverage by unaffiliated analysts is about six months.

The more timely initiation of coverage by affiliated analysts raises the question of whether differences in coverage strength by analyst affiliation are simply due to timing differences. For example, if affiliated analysts provide more favorable coverage to assist in price stabilization, differences in strength of coverage should be most noticeable when coverage is initiated immediately after the end of the quiet period. More generally, if lead and co-manager analysts initiate coverage at the end of the quiet period while unaffiliated analysts initiate five or six months later, differences in recommendations and target price ratios by analyst affiliation may be driven by different information sets that are available for IPO firms at these different points in time. However, it is not clear why these differences would lead to affiliated analysts being systematically more optimistic about the firm's prospects.

[14]We also test for differences in strength of coverage between analyst groups by computing the mean difference in target price ratios and recommendations for each firm and then computing the mean and median across all firms. The results are similar to those we report in Table 2.

[15]See Smith (2003). Paying for coverage in this way is not illegal and does not violate NASD rules. However, the SEC was principally concerned that the payments were not disclosed to investors.

To examine whether timing explains the differences in strength of coverage, we compare target price ratios and recommendations by analyst affiliation for all initiations that occur within 30 days of the IPO. Panel B of Table 2 presents the results. Since about 78% of lead and co-manager analyst recommendations occur within 30 days of the offer date, there is very little difference between the mean and median target price ratios and recommendations in Panels A and B across these two sets of analysts. However, only 16.5% of unaffiliated analysts initiate coverage during this period, so there is the potential for large differences in the strength of coverage between all initiations that occur during the first year and initiations that occur within the first 30 days.

Similar to Panel A, Panel B shows barely any difference between the mean and median target price ratios across all three analyst affiliation categories. In addition, for initiations within 30 days, there is no significant difference between the average recommendation for lead, co-manager, and unaffiliated analysts. Thus, controlling for timing differences, affiliated analysts are no more optimistic in the target prices they assign than are unaffiliated analysts.

Again, we find the largest difference in target price ratios by analyst affiliation for broken deals. For initiations within the first 30 days, lead analysts assign an average target price ratio of 1.80 for IPO firms with zero or negative return to coverage, but co-manager and unaffiliated analysts give these firms an average target price ratio of about 1.69. Although the differences are smaller than in Panel A, Panel B shows that lead analyst recommendations are more favorable regardless of the performance of the IPO.

In summary, all analyst groups issue more favorable coverage to IPO firms that perform poorly in the aftermarket. Even for coverage within the first 30 days after the IPO, broken deals receive higher target price ratios and stronger recommendations for all three analyst affiliation categories. While the likelihood of coverage is positively related to aftermarket stock price performance, strength of coverage is inversely related to performance.

3.3. *Strength of coverage and stock price performance*

Panel A of Table 3 presents the results of regressions of the target price ratio on prior stock returns.[16] To investigate whether this relation varies by analyst affiliation, we interact return to coverage with two dummy variables, one for each alternative analyst type.

As the first column shows, the target price ratio is negatively related to return to coverage. Strong stock price performance prior to the initiation of coverage leads to lower target price ratios. This effect is greatest for lead analysts. In particular, the interactive variables for co-manager and unaffiliated analysts are both positive and statistically significant, revealing that stock returns prior to coverage has the least impact on target prices of unaffiliated analysts.[17]

[16]To account for overall market movements, we further examine the relation between strength of coverage and market-adjusted returns, where we compute market-adjusted returns by subtracting the return on the CRSP value-weighted index over the relevant period from the return to coverage. The results using this measure are qualitatively similar to those in Table 3.

[17]Target price ratios are negative and significantly related to stock returns for both co-manager and unaffiliated analysts at the 1% level.

Table 3
Target price ratios, strong buy recommendations, and prior stock returns by analyst affiliation

The table presents OLS models to explain analyst target price ratios and logit models to explain the likelihood that an analyst assigns a strong buy recommendation are run for analyst reports written on 1,189 IPOs between November 1996 and August 2000 within one year of the IPO. In Panel A, the dependent variable is the target price ratio—the target price divided by the stock price on the day before the target price is announced. In Panel B, the dependent variable equals one when the analyst assigns a recommendation of one on *First Call*'s five-point scale. *Return to Coverage* is the stock return from the offer price to the closing price the day before the analyst report date. *Co-Manager* equals one if the analyst is affiliated with an underwriter that served as a co-manager in the IPO. *Unaffiliated* equals one if the analyst is not affiliated with either the lead, co-lead, or co-managing underwriters. Models are estimated separately using only analyst reports dated within 30 calendar days of the IPO and using only analyst reports dated between 31 and 365 days of the IPO. In Panel A, OLS models are run separately for analyst reports with positive *Return to Coverage* and for analyst reports with zero or negative *Return to Coverage*. *t*-statistics are reported in parentheses.

	All initiations			Initiations within 30 days		Initiations outside of 30 days	
Variable		Return to coverage > 0	Return to coverage ⩽ 0	Return to coverage > 0	Return to coverage ⩽ 0	Return to coverage > 0	Return to coverage ⩽ 0
Panel A: OLS models of the target price ratio							
Return to coverage	−0.10	−0.05	−1.11	−0.03	−1.21	−0.06	−0.99
	(−7.74)	(−3.91)	(−7.16)	(−2.36)	(−6.60)	(−3.13)	(−3.65)
Return to coverage * co-manager	0.04	0.02	0.37	0.01	0.23	0.05	0.41
	(2.78)	(1.63)	(2.05)	(0.36)	(1.04)	(2.05)	(1.84)
Return to coverage * unaffiliated	0.07	0.04	0.56	0.03	0.22	0.05	0.50
	(5.36)	(3.15)	(3.40)	(1.47)	(0.68)	(2.43)	(1.83)
Constant	1.54	1.49	1.59	1.47	1.58	1.50	1.59
	(238.3)	(209.7)	(66.1)	(149.1)	(50.6)	(147.2)	(43.3)
R^2	0.03	0.01	0.08	0.01	0.13	0.01	0.05
N	4,320	3,606	714	1,618	328	1,988	386
Panel B: Logit models, where the dependent variable equals one if the recommendation is a strong buy and zero otherwise							
Return to coverage		−0.23		−0.39		−0.13	
		(−2.86)		(−3.69)		(−0.92)	
Return to coverage * co-manager		−0.03		0.04		−0.16	
		(−0.33)		(0.37)		(−0.83)	
Return to coverage * unaffiliated		0.15		0.29		0.09	
		(1.78)		(2.28)		(0.67)	
Constant		0.34		0.56		0.12	
		(8.50)		(9.46)		(2.08)	
Pseudo R^2		0.01		0.01		0.00	
N		3,623		1,782		1,829	

The negative relation between target price ratios and stock returns is consistent with the booster shot hypothesis. However, the negative relation is also consistent with the anchored target price level hypothesis and may simply reflect the fact that strong past performance means that an analyst is less likely to view the firm as significantly undervalued and may be less likely to post a high target price. If this argument is correct, the negative relation between target price ratios and stock returns should be the same for issues that perform well. In contrast, the booster shot hypothesis predicts that the negative relation between target price ratios and returns will be strongest for poorly performing firms.

To investigate this issue, we estimate two separate regressions based on whether the firm's stock is above the offer price when coverage is initiated. For broken deals, lead analyst target price ratios are very sensitive to share price performance. A one percentage point decline in return to coverage is associated with a 111 basis point increase in the analyst's target price ratio. In contrast, for issues that trade above the offer price at initiation, a one percentage point increase in returns leads to a decline in analyst expected returns of about five basis points. This large asymmetry is consistent with affiliated analysts providing booster shots to support the stock in the aftermarket and not with the anchored target price level hypothesis.

The inverse relation between target prices and stock price performance is not limited to affiliated analysts. Co-manager and unaffiliated analyst target price ratios are also negatively related to prior stock returns. However, target prices for these groups of analysts are significantly less sensitive to stock returns than those for lead analysts. Again, the role the investment bank plays in the IPO affects how aggressively their analysts provide support.

There are three reasons why we believe the anchored target price hypothesis is not the sole determinant of target price ratios for recent IPO firms. First, if the large negative coefficient on return to coverage for broken deals is driven entirely from a mechanical relation between returns and the current stock price, the coefficient should not vary by analyst affiliation. In fact, however, we observe large differences by analyst type.

Second, there is a strong asymmetric relation between target price ratios and aftermarket returns in Table 3 for broken and successful deals. If analysts anchor on a target price valuation on the offer date, large return differences can mechanically generate a more negative slope coefficient when aftermarket returns are negative rather than when stock returns are positive. This arises from the fact that when target prices are fixed, we are essentially regressing one divided by one plus the aftermarket return against the aftermarket return.[18] The slope becomes more negative as aftermarket returns fall. To determine whether this effect is the source of the asymmetric slopes for broken versus successful deals in Table 3, we estimate the relation between the natural logarithm of the target price ratio and the natural logarithm of one plus the stock return prior to coverage. If target prices are fixed at some level and changes in the target price ratio are driven solely by changes in returns to coverage, then the slope coefficient of this regression should be

[18]Consider the regression $TP/OP(1+r) = \alpha + \beta r$, where TP equals the target price, OP equals the offer price, and r equals the aftermarket return. If the offer price and target price are pre-determined at the offer date, then regressing the target price ratio against the aftermarket return would give a more negative slope for broken deals than for successful deals. However, if we consider the regression $\log\left[TP/OP(1+r)\right] = \alpha + \beta \log(1+r)$, this relation will be linear and the same for broken deals and successful deals.

constant as a function of aftermarket return. However, when estimated in logarithmic form, the slope coefficient is −0.58 and statistically different from zero for broken deals. The coefficients on both co-manager and unaffiliated interactive variables are positive and statistically significant. In contrast, in successful deals that have a positive return to coverage, the slope coefficient is −0.07 and is statistically larger than −0.58 at the 1% level. Thus, the asymmetry that we see in Table 3 is much larger than what can be explained by the anchored target price level hypothesis.

Third, to insure the result is not simply mechanical, we also estimate the relation between returns and the target price to sales ratio, where sales is measured during the year preceding the IPO. We choose this metric for two reasons. First, there is no mechanical relation between sales and return to coverage, as there is between the stock's current price and return to coverage. Second, prior research by Houston et al. (2006) and Asquith et al. (2005) finds that price to sales is a metric frequently used by analysts to establish target prices. We regress the target price to sales ratio on return to coverage using models similar to those in Table 3. For target price to sales ratios assigned by lead analysts, the coefficient on return to coverage is negative (−19.70) and highly significant for broken deals, but is positive (5.97) and significant for successful deals. This strong asymmetric relation between returns and target price to sales is another indication that the results in Table 3 are not driven by a mechanical relation between returns and the price of the stock on the date of the analyst report.

Panel B of Table 3 shows the relation between analyst recommendations and past stock returns. Since virtually all recommendations are favorable (either a "1" or "2" on a five-point scale), we examine the relation between the likelihood of a strong buy recommendation and prior stock returns. As the first column shows, there is a negative and significant relation between the likelihood of a strong buy recommendation and return to coverage. This negative relation is weakest for unaffiliated analysts, where the effect is not statistically different from zero.

We also estimate separate logit regressions for broken deals and all other IPO firms (not shown in Table 3). For broken deals, there is no relation between the likelihood of a strong buy and return to coverage for any analyst group. However, for successful IPO firms, there is a negative relation between the likelihood of a strong buy and stock returns. The response does not differ across analyst groups. These results, coupled with those from Table 2, suggest that while broken deals are more likely to receive a strong buy recommendation, the chance of receiving a strong buy does not increase as performance deteriorates further.

Table 3 addresses the question of whether strength of coverage differs between broken and successful deals. However, the support that analysts provide may differ for IPOs that perform unexpectedly well than for those that perform as expected or that underperform. We examine this issue by estimating a spline regression model that permits the relation between target price ratios and prior returns to be a piecewise linear function.[19] To estimate this relation, we assume return to coverage breakpoints of zero and 60%, the sample average for return to coverage. The relation between target price ratios and returns is more negative for broken deals than for deals with positive returns but that perform less than the average. For deals with above-average returns, we find no significant relation

[19]See Greene (1993) for a discussion of spline regressions.

between target price ratios and prior returns. Thus, the relation between strength of coverage and prior returns varies depending on the level of aftermarket performance.

Since an analyst's risk assessment and expectations concerning future earnings growth may vary with firm and industry characteristics, target price ratios and recommendations may be related to these attributes. To address this issue, we model the relation between strength of coverage and returns controlling for analyst affiliation, firm size, sales, whether the IPO firm had positive earnings when it went public, rank of the lead underwriter, whether the IPO occurred during the 1999 to 2000 bubble period, whether the firm is in the technology sector, and the number of days between the offer date and coverage initiation. Since the results in Table 3 indicate that lead affiliation matters most in terms of strength of coverage, we distinguish only lead underwriter affiliation.[20]

Table 4 shows that controlling for firm and offer characteristics, the relation between strength of coverage and stock returns is similar to the relation reported in Table 3. Target price ratios and the likelihood of a strong buy recommendation remain negatively related to returns. Some firm characteristics are related to strength of coverage. Firms with lower sales generally receive higher target price ratios and are more likely to receive a strong buy recommendation at the end of the quiet period. Using a highly ranked underwriter leads to lower target price ratios and a lower probability of a strong buy recommendation. One possible explanation for this is that while issues underwritten by prominent investment banking firms are more likely to receive coverage, given the underwriter's prestige, less support is required in the form of higher target prices.

Firms with positive earnings are assigned lower target price ratios but are more likely to receive strong buy recommendations. During the bubble period, IPO firms were assigned higher target price ratios but were less likely to receive strong buy recommendations. These two results are consistent with higher target prices being assigned to smaller, riskier firms with high growth prospects, while strong buy recommendations are reserved for more established, less risky firms. Nevertheless, controlling for firm characteristics, we continue to find a negative, asymmetric relation between target price ratios and returns to coverage.

4. Changes in strength of coverage over time

The higher target prices and stronger recommendations for broken deals and the negative relation between coverage strength and prior stock returns is most consistent with the booster shot hypothesis. This raises several questions. Do changes in target price ratios and recommendations differ over time for broken deals Versus other issues? Is strength of coverage subsequent to initiation negatively related to prior stock price performance just as it is for initial coverage? How quickly, if at all, does the unusually strong support provided for broken deals diminish over time?

To address these questions, we collect information on target prices and recommendations for up to two years following the initiation of coverage for analysts that initiate coverage within the first year following the IPO. We measure changes in the strength of coverage in several ways. First, we compare recommendations and target price ratios over time. Second, following Brav and Lehavy (2003), we compute the difference between the current and prior target price scaled by the previous target price. Third, we compute the

[20]The results do not change meaningfully when controlling for co-manager affiliated and unaffiliated analysts separately.

Table 4
Determinants of target price tatios and strong buy recommendations

The table presents piecewise-linear regression models of target price ratios and logit models of the likelihood that an analyst assigns a strong buy recommendation are estimated using all analyst reports written on 1,189 IPOs between November 1996 and August 2000 within one year of the IPO. In Panel A, the dependent variable is *Target Price Ratio,* the target price divided by the stock price on the day before the target price is announced. In Panel B, the dependent variable equals one when the analyst assigns a recommendation of one (strong buy) using *First Call*'s five-point scale, and zero otherwise. *Return to Coverage* is the stock return from the offer price to the closing price the day before the analyst report date. *Return to Coverage* $\leqslant 0$ equals *Return to Coverage* if its value is less than or equal to zero, and zero otherwise. $0 <$ *Return to Coverage* $\leqslant 60\%$equals zero if *Return to Coverage* is less than zero, *Return to Coverage* if it is greater than zero and less than or equal to 60%, and 60% if *Return to Coverage* is greater than 60%. *Return to Coverage* $> 60\%$ equals *Return to Coverage* if its value is greater than 60%, and zero otherwise. *Non-Lead* equals one if the analyst is unaffiliated with the lead or co-lead banking firm during the IPO, and zero otherwise. *Underwriter Rank* is the rank of the lead underwriter using Jay Ritter's updated Carter-Manaster ranking, where nine is the highest rank and one is the lowest rank. $EPS > 0$ equals one if the earnings per share for the fiscal year prior to the offer date is positive, and zero otherwise. *Tech* equals one if the firm is in a high technology industry as identified by Loughran and Ritter (2004). *Bubble* equals one if the offer date occurs during 1999 or 2000, and zero otherwise. Models are estimated separately using only analyst reports dated within 30 calendar days of the IPO and using only analyst reports dated between 31 and 365 days of the IPO. *Days to Coverage* is the number of calendar days from IPO to when coverage is initiated. *t*- and *z*-statistics are reported in parentheses.

	Target price ratio		Strong buy recommendation	
Variable	Within 30 days	Outside 30 days	Within 30 days	Outside 30 days
Return to coverage			−0.31	0.01
			(−2.72)	(0.08)
Return to coverage * non-lead			0.17	0.03
			(1.87)	(0.24)
Return to coverage $\leqslant 0$	−1.26	−1.31		
	(−9.09)	(−5.81)		
$0 <$ Return to coverage $\leqslant 60\%$	−0.38	−0.49		
	(−7.77)	(−5.45)		
Return to coverage $> 60\%$	−0.03	−0.02		
	(−1.20)	(−0.79)		
Return to coverage $\leqslant 0$ * non-lead	0.38	0.85		
	(2.13)	(3.64)		
$0 <$ Return to coverage $\leqslant 60\%$ * non-lead	0.04	1.54		
	(0.87)	(1.82)		
Return to coverage $> 60\%$ * non-lead	0.00	−0.00		
	(0.01)	(−0.01)		
Underwriter rank	−0.03	−0.04	−0.21	−0.23
	(−4.69)	(−5.08)	(−3.82)	(−4.34)
Log sales	−0.04	−0.04	−0.13	−0.04
	(−10.6)	(−9.62)	(−4.77)	(−1.44)
$EPS > 0$	−0.05	−0.03	0.37	0.17
	(−3.00)	(−1.86)	(2.91)	(1.54)
Tech	0.01	0.02	−0.17	−0.03
	(0.87)	(1.48)	(−1.85)	(−0.33)
Bubble	0.11	0.14	−0.40	−0.89
	(6.58)	(8.81)	(−3.24)	(−7.88)
Days to coverage		0.0001		0.0000
		(2.57)		(0.38)
Constant	1.95	1.89	2.71	2.68
	(33.9)	(29.7)	(5.92)	(5.77)
R^2/Pseudo R^2	0.28	0.20	0.04	0.04
N	1,851	2,282	1,712	1,809

difference between the current and prior recommendation. We split subsequent recommendations into upgrades, downgrades, and reiterations.

Table 5 presents the mean and median target price ratio and recommendation for the first four analyst reports made by each analyst that provides coverage within 30 days of the IPO date. Broken deals are separated from successful IPO firms on the basis of returns to coverage, and we also separate coverage by analyst affiliation.

Looking first at all analysts, there is a small decline in the target price ratio between the initial and third and fourth subsequent reports. In addition, recommendations become less favorable over time, with the mean recommendation deteriorating from 1.48 to 1.60. Thus, analysts are most enthusiastic in their recommendations and target prices when coverage is initiated than in later reports.

The magnitude of the changes in target prices and recommendations over time depends on the stock price performance prior to the initiation of coverage. The largest changes in target price ratios and recommendations occur for broken deals. The average mean (median) target price ratio falls from 1.73 (1.69) to 1.42 (1.33), a reduction in the analyst average return forecast of over 30 percentage points. Recommendations also become less favorable for broken deals with the mean rating increasing from 1.31 to 1.70. In contrast, for IPO firms with a positive return to coverage, target price ratios remain essentially unchanged, although recommendations become less favorable. Finally, the proportion of broken deals that receive subsequent recommendations by an affiliated analyst is about 30%, which is slightly less than the 39% frequency that other IPO firms receive a second analyst report from an affiliated analyst.

For broken deals, lead analysts go from higher average target price ratios and more favorable recommendations than other analysts at the initiation of coverage to lower target price ratios and less favorable recommendations by the fourth recommendation. The average number of days from initiation of coverage to the fourth target price for lead analysts is 467 days versus 472 days for other analysts, and the difference is not statistically significant.[21] Much of the adjustment in target price ratios for broken deals occurs during the second analyst report. For example, in the initiating report, lead analysts give an average target price ratio of 1.82 to broken deals and 1.45 to successful deals. However, when the second report comes out, this difference is almost completely gone. In the second analyst report, lead analysts give an average target price ratio of 1.59 to broken deals and 1.56 to successful deals. Thus, while lead analysts provide stronger support for broken deals, their support fades over time.

Table 5 examines changes over time in target prices and recommendations for a changing group of analysts (since fewer analysts make a fourth recommendation than initiate coverage). However, we find a similar pattern when we examine changes over time in the recommendations by an unchanging group of analysts. For example, of the 714 analysts that initiate coverage for broken deals, 454 of these analysts provide a second target price. The mean first target price ratio for these analysts is 1.67. For the group of analysts that issue a fourth target price ratio, the average first target price ratio is 1.66.

One potential concern with the results in Table 5 is that the decline in target price ratios reflects the influence of the dot-com bubble. If target prices were set higher during the late 1990s and early 2000s and then were reduced as stock prices declined in the post-bubble

[21]The average number of days from initiation of coverage to the fourth recommendation for all IPO firms is 476 days.

period, this might explain the decline in target price ratios that is apparent in Table 5. Target prices were indeed set at higher levels during the bubble period. For example, the average target price ratio for IPOs that went public during 1999 and 2000 was 1.55 versus an average target price ratio of 1.43 for IPOs that went public from 1996 to 1998. However, the decline in target price ratios over time for broken deals from Table 5 does not appear to be driven solely by the decline in target price ratios during the post-bubble period. For example, for broken deals that went public before 1999, target price ratios decline from an average of 1.64 at the initiation of coverage to 1.46 by the fourth report. For firms that went public after January 1, 1999, the average target price ratio for broken deals declines from 1.82 at initiation to 1.37 in the fourth report.

The second way we measure changes in coverage over time is to compare the strength of coverage provided some distance in time from the IPO date to recommendations and target prices at the initiation of coverage. While the selection of the time frame is somewhat arbitrary, one year is a natural breakpoint. A recommendation is considered to be at year-end if it is within 120 days of the one-year mark and no other recommendation is closer. For example, if the third target price estimate is issued 300 days after the IPO and a fourth target price is given 400 days after the IPO, we use the fourth target price estimate as the year-end target price. With this approach, the target price or recommendation may reflect information that arrives after year-end. Thus, we also measure year-end coverage using the most current recommendation that occurs within one year of the IPO. The results using both approaches are similar, so we report our findings using only the first procedure.

Table 6 provides target price ratios and recommendations one year following the IPO as well as differences between strength of coverage at initiation and one year following the IPO. The table splits summary statistics by analyst affiliation and by return to coverage. Consistent with lead analysts providing only a temporary booster shot, we find no difference between lead and non-lead analyst target price ratios one year after the IPO date. The average lead analyst recommendation is significantly more favorable than the average non-lead analyst recommendation, although the median recommendation is the same for both groups. One year after the IPO, target price ratios of both lead and unaffiliated analysts for broken deals are the same or slightly higher than for other IPOs. Mean and median ratings are similar for broken deals, and the mean lead analyst recommendation is slightly more favorable (although the difference in means is statistically significant at the 5% level only when return to coverage is greater than zero).

As Panel B shows, during the first year after the IPO, both lead and non-lead analysts revise their target price ratios upward, while the average recommendation becomes less favorable. This divergent pattern may simply reflect the lack of variability in recommendations when coverage is initiated. In other words, given that only 7% of all ratings at initiation are less favorable than a buy, it is difficult for the average recommendation to improve over time. Consistent with analysts providing stronger but more transitory booster shots for broken deals, the average target price ratio falls and the average recommendation becomes less favorable for these issues.

Table 7 presents the relation between changes in target prices and recommendations versus prior stock returns over time. If high initial target prices are established to support broken deals, we expect the relation between target price adjustments and stock returns to vary depending on the level of initial support. In Panel A, we regress the percentage change in target prices against stock returns between analyst report dates by the same analyst (this variable is called *Return from Prior Report*). If analysts maintain a constant target price

Table 5
Target price ratios and recommendations from the first to the fourth analyst report

For each analyst that provides coverage for an IPO firm in our sample, we compute the target price ratio and recommendation given by the analyst in their first, second, third and fourth analyst report, when available. Mean and median values across all analysts for both measures of strength of coverage are provided in the table. *Target Price Ratio* is the target price divided by the stock price on the day before the target price is announced. *Recommendation* is the analyst rating on a one-to-five scale (one is a strong buy and five is a sell). *Lead Analysts* are analysts affiliated with the lead or co-lead underwriter for the IPO, and *Non-Lead Analysts* are all other analysts. *Unaffiliated Analysts* are analysts that are not affiliated with either the lead, co-lead, or co-managing investment bank. *Return to Coverage* is the stock return from the offer price to the closing price the day before the analyst report date.

Analyst reports	First target price ratio		Second target price ratio		Third target price ratio		Fourth target price ratio	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Panel A: Target price ratios								
All initiations	1.50	1.42	1.53	1.40	1.49	1.38	1.43	1.35
N	4,320		3,039		2,099		1,477	
Return to coverage $\leqslant 0$	1.73	1.69	1.53*	1.44*	1.48*	1.39*	1.42*	1.33*
N	714		454		295		196	
Return to coverage >0	1.46	1.38	1.53	1.39	1.49	1.38	1.45	1.35
N	3,606		2,585		1,804		1,281	
Lead analysts								
All initiations	1.52	1.44	1.56	1.43	1.52	1.37	1.46	1.38
N	846		614		437		310	
Return to coverage $\leqslant 0$	1.82[a]	1.79[a]	1.59*	1.49*	1.48*	1.36*	1.36*	1.30*
N	165		113		82		54	
Return to coverage >0	1.45	1.39	1.56	1.42	1.52	1.40	1.48	1.41
N	681		501		355		256	
Non-lead analysts								
All initiations	1.50	1.41	1.52	1.39	1.48	1.38	1.44	1.33
N	3,389		2,367		1,619		1,110	
Return to coverage $\leqslant 0$	1.69	1.62	1.51*	1.43*	1.49*	1.40*	1.45*	1.36*
N	535		328		209		140	
Return to coverage >0	1.47	1.38	1.52	1.39	1.48	1.39	1.44	1.34
N	2,854		2,039		1,410		970	

	First recommendation		Second recommendation		Third recommendation		Fourth recommendation	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Panel B: Recommendations								
All initiations	1.48	1	1.49	1	1.56	1	1.60	1
N	3,709		2,455		1,538		961	
Return to coverage $\leqslant 0$	1.40	1	1.47	1	1.53	1	1.61*	1
N	597		344		207		133	
Return to coverage >0	1.49	1	1.49	1	1.56	1	1.60	2
N	3,112		2,111		1,331		828	
Lead analysts								
All initiations	1.36	1	1.43	1	1.45	1	1.46	1
N	717		487		301		179	
Return to coverage $\leqslant 0$	1.26[a]	1	1.38	1	1.50*	1	1.51*	2*
N	140		86		56		35	
Return to coverage >0	1.39	1	1.44	1	1.44	1	1.45	1
N	577		401		245		144	
Unaffiliated analysts								
All initiations	1.50	1	1.50	1	1.58	2	1.63	2
N	2,916		1,925		1,210		764	
Return to coverage $\leqslant 0$	1.44	1	1.48	1	1.53	1	1.64*	1
N	445		251		147		96	
Return to coverage >0	1.51	1	1.50	1	1.59	2	1.63	2
N	2,471		1,674		1,063		668	

[a]Significantly different from *Non-Lead Analysts* at the 5% level.

*Significantly different from the *First Target Price Ratio* or *First Recommendation* at the 5% level.

Table 6
Strength of coverage one year after the IPO

Panel A provides mean and median target price ratios and recommendations for analyst reports that are dated closest to the one-calendar-year offer date anniversary. For each analyst covering a given stock, we identify the report with the date closest to the end of the year after the IPO date (either before, on, or after the one-year anniversary date). We do not include the report unless the report date is within 120 calendar days of the one-year offer date anniversary. Panel B reports the mean and median difference between the analyst's target price ratio or recommendation when coverage on the IPO firm was initiated minus the target price ratio or recommendation at the one-year offer date anniversary. *Target Price Ratio* is the target price divided by the stock price on the day before the target price is announced. *Recommendation* is the analyst rating on a one-to-five scale (one is a strong buy and five is a sell). *Lead Analysts* are analysts affiliated with the lead or co-lead underwriter for the IPO, and *Non-Lead Analysts* are all other analysts. *Initial Return* is the stock return from the offer price to the first-day closing price. *Return to Coverage* is the stock return from the offer price to the closing price the day before the analyst report date.

Analyst reports	Lead analysts				Non-lead analysts			
	Target price ratio		Recommendation		Target price ratio		Recommendation	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Panel A: Strength of coverage one year after the IPO								
All initiations	1.56	1.44	1.43	1	1.54	1.42	1.52	1
N	398		391		2,219		2,210	
Initial return $\leqslant 0$	1.56	1.45	1.41	1	1.50	1.41	1.48	1
N	61		61		252		250	
Initial return >0	1.56	1.43	1.46	1	1.54	1.42	1.52	1
N	337		330		1,967		1,960	
Return to coverage $\leqslant 0$	1.57	1.49	1.45	1	1.60	1.52	1.55	1
N	76		76		320		320	
Return to coverage >0	1.56	1.44	1.42	1	1.52	1.41	1.51	1
N	322		315		1,899		1,890	
Panel B: Strength of initial coverage minus strength of coverage one year after the IPO								
All initiations	−0.087*	−0.004	−0.078	0	−0.071	0.000	−0.06	0
N	393		389		1,846		1,827	
Initial return $\leqslant 0$	0.086*	0.100	−0.224*	0	0.036	0.000	−0.034	0
N	61		61		219		219	
Initial return >0	−0.119*	−0.02	−0.046	0	−0.085	0.000	−0.011	0
N	332		328		1,627		1,618	
Return to coverage $\leqslant 0$	0.215*	0.149	−0.214*	0	0.061	0.000	−0.098	0
N	75		75		242		242	
Return to coverage >0	−0.158*	−0.046	−0.037	0	−0.091	0.000	−0.021	0
N	318		314		1,604		1,595	

*Significantly different from zero at the 5% level.

ratio over time, the estimated coefficient on stock returns will equal one. Alternatively, if analysts revise downward their expectations of future price appreciation based on past appreciation, the coefficient on returns will be less than one. If lead analysts establish high target prices to support broken deals, then the target price adjustments for these analysts should be the least sensitive to stock returns. In Panel B, the dependent variable in the logit model equals one if the analyst upgrades or reiterates the buy/sell recommendation compared to the recommendation in her previous analyst report.

Table 7
Changes in target prices and recommendations over time

Panel A presents OLS models of the relative change in target prices. For each analyst that provides coverage for an IPO firm in our sample, we compute the target price given by the analyst in their first (*TP*1), second (*TP*2), third (*TP*3), and fourth (*TP*4) analyst report, when available. When the first and second target prices are available for the same analyst, we compute the relative change in target price by subtracting the first target price from the second target price, normalized by the first target price. The relative change from the third to the fourth target price is calculated similarly. *Return from Prior Report* is the return on the stock starting at the beginning of the day of the previous analyst report date through the end of the day before the current analyst report date (both analyst reports are written by the same particular analyst). *Non-Lead* is a dummy variable that equals one if the analyst is unaffiliated with the lead or co-lead banking firm during the IPO, and zero otherwise. Panel B presents logit models of changes in recommendations. The dependent variable equals one if the new recommendation represents an upgrade or a reiteration from the analyst's previous recommendation, and equals zero otherwise. *t*-statistics are reported in parentheses in Panel A, and *z*-statistics are reported in parentheses in Panel B.

Dependent variable	Relative change from first to second Target price $\left(\frac{TP2-TP1}{TP1}\right)$			Relative change from third to fourth Target price $\left(\frac{TP4-TP3}{TP3}\right)$		
Variable	All	Return to coverage $\leqslant 0$	Return to coverage >0	All	Return to coverage $\leqslant 0$	Return to coverage >0
Panel A: OLS models of changes in target prices over time						
Return from prior report	0.85	0.60	0.90	0.93	0.70	0.94
	(36.5)	(16.9)	(35.1)	(23.9)	(9.52)	(27.8)
Return from prior report * Non-lead	0.26	0.11	0.24	0.17	0.25	0.21
	(10.2)	(2.78)	(8.67)	(1.65)	(3.22)	(5.95)
Constant	0.01	−0.06	0.04	0.01	−0.01	0.01
	(1.66)	(−4.99)	(4.15)	(1.84)	(−0.47)	(0.70)
R^2	0.81	0.67	0.83	0.86	0.83	0.86
N	2,968	441	2,527	1,425	193	1,232
Dependent variable	Upgrade or reiterate from first to second recommendation			Upgrade or reiterate from third to fourth recommendation		
Variable	All	Return to coverage $\leqslant 0$	Return to coverage >0	All	Return to coverage $\leqslant 0$	Return to coverage >0
Panel B: Logit models of changes in recommendations over time						
Return from prior report	0.27	0.05	0.45	0.32	−0.13	0.40
	(0.98)	(0.12)	(1.22)	(1.21)	(−0.24)	(1.33)
Return from prior report * Non-lead	0.84	0.32	0.94	0.31	0.99	0.21
	(2.47)	(0.55)	(2.18)	(0.98)	(1.18)	(0.59)
Constant	2.44	1.86	2.61	1.20	1.32	1.19
	(30.7)	(11.2)	(27.9)	(18.9)	(7.28)	(0.59)
R^2	0.81	0.67	0.83	0.86	0.83	0.86
N	2,968	441	2,527	1,425	193	1,232

The models in Table 7 and Table 3 are similar. Table 3 illustrates how prior stock returns are related to the target price ratio and buy/sell recommendation assigned by analysts in their initial report. Table 7 shows how prior stock returns are related to changes in the target price and changes in recommendations in subsequent analyst reports.

As the first column of Table 7 Panel A shows, the percentage change from the initial target price to the second target price is positively related to stock returns between the two analyst reports. The coefficient estimate on *Return from Prior Report* is 0.85, meaning that as the stock return from the first to second analyst report increases by one percentage point, the target price of the lead underwriter increases by 85 basis points. Consequently, lead analysts do not maintain a fixed target price ratio between the first and second analyst reports, rather, they adjust target prices less than the change in the stock price. Compared to lead analysts, non-lead analyst target prices are more sensitive to stock returns with an overall coefficient of 1.11 (0.85 + 0.26).

The next two columns indicate that the relation between changes in target prices and prior stock returns differs based on return to coverage. For broken deals, target prices are significantly less sensitive to stock returns than for other IPO firms. The coefficient of 0.60 on *Return from Prior Report* indicates that for broken deals, if the stock's return is one percentage point lower between the two analyst reports, the lead analyst's target price falls by only 60 basis points. Non-lead analyst target price adjustments are significantly more sensitive to stock returns, with a combined coefficient of 0.71, than are the adjustments of lead analysts.

As the target price date gets farther away from the offer date, the sensitivity of target price adjustments to stock returns increases. As columns four though six of Panel A shows, the sensitivity of the third target price adjustment to prior stock returns is higher than it is for the first target price adjustment. For example, in broken deals the coefficient on *Return from Prior Report* is 0.70, while the combined coefficient for successful IPOs is 0.94.

The positive coefficient on *Return from Prior Report* in all the models shown in Panel A of Table 7 stands in stark contrast to the consistently negative coefficient on *Return to Coverage* in Panel A of Table 3. This negative coefficient indicates that for the first target price ratio that is assigned to a recent IPO firm, the higher the prior return on the stock, the lower the target price to current price ratio. From Table 7, we see that this negative relation is confined to the first analyst report. In subsequent analyst reports, the target price ratio tends to increase as prior returns increase.

Similarly, the relation between analyst recommendations and prior stock returns is very different for the first analyst report compared to subsequent analyst reports. Panel B of Table 3 shows that for coverage initiations by lead analysts, the logit coefficient on *Return to Coverage* is negative. This indicates that if the return on the recent IPO firm is low, the stock is more likely to receive a strong buy recommendation.

In contrast, in Panel B of Table 7, the logit coefficient on *Return from Prior Report* is usually positive but not significant. This means that in subsequent analyst reports, prior stock market performance does not impact the lead analyst's likelihood of upgrading the stock or reiterating his prior recommendation. For the second analyst report from non-lead analysts, when return to coverage is positive, Panel B of Table 7 reports a coefficient of 0.94 on *Return from Prior Report * Non-Lead*. This means that for IPO firms with positive aftermarket returns, non-lead analysts are more likely to upgrade the stock if it has strong past returns. However, we do not observe a similar prior return effect in the fourth analyst report.

5. Market reaction to the initiation of coverage

If the favorability of the information conveyed in analyst reports through target price ratios and recommendations are important to the market, there should be a positive relation between strength of coverage and abnormal stock returns around coverage initiation. Abnormal returns at the initiation of coverage should also be useful to identify potential affiliation bias among different types of analysts. Results from prior studies are mixed. For example, Michaely and Womack (1999) find that abnormal returns are lower for lead analyst reports than for non-lead analyst reports. Chen (2004) also finds abnormal returns are lower for buy and strong buy recommendations by lead underwriters. These authors interpret this as evidence that the market sees through the conflicts that lead analysts face and therefore discounts any information issued by lead analysts. However, Bradley (2003) are unable to find any difference between the market's reaction to lead and non-lead analyst recommendations at the end of the quiet period.

For each day that any analyst initiates coverage for all IPO firms in our sample, we estimate the three-day abnormal return for the firm. We compute abnormal returns as the return on the IPO firm minus the return on the Nasdaq index from the day prior to the initiating coverage analyst report date through the day after the report date. It is often the case, especially at the end of the quiet period, that multiple analysts initiate coverage on the same day. We count each of these dates only once. However, the potential for overlap still exists. For example, if there is pre-announcement leakage of an analyst recommendation, then this leakage may affect the returns that we attribute to a different analyst's recommendation. This overlap problem will tend to attenuate any differences in stock returns by analyst affiliation.

Since our primary interest is whether the market discounts affiliation bias, we distinguish announcements by the affiliation of the analyst. For announcements dates where more than one analyst initiates coverage, we classify the affiliation as *Both* if an affiliated and unaffiliated analyst initiate coverage on the same day. If the market discounts recommendations and target prices for affiliation bias, we expect a smaller positive stock price reaction to recommendations and target prices when they are provided only by the lead analyst.

Panel A of Table 8 reports the mean and median three-day abnormal returns separately by strength of recommendation, analyst affiliation, and timing of the coverage. Regardless of the analyst's affiliation, buy and strong buy recommendations result in positive and statistically significant returns. For example, when the average recommendation is less than or equal to 1.5, the mean three-day abnormal return is 3.41% when only lead analysts initiate coverage, 4.40% when only non-lead analysts initiate coverage, and 4.13% when both lead and non-lead analysts initiate coverage. However, consistent with Chen (2004), we find significantly higher returns on days when only unaffiliated analysts provide strong buy recommendations (i.e., the 4.40% non-lead analyst only abnormal return is statistically greater than the 3.41% lead analyst only abnormal return). This difference is largest in broken deals. When the initial return is less than or equal to zero and the initiation occurs within 30 days of the offer date, the mean three-day abnormal return is 4.92% when only non-lead analysts initiate coverage but is only 1.11% when only lead analysts initiate coverage. These results are consistent with investors discounting recommendations of lead analysts to account for affiliation bias.

Table 8
Three-day percentage abnormal returns around initiating analyst report dates

For each day that an analyst initiates coverage for an IPO firm in our sample, we compute the three-day abnormal return starting from the day prior to the analyst report date through the day following the analyst report date. Abnormal returns are the return on the IPO firm minus the return on the Nasdaq index and are expressed in percent. Panel A reports the mean and median abnormal return by analyst affiliation, average recommendation, timing of coverage, and initial return (broken deals are isolated). *Lead Only* (*Non-Lead Only*) includes report dates where all (no) initiating analyst reports are written by lead or co-lead analysts. *Both Lead and Non-Lead* includes report dates on which initiating analyst reports are written by at least one lead/co-lead analyst as well as at least one unaffiliated analyst on the same day. *Average Recommendation* equals the average recommendation across all analysts that initiated coverage on the corresponding day (one is a strong buy and five is a sell). Panel B reports OLS regression models relating three-day percentage abnormal returns at the initiation of coverage to various measures of strength of analyst coverage. Models are run for all analyst initiations within one year of the offer date and for analyst initiations that occur within 30 days of the IPO offer date. *Lead* equals one if at least one analyst affiliated with the lead or co-lead underwriter initiated coverage on the corresponding day, and zero otherwise. *Average Target Price Ratio* is the target price divided by the stock price on the day before the target price is announced, averaged across all analysts that initiated coverage on the corresponding day. *Lead Only* * *Average Target Price Ratio* equals the average target price ratio across all lead or co-lead analysts for the corresponding coverage date, and equals zero if any non-lead analysts initiated coverage on that day. *Lead Only* * *Average Recommendation* equals the average recommendation on a one-to-five scale across all lead or co-lead analysts for the corresponding coverage date, and equals zero if any non-lead analysts initiated coverage on that day. *t*-statistics are reported in parentheses.

	Lead only			Non-lead only			Both lead and non-lead		
	Mean	Median	*N*	Mean	Median	*N*	Mean	Median	*N*
All initiations									
Panel A: Mean and median three-day percentage abnormal returns									
Average recommendation ⩽ 1.5	3.41[a]	2.80[a]	243	4.40[a,*]	2.31[a]	1,233	4.13[a,*]	2.02[a]	324
1.5<Average recommendation ⩽ 2	2.23[a]	0.51	130	1.97[a]	0.77	1,016	1.50[a]	0.59	113
Average recommendation>2	−17.51	−31.18	3	−2.47[a,*]	−4.20[a]	88	−7.20[a,*]	−4.61[a]	5
Initiations within 30 days									
Average recommendation ⩽ 1.5	3.37[a]	2.92[a]	185	4.14[a]	1.34[a]	286	4.22[a,*]	1.90[a]	308
1.5<Average recommendation ⩽ 2	1.33[a]	0.18	81	1.55[a]	0.36	208	1.56[a]	0.48	108
Average recommendation>2			0	−13.71[a]	−12.22	5	−7.41[a]	−3.88[a]	5
Initiations within 30 days and Initial Return ⩽ 0									
Average recommendation ⩽ 1.5	1.11[a]	0.68[a]	49	4.92[a,*]	2.62[a,*]	53	3.43[a,*]	1.11[a,*]	57
1.5<Average recommendation ⩽ 2	1.62	1.24	8	3.37[a,*]	2.38[a,*]	32	3.01[a,*]	1.27	10
Average recommendation>2			0			0			0

Variable	All initiations	Within 30 days	Within 30 days and initial return ⩽ 0
Panel B: OLS regressions of three-day percentage abnormal returns			
Constant	0.17	−4.12	−4.60
	(0.13)	(−1.92)	(−0.96)
Average target price ratio	4.35	7.20	5.54
	(6.73)	(6.87)	(2.46)
Average recommendation	−2.37	−3.82	−2.65
	(−5.47)	(−4.92)	(−1.42)
Lead only * average target price ratio	−2.46	−3.33	−4.09
	(−2.59)	(−2.98)	(−1.75)
Lead only * average recommendation	2.08	3.35	4.99
	(2.02)	(2.78)	(1.65)
Days to coverage	0.00		
	(−0.44)		

Table 8 (*continued*)

Variable	All initiations	Within 30 days	Within 30 days and initial return $\leqslant 0$
Number of analysts initiating at the end of the quiet period		0.31 (3.15)	0.58 (1.78)
N	3,150	1,778	302
Adjusted R^2	0.03	0.05	0.02

*Significantly different from *Lead Only* at the 5% level.
[a]Significantly different from zero at the 5% level.

Using a sample that includes mostly seasoned firms, Brav and Lehavy (2003) show that the market reacts favorably to recommendation upgrades, positive forecast revisions, and increases in target price ratios. Consequently, we expect both the strength of the analyst recommendation as well as the target price ratio assigned to matter for IPO firms. To investigate this issue, we examine the relation between announcement returns with the target price ratio and the analyst's recommendation when coverage is initiated. Panel B of Table 8 reports ordinary least squares (OLS) models for three-day abnormal returns around initiating analyst report dates. In these regressions, we include the target price ratio for the firm averaged across all analysts who initiate coverage on the corresponding day, as well as the average recommendation given by these analysts. A lower number represents a more favorable recommendation.

For all initiations within the first year after the offer date, higher target price ratios and stronger recommendations are associated with higher abnormal returns. For all coverage initiations in our sample, the coefficient on *Average Target Price Ratio* is 4.35, meaning that as the average target price ratio increases by 0.5 (e.g. from 1.25 to 1.75), the abnormal return increases by 2.175%. On days when only lead analysts initiate coverage, the market reaction to the average target price ratio is less than half of what it is when at least one non-lead analyst issues a target price (4.35 versus 1.89, the sum of the coefficients on *Average Target Price Ratio* and *Lead Only* * *Average Target Price Ratio*).[22] We also find that the market discounts the average recommendation of lead analysts compared to those from non-lead analysts. Indeed, when the lead acts alone, there is no statistically significant relation between returns and the strength of the recommendation. The results are similar when we limit the sample to recommendations made within 30 days of the IPO.[23] Overall, these results indicate that investors discount strong recommendations and high target price ratios from lead analysts relative to non-lead analysts.

The second column of Panel B shows that the quantity of coverage, as proxied by the number of analysts initiating coverage at the end of the quiet period, is positively related to abnormal returns. Controlling for the quantity of coverage, the average target price ratio

[22]The standard error for the sum of the coefficients is 0.623.

[23]As a further robustness check, we also examine whether abnormal returns are related to strength of coverage including only observations in which only lead analysts initiate coverage. The coefficients on both the average target price ratio and the average recommendation are not significantly significant at the 5% level. Thus, when no lead analysts initiate coverage, strength of coverage has no significant impact on stock prices.

and average recommendation continue to be statistically related to three-day abnormal returns, and both effects appear even stronger. For example, the coefficient on *Average Target Price Ratio* is now 7.20, meaning that as the average target price ratio increases by 0.5, the abnormal return increases by 3.6%. So, although the amount of coverage following an IPO is important to the market value of the stock, the strength of that coverage is important as well.

Given the relatively strong support provided for broken deals, does the market discount all recommendations and target price ratios more in broken deals, and are recommendations and target price ratios of lead underwriters especially discounted for broken deals? As the last column in Panel B shows, the coefficient estimates for *Average Target Price Ratio* and *Average Recommendation* are similar to previous models (the coefficients in the last column are not statistically different from the previous two models in Panel B), although the latter variable is not statistically different from zero. The coefficients on the *Lead Only* interactive variables are more extreme in third column of Panel B compared to the previous two models, but again there is no statistical difference across the three models.

The results in the last column of Panel B present a bit of a puzzle. In particular, the sum of the coefficients on the two target average target price variables is 1.45 and the sum of the coefficients on the average recommendations is 2.35. Neither of these summed coefficients is statistically significant (the standard errors of the sums are 1.51 and 2.34, respectively). Thus, when lead analysts act alone, stronger coverage has no effect on the issuing firm's stock price. Apart from a pre-commitment to provide strong coverage, it is unclear why lead underwriters risk reputation capital to provide strong coverage for broken deals when the stronger coverage has no effect on the stock price. While it is tempting to argue that this lack of any relation results from the market fully anticipating the level of support provided, if this were the case one would also expect to see no significant price reaction to the initiation of coverage by the lead analyst. However, the average abnormal return when only the lead analyst initiates coverage is 1.3% (significant at the 5% level).

6. Conclusion

What is the nature of the agreement or understanding, if any, between IPO firms and their underwriters for post-IPO analyst coverage? In this paper we show that all analysts, but especially those affiliated with the lead underwriter, provide particularly strong coverage in the form of higher target price ratios and more favorable recommendations for IPO firms whose stock prices perform poorly in the aftermarket. For all analyst coverage initiations within the first year, the average target price ratio that lead analysts assign IPO firms that trade at a price higher than the offer price at initiation is 1.46. However, lead analysts assign an average target price ratio of 1.82 to all other IPO firms ("broken deals") for which the return to coverage is zero or negative. Controlling for firm characteristics, in the first 30 days after the IPO, as return to coverage falls by one percentage point, the target price ratio assigned by the lead analyst increases by 1.45 percentage points. Other analysts also issue higher target price ratios to broken deals, but the difference is largest for lead analysts, highlighting the conflict of interest for analysts employed by the lead underwriter. This especially favorable coverage for broken deals is short lived, disappearing on average by the third analyst report written by the lead underwriter's analyst.

The relation between strength of coverage and returns is consistent with Michaely and Womack's (1999) hypothesis that lead underwriters provide booster shots of especially strong coverage shortly after the offer date to IPO firms whose stocks perform poorly in the aftermarket. Indeed, the relation between target price ratios and returns varies with the level of returns, suggesting that the strength of the booster shot varies with the level of returns.

Stronger coverage by lead analysts may be a manifestation of a conflict of interest, whereby lead analysts care more about future investment banking business than about preserving their reputations as a good stock picker. According to this interpretation, the empirical results in our paper demonstrate that the biases in coverage strength are not fully mitigated by reputation effects. However, if the firm's best brokerage clients hold shares of the IPO firm, the pressure on the lead analyst to support the stock may be highest for broken deals, since the brokerage clients thus far have a loss on their investment in this case. Of course, in a broken deal the investment bank may repurchase the shares from these clients as part of its commitment to stabilize the issuer's aftermarket stock price, reducing the pressure by these clients to provide a booster shot. In this case, there may be an even more direct conflict of interest on the part of the analyst to try to limit the investment bank's loss on the stock. Consequently, the incentives for the lead analyst to provide strong coverage may be greatest when the IPO firm performs poorly in the aftermarket.

The booster shot has a positive effect on the firm's stock price in the first 30 days after the offer date. During this 30-day period, when the average recommendation across all analysts is closer to strong buy than buy, the average three-day abnormal return is between 3.41% and 4.40% depending on whether lead or non-lead analysts initiate on that day. In addition, the market reacts to the strength of the coverage provided. After controlling for the quantity of analyst coverage, within the first 30 days after the IPO, as the target price ratio increases by 0.5 (say from 1.25 to 1.75), the three-day abnormal return increases by about 3.6% when at least the non-lead analyst has initiated coverage. However, the market reacts less to high target price ratios and strong recommendations given by lead analysts compared to coverage strength given by non-lead analysts. Moreover, for broken deals the market appears to completely discount stronger coverage when the lead analyst acts alone.

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