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Analyst Competition and Monitoring: Earnings Management in Neglected Firms

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Analyst Competition and Monitoring: Earnings Management in Neglected Firms*

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We investigate the analyst monitoring role using a sample of firms that lose and later regain analyst coverage along with alternative samples where loss of coverage is exogenous. Relative to otherwise similar firms that maintain coverage, dropped firms reverse earnings management from managing downward to upward, and firms that do so are more likely to regain analyst attention. After resumption of coverage, upward management is attenuated only for firms regaining coverage by multiple analysts. Our findings demonstrate that analysts select firms engaged in more aggressive reporting and suggest that the monitoring role is activated by competition rather than coverage itself.

Keywords: analysts; analyst coverage; monitoring; earnings management; neglected firms.

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1. Introduction

The notion of corporate monitoring by specialized financial intermediaries has persisted since at least the work of Jensen and Meckling (1976), and prior literature argues that security analysts play an important monitoring role. Like institutional investors, boards, and business media, analysts are expected to limit managerial discretion by producing private information that informs the price system.[1] Dyck, Morse, and Zingales (2010) shows that analysts blew the whistle in 17 percent of the large corporate frauds between 1996 and 2004, and additional work finds that analyst coverage has a positive effect on valuation of firms with high cash holdings, which are subject to high agency costs (Bates, Chang, and Lindsey (2012) and Jung, Sun, and Yang (2012)).

While analyst coverage is in general thought to be value enhancing (Chung and Jo (1996)), an alternative literature focuses on countervailing forces to value creation. Several studies highlight the role analysts play in exerting pressure on managers to meet or beat quarterly expectations and in decreasing overall transparency (Bartov, Givoly, and Hayn (2002), Fuller and Jensen (2002), Dechow, Richardson, and Tuna (2003), Graham, Harvey, and Rajgopal (2005), Michenaud (2008), Allayannis and Simko (2009), and Grundfest and Malenko (2009)). In addition, well-known conflicts of interest tend to produce a bias toward optimism and weaken the value-enhancing effects.[2]

In this paper, we revisit the role of analysts as monitors by examining the relation between analyst coverage and earnings management.[3] Our approach first compares the behavior of firms that lose all analyst coverage to a matched sample of firms that maintain coverage. If analyst coverage acts as a monitoring device, we expect more aggressive earnings management in the period without analyst coverage. We then examine the firms for which coverage is resumed. Again, if analysts are effective monitors, we would expect less aggressive earnings management following the resumption of coverage relative to matched peers. While our main analysis focuses on a novel sample of firms that lose all analyst coverage, we repeat our tests on two exogenous loss samples and an alternative sample of continuously covered firms that experience changes in the level of analyst coverage to

[1] See, for example, Grossman and Stiglitz (1980), Healy and Palepu (2001), Lang, Lins, and Miller (2004), and Frankel, Kothari, and Weber (2006).

[2] For discussion of investment banking and other conflicts of interest, see Michaely and Womack (1999), Lin and McNichols (1998), Hong and Kubik (2003), and James and Karceski (2006).

[3] Management of earnings occurs when managers alter financial reporting of the underlying economic performance of the company within the limits of discretion allowed by accounting standards (Healy and Wahlen (1999)).

ensure our findings are not unique to this set of firms.

Overall, our findings are largely supportive of an analyst monitoring role. We observe that, relative to a matched sample of firms that maintain coverage, dropped firms reverse their earnings management practice from significantly managing earnings downward to managing earnings upward. After resumption of coverage, upward management is attenuated, but only for firms regaining coverage by multiple analysts.

While our findings are consistent with the monitoring hypothesis, we document two new important findings. First, earnings management in the dropped period significantly increases the probability of regaining coverage, indicating that analyst selection of firms tends toward those for which investors may benefit the most from more scrutiny. Second, we document that the monitoring effect comes not from analyst coverage *per se*, but rather from coverage by multiple analysts. Thus, analyst monitoring from the production of information is likely to be a byproduct of competition among analysts.

To address our research question, our main empirical focus is a sample of neglected firms, defined as previously covered firms that lose all analyst coverage. An analysis of these firms' practices of managing their earnings when analyst coverage is lost—and in some cases later regained—offers an ideal setting to explore the analyst role. If analysts serve to curb earnings management and other deceptive practices to inflate earnings, we should observe more aggressive financial reporting when the firm moves from being covered to uncovered, followed by more conservative reporting when coverage is resumed. Because the analyst coverage decision is non-random and likely identifies a set of underperforming firms, we use propensity-score matching methods to identify control firms that are similar across multiple dimensions.[4]

We define loss of analyst coverage as no earnings forecasts during at least one calendar year. While some firms are uncovered for short periods, other firms are uncovered for several years in a row. In general, firms do not lose coverage abruptly: the number of analysts following these firms declines slowly in the years prior to losing all coverage. Among the U.S. stocks covered in the

[4] While we acknowledge that matching methods control for the endogeneity of the coverage decision only on the basis of observed attributes, one of these observed attributes is stock price performance, which would incorporate anticipated improvements in operating performance. To ensure unobserved attributes do not drive our results, we also run a series of robustness checks using two subsamples of firms that experience exogenous losses of analyst coverage and a sample of covered firms that experience a change in coverage.

I/B/E/S database, we identify firms that receive no analyst coverage for at least one calendar year from 1983 to 2006. To avoid selecting firms that face imminent delisting, we retain only those firms whose common shares are still publicly traded on the main domestic exchanges at the end of the year when no coverage is received. To construct an approach free of look-ahead bias, we group neglected firms by the number of years for which coverage is lost to date. The final sample consists of 13,364 firm-year observations that represent 18 percent of all U.S. firms covered in the I/B/E/S database. Most of the firms in the sample are small, seasoned, manufacturing firms.

We test our hypotheses using an approach similar in spirit to difference-in-differences, in that we compare earnings management for firms with and without analyst coverage after matching on earnings management (in addition to a number of performance measures and other attributes) in the prior year. To measure earnings management, we employ the traditional methods of modified Jones and industry modified Jones discretionary accruals (Jones (1991), and Dechow, Sloan, and Sweeney (1995)). Because analysts may decide whether to issue forecasts for a variety of reasons ranging from firm performance, interest from institutional investors, prospects of generating revenue for the brokerage firm, or the difficulty in making accurate forecasts, we calculate propensity scores on the probability that a firm has no earnings forecast in a given year to construct an optimal control sample of covered firms to which we can compare earnings management practices. Building on prior theoretical and empirical literature, we model analysts' decisions as a function of firm performance characteristics in the year prior to loss (or resumption) of coverage, including its accounting and stock price performance, its financial health, and its prior tendency to manage earnings. Finally, in the years following the loss (or resumption) of coverage, we measure differences in earnings management for sample firms relative to their control firms.

In a first set of tests, we observe that, in the years preceding the loss of coverage, our sample of neglected firms underperform covered firms and are more likely to manage their earnings downward. Some of these firms may be taking 'earnings baths' in anticipation of a turnaround or making conservative accounting choices in preparation for a possible bankruptcy filing, though the typical sample firm is not in distress. In the years following the loss of coverage, however, sample firms are more likely than their matched peers to modify their earnings by managing upward. The shift to upward earnings management occurs after some years spent without analyst coverage, such

that the firm would realize that coverage is lost and implement changes in accounting policies. Because the firms are re-matched to similar control firms in each year, it is unlikely that these results are an artifact of mean reversion in the direction of earnings management. This result supports the notion of analysts as monitors.

In our second set of tests, we examine earnings management for firms that regain analyst coverage. In constructing the propensity-score matching model for the probability that a firm will regain coverage, we observe that earnings management significantly explains the likelihood that neglected firms will regain analyst attention. Relative to firms that never lose analyst coverage, firms that lose analyst coverage and later regain it are more likely to manage earnings upward. After a resumption of coverage, we observe a pattern consistent with analyst monitoring only for firms that regain coverage by more than one analyst. Analyst quality and conflicts from banking relationships or other affiliations do not explain these patterns. Our results suggest, therefore, that monitoring may be a byproduct of competition among analysts rather than of coverage *per se*.

We also perform a number of robustness checks on our analysis. We examine two exogenous loss subsamples, the first where coverage is lost due to analyst departure and the second where coverage is lost due to brokerage closures, to provide additional assurance that selection issues do not drive our coverage loss results. Similarly, for regaining coverage, we examine earnings management practices in an alternative sample of continuously covered firms that experience a change in the level of analyst coverage. In each case, results are similar to our findings for neglected firms. We also perform our analysis using long-term averages of earnings management to eliminate concerns about mean reversion, as well as verifying that are results are not dependent on the industry definition or on the propensity score model used. Further, we obtain similar results if we exclude firms with potentially confounding events (SEOs, earnings guidance, or credit ratings) and when matching on current−−instead of prior year−−characteristics, giving greater confidence that differences in performance between neglected and matched controls are not driven by simultaneity of the coverage decision and firm performance or other events.

This paper relates to a number of earlier studies that examine whether analysts play a monitoring role in limiting managers' discretion in financial reporting. Degeorge, Ding, Jeanjean, and Stolowy (2005) provide international evidence that the more transparent the country, the stronger

the reduction in earnings management activity associated with analyst following. Ball and Shivakumar (2008) find that, when a firm becomes public, earnings management becomes more conservative, presumably due to the higher level of scrutiny to which firms are subjected, both by analysts and by auditors, boards, rating agencies, institutional investors, press, and regulators.[5] Finally, Liu (2008) examines the trade-off between earnings management and earnings guidance and finds that firms under more effective monitoring by analysts are more likely to manage expectations downward than manage earnings upward.

In particular, our work has ties to Yu (2008), who studies a sample of always-covered firms and finds that higher levels of analyst coverage are associated with lower levels of earnings management. Our analysis, however, differs on several dimensions, starting from the sample selection. Our novel laboratory of firms that lose all analyst coverage enables us to observe the changes in earnings management practices for firms transitioning from various states of analyst monitoring to presumably no monitoring. In examining the resumption of coverage, we are also able to isolate the relative impact of one versus more than one analyst. Our results complement Yu (2008) by showing that the monitoring role of analysts does not increase in the level of coverage uniformly, but instead is activated when the coverage on a firm is provided by two analysts, and becomes more effective as more than two analysts provide coverage on that firm. In addition, our focus on the direction of earnings management—not only on the level—helps us highlight which earnings management practice, upward or downward, is likely to attract or deter analyst coverage.

To our knowledge, no previous study has examined the monitoring of earnings management in the context of analyst competition. Prior studies have shown that analyst career outcomes are influenced by relative accuracy and optimism (Hong and Kubik (2003) and Fang and Yasuda (2009)), while no career rewards accrue from blowing the whistle (Dyck et al. (2010)). In the absence of competition, an analyst thus has reduced incentives to expose aggressive financial reporting since he is less likely to be penalized for inaccuracy, whereas rewards for optimism bias remain (Cowen, Groysberg, and Healy (2006)). Hong and Kacperczyk (2010) demonstrate the importance of analyst competition in reducing the bias of earnings forecasts. We argue that analyst competition plays an

[5] We note that once public, however, firms may engage more in income smoothing, which is related to earnings management (Chaney and Lewis (1998)).

important role also in monitoring the quality of a firm's earnings reporting.

We contribute to the existing literature by providing new insight into the role of analysts as information intermediaries. Our study offers a number of new findings. Perhaps most importantly, the monitoring role played by analysts appears to be activated by competition among analysts. Further, analysts tend to resume coverage on firms engaging in more aggressive upward earnings management, in contrast to the common concern in the analyst monitoring literature that analysts may select higher quality firms that are less aggressive in financial reporting (Yu (2008)). Whether analysts may be initially misled by the earnings management practices of firms or instead selecting firms that are in greater need of monitoring, our findings provide a rationale for firms to engage in earnings management, provided they wish to regain analyst attention. Last, we offer additional empirical support for the analyst monitoring function using a novel sample of firms and new research design. Overall, our results illuminate the role of analysts in improving firm reporting.

The remainder of the paper is organized as follows. Section 2 describes the data used in the study and presents descriptive statistics. In Section 3, we analyze factors associated with loss of analyst coverage and compare earnings management for firms that lose coverage to the practices of similar firms that maintain coverage. In Section 4, we examine earnings management practices for firms that regain analyst coverage. Section 5 discusses robustness, and Section 6 concludes.

2. Data

The data for this study are compiled from several publicly available commercial databases. Analyst coverage information is taken from I/B/E/S for the period 1983 to 2006.[6] Stock price and delisting information are from CRSP. Compustat provides information on firm financial characteristics. Additionally, we collect institutional holding information from Thomson Financial.

2.1 Sample Construction

To construct the sample, we follow Mola, Rau, and Khorana (2012). From all firms in the I/B/E/S Detail data, we identify the firms that receive no analyst coverage for at least one calendar

[6] Our I/B/E/S downloads reflect corrections to the database made in response to the work of Ljungqvist, Malloy, and Marston (2009).

year. We then apply three additional screening criteria. First, since foreign firms may be covered by analysts that we cannot track through I/B/E/S, we retain only firms incorporated in the United States. Second, we require sample firms to have ordinary common shares publicly traded on the NYSE, Amex, or the Nasdaq. Therefore, we remove certificates, shares of beneficial interest, depository units, units of beneficial interest, units of limited partnership interests, depository receipts, real estate investment trusts (REITs), and closed-end funds. Also, we remove ordinary common stocks traded on the over-the-counter markets and on foreign or regional exchanges. Third, using CRSP delisting dates, we retain only those firms that are still publicly traded at the end of the year when analyst coverage is lost. This eliminates firms that lose coverage in a year only because they have been liquidated, acquired, or delisted for other reasons in that year. The final sample of neglected firms consists of 13,364 firm-year observations of U.S. firms that are still publicly traded on the main exchanges at the end of the year when they lose analyst coverage.

Firms that retain coverage serve as control observations. We utilize multidimensional propensity-score matching techniques to construct the sample of control firms and, for robustness, also perform exact matching on size and industry. For each dropped (resumed) firm, we select a covered firm that has a similar predicted probability of having no (any) analyst coverage in year *t*. Covered firms are firms that receive at least one earnings forecast in year *t*, screened for the same criteria used in forming the sample of neglected firms.

2.2 Variable Definitions

Following prior literature (Jones (1991) and Dechow, Sloan, and Sweeney (1995)), we define earnings management as discretionary accruals by year (hereafter, modified Jones DAs) and industry-year (industry modified Jones DAs). In calculating the industry measures, we use two-digit standard industrial classification (SIC) codes, two-digit North American industry classification system (NAICS) codes, and the Fama-French 48 industry codes as alternative industry definitions. Reported results employ Fama-French classifications, though results are qualitatively similar using the alternative definitions.

Because analyst coverage is likely a function of the operating and stock performance of a firm as well as that firm's potential to generate business for the analyst's employer, we define control

variables intended to capture both dimensions. As our operating performance indicators, we compute sales/total assets, ROA, retained earnings/total assets, working capital/total assets, and market value of equity/total liabilities to measure the firm's operating efficiency, profitability, asset liquidity, and leverage. Kothari, Leone, and Wasley (2005) find that performance matching on ROA controls for the effect of performance on measured discretionary accruals. Further, since loss of coverage may identify firms in poor condition, we compute Altman's *Z*-score, which is a proxy for the financial health of a firm (Altman (1968)). The *Z*-score is determined as a linear combination of five accounting ratios mentioned above.[7] In general, the higher the *Z*-score, the lower is the probability that the firm will file for bankruptcy.

Zmijewski (1984) and Shumway (2001) suggest that financial indicators better predictors of performance than accounting ratios. We therefore include two stock performance indicators: excess return and idiosyncratic volatility. Excess return is computed as buy-and-hold return less the CRSP NYSE/Amex/Nasdaq value-weighted return. Idiosyncratic volatility is defined as the standard deviation of residuals from a market model regression using monthly stock returns. We also include controls for market capitalization and the book-to-market (B/M) ratio as defined in Daniel and Titman (1997). Market capitalization, in millions, is common shares outstanding multiplied by the fiscal year closing price. The B/M ratio is defined as (common equity + deferred taxes + investment tax credit – preferred stock), all divided by market capitalization.

Sell-side analysts have economic incentive to provide coverage to firms that are able to generate trading revenue for the analysts' employer. As proxies for the potential to generate trading business, we define variables for trading volume, share turnover, bid-ask spread, total institutional holdings, and number of institutions for each security. Following Gao and Ritter (2010), trading volume of Nasdaq-listed stocks is adjusted to avoid double-counting trades. Share turnover is the total annual trading volume divided by publicly held shares from CRSP. Bid-ask spread is the annual average of daily differences between the closing bid and ask prices scaled by the mid-range closing price.

All variables are winsorized at the 1% and 99% levels and calculated at the end of year *t*-1,

[7] Altman's Z-score is calculated as 0.999×(sales/total assets) + 3.3×ROA + 1.4×(retained earnings/total assets) + 1.2×(working capital/total assets) + 0.6×(market equity/total liabilities), or 0.999×(SALE/AT) + 3.3×(OIADP/AT) + 1.4×(RE/AT) + 1.2×(WCAP/AT) + 0.6×(CSHO×PRCC_F)/LT).

which initially marks the year prior to no analyst coverage or the resumption of coverage.

2.3 Descriptive Statistics

Most firms in our sample are listed on Nasdaq (71%). In its first year of lost coverage, the median sample firm has been listed for more than seven years.[8] Of the 13,364 firm-year observations, 4,091 firms receive no coverage for at least one year. Some of these firms remain uncovered for a second year in a row, while some regain analyst coverage or delist, and thus are removed from the sample of neglected firms. A portion of firms that remain uncovered for the second year may remain uncovered for a third year, and so on. About 31% of the sample receives no coverage for the first year, 32% remains uncovered for the second and third year in a row, and 37% experiences no coverage for the fourth year and beyond. Figure 1 displays the sample by number of subsequent years without analyst coverage.

Also, Figure 1 shows the evolution in the number of sample firms by year. Over the 24-year sample period, from 1983 to 2006, the number of firms that lose coverage appears to rise and fall against the business cycle, with more firms being dropped by analysts during economic contractions and fewer firms being dropped during economic booms. For example, the number of neglected firms reaches its peak in 1991–1992, a period that marks both a U.S. business cycle contraction and a drop in the number of new equity issues, and in the post-bubble period, from 2001 to 2002. Such a pattern is consistent with analysts dropping coverage for firms that may be poor performers.[9]

In general, firms do not lose analyst coverage abruptly. In the years before losing all analyst coverage for the first time, analyst following gradually declines. Interestingly, earnings management shows a similar downward trend. Table 1 reports mean and median statistics for analyst coverage and earnings management in the four calendar years prior to the first year without analyst coverage (year *t*). In particular, Panel A of Table 1 shows that, for the median sample firm, both the number of analysts and the number of earnings estimates steadily decrease from year *t*-4 to year *t*-1 and ultimately become zero in year *t*. Most sample firms are covered by only one analyst in year *t*-1. The

[8] Thus, sample firms are not companies which have merely fallen out of analysts' favor after a recent IPO.

[9] This pattern runs somewhat contrary to the ideas in Khanna, Noe, and Sonti (2008), who argue that the supply of an investment bank's human resources is inelastic. It might be expected that analysts would then drop coverage at a higher rate during economic booms characterized by a large number of IPOs, since the pool of available analysts and the number of stocks each analyst can meaningfully cover is likely to be limited in the short term.

median profitability of sample firms—measured as estimated and actual EPS—progressively shrinks over these years as well. Since the level of the EPS depends on the number of shares outstanding for each firm, we are interested only in the overall trend (and assume relative stability in the number of shares outstanding for each firm). Analysts' EPS estimates for the median sample firm decrease from 0.50 in year *t*-4 to 0.22 in year *t*-1 and progressively worsen relative to the mean industry EPS estimate. Actual EPS decline even more than the EPS estimates, widening the forecast error over time. The median recommendation on a five-point scale is steadily around 2 or 'buy' from year *t*-4 to year *t*-2, and is downgraded to 3 or 'hold' in year *t*-1. As indicated by the increase in the median industry-adjusted recommendation, analysts become progressively more pessimistic toward sample firms than other firms in the same industry. Mean statistics provide similar inferences.

Also, Panel A reports mean and median statistics of the quality of the analyst coverage in the four years prior to the loss of coverage. The proportion of star analysts, as identified by *Institutional Investor* as members of the All-American Research Team, decreases as well as the fraction of analysts employed by investment banks and, in particular, by bulge bracket investment banks (Bear Stearns, Citigroup, Credit Suisse, Deutsche Bank, Goldman Sachs, J.P. Morgan Chase, Lehman Brothers, Merrill Lynch, Morgan Stanley, or UBS). By contrast, the coverage provided by independent or paid-for research firms increases as more investment bank analysts progressively decide to terminate coverage on sample firms. Independent and paid-for research firms are a relatively new segment in the industry, experiencing growth in the aftermath of the Global Analyst Research Settlement in 2003.

In the years before losing analyst coverage, the median sample firm gradually reports more negative total accruals, indicating an increase in the net accrued expense and/or net deferred revenue. As reported in Panel B of Table 1, both modified Jones DAs and industry modified Jones DAs gradually decrease to become significantly negative in year *t*-1. For example, the median industry modified Jones DAs decline from 0.69 in year *t*-4 to –0.84 in year *t*-1, and mean statistics show a similar trend. This pattern implies an increased use of discretionary accruals to trim the reported earnings.

Table 2 reports performance characteristics and earnings management measures for the neglected firm-year sample in the year prior to no coverage relative to all covered firm-years. Year *t*

marks all calendar years for sample firms with no analyst coverage and can represent the first year spent without analyst coverage, the second year, and so on. From an operating performance standpoint, all indicators for sample firms are significantly worse than for covered firms both on average and in median, consistent with Irvine (2001), with the ratio of sales to total assets as the sole exception.[10] Because of the high skewness in the distribution of most indicators, we focus on median values, although averages lead to similar conclusions. Sample firms are less profitable and more levered than covered firms. In Panel A of Table 2, the median *Z*-score for sample firms is 2.39, which, while not indicative of a healthy firm, does not indicate distress on the three bracket-scale defined by Altman (1968). By contrast, covered firms are financially healthy firms with median *Z*-score of 3.52.

From a stock performance standpoint, sample firms are more volatile and have poorer past performance relative to covered firms. As we examine the proxies for a firm's potential to generate trading business, we observe that sample firms are quite small: their median market capitalization is about $25 million, compared to $211 million for covered firms. Jegadeesh, Kim, Krische, and Lee (2004) argue that analysts prefer glamour (growth) stocks to value stocks. We find that the median B/M ratio is below one, indicating that these stocks fall on the glamour side of the spectrum ranging from growth to value stocks, although they look less glamorous than covered stocks. It is no surprise that, given their size, sample stocks are not heavily traded: the trading volume for the median sample stock is 1.67 million shares in year *t*-1. If we regard past trading volume as an indicator of the potential to generate trading business in the future, this statistic projects low potential: at $0.02 per share, the trading volume implies that the median sample stock can generate about $33,400 of annual brokerage fees, compared to $189,400 from the median covered firm. Moreover, sample stocks are less liquid as measured by share turnover and bid-ask spreads and attract less institutional interest as measured by the number of institutions and total institutional holdings. Similar qualitative conclusions can be drawn when we restrict the sample to the year prior to the initial loss of coverage.

Prior to controlling for these differences in characteristics, we compare earnings management

[10] The ratio between sales and total assets (also called asset turnover) measures a firm's efficiency at using its assets in generating sales, with higher values indicating greater efficiency. It is also related to pricing strategy, in that companies with low profit margins tend to have high asset turnover, while those with high profit margins have low asset turnover.

practices for neglected and covered firms. Neglected firms manage their earnings more heavily than covered firms. In Panel B of Table 2, both total accruals and industry modified Jones DAs show a greater extent of managing earnings downwards. Neglected firms report significantly negative industry modified Jones DAs, both on average and in median, while covered firms report significantly positive mean industry modified Jones DAs and negative median values that are insignificantly different from zero. Overall, the picture that emerges from Table 2 is that, in the year prior to no coverage, sample firms experience a downturn in growth prospects, though not necessarily financial distress. In reporting more accrued costs and/or deferring more future revenues, they may take 'earnings baths' in anticipation of a future turnaround.

3. Loss of Coverage

If analyst monitoring plays a role in curbing the use of aggressive discretionary accounting, the loss of analyst coverage represents an opportunity for firms to more liberally manage earnings. Alternatively, if analyst coverage exerts pressure on firms to manage toward target estimates, the loss of analyst coverage might result in reduced levels of earnings management. Given that loss of coverage is a non-random event, we construct a sample of control firms matched on a number of *ex ante* observable characteristics to control for the systematic differences between covered and uncovered firms as outlined in Section 2.3.

We first demonstrate that, prior to the loss of coverage, earnings management practices are markedly different across firms that maintain coverage and those that do not in a multiple regression setting. Next, we show that these differences disappear when controlling for differences in other observable characteristics, whether confined only to size and industry or when using propensity score techniques to match on multiple dimensions. Finally, we examine differences in earnings management subsequent to loss of coverage in the propensity-matched sample of firm-years.

3.1 Probability of Losing Coverage

We begin by examining in a multiple regression setting the characteristics associated with analysts' decision to discontinue coverage. We employ a logistic regression model for the probability

that a firm will lose all analyst coverage in year *t*. Again, year *t* may be the first year a sample firm has spent without analyst coverage, the second year, or so on. As described in Section 2.2, explanatory variables include a firm's operating and stock performance measures and proxies for that firm's potential to generate brokerage revenue. Each regression model also includes year, industry, and exchange fixed effects.

Table 3 presents the results across different methods of matching our sample of neglected firms. For each method, we report two specifications, each with an alternative definition of earnings management: modified Jones DAs or industry modified Jones DAs. White's heteroskedasticity-adjusted *z*-statistics are in parentheses. Standard errors are clustered at the firm level. Columns 1 and 2 report results without any matching. The sample firms that experience a loss of all coverage are compared to all firms in I/B/E/S that meet our screening criteria and maintain coverage by at least one analyst throughout the sample period. Coefficients for all of the variables are significant at the conventional levels, with the exception of the coefficient for share turnover, which is statistically insignificant. As might be expected, firms with lower Altman's *Z*-scores, lower returns, lower trading volume, lower market capitalization, lower institutional holdings, and higher B/M ratios are more likely to lose coverage. These results are intuitive, in that it is widely believed that analysts select higher quality or better performing firms. Perhaps less intuitively, firms with higher spreads and higher idiosyncratic volatility are also more likely to lose coverage. While these characteristics might be associated with generating higher levels of trading revenue, they can also be associated with struggling firms.

Interestingly, earnings management is significantly associated with the probability of losing analyst coverage. Controlling for other factors, the more a firm manages its earnings downward, the higher the probability of being orphaned in a given year (or, the more a firm manages upward, the less likely is the loss of coverage). Such a relation gives rise to the question of whether analysts have a preference for an upward direction of earnings management, though the result could be driven by analyst frustration with the lack of earnings predictability resulting from higher levels of earnings management.

In Columns 3 and 4, our sample of neglected firms is matched on size and industry. We use traditional two-dimensional matching on size and two-digit Fama-French industry codes. We find

matches for 12,488 of the 13,364 neglected firm-year observations. Most coefficients are similar in sign and magnitude to before. In this crudely matched sample, however, firms that lose coverage have better returns than the controls. Further, after matching on size and industry, the coefficients of the earnings management proxies are no longer statistically significant. Notably, total explanatory power drops from over 37% in our first specifications to approximately 5%, indicating that size and industry differences drive a great deal of differences in other firm characteristics.

Last, we present results for our sample of neglected firms and their propensity-score matched controls. To construct the control sample, we use nearest neighbor matching without replacement within a caliper (defined as 0.25 of the standard deviation of propensity scores between the two groups) on all of the characteristics listed as explanatory variables, but match on the operating performance components of Altman's *Z*-score rather than the *Z*-score itself. Overall, we use 14 independent variables, along with year, industry, and exchange fixed effects. The variables are sales/total assets, ROA, retained earnings/total assets, working capital/total assets, market equity/total liabilities, excess return, idiosyncratic volatility, market capitalization, B/M ratio, trading volume, share turnover, bid-ask spread, institutional holdings, and industry modified Jones discretionary accruals. For each sample firm, we select from the sample of covered stocks the firm with the lowest absolute difference in propensity scores. We find matches for 6,843 of the 13,364 sample firm-year observations.

Results of the logistic regression for the probability of losing coverage in year *t* for the sample of neglected firms and their propensity-score matched controls are reported in Columns 5 and 6 of Table 3. Importantly, explanatory power of this regression drops to less than 1%, indicating high quality matching. Only the institutional holdings coefficient remains statistically significant at the 10% level, though the sign is reversed from the unmatched regression with all covered firms. Thus, stocks for matched firms that retain coverage have a lower level of institutional holdings and are marginally more volatile than neglected firms, such that any selection bias from poor performance and anticipated poor performance should not be a concern.[11] For the tests that follow, we use this

[11] In the univariate, there are no differences in the conditional means of the independent variables by design. To further ensure the quality of matching, we run Wilcoxon rank-sum and nonparametric *K*-sample tests on the equality of medians between the explanatory variables for sample firms and their control firms. All tests suggest that we cannot reject the null hypotheses of equality between medians at conventional levels of statistical significance.

more narrowly constructed control group to examine subsequent earnings management.[12]

3.2 Earnings Management after Losing Coverage

We now turn to examine earnings management for firms that lose all analyst coverage relative to the propensity-score matched group of firms that maintain coverage. In the matching procedure, firms without coverage are re-matched to control firms every year, based on the information at year *t*-1. This procedure is free from look-ahead bias because the firm—and market participants as well—learns about analyst coverage or the duration of its status as an uncovered firm up to time *t*. It is important to note that a firm may become aware of being orphaned only at the end of the first year without coverage, whereas accounting reporting would have been finalized for that year. Therefore, if firms react to the loss of analyst coverage, we would expect a change in earnings management more prominently in the subsequent years, years in which the neglected firms are aware that they are without coverage.

Median differences in earnings management measures between neglected firms and their matched controls are reported in Panel A of Table 4. Differences are categorized by the number of years neglected firms are without analyst coverage. So, for example, the 1st year without coverage would indicate differences in earnings management for a firm that is first without coverage for calendar year 1994, matched to its control based on characteristics in 1993. If the same firm continues without coverage through 1998, it would appear twice in the 4th year and beyond sample: once matched on 1996 characteristics to calculate 1997 earnings management differences and once matched on 1997 characteristics to calculate 1998 earnings management differences.

A distinct pattern emerges after the loss of coverage for neglected firms relative to the observationally equivalent covered firms. Overall, we observe an upward reversal of earnings management as the duration of the loss of analyst coverage increases. After the first year without coverage, the median sample firm reports significantly lower total accruals and discretionary accruals, whether measured by modified Jones or the industry modified Jones methods, than its control firm. Thus, firms with loss of coverage appear to engage in downward management in the

[12] Subsequent results are qualitatively similar if we instead use size and industry matched controls, thus reducing concerns over model-dependence in propensity score matching.

first year, taking significant 'earnings baths' relative to the control group of covered firms. In the second year without analyst coverage, no difference in the earnings management measures can be detected for the median firm, though total accruals continue to be lower than for its control firm.

In the third year and beyond, firms that experience the loss of analyst coverage begin making a greater use of discretionary accruals to manage earnings upward relative to matched firms. In particular, the abnormal median industry modified Jones DAs go from –1.23% of the lagged assets after one year spent without analyst coverage to 1.48% of the lagged assets after four or more years spent without analyst coverage. We observe similar patterns when comparing means. When off analysts' radar, sample firms appear to be more aggressive in their accounting, increasing upwards earnings management. The reversal to upward earnings management when firms are not covered provides support for the notion that analysts play a monitoring role.

It is natural to ask if this reversal might be due to mean reversion in financial reporting. To control for a possible cyclicality in earnings management practices, we replicate the analysis using differences in the five-year average of earnings management proxies. In Panel B of Table 4, we find results similar to the ones in Panel A, suggesting that mean reversion in the data is not a concern.

4. Resumption of Coverage

To further explore the role of analysts as monitors, we refocus on the subsample of firms that regain analyst coverage after losing it for one or more years in a row. We examine which factors are associated with resumption of coverage, both in the univariate and multiple regression setting. We then test for differences in earnings management after the change in coverage status.

Resumption of coverage is defined as at least one earnings forecast by an analyst during a given calendar year. From our sample of neglected firms, we isolate a subsample of 1,913 firms that regain analyst coverage and are still publicly traded on the main domestic markets at the end of that year. Of the neglected firms that experience a resumption in coverage, about 45% of the subsample regains coverage after one year, 34% after two or three years, with the remaining 21% of the subsample spending four or more years before attracting analyst interest again.

4.1 Probability of Resuming Coverage

We compare the resumed coverage subsample both to the subset of firms that remain uncovered and to covered firms. Because the same observed factors that drive the decision to drop coverage on a firm likely explain the decision to resume coverage, we examine the same performance and potential revenue generation indicators among the groups. Table 5 reports the mean and median values for these variables along with earnings management proxies. All variables are determined at the end of year *t*-1, which marks the year prior to regaining analyst coverage. We compare the 1,913 observations of firms that regain coverage to: a) 9,273 observations of firms that were uncovered in year *t*-1 and are still without analyst coverage in year *t*; and b) 72,842 observations of firms that were covered in year *t*-1 and are still with analyst coverage in year *t*.

Panel A of Table 5 shows that, relative to the median firm that is still an orphan, the median firm that regains analyst coverage exceeds the threshold of 3 to qualify as a financially healthy company according to the Altman's *Z*-score, and experiences significant stock price outperformance in year *t*-1. Moreover, it shows a higher potential to generate trading business for the brokerage firm in terms of trading volume, turnover, and institutional interest.

Relative to the median covered firm, the median subsample firm reports a similar financial health and operating performance. However, firms that regain analyst coverage are riskier and bigger past winners: the median past excess return is 7.96% with idiosyncratic volatility of 12.52%, compared to the median past excess return of –4.11% with idiosyncratic volatility of 9.29% for covered firms. Moreover, firms with resumed coverage show a lower potential to generate trading revenue: they are smaller in terms of market capitalization, trade considerably less with wider median bid-ask spreads, and attract lower institutional investor interest as proxied by the number of institutions and the total institutional holdings.

Panel B of Table 5 reports mean and median earnings management measures. Both mean and median values of total accruals for the firms that regain coverage lie in between and are statistically different from the two corresponding values for the reference groups. When we focus on discretionary values, however, we observe no statistical differences prior to controlling for firm characteristics.

We next examine these factors in a multiple regression setting. We ask whether analysts

might be affected by a firm's earnings management in their decisions to reinitiate coverage on a firm, controlling for performance indicators and other factors. Table 6 reports the results from logistic regression models for the probability of regaining analyst coverage. Again, all control variables are determined at the end of the prior year. For brevity, Table 6 focuses only on industry modified Jones DAs; the results from the regression models that include modified Jones DAs are almost identical. Also, for brevity, Table 6 reports regressions using Altman's Z-score as a control variable, rather than reporting alternative models that include each of the five components as controls. Results are robust to the inclusion of the components of Altman's Z-score, which measure a firm's operating efficiency, profitability (ROA), asset liquidity, and leverage as controls in the regression instead of the measure itself.

In regression models 1 through 3, benchmark controls are the subset of still uncovered firms. The dependent variable is equal to one when a firm regains analyst coverage in year *t* and zero when it does not. We observe that industry modified Jones DAs are positively associated with the probability of regaining coverage after an extended period without coverage. From Table 4, we know that earnings management increases as the number of years spent without analyst coverage increases, with discretionary accruals becoming significantly positive after four or more years from the initial loss of analyst coverage. In regression model 3 of Table 6, the specification for firms that regain coverage after four or more years without coverage, the coefficient of industry modified Jones DAs is positive and significant at 95% confidence, indicating that greater discretionary accruals are associated with a higher probability that analysts will resume coverage. Marginal effects are small, at approximately 2%, but the base probability for resumption of coverage is small as well, at 2.56%. Managing earnings upward significantly helps a firm to regain analyst attention.

Regression models 4 through 6 instead use continuously covered firms as benchmark controls, with the dependent variable equal to one when a firm moves from being an orphan to being a covered firm and zero when it continues to be covered. Again, after an extended period without analyst coverage, earnings management is associated with a greater likelihood of coverage resumption. In regression model 6 of Table 6, the specification for firms with more than four years without analyst coverage, the coefficient for industry modified Jones DAs is greater in magnitude and statistical significance than in regression model 3, where regained firms are compared to still

uncovered firms, which may also be managing upward in an attempt to gain analyst attention. Here, too, marginal effects are similar in magnitude to the base probability.

These results provide a rationale for firms to use earnings management as a mechanism to attract analyst attention. The firms that significantly manage their earnings upward are more likely to be firms for which coverage is resumed, compared with uncovered or continuously covered firms. Relative to firms without coverage, firms for which coverage is resumed experience higher excess returns, have a larger market capitalization, higher trading volume and share turnover, and lower spreads. These firms also have higher excess returns relative to firms that maintained coverage. They are still smaller and more volatile, with lower trading volume and institutional holdings than continuously covered firms, however. Though firm performance improves, one wonders the extent to which earnings management or other aggressive practices played in reporting such improved performance.

A striking implication of these results is that, while analysts tend to select better performing firms in resuming coverage, they also tend to select firms that manage earnings upward. We find similar results when studying a robustness sample of continuously covered firms that experience a change in analyst following, providing reassurance that this finding is not unique to our sample. Thus, concerns over the form of endogeneity in prior studies appear to be contrary to the selection that actually occurs: with respect to earnings management, analysts select firms that manage earnings more aggressively rather than selecting more disciplined firms. This result may suggest that analysts direct their efforts toward firms that are more in need of monitoring. An alternative interpretation, however, is that analysts are simply drawn to firms reporting rosier performance.

4.2 Earnings Management after Resuming Coverage

We next examine earnings management in the years when coverage is resumed. If analysts serve as effective monitors, we would expect a firm to reduce its earnings management after coverage resumes, particularly since selected firms are significantly managing earnings upward.

Of the subsample of 1,913 firms that regained coverage, some continue to be covered, some lose coverage, and some delist in the years after coverage resumption. The number of firms that continue to be covered gradually decreases over time: 1,443 of the 1,913 firms that regained

coverage in year *t* are covered also in year *t*+1, for two years in a row; 1,106 are covered also in year *t*+2, for three consecutive years; and so on. Over time, the 1,913 firms that regained coverage in year *t* generate 8,243 firm-year observations.

Panel A of Table 7 reports summary statistics describing the level and type of analyst coverage regained by our subsample of firms. In the first year of a new earnings forecast, most firms (63%) regain coverage by one analyst who releases a median number of three reports a year. After three years of resumption, most firms experience an increase in analyst following of up to four analysts who release a total number of 11 reports. The median profitability of sample firms—proxied by estimated and actual EPS—progressively rises over these years as well. EPS estimates for the median subsample firm increase from 0.42 in the first year to 0.70 in the fourth year and beyond, although they continue to be worse than the mean industry EPS estimate. In general, analysts issue EPS estimates that are more favorable than the actual EPS, narrowing the forecast error over time. Analyst recommendation for the median firm that regains coverage is steadily around two, reflecting a 'buy' recommendation. As indicated by the decrease in the median industry-adjusted recommendation, analysts gradually align their optimism level for sample firms closer to that of other firms in the same industry.

As firms progressively regain higher levels of analyst coverage, the measured quality of their coverage increases. The proportion of star analysts as well as the fraction of analysts employed by investment banks and, in particular, by bulge bracket investment banks are greater. Independent and paid-for research firms are more likely to first resume coverage of neglected firms and later direct their attention elsewhere as investment bank analysts provide coverage. Panel B of Table 7 shows a gradual decline in the proxies for discretionary accruals—both median and mean values—as analyst coverage grows.

As before, we use the propensity scores to match control firms that are similar to the subsample firms in predicting the resumption of analyst coverage. As in Table 6, we use two groups of control firms: covered and uncovered firms. Independent variables in the matching are the same as the logistic models of Table 6, using components of the Altman's *Z*-score. We do not report the matching regressions in the interest of brevity; diagnostics indicate the matching is of high quality, with regressions containing observations from the matched samples having only 0.32% to 0.77%

explanatory power. No coefficient in the regressions is statistically significant at the conventional levels.

If competition is an important force in analyst monitoring, we would expect little difference in the earnings management practices of firms experiencing resumption in coverage by only one analyst, whether compared to firms without analyst coverage or to covered firms with only one analyst. For firms regaining coverage by multiple analysts, we would expect a decline in upwards earnings management when transitioning to coverage. In Table 8, we present median differences in earnings management, categorized by the number of analysts that maintain coverage for the subsample firms.

In Panel A, we compare subsample firms that regain coverage by one analyst to continuously covered firms with one analyst. Similarly, we compare subsample firms that resume coverage with two analysts and more than two analysts to continuously covered firms with the same number of analysts. For firms regaining coverage by only one analyst, we see no particular pattern for differences in earnings management relative to similarly covered firms. Modified Jones DAs indicate higher discretionary accruals in the fourth year of coverage for firms that regain relative to those that were covered throughout. Industry modified Jones DAs, however, indicate marginal downward management for subsample firms in the 3rd year of resumed coverage. For firms that regain coverage by two analysts and more than two analysts, however, we observe a pattern consistent with analyst monitoring. Though we observe upward management in the year coverage is regained, earnings management declines steadily across all of the measures beginning in the first complete year of coverage. These findings suggest that coverage by more than one analyst may be required to induce analyst monitoring.

With more than one analyst resuming coverage, we observe a pattern of subsiding upward management. With a single analyst, the lack of a discernible pattern might indicate that covered firms with only one analyst lack scrutiny. To further test our interpretation, in Panel B of Table 8, we compare earnings management of subsample firms that regain coverage by one, two, or more than two analysts to still uncovered firms. Here, we observe that firms that regain coverage by only one analyst continue to manage upward similarly to uncovered firms, suggesting that covered firms with only a single analyst are not particularly well-monitored. Firms that regain coverage by two or more

than two analysts, though they manage upward in the year of resumed coverage, quickly discontinue such practices so that discretionary accruals are lower relative to control firms.[13] Though not displayed in the table, in the fourth year after resumption of coverage (i.e. between years four and five), median differences in discretionary accruals become significantly negative, suggesting that subsample firms with regained analyst coverage manage earnings significantly less than firms that remain uncovered.

The results for different levels of analyst coverage are consistent with the notion that competition among analysts activates the monitoring role. It is possible, however, that as analyst coverage increases, average quality of coverage increases. To check for this possibility, we perform standard *t*-tests on the measures of quality reported in Table 7 (proportion of star analysts and proportion of analysts employed by bulge bracket investment banks). We find no significant differences in the quality of coverage between firms that regain coverage by one analyst and firms that regain coverage by two analysts or between firms that regain coverage by two analysts and firms that regain coverage by three analysts. We also test whether analyst conflicts drive our results. If firms with a single analyst are more likely to have an affiliated analyst, observed patterns might result from conflicts of interest rather than lack of competition. We therefore repeat our analysis from Panel A of Table 8, restricting our sample to resumption of coverage by affiliated analysts *only*.[14] We obtain similar results: having two or more analysts appears to provide effective monitoring, even when the coverage is provided by affiliated analysts, whereas resumption by a single analyst does not appear to alter earnings management practices. We also repeat our original analysis excluding all affiliated analysts. Given the relatively small number of affiliated analysts in the sample, results are almost identical to those reported.

Taken together, it appears that realignment to less aggressive accruals reporting is more likely only if multiple analysts provide coverage. These patterns provide support for the notion that

[13] As shown in Table 4, orphaned firms continue to manage earnings downward in the first years without coverage and do not significantly manage upward until several years without coverage. When we restrict matched controls to firms that have lost coverage for more than two years, the pattern in Panel B of Table 8 reverses more quickly and shows statistically significantly lower discretionary accruals relative to controls.

[14] We define affiliation according to the presence of the analyst's employer as an advisor or syndicate member for the firm's most recent SEO, debt issue, or M&A transaction. If there are no new issues or transactions, we consider the IPO underwriting syndicate. In our sample, 15% of the analysts resuming coverage are affiliated. Demiroglu and Ryngaert (2010), who define affiliation based on any prior investment banking relationships in the previous year, find a similar proportion of affiliated analysts.

competition among analysts drives the quality of monitoring, just as it acts to reduce bias in forecasts.

5. Robustness

We perform a number of tests to verify the validity of our findings. As described earlier, we replicate all of our reported analysis using mean values instead of medians, alternative industry definitions, and size-and-industry matching rather than propensity scores. These checks ensure our results are not an artifact of the selection of medians, industry definition, or of model dependence in the propensity scores. We also verify that mean reversion in earnings management does not explain the results by using long-term averages of earnings management measures in our matching procedure and subsequent analysis. As in Table 4, which reports the results for long-term averages for the period without coverage, we detect a reversal in discretionary accruals for the long-term averages after the resumption of coverage as well. Moreover, in unreported tests, we repeat our analysis using contemporaneous rather than lagged firm performance characteristics in the matching procedure and the regressions. Results are similar. This check gives even greater confidence that differences in performance between neglected and matched controls are not driven by simultaneity of the coverage decision and earnings management changes.[15]

Here, we present and discuss results from three additional tests. In order to provide greater assurance that results are not driven by unobserved heterogeneity, we first repeat our analysis using a sample of firms that lose all coverage due to analyst departure. Second, we employ the brokerage closure methodology of Hong and Kacperczyk (2010).[16] Third, we ensure that our conclusions about regaining coverage are not unique to the selection of neglected firms as our focus by examining covered firms that experience a change in analyst coverage.

[15] The prospect of a secondary equity offering may elicit analyst coverage resumption. Less than 10% (122) of the 1,913 firms that regained coverage issued an SEO in the calendar year of coverage resumption. When we remove these 122 firms from our subsample, the results remain qualitatively unchanged. We obtain similar results also removing firms that issued earnings guidance or firms with credit ratings, which may also influence the decision to resume coverage.

[16] Subsequent work by Chen, Harford, and Lin (2012) also examines absolute levels of accruals-based earnings management using an exogenous-loss framework.

5.1 Exogenous Losses in Analyst Coverage

To address concerns about the selection of our main sample, we repeat the analysis on a subsample of firms that lose all analyst coverage for exogenous reasons. Paragraph (f)(5) of NASD Rule 2711, approved in 2002, requires analysts to issue a final research report prior to terminating coverage of a stock. From the Thomson One Investext database, which stores copies of the original analyst reports, we manually collect data from termination notices issued from 2003 to 2008.[17] Among these notices, 3,121 are coverage terminations due to a performance-unrelated reason like analyst departure. In 131 cases, the departing analyst was the only analyst covering a firm, leaving that firm without coverage. Knowing the date of coverage termination for this subsample of firms allows us to use a finer, quarterly frequency in our data and thus analyze a larger number of exogenous coverage losses than by using a yearly frequency. Further, unlike the full sample for which it may take more than a year for the firm to know it has lost coverage, firms in the exogenous loss sample are able to react immediately.

Panel A of Table 9 reports median values of earnings management proxies for the subsample of 131 exogenous loss firms from quarter q-1 to quarter q+4, where q marks the quarter when firms first lose all coverage. Also, we report median differences in earnings management proxies between the firms that lose coverage due to analyst departure and their control firms, which are covered firms matched on propensity scores from regressions using the same 14 independent variables plus fixed effects as in previous matching regressions, measured in quarter q-1. Results show that there is reversal in earnings management practices in the case of performance-unrelated coverage losses as well.

We also construct an exogenous loss sample from brokerage closures that generally result in the firing of analysts because of redundancy. Following the methodology in Hong and Kacperczyk (2010), we use 15 mergers of brokerage houses. We isolate a sample of stocks (1,762 distinct stocks and 4,659 stock observations) that are covered by both broker-acquirer and broker-target before the merger date (the treatment sample). The stocks that are covered by neither broker-acquirer nor broker-target represent the control group. Each stock in the treatment sample is matched with one of

[17] The data collected from the termination notices are available from the authors upon request, subject to the conditions in the data use agreements.

81 benchmark portfolios obtained sorting the control group into tercile portfolios according to their market capitalization, book-to-market ratio, past returns, and level of analyst coverage. Panel B of Table 9 reports the median benchmark-adjusted difference-in-differences from the year before to the year after the merger. The results show that, after the merger, firms that remain covered by one (or no) analyst report a significant increase in discretionary accruals.[18] Thus, the exogenous loss sample constructed from brokerage closures further supports the notion of multiple analysts being necessary to curb aggressive financial reporting.

5.2 Changes in Analyst Coverage for Covered Firms

To address concerns about our sample for our results on resumption of coverage, we repeat our analysis on firms continuously covered by analysts that experience a change in the number of analysts providing coverage. Over the 24-year sample period, 9,111 distinct firms have at least one earnings forecast by an analyst over each calendar year, yielding 62,380 firm-year observations. We categorize the 62,380 firm-year observations into three groups by changes in analyst following: 26,300 observations experience an increase in the number of analysts in a calendar year, 14,076 observations experience no change, and 22,004 observations experience a decrease in the number of analysts in a calendar year.

Untabulated statistics show that firms that experience a decrease in analyst following report the lowest operating and price performance. For example, the median excess return for these firms is –13.39% in the year prior to experiencing the decrease in analyst coverage, compared to 6.17% for the firms that experience an increase in analyst coverage. However, the firms that experience a decrease show similar potential to generate trading business for analysts' employers relative to the firms that experience an increase in analyst coverage, suggesting that an analyst's decision to skip a year in the publication of earnings forecasts on a firm is mainly driven by a temporary deterioration of that firm's performance. Earnings management proxies indicate that while firms experiencing a

[18] Inference is similar if we instead match using propensity scores from regressions using the same 14 independent variables in our main analysis. For firms that decrease coverage from m to 1 analyst, we observe lower levels of earnings management immediately post-merger relative to firms covered by a single analyst, transitioning to similar levels of earnings management by the second to third quarter after the decrease in coverage. For firms experiencing a loss of coverage resulting in coverage by 2 or more than 2 analysts, we observe no differences relative to control firms covered by the same number of analysts.

decrease in coverage have lower levels of total accruals and industry-modified Jones DAs relative to those experiencing increasing coverage, modified Jones DAs are higher.

As we model the probability that a firm will gain or lose one or more analysts in the next year, we regard the group of covered firms with no change in analyst coverage as the reference group. Table 10 reports coefficients and *z*-statistics from the logistic regression models for the probability that analyst coverage will increase (decrease) from the prior year. In regression models 1 and 2 of Table 10, the dependent variable takes the value of one if a firm experiences an *increase* in analyst coverage in year *t* or zero if that firm experiences no change. In regression models 3 and 4 of Table 10, the dependent variable takes the value of one if a firm experiences a *decrease* in analyst coverage in year *t* or zero if that firm experiences no change. The independent variables are the same as Table 3 with the inclusion of an additional control variable, ANALYST FOLLOWING$_{-1}$, which is equal to the number of analysts issuing earnings forecasts on a firm in year *t*-1. We expect that, controlling for other factors, a firm is more likely to gain (lose) the coverage of an analyst as the number of analysts that already provide coverage is lower (higher). Again, the variable of interest is the proxy for discretionary accruals: modified Jones DAs in models 1 and 3 and industry modified Jones DAs in models 2 and 4.

The probability of gaining one or more analysts is significantly positively associated with upward earnings management, whereas the probability of losing one or more analysts is not reliably associated with earnings management. Managing earnings upward through accrual accounting seems to attract analyst attention. Results in Table 10 confirm our earlier findings in Table 6. The fact that we find similar results for always-covered firms and firms that regain analyst coverage suggest our findings are independent of neglected firms.[19]

For completeness, we examine the effect of an increase (decrease) in coverage on the earnings management behavior of firms. On the one hand, an additional analyst may increase competition, increasing the quality of earnings reporting. Alternatively, after a sufficient amount of competition, an additional analyst may have insignificant impact. In Panel A of Table 11, we report comparisons in earnings management for covered firms that experience a change in coverage from

[19] Using our sample of firms that experience changes in analyst coverage, we also replicate the identification model in Yu (2008) and find similar results.

one to more than one analyst and for firms that experience a decrease in coverage to only one analyst. For firms experiencing an increase in coverage, the matched controls are drawn from firms covered by the same number of analysts as the new coverage level. Similar to our results in Table 8, we observe that as firms transition to being covered by multiple analysts, earnings management subsides. For firms experiencing a decrease in analyst coverage, we observe the opposite effect. Relative to firms covered by a single analyst, firms formerly covered by multiple analysts have lower levels of initial earnings management, but then shift to resemble firms being covered by a single analyst.

Panel B of Table 11 presents analogous results for firms transitioning from and to having two analysts. There are no significant differences in the earnings management proxies for firms increasing analyst coverage from two to more than two analysts relative to firms with the new level of analyst coverage. Nor are there significant differences for firms decreasing coverage from more than two analysts to two analysts relative to firms with coverage by two analysts. These results underscore that having more than one analyst appears to be the key level of coverage to curb earnings management, consistent with the notion that competition among analysts rather than coverage itself activates the analyst monitoring role.

6. Conclusion

In this study, we use earnings management to investigate the role of analysts as monitors. We do so by focusing on a unique sample of firms that lose all analyst coverage for at least one year and the subset of firms that later regain it. This research design allows a comparison across similarly situated firms that differ in the extent of potential analyst monitoring.

We document that neglected firms significantly manage their earnings downward in the years before losing analyst coverage. Once orphans, these firms reverse their earnings management practice by managing earnings upward, suggesting that analyst coverage operates as a monitoring device. Interestingly, we find that neglected firms that manage earnings upward are significantly more likely to regain analyst attention. This result provides firms with a rationale for managing earnings, and shows that analysts do not necessarily select firms with lower levels of earnings management.

Finally, we observe that earnings management declines after a resumption of coverage, but

that this pattern emerges only when multiple analysts resume coverage. We conclude that monitoring and the associated information production is not necessarily a byproduct of analyst coverage *per se*, but instead a byproduct of analyst competition. To put it differently, two analysts are better monitors than one but one analyst is not a better monitor than none.

These findings have important implications for investors who delegate monitoring solely to analysts. For example, to encourage production of information about emerging growth companies (i.e., firms with total annual gross revenues of less than $1 billion) seeking an initial public offering, the Jumpstart Our Business Startups Act (Title I, Sec. 105) allows analysts to attend pitch meetings between the underwriters of the offering and prospective investors.[20] It also allows analysts to provide research reports after the offering by eliminating any so-called quiet period. Given their potential size, emerging growth companies may attract coverage by a limited number of analysts.

[20] See Ritter (2012) for a discussion of the Jumpstart Our Business Startups Act.

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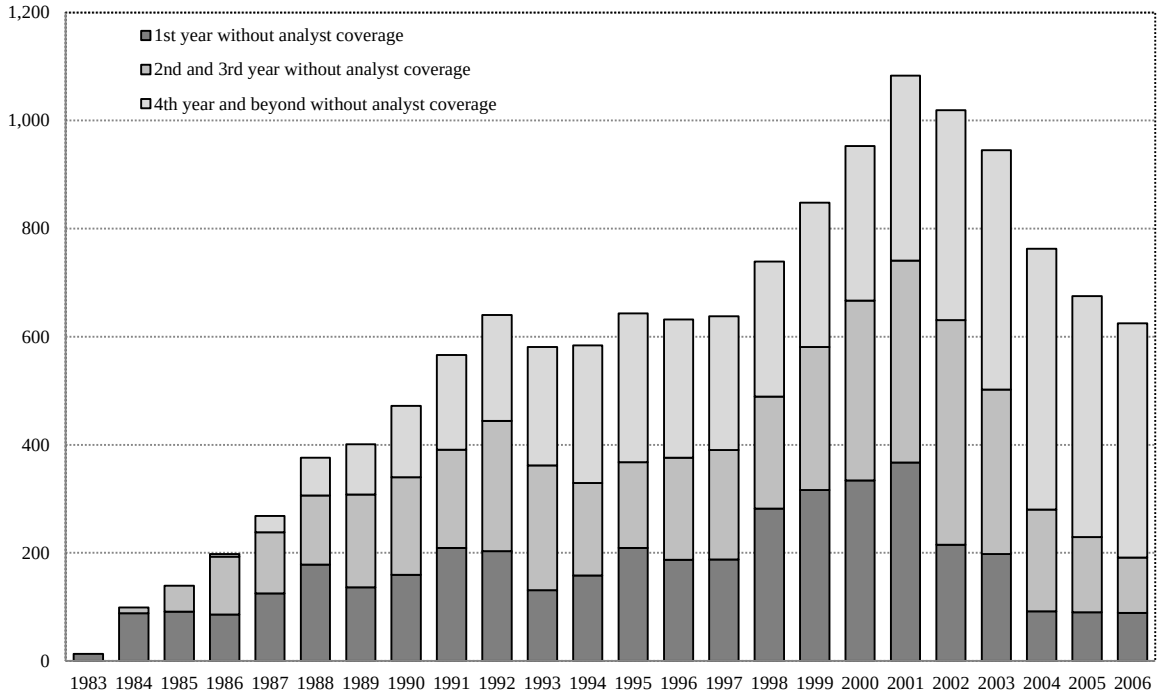
Figure 1

Number of Neglected Firms by Years without Analyst Coverage



The sample of neglected firms consists of U.S. previously covered firms that receive no analyst coverage during at least one calendar year *t* and with common stock still publicly traded on the main domestic stock exchanges at the end of that year. From 1983 through 2006, there are 13,364 firm-year observations without analyst coverage. In any given year, the sample firm-year observations are categorized by the number of subsequent years spent without analyst coverage. Data come from I/B/E/S, Compustat, CRSP, and CRSP/Compustat Merged databases.

Table 1

Analyst Coverage and Earnings Management Prior to Loss of Coverage

	Year prior to loss of coverage							
	Mean				Median			
	t-4	*t*-3	*t*-2	*t*-1	*t*-4	*t*-3	*t*-2	*t*-1
Panel A: Analyst Coverage								
Number of analysts	3.40	3.04	2.51	1.63	2	2	2	1
Number of estimates	9.26	8.13	6.49	3.20	6	5	4	2
EPS estimate	0.52	0.37	0.16	0.09	0.50	0.40	0.28	0.22
Industry-adjusted EPS estimate	-0.34	-0.48	-0.69	-0.70	-0.49	-0.61	-0.72	-0.79
Actual EPS	0.17	-0.08	-0.40	-0.49	0.39	0.27	0.11	0.04
Difference (actual EPS – estimated EPS)	-0.35	-0.44	-0.56	-0.57	-0.03	-0.05	-0.07	-0.10
Recommendation	2.03	2.13	2.27	2.46	2.00	2.00	2.00	3.00
Industry-adjusted recommendation	-0.06	0.04	0.17	0.31	-0.08	-0.01	0.10	0.50
Proportion of star analysts (%)	7.74	7.73	6.67	5.82	0	0	0	0
Proportion of broker:								
Investment banks (%)	91.87	90.25	89.28	87.20	100	100	100	100
Independent research firms (%)	7.96	9.07	9.79	11.33	0	0	0	0
Paid-for research firms (%)	0.17	0.68	0.93	1.47	0	0	0	0
Prop. of bulge bracket invest. banks (%)	13.36	12.77	12.53	10.71	0	0	0	0
Panel B: Earnings Management Proxies (%)								
Total accruals	-0.68	-1.41	-2.91	-5.39	-1.94	-2.44	-3.20	-4.64
Modified Jones DAs	2.60	2.03	0.96	-0.66	0.99	0.54	0.60	-0.42
Industry modified Jones DAs	2.35	1.31	0.65	-1.41	0.69	0.27	-0.11	-0.84

Table 1 reports analyst coverage and earnings management measures in the four years prior to firms receiving no analyst coverage for the first time. Number of analysts is the number of individual analysts issuing at least one report on sample firms during year *t*-*n*. Number of estimates is the total number of EPS estimates in year *t*-*n*. EPS estimate and recommendation relate to the last report issued by an analyst in a given calendar year. Industry-adjusted EPS estimate is the difference between sample EPS estimate and the mean industry EPS estimate. Industry-adjusted recommendation is the difference between the sample recommendation and the mean industry recommendation. Recommendations range from 1= 'strong buy' to 5= 'strong sell.' The EPS estimates come from the I/B/E/S Detail tapes, while recommendations come from the I/B/E/S Recommendation tapes. Though earnings estimates are available on the I/B/E/S tapes since 1981, analyst recommendations are available since 1994. Star analysts are the analysts recognized once a year by *Institutional Investor* as members of the All-American Research Team. Firms that employ analysts are assigned to one of the following categories: 1) investment bank, if analysts' employer is affiliated with an investment bank; 2) independent broker, if analysts' employer has no investment banking affiliation and provides research that is tied to brokerage services and/or institutional trading; or 3) paid-for research firm, if analysts' employer provides research that is directly or indirectly paid by covered firms. Bulge bracket investment banks are Bear Stearns, Citigroup, Credit Suisse, Deutsche Bank, Goldman Sachs, J.P. Morgan Chase, Lehman Brothers, Merrill Lynch, Morgan Stanley, and UBS. Total accruals are defined as (Δ current assets – Δ current liabilities – Δ cash + Δ debt – depreciation)/lagged total assets. Discretionary accruals are determined according to the modified Jones method (Jones (1991)) and the industry modified Jones method (Dechow, Sloan, and Sweeney (1995)). Industry is defined using the 48 Fama-French industries classified by four-digit standard industrial classification (SIC) codes.

Table 2

Comparison of Neglected and Covered Firms

	Neglected firms			Covered firms				
	Mean	Median	N	Mean	Median	N	*P*-value	*P*-value
	(a)	(b)		(c)	(d)		(a)–(c)	(b)–(d)
Panel A: Firm Characteristics								
Sales/total assets	1.27	1.15	11,041	1.15	1.03	62,337	0.00	0.00
ROA (%)	-6.35	1.94	11,040	4.79	8.30	62,337	0.00	0.00
Retained earnings/total assets (%)	-64.56	2.87	12,200	-4.60	11.22	71,401	0.00	0.00
Working capital/total assets	0.23	0.21	12,200	0.24	0.20	71,401	0.00	0.35
Market equity/total liabilities	4.18	1.21	10,971	6.78	2.16	62,199	0.00	0.00
Altman's *Z*-score	2.86	2.39	10,946	5.61	3.52	62,150	0.00	0.00
Excess return (%)	-6.54	-16.71	12,265	5.43	-2.92	72,119	0.00	0.00
Idiosyncratic volatility (%)	15.41	12.92	12,237	11.43	9.55	71,384	0.00	0.00
Market capitalization ($ millions)	70.91	25.47	11,004	1,201.71	210.53	62,556	0.00	0.00
B/M ratio	0.88	0.79	10,981	0.58	0.49	62,311	0.00	0.00
Trading volume (millions of shares)	7.18	1.67	12,277	57.62	9.47	72,135	0.00	0.00
Share turnover	0.50	0.28	12,248	1.02	0.65	67,583	0.00	0.00
Bid-ask spread (%)	6.42	4.85	10,803	2.68	1.94	58,844	0.00	0.00
Number of institutions	12.17	8	12,508	72.97	35	71,900	0.00	0.00
Total institutional holdings (%)	17.22	11.60	12,588	38.63	35.27	72,239	0.00	0.00
Panel B: Earnings Management Proxies (%)								
Total accruals	-5.10	-4.40	12,121	-2.21	-2.86	70,658	0.00	0.00
Modified Jones DAs	2.45	0.02	12,121	3.31	0.77	70,658	0.00	0.00
Industry modified Jones DAs	-0.48	-0.44	12,121	0.46	-0.04	70,658	0.00	0.00

All variables are determined at the end of year *t*-1, which marks the year prior to no analyst coverage. Accounting data items come from the Compustat Xpressfeed database. Sales/total assets are sales divided by total assets (SALE/AT). ROA are earnings before interest and taxation divided by total assets (OIADP/AT). Retained earnings/total assets and working capital/total assets are ratios determined as (RE/AT) and (WCAP/AT), respectively. Market equity/total liabilities is market equity divided by total liabilities ((CSHO×PRCC_F)/LT). Altman's Z-score is defined as 0.999×(sales/total assets) + 3.3×((pretax income + interest expense)/total assets) + 1.4×(retained earnings/total assets) + 1.2×(working capital/total assets)+ 0.6×(market equity/total liabilities), or 0.999×(SALE/AT) + 3.3×(OIADP/AT) + 1.4×(RE/AT) + 1.2×(WCAP/AT) + 0.6×(CSHO×PRCC_F)/LT). The excess return is computed as buy-and-hold return adjusted for the CRSP NYSE/Amex/Nasdaq value-weighted return. Market capitalization ($ millions) is common shares outstanding multiplied by fiscal year closing price (CSHO×PRCC_F). B/M ratio is (common equity + deferred taxes + investment tax credit-preferred stock)/market capitalization, or (CEQ+TXDB+ITCB-PSTK)/(CSHO×PRCC_F). Idiosyncratic volatility is the standard deviation of residuals from a market model regression using monthly stock returns in year *t*-1. Following Gao and Ritter (2010), trading volume of Nasdaq-listed stocks is adjusted to avoid double-counting trades. Share turnover is the total annual trading volume divided by CRSP publicly held shares. Bid-ask spread is the annual average of daily differences between the closing bid and ask prices scaled by the mid-range closing price. Data on institutional holdings come from 13f database. All variables are winsorized at the 1% and 99% levels. The table reports *p*-values from a standard *t*-test for difference in means and a nonparametric test for difference in medians, respectively.

Table 3
Probability of Losing Analyst Coverage

	1 = Neglected firms 0 = Covered firms		1 = Neglected firms 0 = Covered firms matched on size and industry		1 = Neglected firms 0 = Covered firms matched on propensity scores	
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.62	0.62	0.71	0.71	0.03	0.03
	(1.23)	(1.23)	(1.04)	(1.04)	(0.04)	(0.04)
Altman's Z-score$_{t-1}$	-0.01***	-0.01***	-0.01	-0.01	0.00	0.00
	(-3.34)	(-3.27)	(-1.47)	(-1.45)	(0.89)	(0.90)
Excess returns$_{t-1}$	-0.05*	-0.05*	0.11***	0.11***	0.02	0.02
	(-1.86)	(-1.80)	(2.80)	(2.82)	(0.70)	(0.72)
Idiosyncratic volatility$_{t-1}$	2.03***	2.03***	0.58	0.58	-0.47	-0.48
	(6.84)	(6.84)	(1.61)	(1.60)	(-1.51)	(-1.52)
Ln(Market capitalization$_{t-1}$)	-0.68***	-0.68***	-0.00	-0.00	-0.01	-0.01
	(-15.98)	(-16.02)	(-0.17)	(-0.17)	(-0.21)	(-0.21)
B/M ratio$_{t-1}$	0.10***	0.10***	0.05	0.05	0.01	0.01
	(3.24)	(3.23)	(1.40)	(1.40)	(0.27)	(0.27)
Ln(Trading volume$_{t-1}$)	-0.48***	-0.48***	-0.25***	-0.25***	-0.03	-0.03
	(-12.86)	(-12.88)	(-7.19)	(-7.19)	(-0.88)	(-0.88)
Share turnover$_{t-1}$	-0.02	-0.02	-0.05	-0.05	0.04	0.04
	(-0.56)	(-0.51)	(-1.17)	(-1.15)	(1.22)	(1.22)
Bid-ask spread$_{t-1}$	2.16***	2.14***	1.63**	1.63**	0.67	0.67
	(2.90)	(2.87)	(2.05)	(2.04)	(0.84)	(0.83)
Total institutional holdings$_{t-1}$	-1.85***	-1.85***	-0.96***	-0.96***	0.28*	0.28*
	(-12.87)	(-12.90)	(-5.83)	(-5.85)	(1.68)	(1.68)
Modified Jones DAs$_{t-1}$	-0.19***		-0.09		0.01	
	(-2.58)		(-0.79)		(0.16)	
Industry modified Jones DAs$_{t-1}$		-0.31***		-0.16		-0.01
		(-3.20)		(-1.08)		(-0.10)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Exchange fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo-R^2	0.3762	0.3763	0.0507	0.0507	0.0030	0.0029
Wald χ^2	3,849.12	3,843.58	310.82	310.97	55.66	55.64
Prob. > χ^2	0.0000	0.0000	0.0000	0.0000	0.9886	0.9887
Number of observations	54,910	54,910	18,338	18,338	13,686	13,686

The table reports logistic models for the probability that a firm will lose all analyst coverage. The dependent variable takes on a value of one for firms that receive no analyst coverage during the calendar year *t*. Regression models 1 and 2 include the full sample of covered firms. Regression models 3 and 4 use size-and-industry matched covered firms. For each sample firm, we identify the control firm that operates in the same Fama-French industry and is the closest in size to the sample firm in year *t*-1. Regression models 5 and 6 include covered firms that are matched, in year *t*-1, on several variables (sales/total assets, retained earnings/total assets, ROA, working capital/total assets, market equity/total liabilities, idiosyncratic volatility, excess return, market capitalization, B/M ratio, trading volume, share turnover, bid-ask spread, institutional holdings, and industry modified Jones DAs), according to a propensity score matching method. All variables are winsorized at the 1% and 99% levels. White's heteroskedasticity-adjusted *z*-statistics are in parentheses. Standard errors are clustered at the firm level. ***, **, and * indicate that the coefficients are different from zero at the 1%, 5%, and 10% levels, respectively.

Table 4

Differences in Earnings Management in Years without Analyst Coverage

	Number of subsequent years spent without analyst coverage			
Year without analyst coverage	1st year	2nd year	3rd year	4th year and beyond
Panel A: Differences in Earnings Management Proxies (%)				
Total accruals	-1.93***	-0.72***	-0.29	0.95***
Modified Jones DAs	-2.03***	-0.16	0.90***	2.24***
Industry modified Jones DAs	-1.23***	0.23	1.16***	1.48***
Panel B: Differences in Five-Year Average Earnings Management Proxies (%)				
Total accruals	-1.09***	-1.05***	-0.22	0.42***
Modified Jones DAs	-0.75***	-0.36	0.36	1.71***
Industry modified Jones DAs	-0.28	-0.34	0.08	0.48***

Panel A presents median earnings management for neglected firms relative to matched controls. Median values are presented as a percentage of lagged assets. Control firms are identified as covered firms that are matched, in year *t*-1, on several characteristics (sales/total assets, ROA, retained earnings/total assets, working capital/total assets, market equity/total liabilities, idiosyncratic volatility, excess return, market capitalization, B/M ratio, trading volume, share turnover, bid-ask spread, institutional holdings, and industry modified Jones DAs), using propensity scores. Panel B reports the differences in five-year average earnings management proxies between sample and control firms. Sample and control firms are matched on above mentioned characteristics along with the five-year average of industry modified Jones DAs. Year *t* marks the years for which neglected firms receive no analyst coverage. ***, **, and * indicate that median values are different from zero at the 1%, 5%, and 10% levels, respectively, according to the Wilcoxon matched-pairs signed-ranks test.

Table 5

Comparison of Firms that Regain Analyst Coverage with Neglected and Covered Firms

	Subsample firms that regain analyst coverage			Neglected firms that are still without analyst coverage			Covered firms that are still with analyst coverage			*P*-value from difference between means		*P*-value from difference between medians	
	Mean	Median	N	Mean	Median	N	Mean	Median	N				
	(a)	(b)		(c)	(d)		(e)	(f)		(a)–(c)	(a)–(e)	(b)–(d)	(b)–(f)
Panel A: Firm Characteristics													
Sales/total assets	1.23	1.12	1,587	1.30	1.17	7,602	1.14	1.02	60,507	0.00	0.00	0.01	0.00
ROA (%)	-2.21	5.26	1,587	-5.02	2.17	7,602	5.05	8.37	60,507	0.00	0.00	0.00	0.00
Retained earnings/total assets (%)	-65.97	2.78	1,781	-68.25	3.16	8,398	-3.85	12.12	69,521	0.66	0.00	0.41	0.00
Working capital/total assets	0.25	0.22	1,781	0.23	0.22	8,398	0.23	0.19	69,521	0.01	0.04	0.05	0.01
Market equity/total liabilities	6.54	1.86	1,580	4.07	1.21	7,535	6.46	2.19	60,366	0.00	0.79	0.00	0.00
Altman's *Z*-score	4.27	3.00	1,579	2.81	2.42	7,518	5.43	3.50	60,331	0.00	0.00	0.00	0.00
Excess return (%)	29.06	7.96	1,826	1.09	-10.19	8,330	3.38	-4.11	69,974	0.00	0.00	0.00	0.00
Idiosyncratic volatility (%)	15.35	12.52	1,822	15.41	12.72	8,305	11.08	9.29	69,898	0.80	0.00	0.77	0.00
Market capitalization ($ millions)	110.01	56.64	1,588	71.14	23.43	7,550	1,427.26	267.35	60,695	0.00	0.00	0.00	0.00
B/M ratio	0.65	0.56	1,583	0.89	0.81	7,539	0.58	0.49	60,487	0.00	0.00	0.00	0.00
Trading volume	9.43	2.78	1,827	6.29	1.38	8,337	76.04	12.60	69,979	0.00	0.00	0.00	0.00
Share turnover	0.62	0.35	1,827	0.45	0.25	8,337	1.15	0.73	67,252	0.00	0.00	0.00	0.00
Bid-ask spread (%)	4.75	3.71	1,660	6.69	5.00	7,460	2.29	1.62	58,410	0.00	0.00	0.00	0.00
Number of institutions	17.52	12	1,852	11.30	8	8,586	85.38	44	69,742	0.00	0.00	0.00	0.00
Total institutional holdings (%)	20.53	15.53	1,858	16.47	10.69	8,641	42.46	39.90	70,012	0.00	0.00	0.00	0.00
Panel B: Earnings Management Proxies (%)													
Total accruals	-3.42	-3.46	1,761	-4.96	-4.32	8,351	-2.38	-2.87	69,121	0.00	0.00	0.00	0.00
Modified Jones DAs	4.23	0.47	1,761	3.26	0.29	8,351	3.58	0.88	69,121	0.13	0.22	0.42	0.04
Industry modified Jones DAs	0.42	-0.22	1,761	-0.07	-0.29	8,351	0.30	-0.09	69,121	0.25	0.71	0.55	0.32

The table compares the 1,913 observations of firms that regain coverage to: a) 9,273 observations of firms that were uncovered in year *t*-1 and are still without analyst coverage in year *t*; and b) 72,842 observations of firms that were covered in year *t*-1 and are still with analyst coverage in year *t*. All variables are determined at the end of year *t*-1, which marks the year prior to regaining analyst coverage. The last four columns report *p*-values from a standard two-sample *t*-test (a two-sample Wilcoxon rank-sum test) of difference between means (medians).

Table 6

Probability of Regaining Analyst Coverage

	1 = Subsample firms that regain analyst coverage 0 = Neglected firms that are still without analyst coverage			1 = Subsample firms that regain analyst coverage 0 = Covered firms that are still with analyst coverage		
	After 1 year	After 2–3 years	After 4+ years	After 1 year	After 2–3 years	After 4+ years
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	-3.74***	-2.98***	-7.70***	-3.76***	-4.37***	-5.72***
	(-4.05)	(-6.42)	(-6.33)	(-5.24)	(-4.72)	(-5.07)
Altman's *Z*-score$_{t-1}$	-0.00	0.00	0.01**	-0.01	-0.01	0.00
	(-0.05)	(1.07)	(2.21)	(-1.51)	(-1.18)	(0.20)
Excess returns$_{t-1}$	0.29***	0.26***	0.45***	0.54***	0.71***	0.64***
	(4.31)	(6.93)	(5.20)	(9.04)	(11.28)	(8.04)
Idiosyncratic volatility$_{t-1}$	-0.56	-0.78**	-0.24	1.98***	1.17	2.44***
	(-0.80)	(-2.02)	(-0.26)	(2.97)	(1.60)	(2.61)
Ln(Market capitalization$_{t-1}$)	0.28***	0.12***	0.40***	-0.53***	-0.58***	-0.39***
	(4.02)	(3.35)	(5.51)	(-9.40)	(-9.14)	(-5.17)
B/M ratio$_{t-1}$	-0.01	-0.04	-0.18**	0.02	-0.08	-0.16*
	(-0.10)	(-1.23)	(-2.18)	(0.31)	(-1.17)	(-1.76)
Ln(Trading volume$_{t-1}$)	0.38***	0.19***	0.07	-0.29***	-0.29***	-0.58***
	(6.62)	(6.67)	(1.15)	(-4.88)	(-4.41)	(-7.78)
Share turnover$_{t-1}$	0.15**	0.09**	0.00	-0.18*	-0.23**	0.04
	(2.09)	(2.38)	(0.02)	(-1.80)	(-1.96)	(0.53)
Bid-ask spread$_{t-1}$	-1.56	-2.12**	-5.36**	2.88*	-1.61	-0.51
	(-0.91)	(-2.19)	(-2.43)	(1.90)	(-0.82)	(-0.22)
Total institutional holdings$_{t-1}$	1.69***	0.24	-0.92**	-1.39***	-2.45***	-3.64***
	(5.46)	(1.43)	(-2.03)	(-4.60)	(-7.31)	(-8.53)
Industry modified Jones DAs$_{t-1}$	-0.34	-0.01	0.80**	-0.38	0.04	1.08***
	(-1.27)	(-0.05)	(2.13)	(-1.23)	(0.11)	(2.63)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Exchange fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo-R^2	0.1419	0.1239	0.1301	0.2004	0.2263	0.2794
Wald χ^2	398.90	409.15	316.01	1,299.16	1,205.10	926.14
Prob. > χ^2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Number of observations	7,043	6,913	6,736	47,319	47,189	47,012

The table reports logistic models for the probability that a firm will regain analyst coverage in year *t*. The dependent variable takes on a value of one for formerly neglected firms that receive analyst coverage during the calendar year *t*. Regression models 1 to 3 use neglected firms that are still uncovered as a reference group. Regression models 4 to 6 use regularly covered firms as a reference group. All variables are winsorized at the 1% and 99% levels. White's heteroskedasticity-adjusted *z*-statistics are in parentheses. Standard errors are clustered at the firm level. ***, **, and * indicate that the coefficients are different from zero at the 1%, 5%, and 10% levels, respectively.

Table 7

Analyst Coverage and Earnings Management after Resumption of Coverage

	Year after resumption of analyst coverage							
	Mean				Median			
	1st year	2nd year	3rd year	4th year and beyond	1st year	2nd year	3rd year	4th year and beyond
Panel A: Analyst Coverage								
Number of analysts	1.84	2.92	3.65	5.72	1	2	2	4
Number of estimates	3.70	8.08	10.70	19.13	3	5	6	11
EPS estimate	0.48	0.50	0.53	0.79	0.42	0.45	0.48	0.70
Industry-adjusted EPS estimate	-0.55	-0.66	-0.75	-0.65	-0.61	-0.67	-0.63	-0.54
Actual EPS	0.26	0.30	0.31	0.66	0.36	0.40	0.43	0.68
Difference (actual EPS–estimated EPS)	-0.22	-0.21	-0.21	-0.14	-0.01	-0.01	-0.01	0.00
Recommendation	1.88	2.07	2.18	2.28	2	2	2	2
Industry-adjusted recommendation	-0.39	-0.20	-0.12	-0.04	-0.43	-0.18	-0.11	-0.02
Proportion of star analysts (%)	5.07	5.73	5.46	8.16	0	0	0	0
Proportion of broker:								
Investment banks (%)	81.30	84.33	84.86	85.72	100	100	100	100
Independent research firms (%)	15.82	13.87	13.79	13.79	0	0	0	0
Paid-for research firms (%)	2.88	1.80	1.35	0.49	0	0	0	0
Prop. of bulge bracket invest. banks (%)	7.86	8.96	8.80	14.29	0	0	0	0
Panel B: Earnings Management Proxies (%)								
Total accruals	-2.15	-1.64	-2.17	-2.87	-2.64	-2.21	-2.64	-2.78
Modified Jones DAs	4.95	4.82	4.75	4.64	2.90	1.72	1.44	1.42
Industry modified Jones DAs	0.73	0.55	0.33	0.22	0.40	0.32	0.27	0.02

This table presents summary statistics for the subsample of firms that regained analyst coverage in the years following the resumption of coverage. Panel A reports statistics for the level and quality of analyst coverage. Panel B reports earnings management proxies.

Table 8

Differences in Earnings Management in Years after Resumption of Analyst Coverage

Panel A: Differences in Earnings Management between Subsample Firms that Regain Coverage and Covered Firms

Year of resumption of analyst coverage	Subsample firms that regained coverage from 1 analyst vs. Firms that are covered by 1 analyst				Subsample firms that regained coverage from 2 analysts vs. Firms that are covered by 2 analysts				Subsample firms that regained coverage from 3+ analysts vs. Firms that are covered by the same number of analysts			
	1st year	2nd year	3rd year	4th year and beyond	1st year	2nd year	3rd year	4th year and beyond	1st year	2nd year	3rd year	4th year and beyond
Total accruals	0.45	0.69	-0.46	0.06	0.45	0.14	0.87	0.56	2.84***	1.07**	0.59	0.21
Modified Jones DAs	-0.25	0.53	-0.34	1.55**	1.21**	0.89*	0.62	0.70	3.03***	1.61**	0.18	0.45
Industry modified Jones DAs	0.83	-0.02	-1.14*	-0.05	1.16**	1.01*	0.18	0.27	2.87***	0.59	0.33	-0.20

Panel B: Differences in Earnings Management between Subsample Firms that Regain Coverage and Neglected Firms

Year of resumption of analyst coverage	Subsample firms that regained coverage from 1 analyst vs. Neglected firms that are still without analyst coverage				Subsample firms that regained coverage from 2 analysts vs. Neglected firms that are still without analyst coverage				Subsample firms that regained coverage from 3+ analysts vs. Neglected firms that are still without analyst coverage			
	1st year	2nd year	3rd year	4th year and beyond	1st year	2nd year	3rd year	4th year and beyond	1st year	2nd year	3rd year	4th year and beyond
Total accruals	0.23	-0.76	1.60	0.44	3.07***	1.63**	1.11*	1.07	2.75***	3.99***	0.45	-0.93
Modified Jones DAs	-1.03	-0.16	0.16	1.20	1.50**	1.44**	1.04*	0.54	1.78***	2.80***	1.69**	-0.40
Industry modified Jones DAs	-0.55	-2.80**	-0.19	1.16**	1.54**	0.45	0.17	-0.10	1.53**	2.52***	-0.28	-0.07

The table reports median differences in earnings management in the years after the resumption of analyst coverage, categorized by the number of regained analysts. The analysis is restricted to those cases where the number of regained analysts does not change over the resumption years. Panel A reports median differences in earnings management proxies between the firms that regain analyst coverage and covered firms matched in quarter *q*-1 on several characteristics (sales/total assets, ROA, retained earnings/total assets, working capital/total assets, market equity/total liabilities, idiosyncratic volatility, excess return, market capitalization, B/M ratio, trading volume, share turnover, bid-ask spread, institutional holdings, and industry modified Jones DAs) and the number of covering analysts, using propensity scores. Panel B reports median differences in earnings management proxies between the firms that regain analyst coverage and the neglected firms that are still without coverage, matched in quarter *q*-1 on the above mentioned characteristics.

Table 9

Exogenous Losses of Analyst Coverage

Panel A: Exogenous losses of coverage due to analyst departure

Quarter $q_{loss} \pm n$	-1	q_{loss}	+1	+2	+3	+4
Earnings Management Proxies (%)						
Total accruals	-0.61**	-0.88	-1.50*	-0.78	-0.54*	-0.62
Modified Jones DAs	-1.69**	-3.86***	0.19	0.28	1.73**	3.73**
Industry modified Jones DAs	-1.61**	-1.00**	0.59	0.70*	1.36**	0.25
Differences in Earnings Management Proxies (%)						
Total accruals	-2.44***	-1.71**	-0.63	-0.44	-0.12	0.90*
Modified Jones DAs	-4.31***	-4.67***	3.32***	3.59***	3.67***	0.95*
Industry modified Jones DAs	-0.65*	-0.29	3.74***	1.83**	0.29	0.30

Panel B: Exogenous losses of coverage due to brokerage closures

	SIZE/BM/RET/NOAN-matched Earnings Management Proxies (%)		
	Total accruals	Modified Jones DAs	Industry modified Jones DAs
Full sample	1.35*** (0.00)	-1.17*** (-0.87***)	0.22* (-0.30**)
Coverage ≤ 1	0.85** (0.02)	1.12** (2.19***)	1.07** (0.23*)
Coverage > 1 and ≤ 15	1.45*** (-0.04)	-0.86*** (-0.48)	0.47* (-0.58**)
Coverage > 15	1.34*** (0.00)	-1.59*** (-1.20***)	0.17 (-0.15)

Panel A reports median results from exogenous losses of analyst coverage due to analyst departure. From Thomson Research Investext database, we manually collect termination notices issued from 2003 to 2008. Among these notices, 3,121 are coverage terminations due to a performance-unrelated reason like analyst departure. In 131 cases, the departing analyst was the only analyst covering the firm in quarter q_{loss}-1, leaving it without coverage in quarter q_{loss}. We report median values of earnings management proxies in the four quarters after the complete loss of coverage and median differences in earnings management proxies between the firms that lose coverage due to analyst departure and control firms, which are covered firms matched in quarter q_{loss}-1 on the 14 independent variables, using propensity scores. Panel B reports median results from exogenous losses of analyst coverage due to brokerage closures. Following the methodology in Hong and Kacperczyk (2010), we use 15 brokerage mergers, which generally result in the exogenous firing of analysts because of redundancy. We isolate a sample of stocks that are covered by both broker-acquirer and broker-target (the treatment sample). The stocks that are covered by neither broker-acquirer nor broker-target represent the control group. Each stock in the treatment sample is matched with its own benchmark portfolio obtained using the sample of stocks in the control group. To construct the benchmark, we first sort stocks into 81 tercile portfolios according to their market capitalizations (SIZE), book-to-market ratios (BM), past returns (RET), and analyst coverage (NOAN). For each stock i in the treatment sample, we then determine benchmark-adjusted difference-in-differences in earnings management proxies from the year before to the year after the merger date, $(EM_{i2} - EM_{i1}) - (EM_{benchmark2} - EM_{benchmark1})$. Results are categorized by the ending number of reporting analysts in the year after the merger. In parentheses, we also report the median differences-in-differences from the quarter before to the quarter after the merger date.

Table 10

Probability of Change in Analyst Coverage for Covered Firms

	1 = Covered firms that increase analyst coverage 0 = Covered firms with no change in analyst coverage		1 = Covered firms that decrease analyst coverage 0 = Covered firms with no change in analyst coverage	
	(1)	(2)	(3)	(4)
Intercept	-0.89***	-0.89***	0.17	0.16
	(-3.34)	(-3.33)	(0.70)	(0.67)
Altman's *Z*-score$_{t-1}$	0.00	0.00	-0.00	-0.00
	(0.94)	(0.91)	(-1.34)	(-1.40)
Excess returns$_{t-1}$	0.44***	0.44***	-0.42***	-0.42***
	(16.12)	(16.10)	(-14.03)	(-14.03)
Idiosyncratic volatility$_{t-1}$	-0.60**	-0.61**	0.29	0.31
	(-2.02)	(-2.06)	(1.03)	(1.11)
Ln(Market capitalization$_{t-1}$)	0.25***	0.25***	-0.26***	-0.27***
	(10.83)	(10.86)	(-11.43)	(-11.44)
B/M ratio$_{t-1}$	-0.25***	-0.25***	0.06**	0.06**
	(-6.34)	(-6.31)	(2.08)	(2.07)
Ln(Trading volume$_{t-1}$)	0.13***	0.13***	-0.11***	-0.11***
	(6.37)	(6.37)	(-5.36)	(-5.39)
Share turnover$_{t-1}$	0.06***	0.06***	-0.11***	-0.11***
	(3.56)	(3.55)	(-5.22)	(-5.24)
Bid-ask spread$_{t-1}$	-5.47***	-5.46***	8.08***	8.05***
	(-5.81)	(-5.80)	(9.94)	(9.91)
Total institutional holdings$_{t-1}$	0.35***	0.36***	0.07	0.07
	(4.60)	(4.61)	(0.83)	(0.82)
Modified Jones DAs$_{t-1}$	0.18**		-0.14*	
	(2.25)		(-1.72)	
Industry modified Jones DAs$_{t-1}$		0.16**		0.02
		(2.10)		(0.17)
Analyst following$_{t-1}$	-0.01***	-0.01***	0.15***	0.15***
	(-3.65)	(-3.66)	(23.00)	(23.00)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Exchange fixed effects	Yes	Yes	Yes	Yes
Pseudo-R^2	0.1050	0.1049	0.1196	0.1195
Wald chi^2	2,574.46	2,573.05	1,740.86	1,738.63
Prob. > chi^2	0.0000	0.0000	0.0000	0.0000
Number of observations	25,470	25,470	24,171	24,171

The table reports logistic models for the probability that a firm will increase (decrease) analyst following in year *t*. In regression models 1–2 (3–4), the dependent variable takes on a value of one for firms that experience an increase (decrease) in analyst following during the calendar year *t*. In regression models 1 to 4, firms experiencing no change in analyst following from year *t*-1 to year *t* are the reference group. Analyst following$_{t-1}$ is the number of analysts covering a given firm in year *t*-1. All variables are winsorized at the 1% and 99% levels. White's heteroskedasticity-adjusted *z*-statistics are in parentheses. Standard errors are clustered at the firm level. ***, **, and * indicate that the coefficients are different from zero at the 1%, 5%, and 10% levels, respectively.

Table 11

Differences in Earnings Management in Years after Changes in Analyst Coverage

Panel A: Changes in Coverage From/To One Analyst

	Subsample firms that increase coverage from 1 to *n* analysts vs. Firms that are still covered by *n* analysts					Subsample firms that decrease coverage from *m* to 1 analyst vs. Firms that are still covered by 1 analyst			
Year after increase in analyst coverage	1st year	2nd year	3rd year	4th year and beyond	Year after decrease in analyst coverage	1st year	2nd year	3rd year	4th year and beyond
Total accruals	1.81***	0.34	-0.22	-0.68	Total accruals	-1.32**	-0.86*	-0.78	-0.16
Modified Jones DAs	1.61**	1.05*	0.18	0.07	Modified Jones DAs	-0.75	-0.46	-0.65	-0.10
Industry modified Jones DAs	0.84*	0.55	0.00	0.03	Industry modified Jones DAs	-1.16*	-0.05	-0.12	-0.09

Panel B: Changes in Coverage From/To Two Analysts

	Subsample firms that increase coverage from 2 to *n* analysts vs. Firms that are still covered by *n* analysts					Subsample firms that decrease coverage from *m* to 2 analysts vs. Firms that are still covered by 2 analysts			
Year after increase in analyst coverage	1st year	2nd year	3rd year	4th year and beyond	Year after decrease in analyst coverage	1st year	2nd year	3rd year	4th year and beyond
Total accruals	-0.36	-0.29	-0.46	0.56	Total accruals	-0.98	-0.07	-0.10	-0.81
Modified Jones DAs	0.66	0.66	0.76	0.01	Modified Jones DAs	-0.46	0.82	0.26	-0.18
Industry modified Jones DAs	0.16	0.47	-0.00	0.54	Industry modified Jones DAs	-0.32	-0.60	0.08	0.06

The table reports median differences in earnings management in the years after the changes in analyst coverage, categorized by the number of regained analysts. The analysis is restricted to those cases where the new number of analysts does not change in the next years. Panel A reports median differences in earnings management proxies between the firms that experience a change in analyst coverage from/to one analyst and covered firms matched in quarter *q*-1 on several characteristics (sales/total assets, ROA, retained earnings/total assets, working capital/total assets, market equity/total liabilities, idiosyncratic volatility, excess return, market capitalization, B/M ratio, trading volume, share turnover, bid-ask spread, institutional holdings, and industry modified Jones DAs) and the number of covering analysts, using propensity scores. Panel B reports median differences in earnings management proxies between the firms that regain analyst coverage and the neglected firms that are still without coverage, matched in quarter *q*-1 on the above mentioned characteristics.