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Do investment banks listen to their own analysts?

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ABSTRACT

To what extent conflicts of interest affect the investment value of sell-side analyst research is an ongoing debate. We approach this issue from a new direction by investigating how asset-management divisions of investment banks use stock recommendations issued by their own analysts. Based on holdings changes around initiations, upgrades, and downgrades from 1993 to 2003, we find that these bank-affiliated investors follow recommendations from sell-side analysts in general, increasing (decreasing) their relative holdings following positive (negative) recommendations. More importantly, these investors respond more strongly to recommendations issued by their own analysts than to those issued by analysts affiliated with other banks, especially for recommendations on small and low-analyst-coverage firms. Thus, we find that investment banks "eat their own cooking," showing that these presumably sophisticated institutional investors view sell-side recommendations as having investment value, particularly when the recommendations come from their own analysts.

1. Introduction

To what extent conflicts of interest affect the investment value of sell-side analyst research is an ongoing debate. Numerous studies suggest that sell-side analysts issue overly optimistic recommendations to curry favor with covered firms and attempt to win investment banking business for their employers. Such behavior, if it is pervasive, may significantly reduce the investment value of sell-side research. However, several recent studies show that recommendations provided by analysts with potential conflicts of interest do not underperform recommendations provided by other analysts, casting doubt on the importance of such conflicts.[1]

We approach this issue from a new direction. We examine whether institutional investors affiliated with investment banks use stock recommendations issued by their own sell-side analysts. Suppose we discover that an investment bank's money managers disregard (or worse, trade against) the recommendations of the bank's sell-side analysts. Such behavior would be clear evidence that the bank's sell-side recommendations are viewed as not useful (at best) by institutional investors who are particularly well-positioned to judge.

Our primary findings are that money managers affiliated with investment banks use sell-side research in general, and they particularly listen to their own bank's analysts. Specifically, we study 1.1 million holdings changes for institutional investors affiliated with 58 major US investment banks around 70,000 stock recommendations from 1993 to 2003. We find that these investors increase their holdings after positive initiations and upgrades, and they decrease their holdings following downgrades. More importantly, the changes in holdings are economically and statistically larger when the recommendation is from an affiliated analyst.[2] Further tests show that our results are more pronounced for recommendations on small and low-analyst-coverage stocks.

To our knowledge, we are the first to explore how institutional investors respond to recommendations issued by affiliated and

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[1] Examples include Groysberg et al. (2005), Clarke et al. (2006), and Bradley et al. (2008).

[2] There are several different channels through which affiliated funds can gain better access to the analyst research at their own brokerage firms. They may do this through trading relations such as those described in Niehaus and Zhang (2010). Alternatively, investment banking business may cause both affiliated funds and affiliated analysts to take favorable actions on the firm. While this is an interesting research topic, it is beyond the scope of this paper. We thank an anonymous referee for suggesting to us the potential channels.

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unaffiliated analysts.[3] Our results show that sell-side research is used by institutional investors. This fact suggests that relatively knowledgeable market participants view sell-side research as valuable, despite the existence of potential conflicts of interest.

Our results are robust to alternative explanations. For example, we consider the possibility that analyst recommendations and institutional investor holdings changes are joint responses to public events, but we find no evidence to support this. We also explore the hypothesis that affiliated money managers "cherry pick" recommendations based on private information. We find no support for this story either; there is no differential performance between recommendations that are followed and those that are not followed.

The remainder of the paper is organized as follows. We discuss the related literature in Section 2 and sample selection and data in Section 3. Section 4 provides our results. We conclude the paper in Section 5.

2. Related literature

There is a large literature on analyst recommendations. It is widely documented that analysts employed by investment banks may issue overly optimistic recommendations to win investment banking business from the companies they cover. Analysts working for IPO/SEO underwriters may issue more optimistic recommendations than other analysts (Michaely and Womack, 1999). Even analysts not employed by underwriters have incentives to issue optimistic coverage to win future investment banking deals (Bradley et al., 2008).

However, the evidence of optimism and its relationship with investment banking deals is not free from debate. For example, Clarke et al. (2006) examine analyst recommendations for bankrupt firms during the period of 1995–2001 and find no evidence for optimism in recommendations by analysts employed by investment banks that have previous business relations with the firms. Clarke et al. (2007), Fleuriet and Yan (2006), and Ljungqvist et al. (2006) find that the relation between optimistic recommendations and future investment banking mandates is not always strong or at least cannot be generalized across all analysts and all types of investment banking deals.

There is some evidence in the literature about the lower announcement returns around recommendations issued by analysts employed by underwriters (Michaely and Womack, 1999). However, Bradley et al. (2008) find that the difference in announcement returns between recommendations issued by underwriter analysts and non-underwriter analysts disappears after controlling for recommendation characteristics and timing. The evidence on long run performance of recommendations issued by underwriter analysts is also mixed. Some studies show that buy or strong buy recommendations by analysts employed by underwriters perform worse (Michaely and Womack, 1999) while other studies fail to find such evidence (Groysberg et al., 2005; Clarke et al., 2006).

3. Data and sample selection

We obtain institutional holdings data from Thomson Financial's CDA/Spectrum 13f filings for all common stocks traded on New York Stock Exchange (NYSE), American Stock Exchange (AMEX), and NASDAQ. Due to a 1978 amendment to the Securities and Exchange Act of 1934, all institutional investors with security assets of $100 million or more under discretionary management are required to report their holdings each quarter on Form 13f. For reporting purposes, each institution pools together the assets of all client accounts (e.g., trust accounts, corporate pension plan accounts, and mutual fund accounts) into a single filing. This characteristic of the database enables us to examine the use of recommendations at the aggregated institution level, but not at a finer fund level.

We obtain stock recommendation data from I/B/E/S, which collects recommendations from brokerage houses and assigns standardized numerical ratings. The Detail History-Recommendation file provides an entry for each recommendation made by each analyst. Important variables in the file include the date of the recommendation, the name of the analyst and associated bank, the level of the recommendation, the number of analysts following the stock, and the level of the consensus recommendation at mid-calendar month. Our sample period covers the last quarter of 1993 (the beginning of the dataset) to the last quarter of 2003. We stop in 2003 because Thomson Financial has stopped providing the I/B/E/S Broker Translation file.

We classify recommendations into three samples: initiations, upgrades, and downgrades. Following Irvine et al. (2007), we identify analysts' buy and strong buy initiations in the I/B/E/S Detail History-Recommendation file. To ensure that an initiation is not just a result of I/B/E/S adding a bank to the database, we restrict the sample to those initiations by investment banks that first appear in the database at least 180 days prior to any initiation. We follow Green (2006) and classify a recommendation as an upgrade if a stock is upgraded by an investment bank from prior level of sub-buy (i.e. sell, underperform, or hold) to buy or strong buy.[4] Finally, we follow Jegadeesh and Kim (2004) and define a recommendation as a downgrade if a stock is downgraded by an investment bank from a prior level of buy or strong buy to sub-buy. For upgrades and downgrades, we keep the latest one in a quarter in our sample if an investment bank issues more than one recommendation on a stock in the quarter.

To keep the sample formation process manageable, we restrict our attention to the 100 institutions with the most recommendations in I/B/E/S. We focus on recommendations issued by analysts employed by investment banks that have IPO or SEO underwriting activities (so that there are potential conflicts of interest) in our sample period and also have affiliations with institutional investors in CDA/Spectrum (i.e., either there is a parent–subsidiary relationship or both are subsidiaries of another institution). We identify the investment bank with which an analyst is affiliated using the I/B/E/S Broker Translation file. To detect the affiliation relationship between an investment bank and institutional investors, we consult Hoovers Online, the Directory of Corporate Affiliations, Lexis–Nexis, and corporate websites. We also check for M&A news in Lexis–Nexis and *The Wall Street Journal* to identify the exact period for the relationship. Our matching and screening process produces our final working sample of 58 investment banks. Our sample includes all of the major investment banks including the big 10 banks in the Global Settlement of 2003. In our sample, the Carter and Manaster (1990) ranks range from 9 to 1, with both the means and the medians being close to 7.[5] The number of recommendations by each investment bank ranges from 287 to 3600.

[3] Irvine et al. (2004) find that analyst earnings forecasts are more accurate if the asset management division of the same bank holds more of the stock. Mola and Guidolin (2009) find that analyst recommendations are likely to be optimistic if the stock is held by affiliated mutual funds. Neither study, however, examines how institutional investors respond to recommendations issued by analysts affiliated with their own investment banks. Haushalter and Lowry (2009) find that mergers and acquisitions advisors buy (sell) the acquirers that their analysts upgrade (downgrade).

[4] Because an investment bank usually has at most one analyst covering a certain stock, we use investment bank and analyst interchangeably when it comes to coverage.

[5] Following previous studies (e.g., Green, 2006), we do not report the names of investment banks to maintain the confidentiality of the database including the IBES translation file.

Table 1
Summary statistics for portfolios of bank-affiliated institutional investors. This table provides summary statistics for portfolios of bank-affiliated institutional investors in our sample from 1993 to 2003. Panel A presents market value (in millions of dollars), which is calculated as the aggregate stockholding values (in the 13f universe) of institutional investors in our sample. Panel B presents the total number of stocks, which is defined as the count of different stocks (CUSIPs) in portfolios of institutional investors in our sample. Panel C presents average portfolio weights (in percentages) of each stock in portfolios of institutional investors in our sample. Panel D presents top 10 stock holdings as a proportion of total portfolio value (in percentages). Panel E presents concentration, which is defined as the number of different stocks accounting for half of the value of the portfolio. In all panels, we present both means and medians. All statistics are based on averages over four quarters in the year.

	1993	1994	1995	1996	1997	1998
Panel A: market value						
Mean	6020	7177	9013	11,832	16,137	18,971
Med	1390	1612	1683	2154	1922	2233
Panel B: total number of stocks						
Mean	712	916	931	988	1123	1139
Med	546	556	501	430	726	512
Panel C: average portfolio weights						
Mean	.0038	.0037	.0036	.0035	.0032	.0038
Med	.0020	.0018	.0020	.0024	.0016	.0020
Panel D: top 10 holdings as proportion of total value						
Mean	27.620	26.524	27.053	26.828	26.175	26.961
Med	26.030	24.069	24.219	23.832	22.586	25.118
Panel E: concentration						
Mean	40	43	42	43	46	41
Med	30	34	32	35	38	34

	1999	2000	2001	2002	2003
Panel A: market value					
Mean	23,953	25,149	22,086	18,710	19,072
Med	2157	2884	2413	2121	1555
Panel B: total number of stocks					
Mean	1207	1200	1389	1302	1269
Med	468	540	881	699	651
Panel C: average portfolio weights					
Mean	.0038	.0033	.0029	.0033	.0034
Med	.0021	.0019	.0012	.0014	.0016
Panel D: top 10 holdings as proportion of total value					
Mean	29.129	29.351	27.128	26.257	28.498
Med	26.543	27.306	25.928	24.959	25.725
Panel E: concentration					
Mean	36	34	39	41	37
Med	32	30	34	33	32

While our set of 58 banks may seem somewhat small, the resulting sample for analysis is substantial, containing approximately 1.1 million holdings changes. The breakdown is 359,265 holding changes corresponding to 25,160 initiations, 434,584 holding changes for 25,664 upgrades, and 332,940 holding changes for 19,626 downgrades. Among downgrades, only 611 are underperform recommendations and 236 are sell recommendations. The rest are hold recommendations. This distribution is consistent with the literature documenting that sell-side analysts rarely issued negative recommendations over the period we study (e.g., Michaely and Womack, 1999; Bradley et al., 2003).

In Table 1, we provide some basic statistics on the aggregated portfolios of the bank-affiliated institutional investors in our sample. Understanding the overall size of these portfolios as well as typical position sizes is important in interpreting the economic significance of the position changes we describe in our next section. Panel A of Table 1 shows that the mean total market value ranges from \$6.020 billion (in 1993) to \$25.149 billion (in 2000). The medians are much smaller, ranging from \$1.390 billion dollars (in 1993) to \$2.884 billion (in 2000), so there is significant skewness.

Panel B shows that, on average, bank-affiliated institutional investors in our sample hold about 700–1400 stocks in their portfolios. The median is typically near 500, with 2001 as a noticeable exception at 881. Taken together, Panels A and B make it clear that these banks typically manage very large amounts and hold large numbers of securities. The aggregated holdings are comparable to what is observed for mutual funds ranging from moderately-sized to very large.

Panel C shows that, on average, each stock accounts for about .3% to .4% of the overall portfolio. The medians are smaller, typically between .1% and .2%. Because the mean and median position sizes differ, we explore the issue a bit further. As Panel D shows, the top 10 holdings account for a relatively steady proportion, 25–30%, of total market value (means and medians are similar). In Panel E, the mean number of stocks making up half of the total value of the portfolio is typically about 40; the median is typically about 10 less than the mean.[6]

4. Empirical results

4.1. Empirical results for holding changes

To examine the response of institutional investors to recommendations, we construct four measures of holding changes from quarter 0 to quarter 1, where quarter 1 refers to the end of the quarter in which the recommendation takes place. For each recommended stock owned by each institution, the four measures we calculate are raw holding change (*RHC*), percentage holding change (*PHC*), portfolio weight change (*PWC*), and abnormal portfolio weight change (*APWC*). The first of these four measures (*RHC*) just looks at raw changes in shareholdings and is the easiest to interpret. The second measure (*PHC*) tells us the change in the proportion of a company's outstanding stock held by an institution. A drawback to these first two measures is that they do not account for differences in size across institutions. The third measure (*PWC*) addresses this issue by looking at the change in the (percentage) portfolio weight. A drawback to this measure is that weight changes will be due to both price changes and holding changes. We therefore calculate the abnormal portfolio weight change (*APWC*), which is the change in the portfolio weight of a stock in an institution's portfolio less the change in the weight of that stock in the 13f universe. We do not exclude our 58 banks from the 13f universe, so *APWC* is a conservative measure, biased toward zero.[7]

We only calculate our four measures for cases in which the institution owns the stock at the beginning of the quarter. We do not require that the institution own the stock at the end of the quarter, so there is no lookahead bias in our approach. This leaves us with 8042 initiations, 10,552 upgrades, and 10,393 downgrades. We exclude cases where there is no initial position for several reasons. First, and foremost, we have no way of knowing why an institution does not own a particular stock. It could be because the fund manager(s) have a negative opinion, or it could be that the fund manager(s) cannot invest in the stock as a matter of law, practice, or regulation. For example, suppose an institution had a single mutual fund with a small cap focus; such an institution would not hold large cap stocks for any reason. Another issue is that an institution with no initial position cannot react negatively except through a short sale, which, as a practical matter, is a transaction most institutional investors cannot (especially pre-1997) or do not perform. More generally, because of short sale restrictions, including institutions with no initial position imparts a significant

[6] As a robustness check, in subsequent analyses, we excluded the bottom 10% of our sample in terms of total portfolio market value and, separately, the top 10% in terms of investment concentration (i.e., less diversified). We obtain similar results.

[7] In unreported results, we also calculate the abnormal portfolio weight change using the weight of a stock in the CRSP universe, and we obtain similar results.

upward bias to our measures because such institutions, on average, always increase their positions in a quarter (assuming that at least one institution buys). Nonetheless, for the sake of completeness, we explore the reactions of institutions with no initial position in later robustness checks.

Endogeneity is another obvious methodological concern, particularly for upgrades and downgrades. Suppose we observe institutions increasing their shareholdings in a particular stock that has an upgrade during a quarter. Are the institutions reacting to the upgrade or are the institutions and analysts reacting to the same public information? We have no way knowing, which is why we focus on the *differential* reactions of affiliated and non-affiliated institutional investors (there is no *a priori* reason for affiliated investors to react differently to public information compared to non-affiliated investors).

This endogeneity issue is less important for initiations, which are typically planned well in advance. However, initiations are sometimes postponed or accelerated in response to events, so there is still some concern.

4.1.1. Univariate tests

We report the means of the four measures of institutional holdings changes in Table 2. Panel A presents results for the entire sample, while Panel B and Panel C present results for affiliated and unaffiliated institutional investors, respectively. Panel A shows that, on average, institutional investors increase their holdings (*RHC*) by 28,328 shares around an initiation (recall that only positive initiations are included). The change in the average percentage of outstanding shares owned (*PHC*) is .0136%. The portfolio weight change is 0.0021%, and the abnormal portfolio weight change is essentially zero at .0001%. The first three measures are significantly different from zero at any conventional level. The abnormal portfolio weight change is not significant.

To put these numbers in economic perspective, an increase in holdings of 28,328 shares is a purchase on the order of $1 million (assuming a typical share price of $30–$40). The average portfolio weight prior to an initiation (reported in summary statistics for the variable *PW* in Appendix A) is about .14%. Thus, roughly speaking, a portfolio weight change of 0.0021% is a 1.5% increase in the holding of the stock.[8]

Looking at upgrades, the means of the raw holding change (*RHC*), the percentage holding change (*PHC*), and the portfolio weight change (*PWC*) are 18,420 shares, 0.0037%, and 0.0033%, respectively, which are all statistically different from zero at the .01% level. The mean of the abnormal portfolio weight change (*APWC*) is again essentially zero.

We observe the strongest reactions for downgrades. The institutional investors in our sample decrease their holdings, on average, by 41,027 shares, 0.0285%, 0.0152%, and 0.0030% in terms of raw share holdings, percentage holdings, portfolio weights, and abnormal portfolio weights, respectively. All of our measures, including the abnormal portfolio weight change (*APWC*), are highly significant. As we have previously noted, these institutional investors generally do not sell short, so there is a limit to the decline in holdings following downgrades, and our results may be understated to some extent.

Taken at face value, the results in Panel A suggest that these institutional investors take the advice of analysts and trade in the direction indicated by their recommendations. This is particularly true for initiations, which do not suffer to the same degree from the endogeneity issue we previously discussed. Further, it is clear that these investors do not trade against analyst recommendations.

To begin to address the main issue in this paper, Panels B and C compare the reactions of unaffiliated (Panel B) and affiliated (Panel C) money managers. Given that unaffiliated money managers make up about 97% of our sample observations, Panels A and B are of course quite similar. However, every quantity is smaller (in absolute value) in Panel B, suggesting that the affiliated managers have a stronger reaction, a suggestion clearly born out in Panel C.

Examining Panel C, we see that affiliated money managers react much more strongly than unaffiliated managers. For initiations, they buy, on average, 37,428 shares versus 28,083 shares. *PHC* and *PWC* are approximately 2.5 times as large. The most striking difference is *APWC*. For affiliated managers, the abnormal portfolio weight change is approximately 10 times larger than it is for unaffiliated managers. Similar comments apply to upgrades and downgrades, particularly for *APWC*.

Panel D of Table 2 formally tests for differences between Panels B and C. The results show that, on average, in response to buy or strong buy initiations, affiliated institutional investors increase their holdings more than unaffiliated institutions. The differences are statistically significant for the first three differences, but not for the abnormal portfolio weight change.[9] The results are similar for upgrades and downgrades. The most noticeable difference is that the difference in the abnormal portfolio weight change (*APWC*) is negative and highly significant for downgrades.

4.1.2. Multivariate regression analyses

In this section, we examine the effects of recommendations on institutional holdings after controlling for factors that may affect institutional trading. Motivated by previous studies on institutional trading and stock recommendations, we construct the following 14 independent variables: *AFF*, *PW*, *LEAD*, *COMAN*, *AA*, *RANK*, *CON*, *DEV*, *COV*, *MAR*, *LGSZ*, *TECH*, *BM*, and *TIO*. Appendix A contains detailed definitions of these variables and some summary statistics.

In our regressions, *AFF* is the variable of primary interest and is used to designate recommendations from affiliated analysts. For initiations and upgrades, a positive coefficient on *AFF* indicates that an affiliated institution increases its holdings more than unaffiliated institutions. For downgrades, a negative coefficient indicates a stronger reaction.

We include *PW*, the beginning-of-period portfolio weight, because the potential reaction by an institutional investor may depend on the size of the initial position, particularly for downgrades. Recall that we only consider cases in which the initial position is not zero.

We include *LEAD* and *COMAN* to examine the potential effects of underwriting relationships. We include two variables instead of just one because Johnson and Marietta-Westberg (2009) suggest that lead underwriters play a more important role than co-managers. *AA*, a dummy variable for *Institutional Investor* "All-American" analysts, is used to examine whether institutional investors react differently to recommendations issued by high-reputation analysts. Carter–Manaster ranks (*RANK*) are widely used in the literature as a proxy for investment bank reputation. On the one hand, higher reputation investment banks may hire more talented analysts and possess more research resources. Recommendations from high-rank banks may be more useful and less biased due to superior information and reputational concerns. On the other hand,

[8] This is a rough approximation because it is a ratio of averages, not the average ratio.

[9] The average differences in Panel D are not equal to the simple differences between the averages in Panels B and C. In Panel D, for each recommendation, we compute the change for the affiliated investor and the average change of the unaffiliated investors and take the difference. We then average over these differences to do our *t*-test. The number of observations used to compute the average for the unaffiliated investors differs from case to case, which is why the Panel D differences are not the same.

Table 2
Holding changes of affiliated and unaffiliated institutional investors. This table provides average values of four measures of holding changes of institutional investors around initiations, upgrades, and downgrades by sell-side analysts affiliated with 58 major investment banks. Definitions of the four measures, *RHC*, *PHC*, *PWC*, and *APWC*, are provided in Appendix A. *PHC*, *PWC*, and *APWC* are in percentages. Panel A presents results for all institutional investors, while Panel B and Panel C present results for unaffiliated and affiliated institutional investors, respectively. Panel D provides four measures of excess holding changes of affiliated institutions. *ERHC* is calculated by subtracting the mean value of *RHC* among unaffiliated institutional investors from the corresponding value of *RHC* for the affiliated institutional investor. Other variables are defined similarly. Affiliated institutional investors are defined as institutional investors that are affiliated with the investment banks issuing the recommendations. Two-tailed *p*-values are obtained from *t*-tests on whether the values are statistically different from zero.

	N	*RHC*	*PHC*	*PWC*	*APWC*
Panel A: holding changes of institutional investors (both affiliated and unaffiliated)					
Initiations					
Mean	305,885	28,328	.0136	.0021	.0001
(*p*-value)		(<.0001)	(<.0001)	(<.0001)	(0.3310)
Upgrades					
Mean	386,274	18,420	.0037	.0033	.0001
(*p*-value)		(<.0001)	(<.0001)	(<.0001)	(0.1562)
Downgrades					
Mean	299,068	−41,027	−.0285	−.0152	−.0030
(*p*-value)		(<.0001)	(0.0002)	(<.0001)	(<.0001)
Panel B: holding changes of unaffiliated institutional investors					
Initiations					
Mean	297,843	28,083	.0131	.0021	.0001
(*p*-value)		(<.0001)	(<.0001)	(<.0001)	(0.4369)
Upgrades					
Mean	375,722	18,091	.0034	.0033	.0001
(*p*-value)		(0.0360)	(<.0001)	(<.0001)	(0.2888)
Downgrades					
Mean	288,675	−40,259	−.0279	−.0151	−.0028
(*p*-value)		(<.0001)	(0.0008)	(<.0001)	(<.0001)
Panel C: holding changes of affiliated institutional investors					
Initiations					
Mean	8042	37,428	.0321	.0051	. 0012
(*p*-value)		(<.0001)	(<.0001)	(<.0001)	(.1057)
Upgrades					
Mean	10,552	30,156	.0145	.0073	. 0015
(*p*-value)		(0.0521)	(0.0024)	(<.0001)	(.0887)
Downgrades					
Mean	10,393	−62,312	−.0457	−.0171	−.0077
(*p*-value)		(<.0001)	(<.0001)	(<.0001)	(<.0001)
		ERHC	*EPHC*	*EPWC*	*EAPWC*
Panel D: difference in holding changes between affiliated institutional investors and unaffiliated institutional investors					
Initiations					
Mean	8042	14,234	.0156	.0035	.0014
(*p*-value)		(.0106)	(.0028)	(<.0001)	(.1167)
Upgrades					
Mean	10,552	15,118	.0097	.0042	.0012
(*p*-value)		(.0219)	(.0026)	(<.0001)	(.1258)
Downgrades					
Mean	10,393	−27,831	−.0133	−.0039	−.0045
(*p*-value)		(.0639)	(.0200)	(.0003)	(<.0001)

highly ranked banks are more active in investment banking activities such as IPO and SEO underwriting, which are regarded as primary sources of conflicts of interest for sell-side analysts. Thus, we have no *a priori* prediction for the sign of the coefficient on *RANK*.

CON and *DEV* are measures of consensus recommendation and recommendation deviation, respectively. These are included because investor reactions may depend on both the strength of previous recommendations and the extent to which the current recommendation differs from previous recommendations. For similar reasons, we include *COV*, the number of analysts following a stock.

Prior stock performance is an important piece of publicly available information and is also known to affect analyst recommendations. Following previous studies (e.g. Jegadeesh et al., 2004), we use 6-month market-adjusted return (*MAR*) as a measure of pre-recommendation performance. *LGSZ*, a measure of company size, can be regarded as a control for any size-related effects such as information asymmetry and/or liquidity.

As in other studies, *TECH* is used to examine whether there is a differential response for hi-tech firms. We define tech stocks as in Loughran and Ritter (2004). Similarly, we use *BM* as a control since previous literature documents that the book-to-market ratio can be an important investment signal for institutional investors and because reactions may differ across the growth/value spectrum. We include total institutional ownership (*TIO*) because of its effects on trading costs (e.g., Bartov et al., 2000) and also on research by investment banks (e.g., Ljungqvist et al., 2007).

Table 3 provides regression results for portfolio weight changes for our initiation, upgrade, and downgrade samples. The dependent variable is the portfolio weight change, *PWC*, and our results are robust if we use *APWC*s, as we will show in Section 4.5. The regressions control for investment bank and year fixed effects.

Looking at the initiations results first, the coefficient on *AFF* is 0.0038 and highly significant. The number indicates that after controlling for other factors, on average, affiliated investors increase their portfolio weight 0.0038% more than unaffiliated investors. Based on the average portfolio weight of 0.14% prior to an initiation as reported in Appendix A, the difference is about 2.7% of the average position before initiations. A number of the controls are also significant. The initial position size, *PW*, matters in the anticipated

Table 3
Regression results for portfolio weight changes. This table provides regression results for portfolio weight changes of institutional investors around recommendation changes. For definitions of the portfolio weight change (*PWC*) and independent variables, see Appendix A. The three columns are for initiations, upgrades, and downgrades, respectively. In all three columns, we control for investment bank and year fixed effects, whose coefficients are suppressed to conserve space. Two-sided *p*-values are reported below the coefficients.

Variables	Initiations	Upgrades	Downgrades
AFF	.0038	.0034	−.0010
	<.0001	.0005	.3341
PW	−.0001	−.0001	−.0006
	<.0001	<.0001	<.0001
COMAN	−.0003	−.0013	−.0044
	.7102	.0623	.0001
LEAD	.0006	.0005	.0003
	.5906	.6150	.7685
AA	.0000	.0016	−.0003
	.9615	.0008	0.6715
RANK	−.0002	.0001	−.0001
	.2555	.5414	.6344
CON	−.0026	−.0026	−.0039
	<.0001	<.0001	<.0001
DEV	.0011	.0005	−.0029
	.0008	.2054	.0001
COV	.0004	.0005	.0003
	<.0001	<.0001	<.0001
TECH	−.0004	.0030	−.0043
	.2866	<.0001	<.0001
MAR	.0089	.0096	.0194
	<.0001	<.0001	<.0001
BM	.0003	.0009	.0005
	.0014	<.0001	.0036
TIO	−.0070	−.0112	−.0063
	<.0001	<.0001	<.0001
LGSZ	.0004	.0014	−.0024
	.0042	<.0001	<.0001
n	303,870	383,100	293,060
Adj. R^2	.0234	.0250	.0804

way; the larger is the initial position, the smaller is the increase. Interestingly, the next four variables, *COMAN*, *LEAD*, *AA*, and *RANK* are all insignificant, so bank and analyst reputation and the potential for conflicts of interest do not seem to be important.

The three variables related to overall analyst coverage are all highly significant. First, recalling that lower rankings are more positive, the negative value on *CON* indicates a stronger reaction to a favorable initiation when the consensus is already more favorable. Likewise, the larger is the deviation from the consensus (*DEV*) and the greater is the number of analysts covering (*COV*), the stronger is the reaction.

Whether the firm in question is in a high-tech industry (*TECH*) does not matter. The remaining four controls are all highly significant. Previous market-adjusted return (*MAR*) has a strong positive effect. The positive coefficient on book-to-market (*BM*) indicates a stronger reaction to positive initiations on "value" stocks. Total institutional ownership has a negative coefficient, presumably reflecting the fact that the more institutions own collectively, the less they buy on average following a positive initiation. Finally, there is a stronger reaction to initiations on larger firms.

Because our initiations sample contains only positive entries, we expect the results for initiations and upgrades to be similar, and the results for upgrades in Table 3 confirm our priors. The coefficient on *AFF* is highly significant and is about the same numerically as we observe for initiations. For the other coefficients, there are four notable differences. First, unlike initiations, *COMAN* is negative and significant at the 10% level for upgrades, indicating that institutional investors react less strongly to upgrades from co-underwriters. Second, the coefficient for *AA* is positive and significant for upgrades, indicating that upgrades by "All-American" analysts elicit a greater response than initiations, where the coefficient is essentially zero. Third, the deviation from consensus, *DEV*, is positive for upgrades (as it is for initiations), but it is not significant at conventional levels. Fourth, upgrades on hi-tech firms have a much larger effect, whereas hi-tech status has essentially no impact for initiations.

For downgrades, the last column of Table 3 shows that *AFF* is negative as expected, but insignificantly different from zero. To a greater extent than for initiations and upgrades, downgrades tend to be the result of publicly available information concerning adverse company-specific events (e.g., earnings shortfalls). Such events frequently trigger multiple downgrades in a short period of time, and, in such circumstances, the information in any particular analyst's downgrade is of limited value. We explore this issue in greater depth in a Section 4.3 by looking at firm quarters in which only one analyst downgrades and find some supporting evidence for this explanation.

Turning to the other variables, the initial position, *PW*, is negative and highly significant, indicating more selling for larger positions. The coefficient on *COMAN* is negative and highly significant, indicating that institutional investors react more strongly to downgrades from co-underwriters. The three variables dealing with analyst coverage, *CON*, *DEV*, and *COV*, are highly significant. There is more selling when the consensus is low and when the downgrade is worse than the consensus. There is less selling when there is greater coverage. There is stronger selling for tech stocks, poorly-performing stocks, and growth stocks. Likewise, there is more selling for larger firms with higher degrees of institutional ownership.

4.2. Post-recommendation stock price performance

Our results thus far show that institutional investors trade in the direction indicated by recommendations from sell-side analysts. Because of the endogeneity issue, we cannot say conclusively if our results show that institutional investors in general take the advice of sell-side analysts. However, particularly for initiations and upgrades, we do find relatively clear evidence that institutional investors listen to sell-side analysts. We interpret our results as evidence that the potential conflicts of interest do not invalidate the investment value of analyst stock recommendations.

In this section, we explore post-recommendation stock price performance to address an important issue. We cannot rule out the possibility that institutional investors have private information about the bias and investment value of recommendations issued by analysts affiliated with their own investment banks. If they do, they may respond more strongly to recommendations with high investment values and low biases, and less strongly to recommendations with low investment values and high biases.

Unaffiliated institutional investors, knowing that they face a potential adverse selection problem, will respond less strongly to recommendations from other banks. If this is the case, we would expect that following an initiation or upgrade, stocks followed by affiliated institutional investors will outperform stocks not followed (or traded against) by affiliated institutional investors. Similarly, upon a downgrade, stocks sold by affiliated institutional investors will underperform stocks not sold by affiliated institutional investors.

In Table 4, we compare the stock market performance of recommendations followed by affiliated institutional investors with those not followed by affiliated institutional investors. If an affiliated institutional investor strictly increases (decreases) share holdings around an initiation or upgrade (downgrade), we say that the recommendation is followed by affiliated institutional investor.

Table 4
Comparison of stock performance between recommendations followed and not followed by affiliated institutional investors. This table compares returns between recommendations followed by affiliated institutional investors and those not followed. Panels A, B, and C present results for initiations, upgrades, and downgrades, respectively. For initiations and upgrades (downgrades), recommendations followed by affiliated institutional investors are defined as those around which affiliated institutional investors increase (decrease) their share holdings. Otherwise they are defined as not followed. A stock enters a portfolio at the beginning of month after the recommendation and stays in the portfolio for 3, 6, 9, or 12 months. Average monthly abnormal return is the intercept from a regression of the monthly excess (value-weighted) portfolio returns on the Carhart (1997) four factors. All *p*-values are from the regression for corresponding intercepts.

	Followed (*p*-value)	Not followed (*p*-value)	Difference (*p*-value)
Panel A: initiations			
3-month portfolio	−.00367	−.00247	−.00120
	(.4250)	(.5381)	(.5224)
6-month portfolio	−.00098	−.00110	.−00012
	(.8035)	(.6473)	(.6739)
9-month portfolio	.00463	.00345	.00118
	(.2516)	(.6667)	(.3343)
12-month portfolio	.00396	.00379	.00017
	(.2691)	(.2541)	(.5141)
Panel B: upgrades			
3-month portfolio	.01332	.00953	.00379
	(.0012)	(.0091)	(.4345)
6-month portfolio	.01056	.00930	.00126
	(.0028)	(.0026)	(.5118)
9-month portfolio	.00956	.00794	.00162
	(.0043)	(.0055)	(.5230)
12-month portfolio	.00929	.00820	.00109
	(.0027)	(.0032)	(.6452)
Panel C: downgrades			
3-month portfolio	−.01057	−.00957	−.00100
	(.0059)	(.1224)	(.3149)
6-month portfolio	−.00099	−.00044	−.00055
	(.4048)	(.5025)	(.8303)
9-month portfolio	.00479	.00400	.00079
	(.2019)	(.2014)	(.9175)
12-month portfolio	.00466	.00463	.00003
	(.1015)	(.1505)	(.9864)

Otherwise, it is defined as a recommendation not followed by affiliated institutional investors.[10]

We evaluate post-recommendation stock price performance using the Fama and French (1993) factor model approach. Specifically, as in Carhart (1997), we run the following four-factor regression:

$$R_t = \alpha + \beta_1 \times RMRF_t + \beta_2 \times SMB_t + \beta_3 \times HML_t + \beta_4 \times Momentum_t + e_t, \quad (1)$$

where R_t is the excess return in month t on a portfolio, $RMRF_t$ is the CRPS value-weighted market return minus the risk-free rate in month t, and SMB_t, HML_t, and $Momentum_t$ are month t returns on zero-investment portfolios based on size, book-to-market, and momentum effects.[11] The estimated intercept or "alpha" is interpreted as the monthly abnormal return in excess of what could have been achieved by passive investments in the four factors.

Following a recommendation, all stocks followed by their affiliated institutional investors in that quarter are formed into a value-weighted portfolio. Similarly, a portfolio of stocks not followed is formed. We consider holding periods of 3, 6, 9, and 12 months, meaning that a stock is held in the portfolio for these lengths of time and then dropped (in the absence of another recommendation). Although it rarely happens, a stock may enter a portfolio more than once in any given month if there is more than one recommendation on the stock. For the same reason, on rare occasions, a stock can be in both the followed and the not-followed portfolios at the same time if there is more than one recommendation (and differing reactions by affiliated investors).

This portfolio formation process produces a time-series of monthly returns on two portfolios covering our entire sample period 1993–2003. We fit the four-factor model to the full time-series of excess returns and report the resulting estimates in Table 4. To save space, only the alphas and their significance levels are reported.

Beginning with initiations in Panel A of Table 4, the first two columns report alphas for the followed and not-followed portfolios under the four different holding period assumptions. The alphas are consistently indistinguishable from zero. In the third column, we test for differences in the abnormal returns. The excess return in this case is the value-weighted return on a zero-investment strategy that buys stocks followed by affiliated institutional investors and sells short stocks not followed by affiliated institutional investors. For initiations, the differences are numerically quite small and statistically insignificant. Thus, initiations appear to have no investment value (at least as we use them in a trading strategy), and there is no evidence that institutional investors benefit from selectively following or not following initiations.

The results in Panel B for upgrades are somewhat more interesting. In all cases, the abnormal monthly returns are positive and statistically significant for both stocks followed and stocks not followed by affiliated institutional investors. The alphas range from about 80 basis points per month to more than 130, so there is significant investment value in analyst upgrades. However, as with initiations, there is no evidence that stocks followed outperform stocks not followed.

Finally, Panel C presents results for downgrades. Here, as with initiations, there is little evidence of investment value. The exception is the followed portfolio and the 3-month holding period, which has a significantly negative return. Nonetheless, as we have previously seen, there is no differential performance between the followed and non-followed portfolios.

In sum, we find that upgrades by sell-side analysts do have investment value, but not initiations or downgrades. However, the performance of recommendations followed by affiliated institutional investors is not significantly different from the performance of recommendations not followed for any type of recommendation, which suggests that the trading behavior of affiliated institutional investors is not driven by their information advantage about the bias and investment value of recommendations issued by their own bank's analysts.

4.3. Results from unique recommendations

As we have discussed, there is an endogeneity concern when we look at investor responses to analyst recommendations. Thus far, we have primarily focused on differential responses as a means of controlling for this issue. As an extension, we try to identify recommendations that are less likely to be a response to a specific event. To do this, we follow Bradley et al. (2008) and restrict our sample to quarters in which only one analyst has issued a new recommendation for the stock (we call these "unique recommendations").

Table 5 repeats the multivariate regression analyses in Table 3 using the sample of unique recommendations. Note that the firms in our unique recommendations sample are probably not representative of the overall sample. Among other things, they are likely to have less analyst following, which in turn means that they are likely smaller. Further, because the firms are smaller, our

[10] We also compare the performance of recommendations followed and those traded against by affiliated institutional investors and obtain similar results.

[11] We obtain the factor realizations from WRDS.

Table 5
Regression results of portfolio weight changes for unique recommendations. This table provides regression results of portfolio weight change for unique recommendations. Unique recommendations occur in quarters in which a stock receives only one new recommendation. The dependent variable is the portfolio weight change (*PWC*), which is defined in Appendix A. The three columns are for initiations, upgrades, and downgrades, respectively. We control for investment bank and year fixed effects. To conserve space, intercepts and coefficients for fixed effects are suppressed. Two-sided *p*-values are reported below the coefficients.

Variables	Initiations	Upgrades	Downgrades
AFF	.0043	.0078	−.0044
	.0068	.0002	.0480
PW	.0001	.0000	−.0009
	<.0001	.6460	<.0001
COMAN	.0011	.0007	−.0003
	.4446	.5979	.8815
LEAD	.0035	−.0012	.0002
	.0365	.4925	.9288
AA	−.0002	.0020	−.0006
	.8764	.1038	.7628
RANK	−.0002	−.0002	.0001
	.3202	.3514	.8548
CON	−.0002	.0011	−.0025
	.8124	.2035	.2252
DEV	.0018	.0002	−.0022
	.0049	.8494	.2660
COV	.0003	.0007	.0009
	.0017	<.0001	<.0001
TECH	.0001	−.0030	−.0013
	.8493	.0061	.3153
MAR	.0023	.0028	.0014
	.0019	.0158	.3468
BM	−.0003	−.0003	−.0009
	.0427	.3281	.0020
TIO	−.0002	.0070	.0012
	.8670	.0001	<.0001
LGSZ	−.0006	−.0012	−.0044
	.0282	.0047	<.0001
N	31,160	22,406	15,490
Adj. R^2	.0390	.0790	.1586

institutional investors will, on average, have smaller positions in them, and fewer institutions will own them.[12]

Beginning with initiations in Table 5, we see that the coefficient on *AFF* is 0.0043, highly statistically significant and somewhat larger than we observe for the overall sample. That is, after controlling for other factors, affiliated investors increase their portfolio weight 0.0043% more than unaffiliated investors around unique initiations. The difference is about 3% of the average position before initiations. Looking at the controls, the most noticeable differences are that *PW*, *BM*, and *LGSZ* are significant with opposite signs. Also, *CON* and *TIO* are not significant for the unique recommendations sample. These differences, along with the bigger coefficient on *AFF*, suggest that firm size and analyst coverage may influence the reactions of institutional investors, an issue we consider in detail in the next section.[13]

For upgrades, *AFF* is again highly significant, and the coefficient for the unique recommendations is more than twice the size observed in the full sample. As with initiations, there are some differences in the controls, most noticeably for *TIO* and *LGSZ*, which are significant with opposite signs. This is again consistent with the fact that the unique recommendation subsample differs in some important ways from the entire sample, particularly with regard to size.

Finally, for downgrades, *AFF* is negative and significant (at the 5% level), whereas it was insignificant for the whole sample. The coefficient is four times larger (in absolute value) for the unique recommendations subsample. Thus, it appears that institutional investors react much more strongly when (1) their own analyst downgrades and (2) no other analysts downgrade. Thus, the result is consistent with our earlier conjecture that downgrades tend to be the result of publicly available information concerning adverse company-specific events, which frequently trigger multiple downgrades in a short period of time. In such circumstances, the information in any particular analyst's downgrade is of limited value, which may partially explain why the coefficient on *AFF* is statistically insignificant for the whole sample in Table 3. As expected at this point, we observe some differences in controls. For example, *TIO* and *BM* are significant with opposite signs.

4.4. Influence of firm size and analyst coverage

Taken together, the results in our previous sections strongly support the notion that banks listen to their own analysts. The effect, as measured by *AFF*, seems even more pronounced for the sample of unique recommendations. In this section, we explore whether differences in firm size and analyst coverage are important influences.

In Table 6, we present results from our multivariate analysis for firm size quintiles (Panel A) and analyst coverage quintiles (Panel B). To save space, only the coefficients for *AFF* are reported, along with their *p*-values. In Panel A, we see that for initiations, the coefficient on *AFF* is positive and statistically significant at the 1% level in the bottom quintile. The coefficient of .0048 indicates that for firms in the bottom size quintile, affiliated investors increase their portfolio weight 0.0048% more than unaffiliated investors after controlling for other factors. The difference is about 3.4% of the average position before initiations. The coefficients in the middle three quintiles are also positive and statistically significant. The coefficient in the largest quintile is not significant. Thus, it appears that, for initiations, the effect in the differential reaction is much stronger for smaller firms. Upgrades display a similar pattern. The bottom three quintiles are highly significant; the upper two are not. We observe no clear pattern for downgrades.

In Panel B, for initiations and upgrades, we again see a relatively clear pattern of stronger differential reactions for the lower quintiles, but relatively little differentiation for downgrades. So, overall, we find that the stronger response of affiliated institutional investors to initiations and upgrades from their own analysts is concentrated on stocks with relatively smaller market capitalization and lower analyst coverage. This implies that when information asymmetry is high (as measured by firm size and analyst coverage), institutional investors place even more weight on the positive recommendations issued by affiliated analysts. The lack of a significant effect for downgrades in both panels is consistent with downgrades primarily occurring in response to public information.

4.5. Results using abnormal portfolio weight changes

In Tables 3 and 5, we report regression results using portfolio weight change, *PWC*, as the dependent variable. To examine whether our results are robust to other measures of portfolio change, we report results using an alternative measure, abnormal portfolio weight change, *APWC*. Recall that *APWC* is the portfolio weight change, *PWC*, less the portfolio weight change in the 13f universe. Table 7 contains the results. Panel A uses the full sample and corresponds to Table 3. Panel B uses the unique recommendations sample and corresponds to Table 5. Again, for the sake of brevity, we only report the coefficients on *AFF* and their *p*-values.

[12] To overcome these limitations, we repeat our analyses using recommendations where there is no other recommendation issued on the same stock in the past 30 days. We find qualitatively similar results as those in Table 5. We thank an anonymous referee for suggesting this alternative approach.

[13] We also compare abnormal returns of stocks followed by affiliated institutional investors with those not followed by affiliated institutional investors for the next 3, 6, 9, and 12 months based on unique recommendations, and our conclusions are generally similar to those in Section 4.2.

Table 6
Coefficients on *AFF* from regressions of portfolio weight changes across firm size and analyst coverage. This table provides results from regressions of portfolio weight changes across firm size quintiles (Panel A) and analyst coverage quintiles (Panel B). In each quintile, we run a regression similar to that in Table 3 and report the coefficients on *AFF*. Two-sided *p*-values are reported below the coefficients.

	1st Quintile Small	2nd Quintile	3rd Quintile	4th Quintile	5th Quintile Large
Panel A: by firm size					
Initiations					
Coefficients on *AFF*	.0048	.0032	.0026	.0051	.0021
(*p*-value)	(<.0001)	(.0111)	(.0871)	(.0133)	(.5535)
Upgrades					
Coefficients on *AFF*	.0040	.0067	.0065	.0010	.0009
(*p*-value)	(<.0001)	(<.0001)	(.0001)	(.6733)	(.8244)
Downgrades					
Coefficients on *AFF*	−.0023	−.0011	−.0017	−.0012	−.0005
(*p*-value)	(.0219)	(.4423)	(.3880)	(.6575)	(.9108)
	Low				High
Panel B: by analyst coverage					
Initiations					
Coefficients on *AFF*	.0054	.0030	.0025	.0032	.0028
(*p*-value)	(<.0001)	(.0401)	(.1000)	(.1434)	(0.4485)
Upgrades					
Coefficients on *AFF*	.0071	.0045	.0014	.0054	.0002
(*p*-value)	(<.0001)	(.0009)	(.2367)	(.0370)	(.9483)
Downgrades					
Coefficients on *AFF*	−.0015	−.0010	−.0022	−.0044	−.0020
(*p*-value)	(.1853)	(.5429)	(.2770)	(.1080)	(.6205)

Table 7
Coefficients on *AFF* from regressions of abnormal portfolio weight changes. This table provides results from regressions of abnormal portfolio weight changes of institutional investors around recommendations. We run regressions similar to those in Table 3 (Panel A) and Table 5 (Panel B) and report coefficients on *AFF*. Two-sided *p*-values are reported below the coefficients.

	Initiations	Upgrades	Downgrades
Panel A: full sample			
Coefficients on *AFF*	.0018	.0017	−.0027
(*p*-value)	(.0557)	(.0805)	(.0019)
Panel B: unique recommendations			
Coefficients on *AFF*	.0043	.0102	−.0042
(*p*-value)	(.0106)	(<.0001)	(.0178)

Table 8
Coefficients on *AFF* from regressions of portfolio weight changes of institutions with no initial positions in the recommended stock. This table provides coefficients on *AFF* in regressions similar to those in Table 3 (Panel A) and Table 5 (Panel B), but with the sample of institutional investors with no initial positions in the recommended stock. Two-sided *p*-values are reported below the coefficients.

	Initiations	Upgrades	Downgrades
Panel A: full sample			
Coefficients on *AFF*	.0090	.0467	−.0016
(*p*-value)	(.0051)	(<.0001)	(.6811)
Panel B: unique recommendations			
Coefficients on *AFF*	.0197	.0403	−.0037
(*p*-value)	(.0004)	(<.0001)	(.2154)

In Panel A, the results show that the coefficient on *AFF* is 0.0018 and statistically significant, indicating that affiliated institutions increase their abnormal portfolio weight 0.0018% more than unaffiliated institutions around initiations. Additionally, *AFF* has significantly positive coefficients for upgrades and significantly negative coefficients for downgrades.

In Panel B, for initiations, the coefficients on *AFF* are positive and statistically significant, indicating affiliated institutional investors increase their holdings more than unaffiliated institutional investors following unique initiations. The results for upgrades are similar. For downgrades, the coefficients on *AFF* are negative and significant, similar to results in Table 5. In summary, our primary conclusions are qualitatively unchanged when we use an alternative measure of institutional holding changes as the dependent variable.

4.6. Results on portfolio weight changes of institutional investors with no initial positions in the recommended stock

As mentioned in Section 4.1, we exclude cases where an institutional investor does not own the recommended stock at the beginning of the quarter. In this section, we explore whether our results hold in these cases. We repeat our analyses using portfolio weight changes of institutional investors with no initial positions in the recommended stock. We run similar regressions to those in Tables 3 and 5. Table 8 contains the results. Panel A uses the full sample and corresponds to Table 3. Panel B uses the unique recommendations sample and corresponds to Table 5. Once again, for the sake of brevity, we only report the coefficients on *AFF* and their *p*-values.

Panel A shows that affiliated institutions increase their portfolio weights more than unaffiliated institutions around initiations and upgrades, as indicated by the positive and statistically significant (at the 1% level) coefficients on *AFF*. The coefficient on *AFF* is negative but insignificant for downgrades, similar to results in Table 3.[14]

In Panel B, we find similar results using unique recommendations. For initiations and upgrades, the coefficients on *AFF* are positive and statistically significant at the 1% level, indicating that affiliated institutional investors increase their holdings more than unaffiliated institutional investors following unique initiations or unique upgrades. For downgrades, the coefficients on *AFF* are negative but insignificant. In summary, our primary conclusions are

[14] Because Table 8 is for the sample of institutions with no initial positions on the covered stock and 13F does not report short positions, one may wonder the meaning of the negative coefficient on *AFF* for downgrades. The dummy *AFF* measures the difference in portfolio weight change between affiliated and unaffiliated investors. In Panel A, the coefficient −.0016 means that affiliated investors increase their portfolio weight .0016% less than unaffiliated investors, even though the difference is not statistically significant. After further looking into the data, we find that the average portfolio weight increase of unaffiliated investors around downgrades is about .0017% while that of affiliated investors is about zero.

qualitatively unchanged when we use portfolio weight changes of institutional investors with no initial positions in the recommended stock.

4.7. Effects of price changes on portfolio weight changes

Our regression results in Table 3 show that the portfolio weight changes are higher around initiations and upgrades when the recommendation is issued by an affiliated analyst instead of an unaffiliated analyst. We interpret this as evidence that institutional investors listen to their own analysts and trade accordingly. However, there exists an alternative explanation for results in Table 3. It is likely that initiations and upgrades follow recent price increases. At the same time, affiliated institutional investors may hold more stocks covered by their own analysts for information or underwriting reasons.[15] Therefore, a price increase may increase the portfolio weight of the stock for affiliated institutional investors.[16] To see this, assume that there are 10 stocks in the universe, each firm has one share of stock, and all stocks are traded at $1 per share. There are five institutional investors, and each holds two stocks with no overlap. Suppose that institution 1 holds stocks 1 and 2. If the price of stock 1 doubles to $2 per share and the prices of other stocks remain the same, then the weight of stock 1 in institution 1's portfolio changes from 50% to 67% (i.e., $PWC = 17\% > 0$) even with no institutional trading. Further, the value of the abnormal portfolio change (*APWC*) is also positive ($APWC = 17\% - 8\% = 9\% > 0$). Therefore, our tests in Table 7 do not rule out this alternative explanation, either.

To test if our results are driven by price changes, we follow Kacperczyk et al. (2005) to control for the effect of passive weight changes due to price changes. We define $w_{i,j,t}$ as institution i's portfolio weight on stock j in quarter t based on stock prices at the end of quarter t. Further, we compute $w'_{i,j,t-1}$ as the portfolio weight measured in quarter t under the assumption that the institution holds its positions, without trading, from previous quarter $t-1$. Let $R_{j,t-1,t}$ denote the return on stock j from the end of quarter $t-1$ to the end of quarter t, then,

$$W'_{i,j,t-1} = \frac{w_{i,j,t-1}(1+R_{j,t-1,t})}{\sum_{k=1}^{N} w_{i,k,t-1}(1+R_{k,t-1,t})}.$$

We then define the trading of institution i on stock j in quarter t as

$$PWCAP_{i,j,t} = w_{i,j,t} - w'_{i,j,t-1}.$$

This new measure controls for the effects of price changes on portfolio changes. In the above example, institution 1's holding of stock 1 at the beginning of the quarter is $w_{i,j,t-1} = 50\%$, and $w_{i,j,t} = 67\%$ at the end of the quarter. The value of $w'_{i,j,t-1}$ is

$$W_{i,j,t-1} = \frac{50\%(1+100\%)}{50\%(1+100\%)+50\%(1+0\%)} = 67\%.$$

The value of the new measure of portfolio change is

$$PWCAP_{i,j,t} = w_{i,j,t} - w'_{i,j,t-1} = 67\% - 67\% = 0\%,$$

which correctly reflects the fact that institution 1 does not trade on stock 1.

We repeat our analyses in Table 3 by replacing the independent variable *PWC* with the new measure *PWCAP* and report results in Panel A of Table 9. The coefficients on *AFF* for initiations and upgrades are both positive and statistically significant, even though the significance level is lower compared to those in Table 3. The coefficient on *AFF* for downgrades remains statistically insignificant, similar to that in Table 3.

Table 9
Coefficients on *AFF* from regressions of portfolio weight changes adjusted for price changes. This table provides regression results for portfolio weight changes of institutional investors adjusted for price changes. Panel A reports results for the full sample. Panel B reports results for unique recommendations. We run regressions similar to those in Table 3 (Panel A) and Table 5 (Panel B) and report coefficients on *AFF*. Two-sided *p*-values are reported below the coefficients.

Variables	Initiations	Upgrades	Downgrades
Panel A: full sample			
Coefficients on *AFF*	.0049	.0022	−.0014
(*p*-value)	(.0665)	(.0773)	(.4750)
Panel B: unique recommendations			
Coefficients on *AFF*	.0084	.0208	−.0016
(*p*-value)	(.0675)	(.0001)	(.5236)

We then confine our sample to unique recommendations and repeat our analyses in Table 5 by replacing the independent variable *PWC* with the new measure *PWCAP*. We report results in Panel B of Table 9. The coefficient on *AFF* for initiations is positive, but the statistical significance level is reduced to 10% from the 1% in Table 5. The coefficient on *AFF* for upgrades remains highly statistically significant. The coefficient on *AFF* for downgrades is statistically insignificant, similar to that in Table 5.

We have shown in Table 8 that our results hold for institutional investors with no initial positions in the recommended stocks. It is straightforward to show that if institutional investor i holds no position in stock j at the end of quarter $t-1$, then our measures *PWCAP* and *PWC* are the same, because both equal $w_{i,j,t}$. Therefore, our results in Table 8 are not affected by price changes.

Further, our measures *RHC* and *PHC* are not affected by price changes because they measure the change in the number of shares and the change as a percentage of the firm's shares outstanding. Unreported results show that our main results in Table 3 hold even if we use *RHC* or *PHC* as the dependent variable. We omit them for brevity and because *RHC* and *PHC* do not account for differences in size across institutions.[17] These results are, however, available upon request to interested readers.

5. Conclusion

We investigate how institutional investors affiliated with investment banks use stock recommendations from sell-side analysts that are affiliated with their own banks. We find that sell-side recommendations appear to be used by institutional investors in general, though we cannot completely rule out the possibility that analysts and investors are reacting to the same information. However, and more importantly, we find that institutional investors respond more strongly to recommendations issued by analysts affiliated with their own investment banks, particularly for initiations and upgrades. Thus, we find that investment banks do take their own advice. Our results are more pronounced among small and low-analyst-coverage firms.

We examine whether our results are driven by affiliated institutional investors' superior knowledge about the bias and investment value of recommendations issued by analysts affiliated with their own banks. We find that, on average, analyst stock recommendations have investment value for upgrades, but not for initiations or downgrades in the long run. However, regardless of recommendation type, we find no significant difference in returns between recommended stocks followed and not followed by affiliated institutional investors, so we see no evidence of "cherry pick-

[15] For example, Ritter and Zhang (2007) find that investment banks allocate more underpriced IPOs to their affiliated mutual funds in order to enhance fund performance.

[16] We thank an anonymous referee for suggesting this alternative explanation.

[17] Further, *RHC* is influenced by how often the firm splits its stock, and *PHC* is influenced by firm size, which may add noise to our measure of how institutions react to analyst recommendations.

ing" by affiliated investors.

We test whether analyst recommendations and institutional holdings changes are driven by publicly-available information events by restricting our sample to quarters in which only one analyst issues a new recommendation for a stock. For this sample, it is less likely that analyst recommendations are a response to a specific event, and we find that our results hold in this subsample, meaning that institutional investors appear to listen to sell-side analysts, and they particularly listen to the analysts affiliated with their banks.

Our results contribute to the debate on the extent to which conflicts of interest affect the investment value of sell-side analyst research. Our findings indicate that there is no systematic evidence that analysts knowingly issue overly optimistic recommendations despite their own negative opinions on these stocks. Our results also show that the potential conflicts of interest do not invalidate the investment value of sell-side analyst stock recommendations in the eyes of institutional investors.

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Appendix A. Variable definitions and summary statistics

Dependent variables:

RHC: The change in the number of shares of a stock owned by an institution from the end of quarter 0 to quarter 1, where quarter 1 is the quarter of analyst recommendation.

PHC: The change in the proportion of the total outstanding shares of a particular stock owned by an institution from quarter 0 to quarter 1. It is reported in percentages.

PWC: The change in portfolio weight for a particular stock from quarter 0 to quarter 1, where portfolio weight is calculated as the ratio of the market value of a stock held by an institution to the total market value of all stocks in the 13f universe held by that institution. It is reported in percentages.

APWC: The portfolio weight change (*PWC*, defined above) less the change in the weight of the stock in the 13f universe. It is reported in percentages.

Independent variables:

AFF: Dummy variable, equal to 1 if the recommendation is issued by an analyst from an affiliated investment bank; 0 otherwise.

PW: The weight of the stock in the institution's portfolio at the beginning of the quarter.

COMAN: Dummy variable, equal to 1 if the recommendation is issued by an investment bank that was the co-manager of an IPO or SEO of the covered company in the past 60 months; 0 otherwise.

LEAD: Dummy variable, equal to 1 if the recommendation is issued by an investment bank that was the leading underwriter of an IPO or SEO of the covered company in the past 60 months; 0 otherwise.

AA: Dummy variable, equal to 1 if the recommendation is issued by an *Institutional Investor* "All-American" analyst; 0 otherwise.

RANK: Carter and Manaster (1990) rank as a proxy for the reputation of the investment bank.

CON: The level of consensus recommendation: 1 (strong buy), 2 (buy), 3 (hold), 4 (underperformance), and 5 (sell). Following previous literature, we adopt the median level of recommendations in I/B/E/S Summary History-Recommendation file in the month of the recommendation as a proxy for consensus.

DEV: Deviation of the recommendation from consensus recommendation. For the initiation and upgrade sample, *DEV* is calculated as the level of consensus recommendation (*CON*) less that of the recommendation. A positive value of *DEV* for initiations and upgrades means that the recommendation is better than consensus. For the downgrade sample, *DEV* is calculated as the level of the recommendation less that of consensus recommendation (*CON*). A positive value of *DEV* for downgrades means that the recommendation is worse than consensus.

COV: Number of analysts following the stock in I/B/E/S Summary History-Recommendation file in the month of the recommendation.

MAR: Cumulative market-adjusted stock return for the stock in months −6 through −1 preceding the recommendation.

LGSZ: Natural log of the recommended stock's market value (in millions of dollars) at the end of the quarter preceding the recommendation.

TECH: Dummy variable, equal to 1 if the recommended company belongs to high tech sector; 0 otherwise.

BM: Book-to-market ratio of the company at the end of quarter preceding the recommendation.

TIO: Total percentage of institutional ownership of the company at quarter 0 (i.e. at the end of quarter preceding the recommendation).

Summary statistics for independent variables.

Variables	Initiations		Upgrades		Downgrades	
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
AFF	0.0263	0.1600	0.0273	0.1630	0.0348	0.1834
PW	0.0014	0.0058	0.0019	0.0060	0.0016	0.0053
COMAN	0.0325	0.1772	0.0566	0.2311	0.0673	0.2505
LEAD	0.0182	0.1336	0.0281	0.1652	0.0358	0.1858
AA	0.0276	0.3136	0.0656	0.4936	0.0520	0.4424
RANK	6.9568	2.5439	7.0194	2.6785	7.1545	2.5443
CON	1.8622	0.6304	2.1212	0.6391	2.3176	0.6283
DEV	0.2911	0.7549	0.7009	0.7217	0.7284	0.6673
COV	13.3377	7.8777	16.6412	8.2788	15.8960	8.1070
TECH	0.2588	0.4380	0.2484	0.4321	0.2473	0.4314
MAR	0.1019	0.3991	0.0553	0.3356	-0.0269	0.3145
BM	1.5643	1.8025	1.5016	1.5352	1.5748	1.6257
TIO	0.5850	0.2205	0.5927	0.1942	0.5928	0.2028
LGSZ	6.9330	1.7978	7.3832	1.7451	7.2456	1.7649

References

Bartov, E., Radhakrishnan, S., Krinsky, I., 2000. Investor sophistication and patterns in stock returns after earnings announcements. The Accounting Review 75, 43–63.

Bradley, D.J., Jordan, B.D., Ritter, J.R., 2003. The quiet period goes out with a bang. Journal of Finance 58, 1–36.

Bradley, D.J., Jordan, B.D., Ritter, J.R., 2008. Analyst behavior following IPOs: The 'bubble period' evidence. Review of Financial Studies 21, 101–133.

Carhart, M., 1997. On persistence in mutual fund performance. Journal of Finance 52, 57–82.

Carter, R.B., Manaster, S., 1990. Initial public offerings and underwriter reputation. Journal of Finance 45, 1045–1067.

Clarke, J., Ferris, S.P., Jayaraman, N., Lee, J., 2006. Are analyst recommendations biased: Evidence from corporate bankruptcies? Journal of Financial and Quantitative Analysis 41, 169–196.

Clarke, J., Khorana, A., Patel, A., Rau, P.R., 2007. The impact of all-star analyst job changes on their coverage choices and subsequent investment banking deal flow. Journal of Financial Economics 84, 713–737.

Fama, E., French, K., 1993. Common risk factors in the returns on stocks and bonds. Journal of Financial Economics 33, 3–56.

Fleuriet, M., Yan, J., 2006. Deal Making and Stock Picking: Better be Optimistic than Good? Working Paper, University of Pennsylvania.

Green, T.C., 2006. The value of client access to analyst recommendations. Journal of Financial and Quantitative Analysis 41, 1–24.

Groysberg, B., Healy, P., Chapman, C., Gui, Y., 2005. Do Buy-Side Analysts Out-Perform The Sell-Side? Working Paper, Harvard University.

Haushalter, D., Lowry, M., 2009. When Do Banks Listen to their Analysts? Evidence from Mergers and Acquisitions. Working Paper, Penn State University.

Irvine, P., Lipson, M., Puckett, A., 2007. Tipping. Review of Financial Studies 20, 741–768.

Irvine, P., Simko, P., Nathan, S., 2004. Asset management and affiliated analysts' forecasts. Financial Analysts Journal 60, 67–78.

Jegadeesh, N., Kim, J., 2004. Value of Analyst Recommendations: International Evidence. Working Paper, Emory University.

Jegadeesh, N., Kim, J., Krische, S.D., Lee, C.M., 2004. Analyzing the analysts: when do recommendations add value? Journal of Finance 59, 1083–1124.

Johnson, W., Marietta-Westberg, J., 2009. Universal banking, asset management, and stock underwriting. European Financial Management 15, 703–732.

Kacperczyk, M., Sialm, C., Zheng, L., 2005. On the industry concentration of actively managed equity mutual funds. Journal of Finance 60, 1983–2011.

Ljungqvist, A., Marston, F., Starks, L.T., Wei, K., Yan, H., 2007. Conflicts of interest in sell-side research and the moderating role of institutional investors. Journal of Financial Economics 85, 420–456.

Ljungqvist, A., Marston, F., Wilhelm, W.J., 2006. Competing for securities underwriting mandates: Banking relationships and analyst recommendations. Journal of Finance 56, 301–340.

Loughran, T., Ritter, J.R., 2004. Why has IPO underpricing changed over time? Financial Management 33, 5–37.

Michaely, R., Womack, K.L., 1999. Conflict of interest and the credibility of underwriter analyst recommendations. Review of Financial Studies 12, 653–686.

Mola, S., Guidolin, M., 2009. Affiliated mutual funds and analyst optimism. Journal of Financial Economics 93, 108–137.

Niehaus, G., Zhang, D., 2010. The impact of sell-side analyst research coverage on an affiliated broker's market share of trading volume. Journal of Banking & Finance 34, 776–787.

Ritter, J.R., Zhang, D., 2007. Affiliated mutual funds and the allocation of initial public offerings. Journal of Financial Economics 86, 337–368.