Do Analysts Matter for Governance? Evidence from Natural Experiments

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Abstract:

Building on two sources of exogenous shocks to analyst coverage – broker closures and mergers, we explore the causal effects of analyst coverage on mitigating managerial expropriation of outside shareholders. We find that as a firm experiences an exogenous decrease in analyst coverage, shareholders value internal cash holdings less, its CEO receives higher excess compensation, its management is more likely to make value-destroying acquisitions, and its managers are more likely to engage in earnings management activities. Importantly, we find that most of these effects are mainly driven by the firms with smaller initial analyst coverage and less product market competition. We further find that after exogenous brokerage exits, a CEO's total and excess compensation become less sensitive to firm performance in firms with low initial analyst coverage. These findings are consistent with the monitoring hypothesis, specifically that financial analysts play an important governance role in scrutinizing management behavior, and the market is pricing an increase in expected agency problems after the loss in analyst coverage.

JEL classification: G34; G24; G32; M12; M41

Keywords: Financial analyst; Monitoring; Natural experiment; Analyst coverage; Value of cash holding; CEO excess compensation; Acquisition; Earnings management

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1. Introduction

Do financial analysts matter for corporate governance? In their seminal paper, Jensen and Meckling (1976) emphasize the governance role of analysts in reducing the agency costs associated with the separation of ownership and control. Specifically, they point out that, "we would expect monitoring activities to become specialized to those institutions and individuals who possess comparative advantages in these activities. One of the groups who seem to play a large role in these activities is composed of the security analysts employed by institutional investors, brokers and investment advisory services…" (p.354). Indeed, analysts can serve as an external governance mechanism through at least two channels. First, analysts track firms' financial statements on a regular basis and interface with management directly by raising questions in earnings announcement conference calls, which can be regarded as direct monitoring.[1] Second, analysts provide indirect monitoring by distributing public and private information to institutional investors and millions of individual investors through research reports and media outlets such as newspapers and TV programs (Miller, 2006), helping investors to detect managerial misbehavior[2]. We refer to the hypothesis that analysts matter for governance through direct and indirect monitoring as the monitoring hypothesis.

Nevertheless, much of the academic research in this area centers on the conflicts of interest between analysts and sell-side or buy-side clients, which results in an optimistic bias in earnings forecasts (e.g. Das et al., 1998; Gu and Wu, 2003; O'Brien et al., 2005; Ke and Yu, 2006; Mola and Guidolin, 2009; Groysberg et al., 2011).[3] There is a striking paucity of papers that have explicitly tested for a corporate governance role of analysts. In fact, Leuz (2003) points out that the link between analysts and firm value is not clearly established in the literature and calls for more research. Chung and Jo (1996) find a positive correlation between analyst coverage and Tobin's Q,

[1] For instance, Dyck et al. (2010) find that, compared to analysts, the SEC and auditors only play a minor role in detecting corporate fraud. Analysts have been directly involved in the detection of fraud in firms like Compaq, Gateway, Motorola, PeopleSoft, etc.

[2] In a survey of 401 CFOs, Graham et al., (2005) report that more than 36% of managers rank analysts as the most important economic agent in setting the stock price of their firm.

[3] Firth et al. (2012) provide a recent review of this literature.

but there is an under-researched and crucial issue: what are the channels through which analysts increase corporate value? More recently, Yu (2008) examines the effects of analyst coverage on earnings management, and finds that firms followed by more analysts manage their earnings less, which is consistent with the monitoring hypothesis.[4] Yet none of the extant papers has looked at the role of financial analysts in monitoring other major corporate decisions. Therefore, we try to fill this gap by taking a holistic approach to the monitoring role of analyst coverage in mitigating managerial extraction of private benefits from outside shareholders.

The paucity of the research might be partially driven by potential endogeneity concerns (i.e. analyst coverage is likely endogenous). For instance, analysts might tend to cover firms with less severe agency problems. If this is the case, simple OLS regressions of governance outcomes on the number of analysts following the firm would bias towards finding significant results. Unobservable firm heterogeneity correlated with both analyst coverage and corporate decisions and policies could also bias the estimation results. To overcome the endogeneity problem, we rely on two natural experiments, brokerage closures and brokerage mergers, which generate exogenous variation in analyst coverage. These two experiments directly affect firms' analyst coverage, but are exogenous to individual firms' corporate decisions and policies.[5] News of brokerage closures and mergers can easily reach investors through press releases and media outlets. A key advantage of this identification approach is that it not only resolves endogeneity concerns, but also deals with the omitted variable problem by allowing multiple shocks to affect different firms at different times. Using these two natural experiments, we successfully identify 46 brokerage closures and mergers between 2000 and 2010, associated with 4,320 firm-year observations that experience exogenous analyst coverage decreases. We compare the monitoring outcomes of the firms from one year prior

[4] We differ by looking at more comprehensive aspects of monitoring by providing three sets of evidence from the marginal value of cash holdings, CEO pay, and acquisition decisions. Moreover, we utilize natural experiments to overcome endogeneity concerns. We also revisit the effects of analyst coverage on earnings management using our natural experiments framework, both complementing our main results and corroborating Yu's findings.

[5] These setting have been used in recent literature, such as Derrien and Kecskes (2013) and Irani and Oesch (2013).

to the brokerage exit (*t-1*) to one year after the brokerage exit (*t+1*) to ensure that we are capturing only the effect due to the exogenous shocks to analyst coverage, after controlling for a battery of other factors.[6] We provide three distinct and robust sets of evidence in support of the hypothesis that analyst coverage plays an important monitoring role in a firm's overall corporate governance.

Specifically, we look at the effect of an exogenous decrease in analyst coverage on the marginal value of cash holdings, CEO compensation, and acquisition decisions. As liquid assets, cash reserves are the assets most vulnerable to corporate governance problems for a firm, and entrenched mangers can divert cash for private benefit (Frésard and Salva, 2010). CEO compensation is one of the central issues of governance, and CEOs earn greater compensation when governance structures are less effective (Core et al., 1999). Anecdotal evidence shows that recently analysts have tried to curb excessive executive compensation through comments in their reports. For example, longtime bank analyst Mike Mayo points out in his report that, "…I laid out my case again: declining loan quality, excessive executive compensation, headwinds for the industry after five years of major growth driven by mergers."[7] Mergers and acquisitions are one of the largest investments for a firm, and the availability of the terms and characteristics of takeover transactions enable us to pin down the agency problems more easily (Jensen and Ruback, 1983). In a study of the agency problems at dual-class firms, Masulis et al. (2009) also look at value of marginal cash holdings, compensation, and acquisitions, and we use a similar framework to study the monitoring role of analysts. Finally, we revisit the result on earnings management (Yu, 2008) to provide direct evidence on the monitoring effect of analysts.

First, we investigate how the exogenous decrease in analyst coverage affects the marginal value of cash holdings. Cash provides managers with the most discretion over how to spend it, making it especially prone to agency problems. Jensen (1986) argues that entrenched managers would rather retain or invest cash than increase distributions to shareholders when firms do not have good

[6] We will further discuss this in Sections 2 and 6.
[7] Mike Mayo, "Why Wall Street Can't Handle the Truth", *The Wall Street Journal*, November 8, 2011.

investment opportunities. Among many types of assets that firms possess, cash reserves are particularly vulnerable to agency conflicts (Myers and Rajan, 1998), and when insiders have sufficient control rights, cash holdings are largely at risk of being tunneled out of firms for private benefit (Frésard and Salva, 2010). Indeed, Dittmar and Mahrt-Smith (2007) and Pinkowitz et al. (2006) find that cash is less valuable when the agency problem is more severe, and one dollar of cash holdings within the firm may not be worth a dollar to outside shareholders. Following the methodology in Faulkender and Wang (2006), we examine the changes in an incremental dollar of cash's contribution to firm value from before to after the analyst coverage reduction. We find a significant decrease in the marginal value of internal cash after the reduction in analyst coverage due to exogenous shocks from brokerage closures and mergers. Consistent with our monitoring hypothesis, this evidence demonstrates that investors anticipate that with less analyst coverage, corporate managers are more likely to misuse the cash reserves.

In further tests, we find that the drop in monitoring from analysts and the consequent decrease in the value of cash are significantly more pronounced for firms with lower analyst coverage (with an average of five analysts) to begin with. Meanwhile, the effect is insignificant for firms with higher analyst coverage, indicating that the significant effect of the exogenous reduction in analyst coverage is largely driven by the subsample with initially low analyst coverage. We also find that the decrease in the value of holding extra cash diminishes in the subsample of firms with more product market competition and for those whose cash is decreasing rather than increasing. Thus, the effects are pronounced where the impact of the coverage decrease is the greatest and where there are fewer substitute constraints on overspending. We also conduct a placebo test, wherein we replicate the main results of the value of cash holdings using a matched control sample, and find no significant change in the value of cash.

Second, we examine the effects of analyst coverage on CEO total and excess compensation. CEO compensation has long been regarded as a central issue in corporate governance. It is a direct way of shifting wealth from shareholders to the management, and excess compensation is a significant form of private benefits to managers (Masulis et al., 2009). A recent paper by Harford and Li (2007) documents that a substantial expected post-merger increase in compensation gives a CEO ex ante incentives to undertake an acquisition, even if the acquisition is value-destroying. Lang et al. (2004) point out that analyst scrutiny increases corporate transparency and as a consequence, makes it more difficult for managers to engage in self-dealing activities such as asset transfers, excessive compensation and perquisite consumption. Kuhnen and Niessen (2012) find that that the impact of public opinion on reducing executive compensation is more profound in firms with high analyst coverage. Relying on both portfolio matching and propensity score matching strategies, our difference-in-differences (DID) estimation results indicate that both CEO total compensation and excess compensation significantly increase after the firm loses an analyst. In further tests, we find that the significant increase in CEO pay only exists in the subsample with low initial analyst coverage and less market competition. We also find that after exogenous brokerage exits, a CEO's total and excess compensation become less sensitive to firm performance in firms with low initial analyst coverage. All of the evidence is consistent with our hypothesis that managers extract more private benefits at the expense of outside shareholders after the loss of an analyst reduces monitoring.

Our third approach studies how analyst coverage affects firms' acquisition decisions. One private benefit of control widely emphasized in the literature is empire building, a short-hand term for the process by which managers accelerate the growth of firm size and scope through value-destroying acquisitions and investments. During corporate acquisitions, the agency conflicts between managers and shareholders become more severe and their value implications can be measured more easily (Jensen and Ruback, 1983; Masulis et al., 2007). Lin et al. (2011) find that acquirers whose executives have a higher level of D&O insurance coverage experience significantly lower announcement-period abnormal stock returns. We use a sample consisting of 2978 completed domestic mergers and acquisitions made by 651 unique firms in the treatment sample and the same number of firms in the control sample. Our DID estimates indicate that after the exogenous decrease in analyst coverage, acquirers experience lower announcement abnormal returns, and are more likely to have negative announcement abnormal returns. We further find that the effect is significantly more pronounced in the subsample of firms with low initial analyst coverage and less market competition. Taken together, this set of results demonstrates that firms receiving less scrutiny from analysts are more likely to engage in value-destroying acquisitions for private benefits.

Finally, we revisit the impact of analyst coverage on earnings management. Using the absolute level of accruals-based earnings management and real activity manipulation as our measures of earnings management, we find that, ceteris paribus, managers are involved in more earnings management activities after the firms experience an exogenous loss in analyst coverage. The results are consistent with the finding in Yu (2008) that firms followed by more analysts manage their earnings less, and further reinforce our findings articulated above.

Our paper contributes to several strands of the literature. Primarily, our results confirm Jensen and Meckling's emphasis on the monitoring role of analysts. Financial analysts track financial statements regularly, interact directly with managers during earnings release conference calls, and distribute public and private information to investors. In this paper we establish that analyst coverage, through a monitoring channel, causally increases the marginal value of cash holdings, reduces CEO excess compensation, decreases the likelihood of value-destroying acquisitions, and reduces earnings management. Through both direct and indirect monitoring, analysts serve as an important external governance mechanism that must be considered as part of the overall governance system. Moreover, our findings shed light on how analyst coverage enhances firm value. Jensen and Meckling (1976) argue that security analysts are socially productive. Chung and Jo (1996) find a positive correlation between analyst coverage and Tobin's Q. Kelly and Ljungqvist (2012) document negative abnormal event returns from an exogenous reduction in analyst coverage. Nevertheless, there is a relative dearth of studies that address the channels through which analysts increase corporate value. In this study, we try to establish the link between analyst coverage and firm value by analyzing the effects of an exogenous decrease in analyst coverage on corporate decisions and policies. In this regard, our paper also contributes to the broader literature on analyst coverage.

Our paper is also related to the literature examining the marginal value of cash holdings. We find that analyst coverage has a positive and causal effect on the value of cash. Our results are in line with Dittmar and Mahrt-Smith (2007) that an extra dollar of cash is less valuable to shareholders at companies with more antitakeover provisions and lower institutional ownership. They are also consistent with Masulis et al. (2009), who show that corporate cash holdings are worth less to outside shareholders for dual-class companies with a wider divergence between insider voting and cash flow rights, and with Frésard and Salva (2010) who find that the value investors attach to excess cash reserves is substantially larger for foreign firms listed on US exchanges due to the strength of US legal rules and greater informal monitoring. All of these studies attribute their findings to managers extracting private benefits from corporate cash holdings at firms with poor governance.

Finally, our study also adds to the mergers and acquisitions literature by documenting the effect of external monitoring and governance on acquisitions. Existing literature finds that internal governance mechanisms such as anti-takeover provisions (e.g. Masulis et al., 2007) and D&O liability insurance (e.g. Lin et al., 2011) play an important role in determining acquisition returns. In this study, we find that external governance mechanisms such as analyst coverage also play an important role in affecting corporate acquisition decisions.

The remainder of the paper is organized as follows. Section 2 presents our identification strategy and the construction of our sample of firms affected by broker closures and mergers. Sections 3 to 5 analyze the effects of analyst coverage on the marginal value of cash holdings, CEO compensation, and acquisition decisions. In each section, we will first introduce the variables, descriptive statistics, and model specifications, and then report our empirical findings. Section 6 conducts additional robustness tests, and section 7 revisits the effect of analyst coverage on earnings management. Section 8 concludes.

2. Identification, Sample and Data

In attempting to study the effect of analyst coverage on corporate governance outcomes, a major concern is the fact that analyst coverage is likely to be endogenous. On the one hand, reverse causality is an important potential problem. There is a battery of literature that has shown that analysts tend to cover higher quality firms (Chung and Jo, 1996) and those with less information asymmetry (e.g., Lang and Lundholm, 1996; Bhushan, 1989; Bushman et al., 2005). Firms with fewer agency problems are usually regarded as high quality firms, and may attract more analyst coverage. Moreover, the level of information asymmetry may also correlate with corporate decisions and policies. On the other hand, unobservable firm heterogeneity correlated with both analyst coverage and corporate decisions and policies could also bias the estimation results.

Our identification strategy is to use two natural experiments that create exogenous variation in analyst coverage. The first natural experiment is brokerage closures. Kelly and Ljungqvist (2012) find that brokerage closures are mostly triggered by business strategy considerations of the brokers themselves rather than by the heterogeneous characteristics of the firms they cover. Therefore, broker closure is an ideal source of exogenous shocks to analyst coverage as it is not correlated with firm-specific characteristics. It should only affect a firm's managerial expropriation through its effect on the number of analysts covering the firm. Using closures as exogenous shocks to the supply of information, Kelly and Ljungqvist (2012) document the importance of information asymmetry in asset pricing. The second natural experiment is broker mergers. Hong and Kacperczyk (2010) use broker mergers as exogenous shocks to competition and study how competition affects forecast bias. When two brokerage firms merge, they typically fire analysts due to redundancy and possibly lose additional analysts as well due to uncertainty during integration and to culture-clash (Wu and Zang, 2009). If both of the brokerage houses have a different analyst covering the same firm before the merger, then the combined brokerage after the merger will dismiss at least one of the analysts following the firm. The terminated analyst is usually from the target firm. Consequently, broker mergers also provide exogenous variation in analyst coverage if we restrict the sample to firms covered by both of the brokerage houses before the merger, and that continue to be covered by the surviving broker after the merger. The latter requirement of continued coverage ensures that there is no firm characteristic that causes the brokerage to endogenously drop coverage altogether.

To identify broker closures, we first use the I/B/E/S database to construct a list of brokers who disappear from the database between 2000 and 2010, and then search press releases in Factiva to confirm the disappearance is due to broker closure and also to identify closure dates. We also complement our sample with a list of brokerage closures provided by Kelly and Ljungqvist (2012). In total, we obtain a list of broker closures with 30 closure events.

We construct our broker merger sample following Hong and Kacperczk (2010). Using Thomson's SDC Mergers and Acquisition database, we restrict both the acquirer and target primary SIC codes to 6211 (including but not limited to investment banks and brokerage firms) and 6282 (including but not limited to independent research firms). These firms likely employ sell-side financial analysts. We only consider completed deals and deals in which 100% of the target is acquired. Then we manually match all the mergers with the broker houses in the I/B/E/S data. In determining the correct broker house when there are multiple identities for one broker in I/B/E/S, we examine the coverage time period and activity level to determine the correct one. For example, in the case of RBC Dain Rauscher acquiring Ferris Baker Watts Inc on June 20, 2008, there are three BACODEs for RBC Dain Rauscher: 76, 1267, and 2322. We observe that the time period of observations in I/B/E/S for code 76 runs from 1982 through 2001, while the time period for code 2322 is from 2001 to 2011, and is 1999 to 2011 for code 1267. Therefore, 76 is not the relevant code. On the other hand, we find that 2322 merely covered 36 unique firms one year before the acquisition and the number of covered firms was even decreasing after 2008. The target firm Ferris Baker Watts Inc covered 152 unique firms before being acquired. More importantly, the broker 1267 covered 461 firms before the acquisition date, and covered 512 unique firms after the acquisition date. This evidence allows us to conclude that 1267 is the correct code. We also utilize the information contained in BAID in I/B/E/S as explained in Wu and Zang (2009).

After matching the mergers with the I/B/E/S database, we select only those mergers where both merging houses analyze at least two of the same stocks (Hong and Kacperczk, 2010). With this constraint, our procedure produces 24 merger events.[8] Combined with the broker closure sample, our list of 54 brokerage exits is similar to those of Kelly and Ljungqvist (2012) and Hong and Kacperczyk (2010) combined.[9]

We then merge our final sample of broker exits with the I/B/E/S unadjusted historical detail dataset to obtain a sample of covered stocks. We constrain firms covered by closing brokers to stay in the I/B/E/S sample in year *t+1*. We further restrict the covered stocks related to broker mergers to be covered by both merging houses before the merger and continue to be followed by the remaining broker after the merger. We get the analyst coverage information from the summary file in I/B/E/S. In our final sample of affected firms, we choose listed U.S. firms that are not financials or utilities, and that have CRSP and Compustat data in both years *t-1* and *t+1*. We keep the firm-year observations of only *t-1* and *t+1* to ensure that we capture only the direct effects of the exogenous drop in analyst coverage. Assuming the number of brokerage houses (or number of analysts) covering a firm is in equilibrium such that the number of analysts is optimal, the shock may drive the number of analysts out of equilibrium temporarily. It is possible that there will be entry or other brokers will make up for the diminished research in the long term. This setting enables us to

[8] Lehman is not in our sample, as it is not a suitable shock for identification purposes as also pointed out by Kelly and Ljungqvist (2012), because Barclays, which had no U.S. equities business of its own, took over Lehman's entire U.S. research department. The data for Merrill Lynch and Bank of America are retrieved using data downloaded in the earlier date. The observations are dropped by I/B/E/S in the current dataset.
[9] We examine whether our main results are driven by broker mergers or broker closures, and we find no qualitative difference between the two groups.

make good use of the short-term deviation from the equilibrium and analyze the monitoring role of analysts.[10] Applying these constraints and requiring financial and stock information availability, our final sample consists of 4,320 firm-year observations for 1,340 unique firms (associated with 46 brokerage exits) from 1999 to 2011.[11] Appendix B shows the number of broker mergers or closures and the corresponding number of affected firms each year from 2000 to 2010 in our sample. Overall, there is no obvious evidence of clustering in time and the exits are spread out fairly equally over time.

3. Analysis of the Effects of Analyst Coverage on the Marginal Value of Cash Holdings

We begin our analysis of the monitoring effect of analyst coverage by examining the changes in the marginal value of cash holdings after the decrease in analyst coverage due to exogenous broker closures and mergers.

3.1. *Estimation Model and Variables*

We apply the methodology developed by Faulkender and Wang (2006)[12], and augment the model by introducing a dummy variable *After*, whose value equals 1 if the observation is one year after the event of brokerage exit (*t+1*) and 0 if the observation is one year before brokerage exit (*t-1*). We then test our hypothesis by including interaction terms between *After* and change in cash. To be more specific, our regression model is:

$$r_{i,t} - R^B_{i,t} = \alpha_0 + \beta_1 \times \frac{\Delta Cash_{i,t}}{Mcap_{i,t-1}} + \beta_2 \times After_i \times \frac{\Delta Cash_{i,t}}{Mcap_{i,t-1}}$$

[10] Having said that, we also compare three years (*t+3* vs. *t-1*) or five years (*t+5* vs. *t-1*) after and one year prior to the shock in our tests of our major variables of interest, as described in Section 6.

[11] In reality, if the analysts know in advance of the broker closure, then between the announcement and year t+1, some of these analysts would find jobs in new brokerage houses and there would be some observations in which there was no change in analyst coverage in spite of the closure. We check and find that in our full sample there are 120 firm-year observations with no change in analyst coverage, despite a broker closure. We drop these cases and repeat our empirical analyses on value of cash, compensation and acquisition and find the empirical results highly robust. The results are not tabulated and are available upon request.

[12] This framework has been widely used in the recent literature, see, e.g., Dittmar and Mahrt-Smith (2007), Masulis et al. (2009); Fresard and Salva (2010).

$$+\beta_3 \times After_i + \delta' X + \varepsilon_{i,t} \quad (1)$$

where the dependent variable is the excess stock return $r_{i,t} - R_{i,t}^B$ over the fiscal year t.[13] $r_{i,t}$ is the equity return for firm *i* during fiscal year t and $R_{i,t}^B$ is the benchmark return in year t.[14] Following Masulis et al. (2009), we adopt two methods in calculating the benchmark return: (1) the value-weighted return based on market capitalization within each of the 25 Fama-French portfolios formed based on size and book-to-market ratio; (2) the value-weighted Fama-French (1997) 48-industry returns.[15] $\Delta Cash_{i,t}$ proxies for firms' unexpected changes in cash reserves from year *t-1* to t. Following Faulkender and Wang (2006), we standardize $\Delta Cash_{i,t}$ by 1-year lagged market value of equity ($Mcap_{i,t-1}$) in order to avoid the results being dominated by the largest firms. Also the standardization allows us to interpret β_1 as the dollar change in shareholder wealth for a one-dollar change in cash holdings, since stock return is the difference in the market value of equity between t and *t-1* ($Mcap_{i,t} - Mcap_{i,t-1}$) divided by $Mcap_{i,t-1}$. Detailed definitions and descriptions of the variables are available in Appendix A.

The vector X includes a set of firm-specific control variables. These parameters are changes in earnings before extraordinary items ($\Delta Earnings_{i,t}$), changes in net assets ($\Delta NetAssets_{i,t}$), changes in R&D ($\Delta R\&D_{i,t}$), changes in interest ($\Delta Interest_{i,t}$), changes in dividends ($\Delta Dividends_{i,t}$), and net financing defined as new equity issues plus net new debt issues ($NetFinancing_{i,t}$). All these variables are scaled by $Mcap_{i,t-1}$. We also include the interaction between $\Delta Cash_{i,t}$ and 1-year lagged value of cash holdings ($Cash_{i,t-1}$), and the interaction between $\Delta Cash_{i,t}$ and leverage

[13] Very recently, Gormley and Matsa (2012) show that using the "industry-adjusted" and "size and M/B adjusted" stock returns might bias the estimates. We try the benchmark portfolio fixed effects specification using the code as provided by the authors, and find our main results as shown in 3.2 are robust to the adjustment.

[14] Faulkender and Wang (2006) and Masulis et al. (2009) both use contemporaneous fiscal year excess returns as the dependent variable. We also use a July to June window to let the market have 6 months to digest the information, and find the results are even stronger, in both significance and magnitude.

[15] As argued in Masulis et al. (2009), industry-adjusted return is used as an alternative to alleviate the concern that market-to-book ratio is likely to be endogenous when using size and market-to-book ratio adjusted return. As we find later on that the results are quite similar for both the industry-adjusted return and size and market-to-book ratio adjusted return in our regression, we will focus on the size and market-to-book ratio adjusted return in the subsample analysis for brevity.

($Leverage_{i,t}$). $Leverage_{i,t}$ is defined as the market leverage ratio and is calculated as total debt divided by the sum of total debt and the market value of equity during the fiscal year t. Following Dittmar and Mahrt-Smith (2007) and Masulis et al. (2009), we also include the interaction between $\Delta Cash_{i,t}$ and a measure of financial constraint, which is a dummy variable with one indicating that the firm's Whited and Wu (2006) financial constraint index (WW index) is in the top tercile of the sample, and zero otherwise.

Our primary focus is β_2, the coefficient estimate of the interaction between $After_i$ and $\frac{\Delta Cash_{i,t}}{Mcap_{i,t-1}}$. A negative and statistically significant β_2 in regression (1) would be evidence for the monitoring hypothesis, as it suggests that after the decrease in analyst coverage due to exogenous shocks, investors, anticipating that the firm's managers would misuse cash reserves, place a lower value on internal cash.

3.2. Regression Results

We match our final sample of firms affected by exogenous broker closures and mergers to Compustat and CRSP to get financial statement and stock return information. The final sample consists of 3,732 firm-year observations associated with 1,179 unique firms from 1999 to 2011. The summary statistics are presented in Table 1. We find that on average a firm loses 0.96 analysts after a brokerage exit. The top and bottom quartile firm, as well as the median firm, lose one analyst after the broker closure or merger. The change in cash scaled by 1-year lagged market value of equity has a mean (median) of 1.6% (0.4%). Consistent with Faulkender and Wang (2006) and Masulis et al. (2009), the annual excess stock returns are right skewed for both industry-adjusted and size and M/B adjusted excess returns.

[Table 1 here]

Table 2 shows the regression results. In columns (1) and (2), the dependent variable is the industry-adjusted excess return during fiscal year *t*, and in columns (3) and (4), it is the size and market-to-book adjusted excess return of the stock during fiscal year *t*. Financial variables, except leverage, are scaled by the firm's market capitalization at the end of fiscal year *t-1*. All regressions control for year and Fama-French 48 industry fixed effects, whose coefficient estimates are suppressed. Across the four models, we consistently find that the interaction term between *After* and the change in cash has a statistically significant negative coefficient (β_2), which is consistent with our hypothesis that firms losing analyst coverage due to exogenous exits are more likely to misuse cash holdings so shareholders apply a lower value to cash inside these firms. Specifically, based on the estimates in column (2), the marginal value of cash on average decreases by $0.33 after the analyst loss due to brokerage exits, holding other factors constant.

The magnitude of the decrease is economically large and substantially as high as approximately 1/6 of the marginal value of cash holdings before the exogenous brokerage exit. The large effect of analyst coverage due to brokerage exit is consistent with Kelly and Ljungqvist (2012) who find that the cumulative abnormal returns average -112 basis points on the day of an exogenous exit. As we discuss below, in section 3.3.1 we reestimate our results by partitioning the whole sample into subsamples of low or high analyst coverage before brokerage exit, and find that the drop in the marginal value of cash is significantly more pronounced (1/4 of the initial marginal value of cash) for firms with smaller analyst coverage (less than or equal to five), and the effect is insignificant for firms with higher analyst coverage. This indicates that the significant drop in the marginal value of cash holding is largely driven by the subsample with initial low analyst coverage, where the effect of an individual analyst is larger.

The control variables are consistent with prior research. For example, we find negative and significant coefficients for the interaction term between change in cash and lagged cash, and the interaction between leverage and change in cash, which is consistent with Faulkender and Wang (2006) and Masulis et al. (2009). We also find positive and marginally significant coefficients for the interaction between change in cash and our measure of financial constraint as shown in the two full models in column (2) and (4), implying that the marginal value of cash increases with the degree of financial constraint, consistent with Faulkender and Wang (2006).

[Table 2 here]

In the typical value-of-cash regressions in the literature, the change in cash is standardized by the lagged market capitalization (e.g. Faulkender and Wang, 2006; Dittmar and Mahrt-Smith, 2007). One may be concerned that the excess stock return in the before period could affect the market capitalization in the after period and induce a spurious correlation that impacts our variable of interest. To alleviate such a concern, we first replace the interaction between *After* and the change in cash by an interaction term between *After* and (*1/lagged market cap*) in the marginal value of cash regressions. We find that the coefficients of the new interaction term between *After* and (*1/lagged market cap*) are positive in all of our four model specifications, and are even marginally significant at the 10% level when we use industry-adjusted annual excess stock returns as dependent variables. This is significantly contrary to our findings of the negative and significant coefficients of the interaction between *After* and change in cash. For brevity, we do not tabulate the results. Secondly, we standardize the change in cash and the other control variables by total book assets instead of lagged market capitalization. We find that our results are highly robust. In all four of our models, we find that the interaction term between *After* and change in cash are negative and significant at least at 5% level. Taken together, the evidence suggests that standardization is not a serious concern for our results.

3.3. Further Exploration of the Marginal Value of Cash Holdings

As discussed above, we have found an economically significant effect on cash holdings from the exogenous decrease in analyst coverage. The magnitude is substantial, as on average a one analyst drop out of 12.71 original analysts results in a 1/6 drop in the marginal value of cash holding. In this section, we reestimate our results by partitioning the whole sample into low or high initial analyst coverage subsamples, less or more product market competition subsamples, and less or more financial constraint subsamples to refine our understanding of the effect and further corroborate our interpretation.

3.3.1. Firms with Low Analyst Coverage before Brokerage Exits

We check whether the effect is mostly driven by firms with smaller analyst coverage. The more analysts that cover a stock, the less the loss of an analyst matters, akin to the Cournot view of competition (Hong and Kacperczyk, 2010). Low analyst coverage is a dummy variable that equals one if the number of analysts following the firm before brokerage exit is in the bottom tercile of the sample, and high analyst coverage is 1 for the firms in the top tercile of the sample. For the low analyst coverage subsample in the marginal value of cash analysis, the initial mean (median) value of analyst coverage is 4.83 (5).

The initial analyst coverage subsample results are reported in Panel A of Table 3. In columns (1) and (2), the sample is divided into low and high initial analyst coverage subsamples. We find that in the low analyst coverage subsample, the coefficient of the interaction between *After* and change in cash is negative and statistically significant at the 1% level, while it is insignificant in the high analyst coverage subsample. In addition, the coefficient in the low analyst coverage subsample is also larger in magnitude than that in the whole sample regression.[16] More specifically, ceteris paribus, after the exogenous loss of one analyst out of an average of five, the marginal value of cash on average decreases by $0.59, which is approximately 1/4 of the initial marginal value of cash. The result confirms our expectation that the large effect is mainly driven by the low initial analyst

[16] We find there are 70 firm-year observations with one or two analysts before broker exits and thus zero or one analyst after the broker closures/mergers. We drop these cases, and reestimate our value of cash regression in the low initial analyst coverage subsample as in Column (1) of Panel A in Table 3, and our results are not affected.

coverage subsample, and echoes the findings by Hong and Kacperczyk (2010) that the effect of losing an analyst is significantly more pronounced for stocks with smaller analyst coverage.

[Table 3 here]

3.3.2. Firms in Industries with Less Product Market Competition

Theory predicts that product market competition reduces managerial slack (for example, Jensen and Meckling, 1976; Hart, 1983; Holmström, 1982; Schmidt, 1997). Some recent papers such as Giroud and Mueller (2010) find that firms in noncompetitive industries benefit more from good governance than do firms in competitive industries. We reestimate our major results by partitioning the sample into industries with less and more competition, and expect that firms with less competition receive a more pronounced impact from an exogenous loss of analysts. More competition equals 1 if the industry's HHI index is in the bottom quartile of all 48 Fama-French industries, and less competition is defined as the complement. HHI index is calculated as the sum of squared market shares in terms of sales of all Compustat firms in each industry, and higher values indicate greater concentration and lower product market competitiveness.

The subsample results regarding market competition are reported in columns (3) and (4) in Panel A of Table 3. We find that the effect of an analyst loss is statistically significant in the less competition subsample, while insignificant in the more competition subsample at conventional levels. The finding is consistent with our expectation that the significant effect of an exogenous reduction in analyst coverage on the value of cash holdings is mainly driven by the less competitive subsample, and confirms the results in Giroud and Mueller (2010, 2011) that corporate governance matters more for noncompetitive industries.

3.3.3. Firms with Increasing vs. Decreasing Cash

The effect of an exogenous loss in analyst coverage on the marginal value of cash might be expected to be conditional on increasing or decreasing cash. A natural prediction is that the effect of an exogenous loss in analyst coverage is less important for firms with decreasing cash, since in their case, managers are not generating additional cash to waste, and so underinvestment is a greater concern than overinvestment. Another conjecture in contrast to this prediction is that firms could be "optimally" financially constrained, such that cash-decreasing firms are exactly those with managers who would overinvest if they had more funds. In this case we may observe no significant difference between increasing-cash and decreasing-cash firms.

To test these competing hypotheses, we partition the sample into increasing-cash and decreasing-cash subsamples, and reestimate our baseline regressions. We place a firm in the increasing-cash subsample if the cash ratio increases after the exogenous shock to analyst coverage, and in the decreasing-cash subsample otherwise. The results are presented in Panel B of Table 3.

The results show that the interaction between *After* and change in cash is only significant and negative in the increasing-cash subsample, whether we use Size and M/B adjusted annual excess returns or industry-adjusted annual excess stock returns. The results support our hypothesis that the effect of an exogenous loss in analyst coverage disappears for firms with decreasing cash, since in their case, wasting cash is not a concern.

The results of our further analysis of initial analyst coverage, level of product market competition, and decreasing vs. increasing cash not only refine our inferences but also provide further support to the monitoring hypothesis. An alternative explanation for the change in cash following an exogenous decrease in analyst coverage would have to explain these results as well, all of which are predicted by the monitoring hypothesis.

3.4. Placebo Tests Using a Matched Control Sample

In our regressions for the value of cash holdings, we have included a battery of control variables and fixed effects following related literature, and therefore it is unlikely that our results are affected by unobservable effects. To further minimize the possibility that the variation in analyst coverage and the variation in our dependent variables of interest are caused by any unobservable cross-sectional or time-series effects that affect both analyst coverage and corporate policies, we perform a difference-in-differences analysis. Accounting for the fact that too many interaction terms might complicate the interpretation of our results, we conduct a placebo test, where we replicate the main results of the value of cash holdings (model 1) using a matched control sample. If the decrease in the marginal value of cash holdings is not driven by the exogenous reduction in analyst coverage, the interaction between $After_i$ and $\frac{\Delta Cash_{i,t}}{Mcap_{i,t-1}}$, β_2 should also enter negatively and significantly in the control sample regression.

Specifically, we adopt a nearest-neighbor logit propensity score matching strategy, developed by Rosenbaum and Rubin (1983) and used in our context as in Irani and Oesch (2013). The control pool is the remainder of the Compustat universe with valid matching variables. We construct a control sample of firms that are matched to the treated firms along a set of relevant, observable characteristics measured in the year prior to brokerage exits. First, we estimate a logit regression where the dependent variable equals one if a particular firm-year is classified as treated and zero otherwise, and our matching variables are the independent variables. We use a panel of 1866 treatment firm-years and the remainder of the Compustat universe pre-merger firm-years with valid matching variables. Second, the estimated coefficients are used to predict propensity scores of treatment, which are then used to perform a nearest-neighbor match. We perform the propensity score match with replacement and keep one unique match per treated firm. The matching variables include Size (SIZE), Cash flow (CF), Leverage (LEV), Cash (CASH), and Coverage (COV). Size is the log of the market capitalization of the firm. Leverage refers to the leverage ratio, calculated as the firm's total debt divided by the market value of its total assets. Cash is the ratio of cash and short-term investments to total assets. Cash flow is calculated as cash flows divided by total assets.

Coverage refers to the number of analysts covering the firm. Finally, we use the matched control sample to reestimate model 1, and the results are presented in Table 4.

[Table 4 here]

Panel A shows the summary statistics for the matched sample, and indicates that the distributions of the treatment and control samples are indeed similar.[17] For instance, the treated sample has 11.69 analysts following the firm on average, while the control sample has 11.74 on average, and the difference is not significant at conventional levels. Panel B reports the placebo test of the marginal value of cash holdings using the matched control sample. In Columns (1) and (2) of Panel B, the dependent variable is the industry-adjusted excess return during fiscal year t, and in Columns (3) to (6), it is the size and market-to-book adjusted excess return. We find that across all the models, the interaction term between *After* and change in cash is not significantly different from zero.[18] Moreover, the coefficient is much smaller in magnitude than that in the treatment sample regression. In Columns (5) and (6), we divide the sample into high vs. low analyst coverage subsamples and rerun the regressions, and we find no apparent patterns in the two subsamples. To summarize, the placebo test provides additional evidence that the relationship between analyst coverage and the marginal value of cash holdings is not driven by a spurious correlation, and reinforces our monitoring hypothesis.

4. Analysis of the Effects of Analyst Coverage on CEO Compensation

The prior section shows that analyst monitoring restrains the misuse of internal cash holdings. Continuing our analysis of the effect of analyst monitoring, in this section we test whether an exogenous decrease in analyst coverage leads to greater CEO pay and excess compensation.

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[17] In the DID analysis of CEO compensation and acquisitions, we also ensure that the distributions of the treatment and controls samples are similar. We do not report those summary statistics one by one afterwards simply to conserve space.

[18] The DID results based on portfolio matching as implemented in sections 4.2 and 5.2 are qualitatively similar, and we do not report them here for brevity.

4.1. Variable Description and Estimation Methodology

We match our sample of affected firms due to exogenous broker closures and mergers with the ExecuComp database. The final sample consists of 3,562 firm-years for 945 unique firms from 1999 to 2011. CEO compensation is measured by the natural logarithm of CEO total compensation, as the sum of salary, bonus, long-term incentive plan payouts, the value of restricted stock grants, the value of options granted during the year, and any other annual pay. Descriptive statistics are presented in Table 5. From the table, we observe that the mean CEO total compensation is $7.194 million, and the median is $7.663 million. Similar to the sample in the last section, both the mean and median firms lose one analyst, but the mean number of analysts initially covering the firm is somewhat larger since ExecuComp covers only S&P 1500 firms which are usually larger in size.

[Table 5 here]

Based on the talent assignment model by Gabaix and Landier (2008), we also construct a measure of CEO excess compensation, defined as the residuals from the OLS regression of the natural logarithm of CEO total compensation on the natural logarithm of firms' total market value, as well as industry and year fixed effects in the universal sample of ExecuComp firms.

To investigate the effects of exogenous shocks to analyst coverage on CEO compensation, we use a difference-in-differences approach to minimize the concern that the variation in analyst coverage and in compensation are caused by any unobservable cross-sectional or time-series factors that affect both analyst coverage and CEO pay. We use two matching strategies: portfolio matching and propensity score matching. Propensity score matching follows similar procedures to those specified in section 3.4. The matching variables include subsets of Size (SIZE), Tobin's Q (Q), Cash flow (CF), Leverage (LEV), Industry-adjusted ROA (ADJROA), Abnormal stock returns (ABRET), Stock return volatility (VOL), Firm age (AGE), CEO tenure (CEOTENURE), R&D/Sales (RDS), CapEx/Sales (CAPXS), Advertising expense/Sales (ADVS), Lagged total compensation ($LNTDC1_{t-1}$), Institutional ownership (IO), and Coverage (COV), which are documented in the literature as determinants of CEO compensation (e.g. Masulis et al., 2009).

The strategy of portfolio matching closely follows Derrien and Kecskes (2013). Specifically, we match by industry, SIZE, Q, CF, and COV. First, we require that candidate control firms be in the same industry as our treatment firms. We also require candidate control firms to be in the same size quintile, Tobin's Q quintile, and cash flow quintile as our treatment firms. We then retain candidate control firms that have the smallest difference in number of analysts to the corresponding treatment firms. If there are still more than two candidate firms left after the above procedure, we compute the difference between treatment firms and control firms for each of total assets, Tobin's Q, and cash flow. We rank the difference for each of these three variables, and we compute the total rank across all three variables. We keep candidate control firms that have the lowest total rank.

In order to measure the effects of analyst coverage on CEO compensation, for each matching approach, we compare the differences in CEO compensation ($\Delta CEO\ total\ (excess) compensation_i^{Treated}$) between one year after the brokerage exit and one year prior to the exit, to that of its matched control firm $\Delta CEO\ total\ (excess) compensation_i^{Control}$, for a treated firm *i* and our measure of total compensation and excess compensation. We then take the mean of the difference-in-differences across all the firms in our sample. To be more specific, the average treatment effect of the treatment group (DID) is calculated as:

$$DID(CEO\ total\ (excess) compensation) = \frac{1}{N}\sum_{i=1}^{N} \Delta CEO\ total\ (excess) compensation_i^{Treated} - \frac{1}{N}\sum_{i=1}^{N} \Delta CEO\ total\ (excess) compensation_i^{Control}, \qquad (2)$$

where *N* refers to the number of treatment and control firms.

4.2. *Estimation Results*

Table 6 presents the DID estimation results. In Panel A, we use portfolio matching. The dependent variable is either the natural logarithm of CEO total compensation, or CEO excess compensation. As for CEO total compensation, we find a positive and statistically significant DID estimate at the 5% level, indicating that total compensation increases significantly after the firm exogenously loses analyst coverage relative to matched control firms. The result is not only statistically but also economically significant. Specifically, after the broker closure or merger, CEO total compensation increases by about 10.8% compared to control firms, holding everything else constant. In the column for excess compensation, we find that the DID estimate is also positive and statistically significant. In fact, it is more significant than in the total compensation result, and now is significant at the 1% level. Looking at the magnitude, CEO excess compensation experiences an increase of 0.126 after an exogenous loss in analyst coverage, which is 13.6% of one standard deviation of excess compensation in our sample.

[Table 6 here]

Panel B applies a nearest-neighbor logit propensity score matching estimator. We first include SIZE, Q, LEV, ADJROA, ABRET, VOL, $LNTDC1_{t-1}$, AGE, CEOTENURE, and COV as matching variables, and then repeat after dropping LEV, AGE, CEOTENURE. We also augment the matching estimator with RDS, CAPXS, ADVS, and IO. We find that all of the main mean difference-in-differences are highly significant with variants of matching criteria. The estimates are also similar to the results based on portfolio matching in terms of magnitude. The results are consistent with our hypothesis that management extracts more private benefits at the expense of outside shareholders after a reduction in monitoring by financial analysts.

4.3. *Further Exploration of CEO Total and Excess Compensation*

As previously described, we have found an economically significant effect of the exogenous decrease in analyst coverage on a CEO's total and excess compensation. As in section 3.3, we reestimate our results by partitioning the whole sample into low or high initial analyst coverage subsamples, and less or more product market competition subsamples to lend further support to our results and check whether the large effect on CEO pay is mainly driven by the low initial analyst coverage subsample and less market competition subsample. We also examine changes in pay-performance sensitivities after the exogenous reduction in analyst coverage.

4.3.1. Firms with Low Analyst Coverage before Brokerage Exit

As in section 3.3, we first divide the whole sample into low and high initial analyst coverage subsamples. The initial analyst coverage subsample results are reported in Panel C of Table 6.

We report results using both CEO total compensation and excess compensation as dependent variables. We find that our DID estimate is only statistically significant in the low analyst coverage subsample at conventional significance levels for both total and excess compensation regressions. The estimates are positive and larger in magnitude than in the whole sample regressions. The estimate in the low initial analyst coverage sample is almost double that in the high initial analyst coverage subsample for CEO total compensation. Together with the subsample analysis of cash holdings, the results so far confirm our conjecture that the large effect of an exogenous loss in analyst coverage is mainly driven by the low initial analyst coverage firms.

4.3.2. Firms in Industries with Less Product Market Competition

We then partition the sample into less and more product market competition subsamples and reestimate our results for the effect of analyst coverage on CEO pay. The results are shown in Panel D of Table 6.

Across our two measures of compensation, we consistently find that the DID estimates are positive but only statistically significant in the subsamples with less market competition. Thus, the reduction in monitoring is only important when there is also less product market competition to constrain managers. Taken together with the results in 3.3.2, the findings indicate that the less competitive subsamples drive the significant effect of an exogenous reduction in analyst coverage on the mitigation of agency problems.

We further verify whether the CEO is the same both before and after the brokerage exit events and find that out of the 1781 affected firms, 440 have CEO turnover. We try dropping these cases and check whether our results are still robust. Panel E of Table 6 shows the results, which further supports our findings by showing that our results are maintained.

4.3.3. Changes in Pay-Performance Sensitivity after an Exogenous Loss in Analyst Coverage for Firms with Low Analyst Coverage

A large volume of literature looks at the sensitivity of pay of executives to performance, and entrenched and risk averse managers may prefer higher compensation and lower sensitivity to performance (e.g. Jensen and Murphy, 1990; Haubrich, 1994; Hall and Liebman, 1998). To further corroborate our inferences, we examine how CEO pay-performance sensitivity changes after the exogenous loss in analyst coverage, particularly for the subset of firms with low initial analyst coverage. We focus on this subset since we previously find that the effects are mainly driven by the low coverage subsamples. We follow Masulis, Wang, and Xie (2009) in choosing the control variables in our compensation regressions. Although they use contemporaneous control variables in their paper, we change all of our control variables to be lagged relative to the year in which compensation is measured. We also add a measure of institutional ownership in our regressions. To account for the nonlinear relationship between institutional ownership and CEO compensation, we use a dummy variable with one indicating that the total number of shares owned by institutional investors is larger than the annual median and zero otherwise. Table 7 presents the results.

[Table 7 here]

In columns (1) and (2), we split the sample into before and after brokerage exit subsamples, and investigate the changes in pay-performance sensitivity after the exogenous loss in coverage. We find that the coefficients for both *Industry-adjusted ROA* and *Abnormal stock returns* are significant before brokerage exit, but *Abnormal stock returns* becomes insignificant and the magnitude of the coefficient of *Industry-adjusted ROA* is reduced after the exogenous loss in analyst coverage, which implies that a CEO's pay is less sensitive to performance after the exogenous shock to analyst coverage. Columns (3) and (4) report results specifically for excess compensation and we find that *Abnormal stock returns* are significant at the 1% level before the drop in analyst coverage and turn insignificant after the brokerage exit.

We introduce an additional measure of compensation – change in CEO wealth, measured by the change in the sum of values of unrestricted stock, restricted stock and vested and unvested options held by the CEO. The valuation of options uses a methodology similar to that in Core and Guay (2002). Accordingly, we use change in industry-adjusted ROA and change in abnormal stock returns instead of levels as performance measures. The results are presented in Columns (5) and (6) of Table 7. We find that both the change in industry-adjusted ROA and the change in abnormal stock returns are only significant in the before period. Overall, we find that after exogenous brokerage exits, a CEO's total and excessive compensation become less sensitive to performance.[19]

5. Analysis of Acquisition Decisions

[19] In a further robustness test, we also look at the components of CEO compensation, and find that the log value of new options granted in year *t+1* increases significantly in the DID test as in Section 6, compared to the matched sample. The increase is only significant for the low initial analyst coverage subsample. It is possible that incentives substitute for external governance, as what we're seeing in year *t+1* is a large grant of new options (so it looks like compensation goes up and is not sensitive to performance in that year), but going forward, their wealth is actually more sensitive to performance. This is still consistent with our hypothesis—that analysts are an important part of external governance and the board is adjusting to the change in external governance.

Acquisitions provide an ideal setting for our analysis of the effects of analyst coverage on private benefits of control, as they are one of the largest corporate investments, and agency conflicts between the management and shareholders can be amplified during the process. Existing literature has provided evidence that managers use acquisitions to expropriate outside shareholders (e.g. Jensen and Ruback, 1983; Jarrell et al., 1988; Andrade et al., 2001). In this section, we test how analyst coverage impacts acquisition choices by examining acquirer returns and the probability of value-destroying acquisitions.

5.1. Sample and Variable Description

We match our final sample of affected firms with all domestic acquisitions made by U.S. public companies from the SDC Mergers and Acquisitions database. During the process, we require that (1) the deal is completed[20] ; and (2) the acquiring firm has annual financial information in Compustat and daily stock return data for at least 70 days before the announcement date available from CRSP.

These procedures yield a final sample of 1,464 completed domestic mergers and acquisitions. Our major variables of interest are the announcement cumulative abnormal returns (CARs), and the probability of having a negative CAR. We compute CARs using a 5-day window (-2, +2), where event day 0 is the announcement date. Abnormal returns are calculated as the residuals from a market model, with the estimation window being (-210, -11) and the market return being CRSP value-weighted return. Table 8 shows the summary statistics. We find that the average CAR is -0.228%, with a substantial variation (SD=6.17%). To study the likelihood of making value-destroying acquisitions, we code a dummy variable equal to one if the 5-day CAR is negative and 0 otherwise.

[Table 8 here]

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[20] We apply this filter following the recent mergers and acquisitions literature such as Masulis et al. (2007), Gorton et al. (2009), Lin et al. (2011). One advantage is that if the market is good at anticipating deal completion, then using only completed deals minimizes the problem of announcement returns reflecting varying degrees of expected completion.

To examine the effects of an exogenous decrease in analyst coverage on acquisition choices, we again rely on DID estimates based on both portfolio matching and propensity score matching. The control pool is the remainder of the SDC Mergers and Acquisitions universe with valid matching variables. Treated firms are matched using portfolio matching or a nearest-neighbor logit propensity score matching. We use different sets of matching variables drawn from the following set: Size (SIZE), Tobin's Q (Q), Cash flow (CF), Leverage (LEV), ROA, Past abnormal returns (ABRET), Free cash flows (FCF), Total acquisition value in the previous year (ACQ_{t-1}), Relative deal size (REL), Tender offer (TEND), Friendly deal (FRD), High-tech dummy (HITECH), Diversifying dummy (DIV), Stock dummy (STOCK), All cash dummy (ALLCASH), Private dummy (PRV), and Coverage (COV). If multiple deals are conducted by a given acquirer in a particular year, all deal related variables including CAR and probability of a negative CAR are the mean value of all deals made by that particular acquirer in that year, aggregated to the firm level. Deal related variables include REL, defined as the transaction value of the deal over the acquirer's market value, target public status and method of payment. We also include four dummy variables: (1) DIV, indicating whether the acquisition is a diversifying deal, which equals one if acquirer and target do not share a Fama-French 48-industry; (2) HITECH, which equals one if both the bidder and target are in high-tech industries as defined in Loughran and Ritter (2004); (3) TEND, which equals one if the deal involves a tender offer and zero otherwise; (4) FRD, which equals one for friendly deals and zero otherwise.

We construct the following models in estimating the DID of acquisitions:

$$DID(CAR\ (-2,+2)) = \frac{1}{N}\sum_{i=1}^{N} \Delta CAR\ (-2,+2)_i^{Treated} - \frac{1}{N}\sum_{i=1}^{N} \Delta CAR\ (-2,+2)_i^{Control}, \qquad (3)$$

$$DID(Negative\ CAR = 1) = \frac{1}{N}\sum_{i=1}^{N} \Delta(Negative\ CAR = 1)_i^{Treated}) - \frac{1}{N}\sum_{i=1}^{N} \Delta(Negative\ CAR = 1)_i^{Control}, \quad (4)$$

5.2. *Estimation Results*

Panel A of Table 9 reports the portfolio-matching DID results, using industry, SIZE, Q, CF, and COV as matching variables. We find a negative and statistically significant DID estimate of CAR (-2, +2), indicating that after the firm experiences an exogenous decrease in analyst coverage due to brokerage exits, managers make worse acquisitions. Specifically, the 5-day CAR decreases by 1.3% on average after the analyst loss compared with matched control firms, holding other things constant. Meanwhile, we obtain a positive and significant DID estimate of negative CAR, which means that the probability of making a value-destroying acquisition is higher after experiencing a decrease in analyst coverage. More specifically, ceteris paribus, the probability of experiencing negative abnormal returns caused by an acquisition increases by an economically significant 9% after the decrease in analyst coverage.

[Table 9 here]

Panel B uses different sets of matching variables and reports propensity score matching estimator results. All of the results show that after brokerage exits, the firm is more likely to conduct value-destroying acquisition. The estimates of the CAR's are similar to the portfolio matching results, while the estimates of the increase in negative CAR frequencies are somewhat smaller in magnitude.

5.3. Further Exploration of Acquisition Decisions

The results demonstrate that the exogenous analyst loss affects the types of acquisitions undertaken, providing evidence from CARs, and the likelihood of a negative CAR for a given acquiring firm. As an additional robustness check, in this subsection we proceed with the subsample analysis as previously described in Sections 3 and 4.

We divide the sample into low and high initial analyst coverage subsamples and re-estimate our results for the effects of analyst coverage on acquisition decisions. The subsample results are presented in Panel C of Table 9. Across all the models, we consistently find that the DID estimates are only significant in the low analyst coverage subsamples, and they are significantly larger in magnitude than the high coverage subsamples.

We also conduct the market competition subsample analysis for acquisition decisions, and report the results in Panel D of Table 9. We find the significant effects of analyst coverage on acquisitions only exist for the subset of firms with less market competition. The results indicate that the significant effects on acquisition decisions are mainly driven by the low analyst coverage subsample and the less competition subsample.

6. Additional Robustness Checks

Overall, the results confirm our hypothesis that a decrease in analyst coverage reduces monitoring, resulting in increased agency problems as evidenced by a decreased marginal value of cash reserves, greater excess compensation and more value-destroying acquisitions. In this section, we perform additional robustness checks, including evaluating possible channels through which analysts affect governance, alternative model specifications, the effect of star analysts, and the persistence of the effects.

6.1. Channels

First, we look at the change in analyst forecast bias using our difference-in-differences approach. Treated firms are matched using nearest-neighbor logit propensity score matching. The matching variables include Size (SIZE), Tobin's Q (Q), Leverage (LEV), Cash (CASH) and Coverage (COV), as in Mola and Guidolin (2009) and Hong and Kacperczyk (2010). Following the literature, the main variables of interest are mean bias and median bias. Analyst forecast bias is the difference between the forecast analyst *j* in year *t* and the actual EPS, expressed as a percentage of the previous year's stock price. The consensus bias is expressed as the mean or median bias among all analysts covering a particular stock. We exclude observations that fall below the 25th percentile of the size distribution, observations with stock prices lower than $5, and those for which the absolute difference between the forecast value and the true earnings exceeds $10. The final sample consists of 3292 firm-years, of which there are 1646 treatment firms. The results are presented in Table 10. The summary statistics in Panel A show that the mean (median) value of forecast bias is 3.81% (3.80%) in the treatment sample. The DID results suggest that the mean (median) optimistic bias increases by 0.93% (0.86%), statistically significant at the 5% level, implying that after exogenous shocks to analyst coverage, the remaining analysts make worse earnings forecasts and also more optimistic forecasts about the firm.

[Table 10 here]

Second, we examine a specific characteristic of analysts: being more critical of the firm. We classify the lost analyst to be critical if he/she issued lower-than-consensus investment recommendations in the year prior to the brokerage exit. We then compare the DID estimation of compensation and acquisitions for the affected firms with critical vs. non-critical analysts relative to control firms. Table 11 shows the results. The sample consists of 606 firm-years in the lower-than-consensus subsample in Panel A and 220 firm-years in the lower-than-consensus subsample in Panel B. We find that the effects of exogenous reductions in analyst coverage are more pronounced when firms lose lower-than-consensus analysts, implying that critical analysts add more value as monitors.[21]

[Table 11 here]

Third, we investigate another analyst characteristic: being independent or non-independent of the firms they cover. There is a literature in both finance and accounting that looks at the differences in recommendations and forecasts of independent vs. non-independent analysts. In particular, the findings in Gu and Xue (2008) suggest that forecasts of independent analysts are superior to those of non-independent analysts in representing ex ante market expectations.[22] Our classification of analyst independence follows Gu and Xue (2008), who use Nelson's Directory of Investment Research to identify the types of analyst firms.[23] After manually matching to our sample, we find that out of the 46 terminated brokers, 8 are independent brokers. However, as independent brokers are typically smaller and cover fewer firms, the affected firm-year observations are only a small proportion of the whole sample. For example, in the CEO compensation sample, there are 432 firm-years in the independent analyst subsample and 3082 firm-years in the non-independent analyst subsample. For the analysis of CEO compensation and acquisition decisions, we divide the sample into independent and non-independent subsamples, and repeat the DID estimations. Panels C and D in Table 11 show the results. Specifically, we find that the effects of exogenous drops in analyst coverage are more pronounced in the independent analyst subsample, consistent with Gu and Xue (2008)'s finding that independent analysts have more influence on the firms.[24]

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[21] We also conduct a similar subsample analysis for the value of cash holdings. The sample consists of 990 firm-years in the lower-than-consensus subsample, and 2742 firm-years in the other subsample. We rerun the marginal value of cash holdings regressions for both of the subsamples, and find that the decrease in the value of cash holdings in the lower-than-consensus subsample (1/4) is significantly larger than that in the higher-than-consensus subsample (1/7), as indicated by a Wald test of the equality of the estimated coefficients between the two subsamples, although the coefficient on the interaction term between *After* and the change in cash is not statistically significant at conventional levels in the lower-than-consensus subsample, probably due to the small number of observations in this subset of firm-year observations.

[22] We thank an anonymous referee for suggesting this analysis to us.

[23] We thank Zhaoyang Gu for providing an updated version of the data.

[24] Due to the small number of observations in the independent subsample, we check whether our previous results for the marginal value of cash holdings, are affected by analyst independence by including an

Some prior studies such as Lin and McNichols (1998) and Michaely and Womack (1999) use actual investment banking relationships to classify independent and non-independent analysts (affiliated vs. unaffiliated). We also check our main results conditional upon whether the exiting brokerage has an underwriting relationship with the firm in the three years before its exit. The underwriting relationships can include debt or equity issuance, and the data come from SDC. We find that the underwriting analyst subsample contains only 108 firm-years for the analysis of CEO compensation, and only 8 firm-years for the analysis of acquisition decisions. The sample size for the underwriting analyst subsample is too small to draw meaningful statistical inferences.

Fourth, we look at whether the lost analyst is an "all-star" analyst. Some evidence suggests that certain analysts are more influential than others and the most well-known analyst ranking is done by Institutional Investor magazine, which polls buy-side institutional investors every year to rank sell-side analysts (e.g., Stickel, 1992; Loh and Stulz, 2011). It is not necessarily true, however, that "all-star" analysts have more influence on corporate policies than other analysts. One reason is that the star status of an analyst is determined by his/her popularity with institutional investors, rather than his/her influence on corporate policies. Therefore, whether the effect of an exogenous reduction in analyst coverage is more pronounced for an "all-star" analyst is an empirical question.

Following Liu and Ritter (2010, 2011), we use the "all-star" designation in the October issue of Institutional Investor magazine. We classify the lost analyst as "all-star" if the analyst is an Institutional Investor all-star analyst within one year of the brokerage exits.[25] Firms affected by the exit events in year *t* are deemed to be covered by an all-star from October of year *t-1* if this analyst initiates coverage within 12 months of the events.

After checking, we find that there are 20 lost "all-star" analysts in our sample, affecting 68 firms in CEO compensation sample, and 18 deals in acquisition sample. We estimate the difference-in-

interaction term between the independent dummy and the change in cash. We find that our results are maintained.

[25] For more information about the construction of the dataset, see Liu and Ritter (2010, 2011).

differences results for CEO compensation in the subsample with "all-star" analysts, and find that the DID estimate for total compensation (excess compensation) is 0.21 (0.18). The economic magnitude is almost double the estimate in the whole sample, but it is statistically insignificant, probably due to such a small sample size. We further estimate the difference-in-differences results for acquisitions in the "all-star" analysts subsample, and find the DID estimate for CAR (propensity of a negative CAR) is -1.16% (11.2%), which is larger than the estimate using the whole sample. It is again insignificant as it lacks statistical power with only 18 observations. We also repeat the value of cash analysis using the "all-star" subsample (198 observations). The directions of the coefficients are consistent with our prior findings, but are statistically insignificant again due to the relatively small number of observations. Given the magnitude of the point estimates in these subsamples, we verify that our results remain if we drop the observations with a lost all-star analyst. We check the DID analysis of CEO compensation and acquisition decisions, and also the OLS regression analysis of the marginal value of cash holding. We find that all of our previous results remain. These results are not tabulated in the paper for brevity.

6.2. Monitoring vs. Information Story

As we discuss in the introduction, analysts can act as an external governance mechanism through both direct and indirect monitoring. Analysts provide indirect monitoring by distributing public and private information to institutional investors and millions of individual investors, helping investors to detect managerial misbehavior. The preceding analyses do not disentangle the direct and indirect monitoring (via improvement in information environment), instead treating them together as parts of the governance role played by analysts. In this section, we perform additional tests to explore whether both direct monitoring and the indirect information channel impact corporate outcomes, so that we can provide a more complete understanding of the underlying channels.

We first look at the changes in liquidity before and after the loss of an analyst. Kelly and Ljungqvist (2012) find that an exogenous loss of analyst coverage increases stock illiquidity. We use Amihud's (2002) measure, and implement the DID analysis as in Section 6.1. Treated firms are matched using nearest-neighbor logit propensity score matching. The matching variables include Size (SIZE), Tobin's Q (Q), Leverage (LEV), Cash (CASH), Amihud's Illiquidity (AI), and Coverage (COV). We find that the DID estimator for stock illiquidity is 0.02 and significant at the 5% level. The magnitude is similar to what is found in Kelly and Ljungqvist (2012). The results indicate that information asymmetry increases follows an exogenous loss in analyst coverage.

We then look at institutional ownership, where there are two possible outcomes. One conjecture is that investors might anticipate that with less analyst coverage, managers are more likely to misuse the cash reserve or conduct value-destroying acquisitions. Institutional investors might leave the stock after the loss of an analyst. Alternatively, institutional investors may have access to private information that is unavailable to retail investors, and therefore, the increase in information asymmetry due to an exogenous decrease in analyst coverage might "crowd out" the demand by retail investors (Kelly and Ljungqvist, 2012). Consequently, whether the exogenous drop in analyst coverage increases or decreases institutional ownership is an empirical question.

We directly test this in our DID framework. Treated firms are matched using nearest-neighbor logit propensity score matching. The results are reported in Table 12. Panel A reports summary statistics for institutional ownership in the treatment sample prior to brokerage exits. Panel B reports the DID results of institutional ownership, and we find that the DID estimate for institutional ownership is insignificant at conventional levels.[26] We further split the sample according to the initial number of analysts, and find a positive DID estimate of institutional ownership in the low analyst coverage subsample, and a negative DID estimate in the high analyst

[26] Our sample differs from Kelly and Ljungqvist (2012) with respect to the broker merger sample, as we are using SDC M&A database, and they are using Investext. Also they are using Reuters Estimates to identify the affected stocks, while we are using a more commonly used database I/B/E/S. Our sample is similar to those of Kelly and Ljungqvist (2012) and Hong and Kacperczyk (2010) combined. In addition, we extend the sample period to 2011, while the sample used in Kelly and Ljungqvist (2012) ends in 2008.

coverage subsample, although both are insignificant at the 10% level. Although the DID estimates are not significant, we note that the standard deviation of the change in institutional ownership is as high as 12%. Therefore, we divide the sample into subsamples based on whether institutional ownership decreases or not, and check whether our results hold for these two subsamples.

[Table 12 here]

Panels C and D report the DID results of CEO compensation and acquisition decisions, conditional upon whether institutional ownership is decreasing or non-decreasing following brokerage exits. Panel E reports the analogous OLS regression results for the marginal value of cash. If institutions instead of analysts play a direct governance role for the firms, we should expect to see that the effects of an exogenous drop in analyst coverage are only significant in the institutional ownership decreasing subsamples, compared to non-decreasing subsamples. By contrast, in Panels C, D and E, we find that our results generally hold in both of the decreasing and non-decreasing subsamples. It is even more interesting to notice that in Columns (1) and (2) of Panel E, the result is only significant in the non-decreasing subsample, inconsistent with the hypothesis that institutions instead of analysts directly affect governance in the brokerage merger and brokerage closure setting. Overall, this gives weight to the importance of direct monitoring by analysts. It is also notable that cash is worth more in the constrained sub-sample only if institutional ownership does not decrease (Panel E). If institutional ownership does decrease, the constraint interaction is not statistically significant (with a negative sign). This finding explains the weak results on this interaction term in table 2. And this also shows the important of corporate governance in affecting the marginal value of cash.

6.3. Persistence Test

As mentioned in Section 2, we explore the direct effects of the exogenous decrease in analyst coverage by comparing the monitoring outcomes from one year prior to the brokerage exit (*t-1*) to one year after the brokerage exit (*t+1*). We further find that most of the firms in our sample regain their analyst coverage after three years, consistent with our conjecture that the exogenous shocks drive the number of brokers (analysts) out of the equilibrium temporarily. This is also consistent with the finding in Derrien and Kecskes (2013) that decreases in analyst coverage are one-time decreases. We compare our monitoring outcome variables between three years (*t+3* vs. *t-1*) or five years (*t+5* vs. *t-1*) after and one year prior to the shock in our tests, and find no significant results, again consistent with Derrien and Kecskes (2013) who find that the significant changes in investment and financing due to exogenous reductions in analyst coverage mainly occur between *t-1* and *t+1*.

7. Revisiting How Analyst Coverage Affects Earnings Management

Yu (2008) investigates the effect of analyst coverage on earnings management and finds that firms followed by more analysts manage their earnings less. Using data from 21 countries, Degeorge et al. (2013) document that more analyst coverage results in less earnings management in countries with highly developed financial systems. Relying on only broker mergers as a natural experiment, Irani and Oesch (2013) find that the quality of financial reporting is significantly worse after reductions in analyst coverage. In this section, we revisit Yu's study by using our natural experiments framework. Consistency with Yu (2008)'s results will further validate our approach.

7.1. Measuring Earnings Management

Following the most recent literature in earnings management (e.g. Roychowdhury, 2006; Cohen et al., 2008; Zang, 2012), we use two measures of earnings management: real activities manipulation and accruals-based earnings management.

As described in Roychowdhury (2006) and Zang (2012), real activities manipulation comprises of two parts: (1) increasing earnings by reducing the cost of goods sold (COGS) by overproducing inventory, measured by the abnormal level of production costs; (2) lowering discretionary expenses, including advertising, R&D expenditure, and selling, general, and administrative (SG&A) expenses, measured by the abnormal level of discretionary expenses. Specifically, the abnormal level of production costs (RM_{PROD}) is measured as the residual from the following cross-sectional OLS regressions for each year and industry combination using annual financial information from the Compustat universe over the period from 1999 to 2011:

$$\frac{PROD_{i,t}}{AT_{i,t-1}} \equiv \frac{COGS_{i,t}+\Delta INVT_{i,t}}{AT_{i,t-1}} = \beta_1 \frac{1}{AT_{i,t-1}} + \beta_2 \frac{Sale_{i,t}}{AT_{i,t-1}} + \beta_3 \frac{\Delta Sale_{i,t}}{AT_{i,t-1}} + \beta_4 \frac{\Delta Sale_{i,t-1}}{AT_{i,t-1}} + \varepsilon_{i,t} \quad (5)$$

where $PROD_{i,t}$ is the sum of $COGS_{i,t}$ and $\Delta INVT_{i,t}$, and the variables are as coded in Compustat database; $COGS_{i,t}$ is the cost of goods sold in year *t*; $\Delta INVT_{i,t}$ is the change in inventory from *t-1* to *t*; $Sale_{i,t}$ is the net sales in year *t* and $\Delta Sale_{i,t}$ is the change in net sales from year *t-1* to *t*; $AT_{i,t-1}$ is the total assets at the end of *t-1*. OLS regressions are run separately for each year and two-digit SIC code combination with a minimum of 15 observations.[27]

The abnormal level of discretionary expenses (RM_{DISX}) are estimated as the residuals from the following cross-sectional OLS regressions for each year and industry combination:

$$\frac{DISX_{i,t}}{AT_{i,t-1}} \equiv \frac{XRD_{i,t}+XAD_{i,t}+XSGA_{i,t}}{AT_{i,t-1}} = \beta_1 \frac{1}{AT_{i,t-1}} + \beta_2 \frac{Sale_{i,t-1}}{AT_{i,t-1}} + \varepsilon_{i,t} \quad (6)$$

where $DISX_{i,t}$ is the sum of R&D, advertising, and SG&A expenses in year *t*. The above regression is run cross-sectionally for industry-years with at least 15 observations. Following Zang (2012), we multiply the residuals by -1 (RM_{DISX}) to make high values indicate larger amounts of discretionary expenses cut by firms to increase reported earnings. We then take the sum of the two parts into one proxy of real activities manipulation.

Also following Roychowdhury (2006) and Zang (2012), we use a modified version of the Jones (1991) model to estimate discretionary accruals as our measure of accrual-based earnings

[27] The results are similar if we use Fama-French 48-industry classifications for all the estimation regressions.

management.[28] To define discretionary accruals, we obtain annual financial information from the Compustat universe over the period from 1999 to 2011, and then run the following cross-sectional OLS regressions for each year and industry combination:

$$\frac{IB_{i,t}-OANCF_{i,t}}{AT_{i,t-1}} = \beta_1 \frac{1}{AT_{i,t-1}} + \beta_2 \frac{\Delta Sale_{i,t}}{AT_{i,t-1}} + \beta_3 \frac{PPEGT_{i,t}}{AT_{i,t-1}} + \varepsilon_{i,t} \quad (7)$$

where *IB* refers to income before extraordinary items; *OANCF* indicates cash flow from operations; *PPEGT* is gross property, plant and equipment. OLS regressions are run separately for each year and two-digit SIC code combination with a minimum of 15 observations. We use the estimated residuals as our proxy for accruals-based earnings management.

We use the absolute value of real activities manipulation and accruals-based earnings management as our measure of earnings management, since managers have incentives to manage earnings not only upward but also downward, and we are interested in manipulations in both directions (Yu, 2008).

7.2. Regression Model and Description of Other Variables

We match our sample of affected firms with the earnings management sample, and obtain a final sample consisting of 4,320 firm-years from 1999 to 2011. As shown in Panel A of Appendix C, the mean (median) value of the absolute level of accruals-based earnings management is 0.192 (0.059), with a standard deviation of 0.464, while the mean (median) value of the absolute level of real activities manipulation is 0.382 (0.248), with a standard deviation of 0.593.

To examine the effect of analyst coverage on earnings management, we construct the following model:

$$Y_{i,t} = \alpha_0 + \beta_1 \times After + \delta' X + \varepsilon_{i,t} \quad (8)$$

[28] The method is essentially the same as the one used in Dechow et al. (1995) and Yu (2008).

Y is either the absolute level of accruals-based earnings management or real activities manipulation. X includes a set of control variables: Market-to-book ratio, ROA, growth rate of assets, cash flow volatility, external financing activities, institutional ownership, and firm size. All regressions control for year and industry fixed effects.

7.3. Regression Results

Panel B of Appendix C reports the regression results. In both Columns (1) and (2), the coefficient for *After* is positive and statistically significant. Overall, we find that the absolute level of accruals-based earnings management increases by 0.036 after the firms lose some analyst coverage. The magnitude is relatively large compared to a mean value of 0.192 in our sample. Put another way, it is a 7.8% of a standard deviation increase in the absolute value of accruals-based earnings management. The magnitude of increase in real activities manipulation is similarly significant, which amounts to 7.3% of a standard deviation. The evidence lends further support to our previous findings that with less monitoring from analysts, managers are more likely to act for their own benefits.

8. Concluding Remarks

In this paper, we examine the role of analysts in corporate governance. Specifically, we test whether financial analysts play a monitoring role in mitigating agency conflicts over corporate decisions and policies. Relying on two sources of exogenous shocks to analyst coverage – broker closures and mergers, we explore the causal effects of analyst coverage on managerial expropriation of outside shareholders. We find that when a firm experiences an exogenous decrease in analyst coverage, cash holdings contribute less to shareholder value, its CEO receives higher excess compensation, its management is more likely to make value-destroying acquisitions, and managers are more likely to engage in earnings management activities. Importantly, we find that the effect is significantly more pronounced for firms with smaller initial analyst coverage, where the impact on monitoring is larger, and for those with less product market competition, meaning there are fewer substitute constraints on agency problems. In further investigation of the changes in cash value, we find that the effect on the marginal value of cash disappears for firms with decreasing cash. We also find that a CEO's total and excess compensation become less sensitive to firm performance for the subsample of firms with low initial coverage.

All of the evidence is consistent with our hypothesis that with less monitoring from analysts, managers are more likely to extract private benefits at the expense of outside shareholders, indicating that analyst coverage plays an important role protecting shareholder value by scrutinizing management behavior and reducing the costs for others to do so. We offer a complementary interpretation to Kelly and Ljungqvist (2012)'s findings, by demonstrating that the reason the stock price drops following an exogenous analyst decrease is not just because of greater information asymmetry, but also because the market is pricing an increase in expected agency problems, which is what we find in this study.

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Table 1

Summary Statistics—Analysis of the Marginal Value of Cash Holdings

The sample consists of 3732 firm-years for 1179 unique firms from 1999 to 2011. Variable definitions are given in Appendix A.

	Mean	Std.	Q1	Median	Q3
Analyst coverage					
Before brokerage exit	12.708	7.616	7	12	18
After brokerage exit	11.748	7.481	6	11	17
Excess stock returns during the fiscal year					
Industry-adjusted annual excess stock returns	-0.071	0.510	-0.353	-0.101	0.143
Size and M/B adjusted annual excess stock returns	-0.020	0.502	-0.325	-0.074	0.171
Firm characteristics					
Total assets (in $ millions)	9990.350	30564.900	551.209	2016.064	7618.800
Leverage	0.160	0.158	0.025	0.120	0.243
(The variables below are scaled by the market value of equity of the firm of fiscal year t - 1.)					
$\Delta Cash_t$	0.016	0.327	-0.013	0.004	0.033
$Cash_{t-1}$	0.148	0.438	0.025	0.068	0.168
$\Delta Earnings_t$	0.134	6.618	-0.020	0.005	0.027
$\Delta NetAssets_t$	0.056	0.750	-0.022	0.029	0.103
$\Delta R\&D_t$	-0.001	0.041	0	0	0.002
$\Delta Interest_t$	0.002	0.048	-0.001	0	0.002
$\Delta Dividends_t$	0.000	0.030	0	0	0.001
$NetFinancing_t$	0.016	0.250	-0.038	0	0.030

Table 2
OLS Regression Analysis of the Marginal Value of Cash Holdings

The sample consists of 3732 firm-years for 1179 unique firms from 1999 to 2011. In columns (1) and (2), the dependent variable is the industry-adjusted excess return during fiscal year t, and in columns (3) and (4), it is the size and market-to-book adjusted excess return of the stock during fiscal year t. After is an indicator whose value equals 1 if the observation is one year after the event of brokerage exit and 0 if the observation is one year before brokerage exit. Constrained is a dummy variable with 1 indicating the firm's Whited and Wu (2006) financial constraint index (WW index) is in the top tercile of the sample, and zero otherwise. Other variable definitions are given in Appendix A. Financial variables, except leverage, are scaled by the market capitalization of the firm at the end of fiscal year t - 1. All regressions control for year and Fama-French 48 industry fixed effects, whose coefficient estimates are suppressed. Heteroskedasticity-consistent standard errors clustered at the firm and year levels are reported in brackets. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Table 2, continued

	Dependent Variable			
	Industry-Adjusted Annual Excess Stock Returns		Size and M/B Adjusted Annual Excess Stock Returns	
	(1)	(2)	(3)	(4)
$\Delta Cash_t$	1.641***	1.801***	1.731***	1.866***
	[0.214]	[0.215]	[0.215]	[0.215]
After × $\Delta Cash_t$	-0.320**	-0.333**	-0.413***	-0.393***
	[0.134]	[0.135]	[0.134]	[0.135]
After	-0.012	-0.011	-0.034	-0.032
	[0.021]	[0.021]	[0.021]	[0.021]
$Cash_{t-1}$ × $\Delta Cash_t$	-0.074***	-0.179***	-0.076***	-0.207***
	[0.007]	[0.020]	[0.007]	[0.020]
$Leverage_t$ × $\Delta Cash_t$	-0.587**	-0.174	-0.810***	-0.376
	[0.252]	[0.259]	[0.253]	[0.259]
Constrained $(dummy)_t$ × $\Delta Cash_t$	0.821	1.141*	0.643	0.961*
	[0.583]	[0.582]	[0.585]	[0.582]
$Cash_{t-1}$	0.506***	0.469***	0.473***	0.423***
	[0.039]	[0.040]	[0.039]	[0.040]
$Leverage_t$	-0.503***	-0.455***	-0.632***	-0.589***
	[0.057]	[0.057]	[0.057]	[0.057]
Constrained $(dummy)_t$	-0.036**	-0.024	-0.073***	-0.061***
	[0.018]	[0.018]	[0.018]	[0.018]
$\Delta Earnings_t$		0.099***		0.127***
		[0.020]		[0.020]
$\Delta NetAssets_t$		0.143***		0.149***
		[0.020]		[0.020]
$\Delta R\&D_t$		0.215		0.238
		[0.199]		[0.198]
$\Delta Interest_t$		-1.118***		-1.212***
		[0.378]		[0.378]
$\Delta Dividends_t$		0.104		-0.037
		[0.256]		[0.256]
$NetFinancing_t$		-0.190***		-0.161***
		[0.045]		[0.045]
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	3,732	3,732	3,732	3,732
Adjusted R^2	0.151	0.171	0.119	0.144

Table 3
Further Exploration of the Marginal Value of Cash Holdings: OLS Regression Analysis

The sample consists of 3732 firm-years for 1179 unique firms from 1999 to 2011. The dependent variable is the size and market-to-book adjusted excess return of the stock during fiscal year t. In Panel A, the sample is partitioned into low or high analyst coverage before brokerage exit subsamples and less or more product market competition subsamples. Low analyst coverage is a dummy variable that equals 1 if the number of analysts following the firm before brokerage exit is in the bottom tercile number of the sample, and high analyst coverage is 1 for the firms in the top tercile of the sample. More competition equals 1 if the industry's HHI index is in the bottom quartile of all 48 Fama-French industries, and less compensation is defined otherwise. HHI is calculated as the sum of squared market shares of all Compustat firms in each industry, and higher values indicate greater concentration and lower product market competitiveness. Constrained is a dummy variable with one indicating the firm's Whited and Wu (2006) financial constraint index (WW index) is in the top tercile of the sample, and zero otherwise. In Panel B, the sample is partitioned into cash increasing and cash decreasing subsamples. A firm is coded as cash increasing if the cash ratio increases after the exogenous shocks to analyst coverage. After is an indicator whose value equals 1 if the observation is one year after the event of brokerage exit and 0 if the observation is one year before brokerage exit. Other variable definitions are given in Appendix A. Financial variables, except leverage, are scaled by the market capitalization of the firm at the end of fiscal year t - 1. All regressions control for year and Fama-French 48 industry fixed effects, whose coefficient estimates are suppressed. Heteroskedasticity-consistent standard errors clustered at the firm and year levels are reported in brackets. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Table 3, continued

Panel A. Analyst Coverage before Brokerage Exits and Product Market Competition

	Dependent Variable: Size and M/B Adjusted Annual Excess Stock Returns			
	Low analyst coverage	High analyst coverage	Less competition	More competition
	(1)	(2)	(3)	(4)
$\Delta Cash_t$	2.135***	2.134***	2.188***	1.656***
	[0.352]	[0.760]	[0.296]	[0.330]
After × $\Delta Cash_t$	-0.594***	-0.081	-0.684***	-0.300
	[0.208]	[0.362]	[0.197]	[0.195]
After	-0.059	-0.029	0.005	-0.062*
	[0.047]	[0.030]	[0.028]	[0.033]
$Cash_{t-1}$ × $\Delta Cash_t$	-0.163***	-0.790***	-0.186*	-0.177***
	[0.029]	[0.281]	[0.105]	[0.029]
$Leverage_t$ × $\Delta Cash_t$	0.121	-2.496**	-1.307***	-0.067
	[0.364]	[1.171]	[0.430]	[0.372]
Constrained $(dummy)_t$	2.402**	-1.264	0.685	0.859
× $\Delta Cash_t$	[1.047]	[1.875]	[0.751]	[0.960]
$Cash_{t-1}$	0.437***	0.711***	0.493***	0.389***
	[0.069]	[0.106]	[0.059]	[0.058]
$Leverage_t$	-0.570***	-0.740***	-0.631***	-0.564***
	[0.107]	[0.116]	[0.079]	[0.082]
Constrained $(dummy)_t$	-0.051	-0.131***	-0.051**	-0.075***
	[0.038]	[0.040]	[0.024]	[0.027]
$\Delta Earnings_t$	0.097***	0.140	0.186***	0.099***
	[0.029]	[0.090]	[0.028]	[0.030]
$\Delta NetAssets_t$	0.157***	0.110**	0.231***	0.086***
	[0.033]	[0.053]	[0.029]	[0.028]
$\Delta R\&D_t$	0.179	0.336	0.166	-0.063
	[0.267]	[0.761]	[0.212]	[0.551]
$\Delta Interest_t$	-2.876***	2.183	-2.031***	-0.799*
	[0.703]	[1.836]	[0.725]	[0.472]
$\Delta Dividends_t$	-0.830	0.202	-0.119	0.411
	[0.976]	[0.681]	[0.303]	[0.445]
$NetFinancing_t$	-0.121*	-0.394***	-0.360***	0.054
	[0.066]	[0.134]	[0.057]	[0.073]
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	1,245	1,252	1,980	1,752
Adjusted R^2	0.158	0.157	0.188	0.145

Panel B. Cash Increasing or Cash Decreasing

	Dependent Variable			
	Industry-Adjusted Annual Excess Stock Returns		Size and M/B Adjusted Annual Excess Stock Returns	
	Cash increasing	Cash decreasing	Cash increasing	Cash decreasing
	(1)	(2)	(3)	(4)
$\Delta Cash_t$	2.704***	0.095	2.589***	0.189
	[0.104]	[0.173]	[0.189]	[0.135]
After × $\Delta Cash_t$	-0.667***	0.232	-0.836***	0.340
	[0.242]	[0.183]	[0.251]	[0.208]
After	0.052**	-0.039	0.036	-0.052
	[0.026]	[0.025]	[0.025]	[0.033]
$Cash_{t-1}$ × $\Delta Cash_t$	-0.206**	-0.133	-0.252**	-0.105
	[0.088]	[0.093]	[0.107]	[0.122]
$Leverage_t$ × $\Delta Cash_t$	-0.693	1.266***	-0.754	0.796
	[1.098]	[0.379]	[1.116]	[0.551]
Constrained $(dummy)_t$ × $\Delta Cash_t$	2.242	0.688	1.718	0.921**
	[1.542]	[0.643]	[1.859]	[0.456]
$Cash_{t-1}$	0.431***	0.304***	0.419***	0.267***
	[0.121]	[0.082]	[0.109]	[0.086]
$Leverage_t$	-0.449**	-0.269***	-0.621***	-0.365***
	[0.220]	[0.092]	[0.239]	[0.080]
Constrained $(dummy)_t$	-0.043	-0.033	-0.093**	-0.039
	[0.069]	[0.030]	[0.045]	[0.025]
$\Delta Earnings_t$	0.113	0.067	0.159	0.095***
	[0.081]	[0.050]	[0.097]	[0.021]
$\Delta NetAssets_t$	0.178**	0.108***	0.181**	0.113***
	[0.070]	[0.035]	[0.085]	[0.019]
$\Delta R\&D_t$	0.252	0.270	0.066	0.331
	[1.051]	[0.329]	[0.725]	[0.217]
$\Delta Interest_t$	-0.584**	-1.187	-1.126***	-1.150
	[0.280]	[0.725]	[0.385]	[1.275]
$\Delta Dividends_t$	0.087	0.227	-0.249	-0.006
	[0.178]	[0.197]	[0.190]	[0.164]
$NetFinancing_t$	-0.248***	-0.274***	-0.193**	-0.252***
	[0.083]	[0.084]	[0.093]	[0.066]
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	2,152	1,532	2,152	1,532
Adjusted R^2	0.233	0.162	0.196	0.130

Table 4
Analysis of Marginal Value of Cash Holdings: Placebo Tests Using the Matched Control Sample

The table presents placebo tests for the analysis of the marginal value of cash holdings using the matched control sample. The control pool is the remainder of the Compustat universe with valid matching variables. Treated firms are matched using a nearest-neighbor logit propensity score matching. The matching variables include Size (SIZE), Leverage (LEV), Cash (CASH), Cash flow (CF), and Coverage (COV) prior to the event of brokerage exit. Size is the log of market capitalization of the firm. Leverage refers to the leverage ratio, calculated as firm's total debt divided by the market value of total assets. Cash is the ratio of cash and short-term investments to total assets. Cash flow is calculated as cash flows divided by total assets. Coverage refers to the number of analysts covering the firm. The matching also includes industry and year. The sample consists of 3430 firm-years. Panel A shows the summary statistics for the matched sample, and Panel B reports the placebo test of the marginal value of cash holdings using the matched control sample. In columns (1) and (2) of Panel B, the dependent variable is the industry-adjusted excess returns during fiscal year t, and in columns (3) and (4), it is the size and market-to-book adjusted excess returns of the stock during fiscal year t. After is an indicator whose value equals 1 if the observation is one year after the event of brokerage exit and 0 if the observation is one year before brokerage exit. Constrained is a dummy variable with one indicating the firm's Whited and Wu (2006) financial constraint index (WW index) is in the top tercile of the sample, and zero otherwise. Other variable definitions are given in Appendix A. Financial variables, except leverage, are scaled by the market capitalization of the firm at the end of fiscal year t - 1. All regressions control for year and Fama-French 48 industry fixed effects, whose coefficient estimates are suppressed. Heteroskedasticity-consistent standard errors clustered at the firm and year levels are reported in brackets. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A. Summary Statistics for Matched Samples

Variable	Treated Firms			Matched Control Firms			Difference in Means	T-Stat.
	Mean	Std.	Med.	Mean	Std.	Med.		
SIZE	7.655	1.810	7.537	7.403	1.842	7.415	0.252	(0.28)
LEV	0.153	0.152	0.114	0.154	0.155	0.111	-0.001	(-0.10)
CASH	0.172	0.200	0.084	0.174	0.201	0.085	-0.003	(-0.41)
CF	0.076	0.162	0.095	0.079	0.135	0.093	-0.003	(-0.58)
COVERAGE	11.688	6.759	11	11.743	7.761	10	-0.055	(-0.22)

Panel B. Marginal Value of Cash Holdings: Placebo Tests Using the Matched Control Sample

	Dependent Variable					
	Industry-Adjusted Annual Excess Stock Returns		Size and M/B Adjusted Annual Excess Stock Returns			
					Low analyst coverage	High analyst coverage
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta Cash_t$	1.005**	1.226***	1.085***	1.256***	0.829	2.028*
	[0.419]	[0.463]	[0.408]	[0.474]	[0.691]	[1.199]
After × $\Delta Cash_t$	-0.241	-0.161	-0.427	-0.352	-0.149	0.055
	[0.259]	[0.243]	[0.279]	[0.261]	[0.444]	[0.384]
After	0.006	0.008	0.010	0.012	0.073	-0.068**
	[0.035]	[0.033]	[0.040]	[0.038]	[0.069]	[0.033]
$Cash_{t-1}$ × $\Delta Cash_t$	-0.027***	-0.021***	-0.026***	-0.019***	-0.019**	-0.614
	[0.005]	[0.006]	[0.005]	[0.006]	[0.009]	[0.889]
$Leverage_t$ × $\Delta Cash_t$	-1.019***	-1.203***	-1.015***	-1.253***	-1.378**	-0.381
	[0.274]	[0.395]	[0.238]	[0.377]	[0.576]	[3.229]
Constrained $(dummy)_t$ × $\Delta Cash_t$	-0.436	0.098	-0.673	-0.358	-1.410	2.479
	[0.882]	[1.006]	[0.942]	[1.058]	[2.131]	[2.689]
$Cash_{t-1}$	0.530***	0.494***	0.473***	0.424***	0.459***	0.628***
	[0.116]	[0.120]	[0.120]	[0.123]	[0.160]	[0.173]

$Leverage_t$	-0.536***	-0.530***	-0.695***	-0.697***	-0.571***	-0.648***
	[0.129]	[0.137]	[0.116]	[0.122]	[0.165]	[0.151]
$Constrained (dummy)_t$	-0.062	-0.056	-0.111*	-0.105*	-0.152***	0.047
	[0.054]	[0.053]	[0.062]	[0.060]	[0.057]	[0.166]
$\Delta Earnings_t$		0.060***		0.064***	0.056*	0.249*
		[0.023]		[0.023]	[0.030]	[0.142]
$\Delta NetAssets_t$		0.090***		0.084*	0.100***	0.027
		[0.034]		[0.043]	[0.038]	[0.050]
$\Delta R\&D_t$		-0.592*		-0.664*	-0.523	3.083**
		[0.356]		[0.384]	[0.338]	[1.244]
$\Delta Interest_t$		0.322		0.358	0.483	-0.023
		[0.374]		[0.386]	[0.430]	[1.855]
$\Delta Dividends_t$		-0.431		-0.564	-1.606*	-0.091
		[0.380]		[0.451]	[0.883]	[0.173]
$NetFinancing_t$		-0.110		-0.084	-0.082*	0.101
		[0.079]		[0.078]	[0.046]	[0.180]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,430	3,430	3,430	3,430	1,137	1,155
Adjusted R^2	0.161	0.178	0.134	0.153	0.196	0.366

Table 5
Summary Statistics—Analysis of CEO Compensation

The sample consists of 3516 firm-years from 1999 to 2011. Variable definitions are given in Appendix A.

	Mean	Std.	Q1	Median	Q3
Analyst coverage (COV)					
Before brokerage exit	14.848	7.560	9	14	20
After brokerage exit	13.803	7.350	8	13	18
CEO compensation					
Total compensation (in $ millions)	7.194	7.663	1.975	4.543	9.334
Excess compensation	0.253	0.927	-0.307	0.288	0.858
Log (Total compensation in 000)	8.370	1.075	7.614	8.432	9.154
Firm characteristics					
Size (SIZE)	7.992	1.599	6.769	7.847	9.150
Leverage (LEV)	0.138	0.136	0.021	0.106	0.209
Tobin's Q (Q)	2.244	1.654	1.312	1.740	2.600
R&D/Sales (RDS)	0.072	0.233	0	0.009	0.095
CapEx/Sales (CAPXS)	0.085	0.209	0.025	0.043	0.080
Advertising expense/Sales (ADVS)	0.014	0.030	0	0	0.015
Industry-adjusted ROA (ADJROA)	0.003	0.096	-0.043	0	0.049
Abnormal stock returns (ABRET)	0.134	0.847	-0.227	0.018	0.305
Stock return volatility (VOL)	0.395	0.278	0	0	0.553
Institutional ownership (IO)	0.734	0.193	0.633	0.762	0.868
Firm age (AGE)	24.959	21.239	9	17	35
CEO tenure (CEOTENURE)	6.767	6.781	2	5	9

Table 6
Difference-in-Differences Analysis of CEO Total and Excess Compensation

The table presents DID tests for the analysis of CEO compensation using the matched control sample. The control pool is the remainder of the ExecuComp universe with valid matching variables. Treated firms are matched using portfolio matching or nearest-neighbor logit propensity score matching. The matching variables include variants of Size (SIZE), Tobin's Q (Q), Cash flow (CF), Leverage (LEV), Industry-adjusted ROA (ADJROA), Abnormal stock returns (ABRET), Stock return volatility (VOL), Firm age (AGE), CEO tenure (CEOTENURE), R&D/Sales (RDS), CapEx/Sales (CAPXS), Advertising expense/Sales (ADVS), Lagged total compensation ($LNTDC1_{t-1}$), Institutional ownership (IO), and Coverage (COV) prior to the event of brokerage exit. Size is the log of market capitalization of the firm. Tobin's Q is the market value of assets over book value of assets. Cash flow is defined as earnings before extraordinary items plus depreciation and amortization divided by total assets. Leverage refers to the leverage ratio, calculated as firm's all debt divided by the market value of total assets. Coverage refers to the number of analysts covering the firm. The strategy of portfolio matching closely follows Derrien and Kecskes (2013), using SIZE, Q, CF, and COV. All matching includes industry and year. The sample consists of 3516 firm-years for the treatment sample and a same number of firm-years for the control sample. Panel A shows the DID results using portfolio matching as in Derrien and Kecskes (2013), and Panel B reports the DID test of CEO compensation using propensity score matching with variants of matching criteria. In Panel C, we redo the difference-in-differences estimations by dividing the treatment sample into low vs. high initial analyst coverage subsamples. In Panel D, we conduct product market competition subsample analysis. Panel E shows the results after dropping 440 cases where CEO turnover occurs. The dependent variable is either the natural logarithm of CEO total compensation or CEO excess compensation. CEO excess compensation is defined as the residuals from the OLS regression of the natural logarithm of CEO total compensation on the natural logarithm of firms' total market value, industry and year fixed effects in the universal sample of ExecuComp firms. Other variable definitions are given in Appendix A. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A. DID Analysis of CEO Compensation: Portfolio Matching on SIZE, Q, CF, and COV

	Mean of diff-in-diffs (treatments vs. controls)	
	CEO total compensation	CEO excess compensation
	0.108**	0.126***
(Standard error)	(0.049)	(0.044)

Panel B. DID Analysis of CEO Compensation: Propensity Score Matching Estimator

	Mean of diff-in-diffs (treatments vs. controls)	
	CEO total compensation	CEO excess compensation
(i) Matching on SIZE, Q, LEV, ADJROA, ABRET, VOL, $LNTDC1_{t-1}$, AGE, CEOTENURE, COV		
	0.125**	0.135**
(Standard error)	(0.052)	(0.054)

(ii) Matching on SIZE, Q, ADJROA, ABRET, VOL, $LNTDC1_{t-1}$, COV

	0.106**	0.115**
(Standard error)	(0.051)	(0.053)
(iii) Matching on SIZE, Q, LEV, ADJROA, ABRET, VOL, AGE, CEOTENURE, RDS, CAPXS, ADVS, $LNTDC1_{t-1}$, COV		
	0.124**	0.134**
(Standard error)	(0.051)	(0.053)
(iv) Matching on SIZE, Q, LEV, ADJROA, ABRET, VOL, AGE, CEOTENURE, RDS, CAPXS, ADVS, $LNTDC1_{t-1}$, IO, COV		
	0.136***	0.145***
(Standard error)	(0.052)	(0.055)

Panel C. DID Analysis of CEO Compensation: Mean Difference-in-Differences Conditional Upon Analyst Coverage before Brokerage Exits

	Mean of diff-in-diffs (treatments vs. controls)	
	CEO total compensation	CEO excess compensation
Low initial analyst coverage	0.149***	0.138**
(Standard error)	(0.046)	(0.040)
High initial analyst coverage	0.083	0.097
(Standard error)	(0.056)	(0.059)

Panel D. DID Analysis of CEO Compensation: Mean Difference-in-Differences Conditional Upon Product Market Competition

	Mean of diff-in-diffs (treatments vs. controls)	
	CEO total compensation	CEO excess compensation
Less competition	0.217***	0.218***
(Standard error)	(0.042)	(0.044)
More competition	0.012	0.032
(Standard error)	(0.041)	(0.042)

Panel E. DID Analysis of CEO Compensation: Same CEO before and after Brokerage Exits

	Mean of diff-in-diffs (treatments vs. controls)	
	CEO total compensation	CEO excess compensation
	0.111***	0.165***
(Standard error)	(0.047)	(0.051)

Table 7
Further Exploration of CEO Total and Excess Compensation: Changes in Pay-Performance Sensitivity after Brokerage Exits for Firms with Low Analyst Coverage

In this table, we investigate the changes in pay-performance sensitivities after exogenous brokerage exits for the subset of firms with low initial analyst coverage. The sample consists of 1078 firm-years from 1999 to 2011. The dependent variable is either the natural logarithm of CEO total compensation, CEO excess compensation, or change in CEO wealth. CEO excess compensation is defined as the residuals from the OLS regression of the natural logarithm of CEO total compensation on the natural logarithm of firms' total market value, industry and year fixed effects in the universe of ExecuComp firms. Change in CEO wealth is measured by the change in sum of values of unrestricted stock, restricted stock and vested and unvested options held by the CEO. The valuation of options uses a methodology similar to that in Core and Guay (2002). All control variables are lagged measures relative to the year in which compensation is measured. Institutional ownership (dummy) is a dummy variable with one indicating that the total number of shares owned by institutional investors is larger than the annual median and zero otherwise. In Columns (5) and (6), changes in performance measures (industry-adjusted ROA and abnormal stock returns) are used instead of being measured in levels. Other variable definitions are given in Appendix A. All regressions control for Fama-French 48 industry fixed effects, whose coefficient estimates are suppressed. Heteroskedasticity-consistent standard errors clustered at the firm and year levels are reported in brackets. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Table 7, continued

	Dependent Variable					
	CEO Total Compensation		CEO Excess Compensation		Δ(CEO Wealth)	
	Before brokerage exit	After brokerage exit	Before brokerage exit	After brokerage exit	Before brokerage exit	After brokerage exit
	(1)	(2)	(3)	(4)	(5)	(6)
Log (total assets)	0.530***	0.508***	0.282***	0.282***	-0.070***	-0.048
	[0.032]	[0.032]	[0.041]	[0.027]	[0.019]	[0.078]
Leverage	-0.623	-0.193	-2.269***	-1.936***	0.571*	0.696*
	[0.603]	[0.221]	[0.584]	[0.402]	[0.344]	[0.413]
Tobin's Q	0.027	0.022	0.032	0.022	0.087***	0.006
	[0.028]	[0.027]	[0.021]	[0.038]	[0.022]	[0.013]
Industry-adjusted ROA	1.244*	1.217**	0.890	0.672		
	[0.696]	[0.596]	[0.643]	[0.546]		
Abnormal stock returns	0.125***	0.135	0.120***	0.061		
	[0.026]	[0.085]	[0.022]	[0.056]		
Δ(Industry-adjusted ROA)					2.325***	-0.427
					[0.731]	[1.237]
Δ(Abnormal stock returns)					0.220***	0.050
					[0.030]	[0.049]

Stock return volatility	0.173***	0.143	0.178**	0.375	-0.277**	0.366
	[0.058]	[0.092]	[0.077]	[0.295]	[0.141]	[0.426]
ROA volatility	1.410***	1.291***	1.715***	1.943***	-1.547	-3.771
	[0.234]	[0.489]	[0.324]	[0.698]	[2.240]	[5.096]
R&D/Sales	1.214***	1.528***	1.180*	1.181***	-0.728	-0.378
	[0.436]	[0.425]	[0.609]	[0.349]	[0.767]	[0.984]
CapEx/Sales	-0.122	-0.681***	-0.058	-0.868***	0.323	-0.648
	[0.267]	[0.254]	[0.383]	[0.324]	[0.454]	[0.882]
Advertising expense/Sales	1.238***	0.161	0.060	-1.475	0.353	-1.351
	[0.397]	[0.224]	[0.482]	[1.668]	[4.562]	[1.279]
Firm age	0.002	0.001	-0.001	-0.003	-0.000	0.006***
	[0.001]	[0.001]	[0.002]	[0.002]	[0.006]	[0.002]
CEO tenure	-0.007	-0.001	-0.004	0.001	0.015***	0.010
	[0.004]	[0.005]	[0.005]	[0.006]	[0.004]	[0.007]
Institutional ownership (dummy)	0.188***	0.227***	0.166***	0.220***	0.093	0.033
	[0.044]	[0.044]	[0.027]	[0.070]	[0.115]	[0.227]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	539	539	539	539	418	418
Adjusted R^2	0.459	0.501	0.286	0.297	0.208	0.213

Table 8

Summary Statistics—Analysis of Acquisition Decisions

The sample consists of 1464 completed domestic mergers and acquisitions. Variable definitions are given in Appendix A.

	Mean	Std.	Q1	Median	Q3
Analyst coverage (COV)					
Before brokerage exit	15.932	9.655	8	15	22
After brokerage exit	15.034	8.673	8	14	21
Acquirer announcement-period abnormal return					
CAR(-2, +2)	-0.228%	6.170%	-3.416%	-0.195%	3.215%
1 if CAR(-2, +2) < 0, 0 Otherwise	0.517	0.500	0	1	1
Acquirer characteristics					
Size (SIZE)	8.460	1.842	7.148	8.451	9.869
Tobin's Q (Q)	3.052	4.433	1.413	1.953	3.150
ROA	0.131	0.107	0.086	0.134	0.193
Leverage (LEV)	0.113	0.127	0.006	0.071	0.174
Past abnormal returns (PABRET)	0.163	1.284	-0.292	0.015	0.321
Total acquisition value in the previous year (in $ millions) (ACQ_{t-1})	570.651	1368.151	0	48.500	333
Free cash flows (FCF)	0.078	0.111	0.039	0.081	0.139
Deal characteristics					
Relative deal size (REL)	0.057	0.120	0.003	0.014	0.054
Friendly deal (FRD)	0.979	0.144	1	1	1
Tender offer (TEND)	0.040	0.196	0	0	0
Private (dummy) (PRV)	0.563	0.496	0	1	1
All cash (dummy) (ALLCASH)	0.198	0.399	0	0	0
Stock (dummy) (STOCK)	0.160	0.366	0	0	0
Diversifying (dummy) (DIV)	0.421	0.494	0	0	1
High-tech (dummy) (HITECH)	0.461	0.499	0	0	1

Table 9

Difference-in-Differences Analysis of Acquisition Decisions

The table presents DID tests for the analysis of acquisition decisions using the matched control sample. The control pool is the remainder of the SDC Mergers and Acquisitions universe with valid matching variables. Treated firms are matched using portfolio matching or a nearest-neighbor logit propensity score matching. The matching variables include variants of Size (SIZE), Tobin's Q (Q), Cash flow (CF), Leverage (LEV), ROA, Past abnormal returns (PABRET), Free cash flows (FCF), Total acquisition value in the previous year (ACQ_{t-1}), Relative deal size (REL), Tender offer (TEND), Friendly deal (FRD), High-tech dummy (HITECH), Diversifying dummy (DIV), Stock dummy (STOCK), All cash dummy (ALLCASH), Private dummy (PRV), and Coverage (COV) prior to the event of brokerage exit. Size is the market capitalization of the firm. Tobin's Q is the market value of assets over book value of assets. Cash flow is defined as earnings before extraordinary items plus depreciation and amortization divided by total assets. Leverage refers to the leverage ratio, calculated as total debt divided by the market value of total assets. Coverage refers to the number of analysts covering the firm. If multiple deals are conducted by a given acquirer in a particular year, all deal related variables are the mean value of all deals made by that particular acquirer in that year, aggregated to the firm level. The strategy of portfolio matching closely follows Derrien and Kecskes (2013), using SIZE, Q, CF, and COV. All matching includes industry and year. The sample consists of 2978 completed domestic mergers and acquisitions made by 651 firms in the treatment sample and a same number of firms in the control sample. Panel A shows the DID results using portfolio matching as in Derrien and Kecskes (2013), and Panel B reports the DID test of acquisitions using propensity score matching with variants of matching criteria. In Panel C, we redo the difference-in-differences estimations by dividing the treatment sample into low vs. high initial analyst coverage subsamples. In Panel D, we conduct product market competition subsample analysis. The dependent variable is the acquirer's 5-day cumulative abnormal return (CAR) in percentage points, or a dummy variable which equals to 1 if the 5-day CAR is negative and 0 otherwise. Other variable definitions are given in Appendix A. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A. DID Analysis of Acquisition Decisions: Portfolio Matching on SIZE, Q, CF, and COV

	Mean of diff-in-diffs (treatments vs. controls)	
	CAR(-2, +2)	1 if CAR(-2, +2) < 0, 0 Otherwise
	-1.30%**	9.00%**
(Standard error)	(0.006)	(0.037)

Panel B. DID Analysis of Acquisition Decisions: Propensity Score Matching Estimator

	Mean of diff-in-diffs (treatments vs. controls)	
	CAR(-2, +2)	1 if CAR(-2, +2) < 0, 0 Otherwise
(i) Matching on SIZE, Q, LEV, ROA, PABRET, FCF, ACQ_{t-1}, COV		
	-0.99%***	5.06%*
(Standard error)	(0.004)	(0.031)
(ii) Matching on SIZE, Q, LEV, ROA, PABRET, FCF, ACQ_{t-1}, STOCK, ALLCASH, COV		
	-1.02%***	5.23%*
(Standard error)	(0.004)	(0.031)
(iii) Matching on SIZE, Q, LEV, ROA, PABRET, FCF, ACQ_{t-1}, REL, DIV, TEND, FRD, STOCK, ALLCASH, COV		
	-1.03%**	5.54%*
(Standard error)	(0.004)	(0.030)
(iv) Matching on SIZE, Q, LEV, ROA, PABRET, FCF, ACQ_{t-1}, REL, DIV, TEND, FRD, STOCK, ALLCASH, PRV, COV		
	-1.06%**	5.67%*
(Standard error)	(0.004)	(0.034)

Panel C. DID Analysis of Acquisition Decisions: Mean Difference-in-Differences Conditional Upon Analyst Coverage before Brokerage Exits

	Mean of diff-in-diffs (treatments vs. controls)	
	CAR(-2, +2)	1 if CAR(-2, +2) < 0, 0 Otherwise
Low initial analyst coverage	-1.94%***	11.34%**
(Standard error)	(0.007)	(0.046)
High initial analyst coverage	-0.19%	6.14%
(Standard error)	(0.005)	(0.042)

Panel D. DID Analysis of Acquisition Decisions: Mean Difference-in-Differences Conditional Upon Product Market Competition

	Mean of diff-in-diffs (treatments vs. controls)	
	CAR(-2, +2)	1 if CAR(-2, +2) < 0, 0 Otherwise
Less competition	-1.95%***	12.24%***
(Standard error)	(0.005)	(0.039)
More competition	-0.60%	4.79%
(Standard error)	(0.005)	(0.036)

Table 10
DID Analysis of Analyst Forecast Bias

The table presents DID tests for the analysis of analyst forecast bias using the matched control sample. Treated firms are matched using nearest-neighbor logit propensity score matching. The matching variables include Size (SIZE), Tobin's Q (Q), Leverage (LEV), Cash (CASH) and Coverage (COV). Size is the log of market capitalization of the firm. Tobin's Q is the market value of assets over book value of assets. Leverage refers to the leverage ratio, calculated as total debt divided by the market value of total assets. Cash is the ratio of cash and short-term investments to total assets. Coverage refers to the number of analysts covering the firm. The main variables of interest are mean bias and median bias. Analyst forecast bias is the difference between the forecast analyst *j* in year *t* and the actual EPS, expressed as a percentage of the previous year's stock price. The consensus bias is expressed as a mean or median bias among all analysts covering a particular stock. We exclude observations that fall below the 25th percentile of the size distribution, observations with stock prices lower than $5, and those for which the absolute difference between forecast value and the true earnings exceeds $10. The sample consists of 3292 firm-years for the treatment sample and a same number of firm-years for the control sample. In Panel A, summary statistics are presented. Panel B provides DID estimator results. Other variable definitions are given in Appendix A. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A. Summary Statistics for the Treatment Sample

	Mean	Std.
Mean Bias	0.0381	0.1110
Median Bias	0.0380	0.1180

Panel B. DID Results

	Mean of diff-in-diffs (treatments vs. controls)	
	Mean Bias	Median Bias
Matching on SIZE, Q, LEV, CASH, and COV		
	0.0093**	0.0086**
(Standard error)	(0.0037)	(0.0039)

Table 11

DID Analysis of CEO Compensation and Acquisition Decisions: Exiting Analyst was Lower than Consensus or Independent

The table presents DID tests for the analysis of CEO compensation acquisition decisions using the matched control sample, conditional upon whether or not the exiting analyst issued a lower investment recommendation about the affected stock than consensus or was independent in the year before the brokerage exit. The classification of analyst independence follows Gu and Xue (2008). Treated firms are matched using nearest-neighbor logit propensity score matching. The matching variables follow Tables 6 and 9. The sample consists of 605 firm-years in the lower-than-consensus subsample and 2907 firm-years in the others subsample in Panel A, and 220 firm-years in the lower-than-consensus subsample and 924 firm-years in the others subsample in Panel B. Others include higher-than-consensus and equal-to-consensus observations. The sample consists of 432 firm-years in the independent analyst subsample and 3082 firm-years in the non-independent analyst subsample in Panel C, and 170 firm-years in the independent analyst subsample and 1162 firm-years in the non-independent analyst subsample in Panel D. In Panels A and C, the dependent variable is either the natural logarithm of CEO total compensation, CEO excess compensation, or change in CEO wealth. CEO excess compensation is defined as the residuals from the OLS regression of the natural logarithm of CEO total compensation on the natural logarithm of the firm's total market value, as well as industry and year fixed effects in the sample of ExecuComp firms. The dependent variable in Panels B and D is the acquirer's 5-day cumulative abnormal return (CAR) in percentage points, or a dummy variable which equals 1 if the 5-day CAR is negative and 0 otherwise. Other variable definitions are given in Appendix A. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A. DID Analysis of CEO Compensation: Lower-than-consensus vs. Others

	Mean of diff-in-diffs (treatments vs. controls)	
	CEO total compensation	CEO excess compensation
Lower-than-consensus	0.202***	0.212***
(Standard error)	(0.071)	(0.072)
Others	0.106***	0.114***
(Standard error)	(0.032)	(0.034)

Panel B. DID Analysis of Acquisition Decisions: Lower-than-consensus vs. Others

	Mean of diff-in-diffs (treatments vs. controls)	
	CAR(-2, +2)	1 if CAR(-2, +2) < 0, 0 Otherwise
Lower-than-consensus	-1.86%*	13.78%**
(Standard error)	(0.010)	(0.06)
Others	-0.91%**	2.54%
(Standard error)	(0.005)	(0.029)

Panel C. DID Analysis of CEO Compensation: Independent vs. Non-independent

	Mean of diff-in-diffs (treatments vs. controls)	
	CEO total compensation	CEO excess compensation
Independent	0.150*	0.152*
(Standard error)	(0.087)	(0.088)
Non-independent	0.119***	0.129***
(Standard error)	(0.031)	(0.033)

Panel D. DID Analysis of Acquisition Decisions: Independent vs. Non-independent

	Mean of diff-in-diffs (treatments vs. controls)	
	CAR(-2, +2)	1 if CAR(-2, +2) < 0, 0 Otherwise
Independent	-1.86%**	13.82%**
(Standard error)	(0.001)	(0.063)
Non-independent	-0.95%***	4.48%*
(Standard error)	(0.003)	(0.025)

Table 12

Analysis of CEO Compensation, Acquisition Decisions, and the Marginal Value of Cash Holdings: Decreasing vs. Non-decreasing Institutional Ownership

The table reports the analysis of CEO compensation, acquisition decisions, and the marginal value of cash holdings, conditional upon whether institutional ownership is decreasing or non-decreasing following the events of broker exit. Panel A reports summary statistics for institutional ownership in the treatment sample prior to brokerage exits. Panel B reports the DID results of institutional ownership. Panels C and D report the DID results of CEO compensation and acquisition decisions, conditional upon whether institutional ownership is decreasing or non-decreasing following brokerage exits. Panel E reports the OLS regression results of the marginal value of cash, according to whether institutional ownership or liquidity are increasing or decreasing following the events of broker exit. The sample ranges from 1999 to 2011. Treated firms are matched using nearest-neighbor logit propensity score matching. The matching variables in Panel B include SIZE, Q, LEV, CASH, IO, and COV. The matching variables in Panels C and D follow Tables 6 and 9, respectively. The sample includes of 1162 firm-years in the IO decreasing subsample in Panel C, 664 acquisition deals in the IO decreasing subsample in Panel D. In Panel C, the dependent variable is either the natural logarithm of CEO total compensation or CEO excess compensation. CEO excess compensation is defined as the residuals from the OLS regression of the natural logarithm of CEO total compensation on the natural logarithm of the firm's total market value, as well as industry and year fixed effects in the sample of ExecuComp firms. The dependent variable in Panel D is the acquirer's 5-day cumulative abnormal return (CAR) in percentage points, or a dummy variable which equals to 1 if the 5-day CAR is negative and 0 otherwise. In Panel E, the dependent variable is the size and market-to-book adjusted excess returns of the stock during fiscal year t. After is an indicator whose value equals 1 if the observation is one year after the event of brokerage exit and 0 if the observation is one year before brokerage exit. Constrained is a dummy variable with one indicating the firm's Whited and Wu's (2006) financial constraint index (WW index) is in the top tercile of the sample, and zero otherwise. Other variable definitions are given in Appendix A. Financial variables, except leverage, are scaled by the market capitalization of the firm at the end of fiscal year t - 1. All regressions control for year and Fama-French 48 industry fixed effects, whose coefficient estimates are suppressed. Heteroskedasticity-consistent standard errors clustered at the firm level are reported in brackets. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Table 12, continued

Panel A. Summary Statistics for the Treatment Sample

	Mean	Std.
Full sample	0.6174	0.2814
Low analyst coverage	0.4753	0.2940
High analyst coverage	0.6852	0.2331

Panel B. DID Results of Institutional Ownership

	Mean of diff-in-diffs (treatments vs. controls)
	Institutional Ownership
Matching on SIZE, Q, LEV, CASH, IO, and COV	
Full sample	-0.0028
(Standard error)	(0.0070)
Low analyst coverage	0.0107
(Standard error)	(0.0170)
High analyst coverage	-0.0059
(Standard error)	(0.0087)

Panel C. DID Analysis of CEO Compensation: Decreasing vs. Non-decreasing Institutional Ownership

	Mean of diff-in-diffs (treatments vs. controls)	
	CEO total compensation	CEO excess compensation
Decreasing	0.113**	0.131**
(Standard error)	(0.054)	(0.058)
Non-decreasing	0.139***	0.146***
(Standard error)	(0.035)	(0.036)

Panel D. DID Analysis of Acquisition Decisions: Decreasing vs. Non-decreasing Institutional Ownership

	Mean of diff-in-diffs (treatments vs. controls)	
	CAR(-2, +2)	1 if CAR(-2, +2) < 0, 0 Otherwise
Decreasing	-1.37%**	6.22%*
(Standard error)	(0.004)	(0.035)
Non-decreasing	-0.63%*	4.58%*
(Standard error)	(0.004)	(0.025)

Table 12, continued

Panel E. Decreasing vs. Non-decreasing Institutional Ownership

	Dependent Variable			
	Industry-Adjusted Annual Excess Stock Returns		Size and M/B Adjusted Annual Excess Stock Returns	
	Decreasing	Non-decreasing	Decreasing	Non-decreasing
	(1)	(2)	(3)	(4)
$\Delta Cash_t$	1.081***	2.742***	1.134**	2.709***
	[0.172]	[0.349]	[0.475]	[0.210]
After × $\Delta Cash_t$	-0.259	-0.540***	-0.494***	-0.479**
	[0.186]	[0.186]	[0.089]	[0.229]
After	0.023	-0.027	0.014	-0.056**
	[0.027]	[0.022]	[0.035]	[0.026]
$Cash_{t-1}$ × $\Delta Cash_t$	0.004	-0.140***	0.159	-0.161***
	[0.125]	[0.033]	[0.126]	[0.046]
$Leverage_t$ × $\Delta Cash_t$	-0.189	-0.302	-0.752	-0.541
	[0.653]	[0.388]	[0.888]	[0.424]
Constrained $(dummy)_t$ × $\Delta Cash_t$	-0.919	3.337***	-1.285	3.150***
	[2.213]	[0.448]	[2.996]	[0.335]
$Cash_{t-1}$	0.463***	0.517***	0.498***	0.440***
	[0.090]	[0.174]	[0.097]	[0.162]
$Leverage_t$	-0.428***	-0.348**	-0.577***	-0.441***
	[0.163]	[0.136]	[0.160]	[0.150]
Constrained $(dummy)_t$	-0.130***	0.088	-0.197***	0.080
	[0.049]	[0.057]	[0.025]	[0.057]
$\Delta Earnings_t$	0.149***	0.070***	0.205***	0.098***
	[0.038]	[0.024]	[0.061]	[0.034]
$\Delta NetAssets_t$	0.097**	0.202***	0.085	0.212***
	[0.044]	[0.035]	[0.067]	[0.034]
$\Delta R\&D_t$	-1.416***	0.407***	-1.133***	0.517***
	[0.259]	[0.099]	[0.224]	[0.160]
$\Delta Interest_t$	0.596*	-3.512***	-0.122	-3.844***
	[0.345]	[0.657]	[0.443]	[1.007]
$\Delta Dividends_t$	-0.222	0.644*	-0.365***	-0.305
	[0.173]	[0.372]	[0.141]	[0.204]
$NetFinancing_t$	-0.263**	-0.237	-0.108	-0.227
	[0.124]	[0.146]	[0.159]	[0.141]
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	1,630	1,702	1,630	1,702
Adjusted R^2	0.237	0.235	0.224	0.202

Appendix A
Variable Definitions

Variable	Definition *(Compustat data codes are italicized)*
After	An indicator whose value equals 1 if the observation is one year after the event of brokerage exit and 0 if the observation is one year before brokerage exit. Source: I/B/E/S, Factiva, SDC, and Kelly and Ljungqvist (2011)
Analysis of the Marginal Value of Cash Holdings	
Industry-adjusted annual excess stock returns	Firm-level stock returns minus Fama–French (1997) industry value-weighted returns. Source: Ken French's web site
Size and M/B adjusted annual excess stock returns	Firm-level stock returns minus Fama–French size and book-to-market matched portfolio returns. Source: Ken French's web site
Leverage	Total debt (*dltt + dlc*)/Market value of total assets (*at − ceq + csho × prcc_f*). Source: Compustat
Constrained (dummy)	A dummy variable with one indicating the firm's Whited and Wu's (2006) financial constraint index (WW index) is in the top tercile of the sample and zero otherwise. Source: Compustat
$\Delta Cash_t$	Change in cash (*che*). Source: Compustat
$\Delta Earnings_t$	Change in earnings before extraordinary items (*ib + xint + txdi + itci*). Source: Compustat
$\Delta NetAssets_t$	Change in net assets (*at − che*). Source: Compustat
$\Delta R\&D_t$	Change in R&D (*xrd*, set to 0 if missing). Source: Compustat
$\Delta Interest_t$	Change in interest (*xint*). Source: Compustat
$\Delta Dividends_t$	Change in common dividends (*dvc*). Source: Compustat
$NetFinancing_t$	New equity issues (*sstk − prstkc*) + Net new debt issues (*dltis − dltr*). Source: Compustat
Analysis of CEO Compensation	
Total compensation (in $ millions)	Annual total compensation received by a CEO, comprising salary, bonus, restricted stock awards, stock option grants, long-term incentive payouts, and all others. Source: ExecuComp variable TDC1
Excess compensation	The residuals from the OLS regression of the natural logarithm of CEO total compensation on the natural logarithm of firms' total market value, industry fixed effects and year fixed effects in the sample of ExecuComp firms. Source: ExecuComp
Size (SIZE)	Log of the market capitalization of the firm (*prcc_f × csho*). Source:

	Compustat
Leverage (LEV)	Total debt (*dltt + dlc*)/Market value of total assets (*at − ceq + csho × prcc_f*). Source: Compustat
Tobin's Q (Q)	Market value of assets over book value of assets: (*at − ceq + csho × prcc_f*)/*at*. Source: Compustat
R&D/Sales (RDS)	*xrd* (set to 0 if missing)/*sale*. Source: Compustat
CapEx/Sales (CAPXS)	*capx* (set to 0 if missing)/*sale*. Source: Compustat
Advertising expense/Sales (ADVS)	*xrd* (set to 0 if missing)/ *sale*. Source: Compustat
Industry-adjusted ROA (ADJROA)	ROA (*oibdp*/*at*) adjusted by industry median ROA. Industries are defined according to Fama–French 48 industry classifications. Source: Ken French's web site
Abnormal stock returns (ABRET)	Compounded daily excess (over the CRSP value-weighted index) returns over the fiscal year. Source: CRSP
Stock return volatility (VOL)	Standard deviation of monthly stock returns during the past 5 years. Source: ExecuComp, CRSP
Firm age (AGE)	The number of years since a firm's first appearance in CRSP. Source: CRSP
CEO tenure (CEOTENURE)	The number of years a CEO has been in office. Source: ExecuComp

Analysis of Acquisition Decisions

CAR(-2, +2)	Five-day cumulative abnormal return calculated using a market model estimated over the period [-210, -11] relative to the announcement date (day 0). Source: CRSP
Size (SIZE)	Log of the market capitalization of the firm (*prcc_f × csho*). Source: Compustat
Tobin's Q (Q)	Market value of assets over book value of assets: (*at − ceq + csho × prcc_f*)/*at*. Source: Compustat
ROA	Operating income before depreciation (*oibdp*) over book value of total assets (*at*). Source: Compustat
Leverage (LEV)	Total debt (*dltt + dlc*)/Market value of total assets (*at − ceq + csho × prcc_f*). Source: Compustat
Past abnormal returns (PABRET)	Compounded daily excess (over the CRSP value-weighted index) returns over prior fiscal year. Source: CRSP
Total acquisition value in the previous year (ACQ_{t-1})	A summation of the deal value of all the transactions made by a given acquirer in the previous year. Source: SDC
Free cash flows (FCF)	(*oibdp- xint-txdi-capx*)/*at*. Source: Compustat
Relative deal size (REL)	Deal value (from SDC) over acquirer's market value of total assets (*at − ceq + csho × prcc_f*). Source: Compustat

Friendly deal (FRD)	Indicator variable: 1 for friendly deals; zero otherwise. Source: SDC
Private (dummy)	Indicator variable: 1 for private targets, and 0 otherwise. Source: SDC
All cash (dummy) (ALLCASH)	Indicator variable: 1 for purely cash-financed deals, 0 otherwise. Source: SDC
Stock (dummy) (STOCK)	Indicator variable: 1 for deals at least partially stock financed, and 0 otherwise. Source: SDC
Diversifying (dummy) (DIV)	Indicator variable: 1 if acquirer and target do not share a Fama–French industry, and 0 otherwise
Tender offer (TEND)	Equals one if the deal involves a tender offer; zero otherwise. Source: SDC
High-tech (dummy) (HITECH)	Indicator variable: 1 if acquirer and target are both from the high-tech industries defined by Loughran and Ritter (2004), and 0 otherwise

Analysis of Earnings Management

Absolute level of accrual-based earnings management	Absolute value of discretionary accruals, estimated by a cross-sectional version of the modified Jones model
Absolute level of real activities manipulation	Calculated using abnormal level of production costs and abnormal level of discretionary expenditures, estimated cross-sectionally following Roychowdhury (2006) and Zang (2012)
Market-to-book ratio	(Fiscal-year-end market value of equity + book value of liabilities)/total assets. Source: Compustat
ROA	Operating income before depreciation (*oibdp*) over book value of total assets (*at*). Source: Compustat
Growth rate of assets	The change of assets (*at*) scaled by lagged assets. Source: Compustat
Cash flow volatility	The standard deviation of cash flows of a firm in the entire sample period, scaled by lagged assets. Source: Compustat
External financing activities	Measured by the sum of net cash received from equity and debt issuance scaled by total assets. Source: Compustat
Size	Log of the market capitalization of the firm (*prcc_f × csho*). Source: CRSP, Compustat
Institutional ownership	Institutional ownership is measured by the percentage of common shares owned by institutional investors. Source: CDA/Spectrum Institutional 13(f) filings

Appendix B
Descriptive Statistics for Brokerage Exits

The table presents the number of brokerage exits and the number of affected firms in each year from 2000 to 2010 in our sample.

Year	No. of Brokerage exits	No. of Affected Firms
2000	7	364
2001	9	388
2002	4	316
2003	2	26
2004	2	76
2005	7	200
2006	3	103
2007	5	309
2008	3	266
2009	3	28
2010	1	84
Total	46	2,160

Appendix C

Revisiting the Effect of Analyst Coverage on Earnings Management

The sample consists of 4320 firm-years for 1340 unique firms from 1999 to 2011. Panel A provides summary statistics, while Panel B presents OLS regression results. Variable definitions are given in Appendix A. The dependent variable in column (1) is the absolute value of discretionary accruals, estimated by a cross-sectional version of the modified Jones (1991) model. In column (2), the dependent variable is the absolute level of real activities manipulation, calculated using abnormal level of production costs and abnormal level of discretionary expenditures, estimated cross-sectionally following Roychowdhury (2006) and Zang (2012). After is an indicator whose value equals 1 if the observation is one year after the event of brokerage exit and 0 if the observation is one year before brokerage exit. Institutional ownership is measured by the percentage of common shares owned by institutional investors. Other variable definitions are given in Appendix A. All regressions control for year and industry fixed effects, whose coefficient estimates are suppressed. Heteroskedasticity-consistent standard errors clustered at the firm level are reported in brackets. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A. Summary Statistics

	Mean	Std.	Q1	Median	Q3
Analyst coverage					
Before brokerage exit	12.581	7.714	6	11	18
After brokerage exit	11.748	7.697	6	11	17
Earnings management					
Absolute level of accrual-based earnings management	0.192	0.464	0.024	0.059	0.148
Absolute level of real activities manipulation	0.382	0.593	0.103	0.248	0.486
Firm characteristics					
Market-to-book ratio	2.193	1.758	1.253	1.697	2.546
ROA	0.115	0.148	0.076	0.130	0.187
Growth rate of assets	0.150	0.425	-0.024	0.068	0.191
Cash flow volatility	0.117	0.184	0	0.069	0.118
External financing activities	0.017	0.253	-0.036	-0.001	0.026
Size	8.046	1.871	6.731	7.978	9.335
Institutional ownership	0.631	0.283	0.479	0.703	0.842

Panel B. OLS Regression Analysis of Earnings Management		
	Dependent Variable	
	Absolute level of accrual-based earnings management	Absolute level of real activities manipulation
	(1)	(2)
After	0.036***	0.043***
	[0.014]	[0.014]
ROA	-0.136**	-0.153**
	[0.061]	[0.074]
Growth rate of assets	0.113***	0.232***
	[0.027]	[0.053]
Cash flow volatility	0.136**	0.300*
	[0.063]	[0.157]
External financing activities	-0.025	-0.034
	[0.067]	[0.110]
Size	-0.002	-0.027***
	[0.004]	[0.007]
Market-to-book ratio	-0.017***	0.048***
	[0.006]	[0.008]
Institutional ownership	-0.001	0.011
	[0.024]	[0.034]
Year fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Observations	4,320	3,806
Adjusted R^2	0.185	0.200