Mutual Funds and Affiliated Analyst Recommendations:

Optimism or Information Sharing?

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Abstract

This study examines whether the group affiliation between asset management firms and brokerage firms influences sell-side analyst recommendations. Using fund holdings data of mutual funds firms belonging to business groups in Korea (i.e., chaebols), we examine whether affiliated analysts differently treat stocks held by fund management firms in the same chaebol from other stocks. Our main results show that analysts provide less favorable recommendations and more accurate forecasts on the affiliated stocks, indicating that affiliated analysts might share information on those stocks with affiliated fund managers. Although our overall results support the information sharing argument, analysts are found to be selectively optimistic to highly valuable stocks to affiliated fund managers.

Keywords: analyst optimism; stock recommendations; mutual fund; business group

1. Introduction

Reporting analysts face conflicts of interest in various situations. For example, investment banking relationships that brokerage firms have may affect analyst optimism where affiliated analysts from underwriter firms provide more optimistic recommendations compared to unaffiliated analysts (e.g., Dugar and Nathan, 1995; Lin and McNichols, 1998; Michaely and Womack, 1999; O'Brien et al., 2005). Analysts may issue optimistic reports to maintain a good relationship with management and thus to access exclusive information of the covered stock (e.g., Das et al., 1998; Francis and Philbrick, 1993; Lim, 2001). Increased trading commissions generated by inflated recommendations also motivate analysts to provide biased opinions (e.g., Beyer and Guttman, 2011; Cowen et al., 2006). More recently, research shows that pressure from the buy side also influences analysts forecasting incentives (e.g., Firth et al., 2013; Gu et al., 2013). That is, analysts may bias their opinions in favor of client institutional investors who trade via brokerage firms of reporting analysts.

Our paper questions whether a different dimension of conflicts of interest exists for sell-side analysts due to a business group affiliation between asset management firms and brokerage firms. We define an affiliated analyst as a person who works for a brokerage firm belonging to a business group that also has an asset management firm as a subsidiary. Affiliated stocks are included in mutual funds managed by the member firm within the same business group which the firm of affiliated analysts is a member of. Thus, in our research setting, affiliated analysts may cover affiliated stocks as well as unaffiliated stocks. In particular, we focus on family-controlled industrial conglomerates in Korea called *chaebol*. One special feature of chaebol is that affiliated firms in a chaebol group usually keep close business ties

and engage in mutual cross-debt guarantees with other member firms. Interlocking ownership along with various business ties allows controlling families to exert substantial influences over the affiliated firms of the same chaebol group (Bae, Kang, & Kim, 2002).

Mutual funds in Korea are usually distributed and sold by securities firms, banks and insurance companies. The fund management firms cannot directly sell their own funds unlike large US mutual fund families such as Fidelity. Among these distributors, securities firms provide investment recommendations as well as brokerage services to their clients. That is, securities firms, i.e., brokerage firms are one of the most important marketing channel for mutual fund managers. However, in turn, mutual fund managers generate trades by using brokerage services, which makes them to be the most vital client to brokerage firms. Ideally, fund managers use brokerage firms which provide the most accurate and high quality research reports to clients and fund managers, while brokerage firms recommend the funds managed by the best performing asset management firms. The problem is that the large business groups in Korea are allowed to retain substantial ownership in both brokerage firms and asset management firms. The financial regulations in Korea prior to 2009 prohibited financial institutions from providing both brokerage service and asset management service by the same firm. Therefore, affiliated brokerage firms and asset management firms are separate independent entities by law but are under the influence of the same controlling families. This unique setting allows us to test reporting incentives of analysts in business group affiliated brokerage firms.

Anecdotal evidence shows how the group affiliation between asset management firms and brokerage firms may affect behaviors of their employees and clients. For example, employees in chaebol brokerage firms are under pressure to sell the funds operated by affiliated

asset management firms. Some firms even set the target number of affiliated funds for each employee to sell and whether to meet the target or not is reflected in employee performance evaluations. Such practice is called "Campaign" in practice.[1] The Campaign normally focuses on the affiliated funds generating high sales fees provided by asset management firms. Analysts belonging to chaebol brokerage firms will also be affected by this interdependent business relationship and will likely be biased in favor of their big clients, affiliated fund managers. To boost performance of affiliated mutual funds, analysts may give more optimistic opinions for the stocks covered by affiliated mutual fund managers than other stocks (analyst optimism hypothesis). On the other hand, affiliated analysts may utilize information advantages and research pools provided by the business group to produce more accurate and informative recommendations (information sharing hypothesis). Employees in the same chaebol can communicate more frequently via the internal media and through close business ties and personnel changes between member firms. Furthermore, chaebol groups tend to strategically locate their financial firms in the vicinity for better communications between employees in the same group.[2] Therefore, affiliated mutual fund managers can share exclusive tips about the performance and the prospects of covered stocks more easily with affiliated analysts.

By using analyst reports and the mutual fund holding data from July 1, 2000 to February 31, 2008, we calculate relative recommendations and forecast accuracy of affiliated and non-affiliated analysts.[3] Consistent with the information sharing hypothesis, our results

[1] "Securities firms, sales firms, asset management firms should do their own job", Dec 2008, Shin-Dong-A, source: http://shindonga.donga.com/Library/3/03/13/108026/3 (written in Korea)

[2] Samsung group, for example, relocated Samsung Securities, Samsung Asset Management and Samsung Life Insurance into the same building. The main reason for the move is to create a synergy among employees in the financial industry through close cooperation and frequent meetings. ("Samsung Group's Financial Units Open "Seocho-dong" Era", The Korea Economic Daily, August 16, 2016, source: http://english.hankyung.com/business/2016/08/16/1137001/span-classkeywordsamsungspan-groups-financial-units-open-span-classkeywordseochospandong-era)

[3] The mutual fund data are exclusively provided by the Asset Management Association of Korea. The Personal

show that chaebol affiliated analysts are more likely to release less favorable recommendation on the stock invested by affiliated mutual funds. The results are confirmed by the more accurate and less optimistic earnings forecasts issued by the affiliated analysts. We run additional tests to further explore alternative explanations for our main results. We find that our main results are not driven by either the differences in forecasting skills between chaebol and non-chaebol affiliated analysts or another conflict of interest surrounding chaebol affiliation firms reported in Lim and Jung (2012) and Song et al. (2012). Although our overall empirical results support the information sharing hypothesis, we find that analysts use their high reputation and credibility built on accurate recommendations to selectively benefit the funds managed by their affiliated mutual fund managers. In particular, we find that affiliated analysts change their recommendations to be more optimistic as the funding amounts increase, during the beginning year of new stock inclusion to the fund held by affiliated mutual fund managers and in December. Finally, we examine the market reactions to the affiliated analysts' recommendations and find that stock market investors discount the affiliated analysts' recommendations due to a possible bias caused by the group affiliation.

Our paper makes the following contributions to the extant literature. First, we investigate a potential agency conflict that analysts face caused by the group affiliation between brokerage firms and asset management firms. Previous studies like Firth et al. (2013) and Gu et al. (2013) document analyst optimism caused by commission income generated from mutual fund clients of brokerage firms. In this case, an analyst's recommendation is relatively higher on the stocks held by the clients of brokerage firms. Our study particularly focuses on the stocks held by affiliated asset management firms. The affiliated fund managers can also be the clients

Information Protection Act prohibits a provision of further data after February 2008.

of affiliated brokerage firms. However, affiliated analysts rather provide more accurate recommendations overall on the affiliated stocks than other stocks through information sharing, inconsistent with findings of Firth et al. (2013) and Gu et al. (2013). Analysts also may face a conflict between being accurate to establish their reputation versus providing optimistic opinions to generate trading commissions (Hong and Kubik, 2003; Jackson, 2005). Our findings confirm that analysts become selectively optimistic to benefit affiliated mutual fund managers while not demanding their career reputation. Second, our findings extend the evidence of analyst favoritism toward affiliated group member firms documented by Lim and Jung (2012) and Song et al. (2012). They find that the forecasts and recommendations published by chaebol-affiliated analysts tend to be less accurate and more optimistic compared to non-affiliated analysts. The previous studies investigate the situation where non-financial chaebol companies are permitted to own securities firms as subsidiaries. This means that an analyst working in a securities firm owned by a chaebol group can issue recommendations on other member firms within the same group as well as chaebol members' direct competitors in the market. Our research can be differentiated in that our focus is the group affiliation between brokerage firms and asset management firms not that between brokerage firms and other non-financial firms. Furthermore, our findings in general support the information sharing argument between affiliated member firms rather than analyst optimism. The optimistic bias is only found in the highly valuable stocks to affiliated fund managers such as stocks with a high amount of fund holdings or stocks firstly included in mutual funds. Furthermore, our findings contribute to a stream of literature on the investment strategies of mutual fund families. Mutual fund managers in US may have agency conflicts between their clients and mutual fund family that the fund managers belong to (e.g., Bhattacharya et al., 2013; Chevalier and Ellison, 1997; Gaspar et al., 2006). The fund families are suspected to organize investment strategies across

the member mutual funds to maximize the total group profit (Elton et al., 2007; Gaspar et al., 2006). Our study presents a special case where mutual fund managers strategically cooperate with affiliated analysts to maximize the profits of their affiliated firms. Such tactical collaboration can also be used as window dressing purposes by mutual fund managers (Agarwal et al., 2014) as we find the analyst recommendations are biased in favor of highly valuable stocks to affiliated fund managers.

This paper is structured as follows. Section 2 presents hypotheses followed by data and descriptive statistics in Section 3. The results are presented in Section 4 with additional tests in Section 5. Finally, Section 6 concludes the paper.

2. Hypothesis Development

Mutual fund families are a group of legally independent entities that are marketed by the same sponsoring management company and that also share one distributor for their funds. Most of mutual funds in US belong to these big family organizations. The top 50 US fund families have over 80% of all the equity assets under management (Gaspar et al., 2006). Due to the influence of large mutual fund families, mutual fund managers have been suspected to pursue interest of their family groups rather than that of their clients. The main advantage of forming a family is cost saving from economy of scale in term of finding clients and selling funds. The affiliated member firms may also share valuable information about the stocks covered, which can lead to an increase in research quality. However, the fund families might coordinate investment strategies across the affiliated mutual funds to maximize the total group profit at the expense of clients' profits of individual funds. Gaspar et al. (2006) find evidence

of a “performance transfer” from less valuable funds of the group (i.e., low fee, low past performing, or old funds) to more valuable funds of the group (i.e., high fee, high past performing or young funds). They argue that the families engage in a “cross-fund subsidization” to enjoy a spillover effect on the overall group funds by creating a highly performing star fund (Nanda et al., 2004). Creating a brand name for the family is also important as investors tend to select a fund family first rather than focusing on individual funds (Massa, 2003). Gaspar et al. (2006) further identify potential channels of such subsidization. One is allocating underpriced initial public offering (IPO) stocks to high value funds and the other is though opposite trades between the affiliated mutual funds in favor of high value funds.

In our research setting, a similar type of cross-subsidization among firms may exist although there is no mutual fund family in Korea. Especially, when business groups own both a mutual fund management firm and a brokerage firm the controlling families may pressure affiliated analysts to provide favorable opinions for stocks covered by the affiliated mutual fund management firm for the maximization of group profits. In addition, chaebol member firms tend to engage in various internal transactions such as sharing intangible and financial resources and marketing channels with other member firms (Chang and Hong, 2000). This means the affiliated mutual fund managers are important clients for affiliated brokerage firms as they will generate trades to the brokerage firm and also provide marketing channels for reporting analysts. If chaebol-affiliated analysts are influenced by the controlling families of the group and the close business ties between the brokerage house and the asset management firm, they will have incentives to produce biased reports in favor of the affiliated mutual fund managers. Accordingly, we propose our first hypothesis, the analyst optimism hypothesis as follows:

H1: Affiliated analysts in a business group will provide more optimistic reports for stocks covered by affiliated mutual fund managers in the same business group than other stocks (analyst optimism hypothesis).

On the other hand, affiliated analysts may be able to produce more accurate and more informative recommendations about stocks covered by affiliated mutual fund managers on a basis of their information advantages. Employees in the same business groups can communicate more frequently through the internal media (Lim and Jung, 2012). Shin and Park (1999) document that there is an internal capital market within a chaebol group, which helps reducing the financing difficulties of the chaebol member firms. As securities firms often play an important role in the internal capital market, they are likely to engage in various mutual business ties and personnel exchanges among the chaebol member firms (Song et al., 2012). By sharing an information and research pool of the group, affiliated analysts and affiliated mutual fund managers can achieve more precise evaluation of covered stocks. They can also share exclusive tips about the performance and the prospects of covered stocks easily by using various group communication channels.

Furthermore, evidence shows as investors and regulators have become more concerned with the conflicts of interest that analysts face, forecasts of analysts become more accurate and less biased. Kadan et al. (2009) examine the informativeness of analyst recommendations measured by market reactions surrounding the Global Analyst Research Settlement, the regulation to mitigate the interdependence between research and investment banking in 2002. They report after the agreement, optimistic recommendations have become less frequent and

more informative. Gu and Xue (2008) argue the presence of independent analysts works as a disciplinary measure for non-independent analysts, i.e., affiliated analysts in our research setting. They find forecast accuracy of non-independent analysts is higher by about 20% when independent analysts are issuing a report for the same firms than when there is no other independent analyst. It has been also reported that the market discounts optimistic recommendation made by affiliated analysts. For example, the average daily abnormal return to buy recommendations made by independent analysts is higher by 3.1 basis points than that of buy recommendations announced by analysts from investment banks (Barber et al., 2007). To build a good reputation in the market, affiliated analysts might provide more accurate forecasts and less biased opinions on the affiliated stocks by utilizing their information advantages. In line with this argument, we present the competing hypothesis as follows:

H2: Affiliated analysts in a business group will provide more accurate reports for stocks covered by affiliated mutual funds in the same business group than other stocks (information sharing hypothesis).

3. Sample selection and research design

Sample selection

We combine two datasets for our analysis from two sources. First, all analyst stock recommendations are obtained from the DataguidePro database for companies listed on the Korean Stock Exchange (KSE) and the Korean Securities Dealers Automated Quotation

(KOSDAQ) from July 1, 2000 to February 31, 2008.[4] Then, the information on a fund portfolio is acquired from data exclusively provided by the Asset Management Association of Korea (AMAK). To calculate earnings forecast accuracy and optimism, we limit our sample to the recommendations issued simultaneously with an earnings forecast. For each recommendation during our research period, we identify whether the analyst who issue the recommendation belongs to a brokerage in a chaebol group and whether the recommended stock is included in a fund portfolio managed by an affiliated fund manager. Since we examine stock recommendations, we consider only equity funds for our analysis. Chaebol affiliations are confirmed by the list of business groups provided by the Korea Fair Trade Commission (KFTC).[5] To alleviate the effects of reiteration, we use only the most recent stock recommendations prior to the actual earnings reporting date for each year.[6] The actual earnings reporting dates are obtained from TS-2000 database. To calculate relative recommendation optimism, we further eliminate the stock recommendations if the recommended stock is not followed by more than one analyst. Finally, we exclude the observations with missing values to generate control variables. Through this sampling process, our final sample includes 53,593 recommendations. In the final sample, 31,329 (58.46%) recommendations are issued on a stock invested by a mutual fund and 25,349 (47.30%) recommendations are issued on the affiliated stocks. Table 1 describes the detailed procedure of our sample selection.

Table 2 presents the distribution of the stock recommendations in our final sample. Panel A illustrates the distribution of stock recommendations by year. It shows that stock

[4] Lim and Jung (2012) and Song et al. (2012) also use analyst recommendation and forecast data from the same data provider in their studies.
[5] The definition of a business group by The Korea Fair Trade Commission (KFTC) is a collection of companies that function as one economic entity with a common source of control such as a single controlling shareholder, his/her relatives, and their affiliated companies that own more than 30% of the total equity value of a company.
[6] We also use the sample of all stock recommendations. The regression result with the full sample is reported in Column (6) of Table 5.

recommendations seem to be evenly distributed across our sample period, with no sign of a serious time-series pattern. Panel B illustrates the distribution of stock recommendations by industry. Industries are classified by Korean Standard Industrial Code (KSIC). Most recommendations are found in manufacturing industry (52.67%), followed by high-tech industry (11.86%) and information and communication industry (11.31%).

Research design

To test our hypotheses, we perform various multivariate tests with different research models. First, we estimate the following Ordinary Least Square (OLS) regression model (1) with *Relative recommendation* as the dependent variable. Following Firth et al. (2013), *Relative recommendation* is calculated as individual stock recommendation minus the median stock recommendation among all recommendations issued by all existing analysts covering the same stock in a month.

$$
\begin{aligned}
&Relative\ \ recommendation \\
&\quad = \beta_0 + \beta_1 Affiliated + \beta_2 Firm\ \ size + \ \ \beta_3 Funded + \beta_4 Firm\ \ coverage \\
&\quad + \beta_5 Industry\ \ coverage + \beta_6 Broker\ \ size + \beta_7 Analyst\ \ followings \\
&\quad + \beta_8 Career\ \ experience + \beta_9 Firm - specific\ \ experience \\
&\quad + \beta_{10} Forecast\ \ horizon + \beta_{11} Absolute\ \ forecast\ \ accuracy \\
&\quad + \beta_{12} Number\ \ of\ \ strong\ \ buy + \beta_{13} Number\ \ of\ \ buy \\
&\quad + \beta_{14} Number\ \ of\ \ hold + \beta_{15} Number\ \ of\ \ underperform \\
&\quad + \beta_{16} Number\ \ of\ \ sell + Year\ \ fixed\ \ effects \\
&\quad + Industry\ \ fixed\ \ effects + \ \ e \quad (1)
\end{aligned}
$$

where *Affiliated* is our main independent variable of interest. It is a dummy variable that equals 1 if the recommendation is issued by affiliated analysts for the affiliated stock and 0 otherwise. Thus, if chaebol affiliated analysts are more likely to release more (less) favorable recommendation on the stock invested by a mutual fund within the same chaebol-group with the brokerage, the coefficient on *Affiliated*, β_1, will be positive (negative).

Following previous studies such as Lim and Jung (2012), Song et al. (2012), and Firth et al. (2013), we control for firm, brokerage-firm, and analyst specific characteristics known to affect an analyst's recommendations. First, we control for the recommended firm characteristics. *Funded* is a dummy variable which equals to 1 if a recommended stock is invested by a mutual fund and 0 otherwise. *Firm size* is the logarithmic value of the recommended firm's market capitalization. *Analyst followings* is the number of analysts following the recommended firm at the end of the year. Second, we also control for brokerage related characteristics. *Broker size* is the number of analysts at a brokerage firm. Third, we control for analyst related characteristics. *Firm coverage* is the number of companies covered by an analyst for a year. *Industry coverage* is the number of industries covered by an analyst for a year. *Career experience* is the number of years from the analyst as first listed on the DataguidePro database. *Firm-specific experience* is the number of years of experience related to a particular firm since the analyst's first recommendation appeared in the DataguidePro database. *Forecast horizon* is the number of years between the earnings forecasting date and the corresponding report date of the actual earnings. *Absolute forecast accuracy* is the absolute value of the difference between individual forecasted earnings and actual reported earnings, scaled by price and multiplied by -1. *Number of recommendations* is the number of each type of recommendations issued by other analysts for the same company and year. We also control for year and industry fixed effects. All control variables are measured at the year-end before

the recommendation's issuance. Detailed definitions of the variables are also described in the Appendix.

Second, we estimate ordered logit regression with *Level of recommendations* as the dependent variable. *Level of recommendations* is the level of an analyst's stock recommendation coded as 4 for Strong Buy, 3 for Buy, 2 for Hold, 1 for Underperform, and 0 for Sell. To control for general optimism in analysts' stock recommendations, we additionally include *Median stock recommendation* in this ordered logit regression model. *Median stock recommendation* is the median of all recommendations issued by all existing analysts covering the same stock for the recommended month. The other control variables are the same with those in the regression model (1).

Third, we use Heckman selection model to alleviate the sample selection bias caused from the systematic difference between funded and non-funded stocks. If analysts selectively choose to recommend on stocks that are invested by mutual funds, the endogenous selection bias can induce a systematic bias in the analysts' recommendations (McNichols and O'Brien, 1997; O'Brien and Bhushan, 1990). To address the bias, we take two steps of Heckman selection model. In the first stage, we estimate a logit regression with *Funded* as the dependent variable. Following Ljungqvist et al. (2007) and Firth et al. (2013), *Broker industry coverage* is used as an instrumental variable. *Broker industry coverage* is the ratio of the number of all existing recommendations from the brokerage firm that cover stocks belonging to the given stock's industry to the total number of all existing recommendations issued by that brokerage firm. In the second stage, we re-estimate our regression (1) with *Inverse Mill's ratio,* calculated from the first stage, as an additional control variable.

Fourth, we perform OLS regression in which the dependent variable is *Relative*

recommendation calculated using the mean recommendation instead of median recommendation. In the regression, *Median stock recommendation* is also converted to the mean recommendation to alleviate the effect of overall optimism in stock recommendations.

Fifth, we test the full sample including all stock recommendations. To eliminate the effect of the reiteration of recommendations during a year, our final sample tested in the above regression model includes only the most recent recommendation before the actual earnings announcement date for a year. However, one potential concern of the sample is that there may be frequent changes in the recommendations during a year. To address this concern, we re-estimate our regression model (1) with the full sample before leaving the most recent recommendation before the actual earnings announcement date for a year in our sample selection procedure.

4. Results

Descriptive statistics

Table 3 presents the descriptive statistics of the variables used in our analyses. The mean and median of recommendations (*Level of recommendation*) are 2.658 and 3.000, respectively, indicating that on average, analysts release 'Buy' recommendations. It also confirms the optimistic bias in analysts' recommendations in general. The mean and median of relative recommendations is -0.046 and 0.000, respectively. As its first and third quartile values are all 0.000, it seems that analysts tend to herd toward the mean recommendation levels. Also, the mean and median of Δ*Relative recommendation* are -0.008 and 0.000, implying that

recommendations do not change much overall. Our main independent variable, *Affiliated*, has 0.112 as its mean, implying that 11.2% of recommendations are made for affiliated stocks.

Correlations

Table 4 presents the Pearson (upper-right triangle) and Spearman (lower-left triangle) correlations among the dependent variables included in our main multivariate analyses and the independent variable of our interest, *Affiliated*. It firstly shows that *Affiliated* is positively correlated with *Level of recommendation*. It implies that the recommendations in our hypothesized relationships are more optimistic than the others. However, contrast to *Level of recommendation*, *Affiliated* is negatively correlated with *Relative recommendation*, which means that recommendations by affiliated analysts are less optimistic than the others. The opposite correlations may be driven by the fact that recommendations on the stocks invested by a mutual fund are in general more optimistic than those not covered by a mutual fund while affiliated analysts make less optimistic recommendations on the affiliated stocks compared to other stocks included in mutual funds. Thus, we additionally control for the level of optimism by including *Median stock recommendation* when we use *Level of recommendation* as the dependent variable for our main regression tests in the following section. *Affiliated* is also positively correlated with *Absolute forecast accuracy*, implying that forecasted earnings from our hypothesized relationships are more accurate than the others consistent with H2.

Multivariate analysis

Table 5 presents our multivariate regression results. In column (1), we perform OLS

regression with *Relative recommendation* as a dependent variable. Inconsistent with our H1, the coefficient on *Affiliated* is significantly negative, implying that recommendations issued from our hypothesized relationships are less optimistic than the others. In column (2), we estimate ordered logit regression with *Level of recommendations* as a dependent variable. To control for general optimism in analysts' stock recommendations, *Median stock recommendation* is additionally included in the model. It shows that the coefficient on *Affiliated* is significantly negative, confirming the less optimistic bias in column (1). This result also confirms the conjecture that the opposite correlations between *Affiliated* and *Level of recommendations* and *Relative recommendation* are driven by the general optimism in analysts stock recommendations on funded stocks. In columns (3) and (4), we estimate Heckman selection model. Column 3 performs the first-stage logit regression with *Funded* as the dependent variable. *Broker industry coverage*, which is used as an instrumental variable, is positively related to the probability that the recommended stock is funded by a mutual fund (i.e., *Funded = 1*). Column (4) reports the second stage regression result, additionally controlling for the *Inverse Mill's ratio* obtained from the first stage. The coefficient on *Affiliated* in column (4) is also significantly negative as consistent with the results in columns (1) and (2). The *Inverse Mill's ratio* is significantly related with the dependent variable, *Relative recommendation*, confirming that our implementation of Heckman selection model is well developed. In column (5), we perform OLS regression in which the dependent variable is *Relative recommendation* calculated using the mean recommendation instead of median recommendation. The coefficient on *Affiliated* in column (5) also remains significantly negative. In column (6), unlike the test sample used in columns (1) through (5), which includes only the most recent recommendation before the actual earnings announcement during a year, we use the full sample to allow the reiteration recommendations during a year. Column (6)

shows that the coefficient on *Affiliated* is still significantly negative. The main results in Table 5 reject the analyst optimism hypothesis (H1) and rather support the information sharing hypothesis (H2) where affiliated analysts have better access to the information held by affiliated mutual fund managers. To further check if the earnings forecasts issued by affiliated analysts are more accurate and less optimistic than the other analysts consistent with H2, we conduct an accuracy test by using analysts' earnings forecasts.

To examine the conjecture, we perform the OLS regressions with *Absolute forecast accuracy* and *Forecast optimism* as dependent variables, respectively. Following Hong and Kubik (2003), *Absolute forecast accuracy* is defined as the absolute value of the difference between individual forecasted earnings and actual reported earnings, scaled by price and multiplied by -1. *Forecast optimism* is calculated as individual forecasted earnings minus the average forecasted earnings for the same firm and target-year, scaled by the standard deviation of forecasts for the firm and target year.

Table 6 presents the regression results. In column (1), dependent variable is *Absolute forecast accuracy*. It shows that the coefficient on *Affiliated* is marginally significantly positive, meaning that the forecasted earnings from our hypothesized relationships are more accurate than the others. In column (2) using *Forecast optimism* as the dependent variable, the coefficient on *Affiliated* is significantly negative. It implies that the forecasted earnings from our hypothesized relationships are less optimistic than the others, consistent with H2.

Alternative explanations

We perform additional tests to examine alternative explanations for our main results

and further alleviate the effects of the possible omitted variables. First, there may be systematic difference in the forecasting ability between analysts with and without chaebol affiliations. If chaebol affiliated analysts possess superior abilities than non-affiliated analysts, our main regression results could be driven by the difference of analyst skills rather than our hypothesized relationship. To alleviate this concern, we additionally include a dummy variable, *Chaebol broker* which is equal to 1 if an analyst belongs to a chaebol brokerage firm and 0 otherwise. The full sample results are presented in column (1) of Table 7 and those with a subsample excluding the recommendations by non-chaebol analysts in column (2) of Table 7. The results in columns (1) and (2) show that the coefficients on *Affiliated* are still significantly negative, implying that our results are not driven by the differences in skills between chaebol and non-chaebol affiliated analysts.

Second, Lim and Jung (2012) and Song et al. (2012) argue that there is a systematic bias in the recommendations if chaebol affiliated analysts release recommendations on the firm within the same chaebol group. To control for the chaebol affiliation, we include a dummy variable, *Chaebol firm* which equals to 1 if a chaebol affiliated analyst issues a stock recommendation on a firm belonging to the same chaebol group with the analyst's brokerage and 0 otherwise. The *Chaebol firm* dummy is included in column (3) and the dummy variable and its interaction with *Affiliated* in column (4). The results in columns (3) and (4) reveal that the coefficients on *Chaebol firm* are all significantly positive, consistent with findings by Lim and Jung (2012) and Song et al. (2012). However, the coefficient on interaction between *Chaebol firm* and *Affiliated* is not statistically significant, implying that our main results are not affected by whether the covered stock is a chaebol member firm or not. Furthermore, the coefficients on *Affiliated* in column (3) and (4) still remain significantly negative, supporting our information sharing hypothesis.

5. Additional tests

Although our overall empirical results support the information sharing hypothesis, it is still questionable how the mutual funds are rewarded by sharing such information in returns. One possibility is that analysts use their high reputation and credibility established by providing accurate recommendations on the stocks overall to selectively benefit the funds managed by their affiliated mutual fund managers. To answer this question, we perform additional tests to see if a certain type of affiliated mutual funds receives favorable recommendations by the affiliated analysts.

Fund amounts

If the funding amounts on a stock are not big enough, analyst recommendations on the stock would not substantially affect a profit of fund management firms and thereby, total group profits. However, as the amounts increase, the affiliated analysts could be under high pressure to release more favorable recommendations. We test this conjecture by re-estimating our regression model (1) with *Affiliated*FAMT* as an additional independent variable. *FAMT* is the logarithmic value of the total dollar amounts funded by a mutual fund at the issuance of the recommendation on the stock. Thus, *Affiliated*FAMT* means the logged dollar amounts funded on a stock in our hypothesized relationships. Table 8 presents the regression results. In columns (1) and (2), we use full sample with *Relative recommendation* and *Level of recommendation* as the dependent variable, respectively. The results show that the coefficients on *Affiliated*FAMT*

are all significantly positive while the coefficients on *Affiliated* remain all significantly negative. It implies that although the recommendations on affiliated stocks are in general less optimistic than the others, they become more optimistic as the funding amounts increase. Interestingly, when *FAMT* is greater than 13.5 in column (1) the relative recommendations of affiliated analysts become optimistic toward affiliated stocks.[7] As *FAMT* is ranged from 1.39 to 18.03 for the affiliated stocks, our results indicate analysts provide optimistic recommendations only on the stocks with a high amount of fund holdings. In columns (3) and (4), we restrict our sample to chaebol affiliated analysts only (i.e., *Affiliated*=1). The dependent variables in columns (3) and (4) are with *Relative recommendation* and *Level of recommendation* as a dependent variable, respectively. The results show that the coefficients on *Affiliated*FAMT* are still significantly positive.

Affiliation start and quit

When fund managers include a new stock in their fund portfolio, the returns on the fund will be immediately evaluated in the market as the managers' ability. Thus, during the beginning year of new stock inclusion to a fund, the managers will ask their affiliated analysts for help to boost the returns on the fund. To test this conjecture, we examine the change in recommendations during the beginning year of new stock inclusion to a fund and old stock exclusion from a fund. Specifically, we perform OLS regression with Δ*Relative recommendation* as the dependent variable and logit regressions with *Upgrade* and *Downgrade*, respectively. Δ*Relative recommendation* is the change in the relative recommendation calculated as the current year relative recommendation minus previous relative

[7] The sum of the coefficient on *Affiliated*FAMT* multiplied by 13.5 and the coefficient on *Affiliated* becomes zero.

recommendation. *Upgrade* (*Downgrade*) is a dummy variable which equals to 1 if an analyst releases upgraded (downgraded) stock recommendation comparing to previous recommendation and 0 otherwise. Our new independent variables of interests are *Affiliation_Start* and *Affiliation_Quit*. *Affiliation_Start* (*Affiliation_Quit*) is a dummy variable which equals to 1 if it is the beginning year that the recommended stock is included in (excluded from) a fund where the fund manager and the analysts are within a same Chaebol group and 0 otherwise. The regression results are shown in Table 9. It reveals that the coefficients on *Affiliation_Start* are significantly positive when Δ*Relative recommendation* and *Upgrade* are used as the dependent variable but not statistically significant when *Downgrade* is used as the dependent variable. The results confirm our conjecture that affiliated analysts change their recommendations to be more optimistic during the beginning year of new stock inclusion to the fund held by affiliated mutual fund managers.

December effect

Affiliated analysts can be more cooperative with their affiliated fund managers when both the parties are under high pressure for good performance. Investors evaluate funds on a calendar-year basis (e.g., Brown et al., 1996; Hu et al., 2011; Jennifer et al., 2007; Judith Chevalier and Glenn Ellison, 1997; Sirri and Tufano, 1998) and thus, December provides greater incentives for fund managers to window-dress their fund performance compared to other months (Wermers, 2000). Window dressing in mutual funds is referred as fund managers' behavior to alter or distort their portfolios to drive up their fund values. Agarwal et al. (2014) empirically find that mutual fund managers are more likely to engage in performance boosting investement strategies in December than other months. Furthermore,

affiliated analysts will have a greater incentive to release optimistic recommendations in December in an attempt to receive better evaluation from their affiliated fund managers. In every January, Maeil Business News presents the best analyst awards, the most prestigious analyst award in Korea. The evaluation for the award is highly based on fund managers' recommendations. Analysts may want to curry favor with the affiliated fund managers by releasing optimistic recommendations on the affiliated stocks. Therefore, we expect that affiliated analysts are more likely to release optimistic recommendations on stocks invested by affiliated fund managers in December than in other months.

To examine our expectation, we create new dummy variable, *December*, which equals 1 if the recommendation is issued in December and 0 otherwise. Then, we re-estimate our regression model (1) with *December* and its interaction term with *Affiliated*. Different from our main tests which employ the most recent recommendation before the actual earnings announcement during a year, we use full sample allowing the reiterated recommendations during a year to compare the optimistic bias within a year. Table 10 presents the regression results. In columns (1) and (2), *Relative recommendation* and *Level of recommendation* are used as the dependent variable, respectively. The results show that the coefficients on *Affiliated*December* are all significantly positive, implying that affiliated analysts release more optimistic recommendations on the stocks invested by affiliated fund managers in December than in other months.

Market reaction

If the affiliated analysts are accurate in general but selectively, how does the market react to the affiliated analysts' recommendations? To answer this question, we examine the

three days buy and hold abnormal return (*Buy and hold 3 day abnormal return*) calculated as the cumulative three day buy-and-hold returns for the recommended securities minus the average cumulative three-day buy-and-hold return for the relevant size decile, centered on the recommendation date. Specifically, following Lin and McNichols' (1998) return model, we estimate following OLS regression model (2) with *Buy and hold 3 day abnormal return* as the dependent variable.

$$Buy\ \ and\ \ hold\ \ 3\ \ day\ \ abnormal\ \ return = \alpha_1 Strong\ \ buy + \alpha_2 Buy + \alpha_3 Hold + \alpha_4 Underperform + \alpha_5 Sell + \alpha_6 Strong\ \ buy * SameChaebolFunded + \alpha_7 Buy * SameChaebolFunded + \alpha_8 Hold * SameChaebolFunded + \alpha_9 Underperform * SameChaebolFunded + \alpha_{10} Sell * SameChaebolFunded + \ e \qquad (2)$$

where *Strong buy* is an indicator variable which equals to 1 if the recommendation is 'Strong Buy' and 0 otherwise; *Buy* is an indicator variable which equals to 1 if the recommendation is 'Buy' and 0 otherwise; *Hold* is an indicator variable which equals to 1 if the recommendation is 'Hold' and 0 otherwise; *Underperform* is an indicator variable which equals to 1 if the recommendation is 'Underperform' and 0 otherwise; *Sell* is an indicator variable which equals to 1 if the recommendation is 'Sell' and 0 otherwise;

Table 11 presents the OLS regression results for the market reaction analyses. The test sample used in column (1) includes all recommendations issued on both funded and unfunded stocks and it in column (2) includes recommendations on funded stocks only. The results in column (1) and (2) reveal that stock market, in general, efficiently react to analysts' recommendations. That is, the buy and hold 3 day abnormal returns are positive to analysts' 'Strong buy' and 'Buy' recommendations while negative to analysts' 'Hold', 'Underperform'

and ‘Sell’ recommendations. However, the coefficients on *Buy*Affiliated* are all significantly negative, implying that stock market investors discount the affiliated analysts’ ‘Buy’ recommendations due to a possible bias caused by the group affiliation.

6. Conclusion

This study examines if the group affiliation between asset management firms and brokerage firms affects sell-side analyst recommendations in business groups in Korea. We test the analyst optimism hypothesis and the information sharing hypothesis. Our main results are consistent with the information sharing hypothesis, showing that affiliated analysts report less favorable recommendations and more accurate forecasts on the stock held by affiliated mutual funds. Further tests conducted rule out the alternative explanations for our main results such as the differences in forecasting skills between chaebol and non-chaebol analysts and another type of agency conflict that affiliated analysts face reported by Lim and Jung (2012) and Song et al. (2012). Although our overall empirical results support the information sharing hypothesis, the analyst optimism increases with the holding amount of stocks invested by affiliated mutual fund managers. Also, the increased optimistic bias in recommendations is found during the beginning year of new stock inclusion in the affiliated fund and in December. Finally, we find the stock market discounts recommendations by affiliated analysts due to a possible bias caused by the group affiliation.

Our findings have practical implications to corporate managers, investors and regulators. The increased forecast accuracy of affiliated analysts supports the notion that establishing a business cluster for companies in the finance industry can create a synergy effect.

This strategy will particularly be effective for firms with interdependent business relationships such as brokerage firms (in charge of marketing and sales of funds) and asset management firms (in charge of fund management) in our research setting. Furthermore, it will be more impactful when these firms belong to the same business group as subsidiaries. However, investors need to be wary of possible adverse effects caused by close cooperation between the affiliated firms from the same group. One example shown in our paper is that analysts might strategically provide optimistic opinions on the selected stocks for window dressing purposes of affiliated mutual fund managers. The problem is this type of subtle manipulation will be hard to detect especially for individual clients of mutual funds. Furthermore, there is no requirement for fund managers to publicly disclose which individual assets are included in their portfolio while they are required to disclose investment returns and investment ratios of diverse asset classes quarterly. This would allow affiliated fund managers to secretly collaborate with affiliated analysts without a strict scrutiny from their clients. Regulators would need to consider such potential agency conflicts exist to help individual investors to make fully informed investment decisions.

We acknowledge the following limitations of our analysis. First, due to the limitation on data availability, we do not control for the commission income generated by mutual fund clients as reported in Firth et al. (2013) and Gu et al. (2013). Affiliated mutual fund managers are likely to be clients of affiliated brokerage firms as chaebol member firms tend to engage in internal transactions. However, the client-brokerage relationship will only weaken our results as the commission based affiliations strengthen the optimism in the affiliated analysts' recommendation, contrast to our findings supporting the information sharing hypothesis. Furthermore, our findings show that affiliated analysts treat the stocks held by their affiliated fund management firms differently from the stocked invested by other mutual funds. Second,

our sample period is limited to the period before February 2008 because the Personal Information Protection Act prohibits the AMAK from providing further data after February 2008. In addition, the Financial Investment Services and Capital Markets Act introduced in February 2009 allowed securities firms to merge with other financial firms such as asset management firms except for banking and insurance firms. This means, a securities firm might not be an independent entity from a fund management firm any more as it is in our current research setting. Finally, future studies could examine the subsequent effects of the selective optimism by affiliated analysts on fund holdings and performance of the mutual funds including the recommended stock.

Appendix. Definitions of variables

Variable Names	Variable Definitions
Relative recommendation	Individual stock recommendation minus the median stock recommendation among all recommendations issued by all existing analysts covering the same stock in a month
Level of recommendation	Level of an analyst's stock recommendation coded as 4 for Strong Buy, 3 for Buy, 2 for Hold, 1 for Underperform, and 0 for Sell.
Δ*Relative recommendation*	Change in the relative recommendation calculated as the relative recommendation minus previous relative recommendation
Median stock recommendation	Median stock recommendation among all recommendations issued by all existing analysts covering the same stock for a month
Upgrade	A dummy variable which equals 1 if an analyst releases upgraded stock recommendation comparing to previous recommendation and 0 otherwise
Downgrade	A dummy variable which equals 1 if an analyst releases downgraded stock recommendation comparing to previous recommendation and 0 otherwise
Absolute forecast accuracy	Price scaled absolute value of the difference between individual forecasted earnings and actual reported earnings, multiplied by -1
Average forecasted earnings	Average earnings forecasts issued by all existing analysts covering the same stock, for the same target year-end
Forecast optimism	Individual forecasted earnings minus the average forecasted earnings for the same firm and target-year, scaled by the standard deviation of forecasts for the firm and target year
Buy and hold 3 day abnormal return	Three days buy-and-hold abnormal returns during (-1, 1) window centered on the recommendation date, calculated as the three day buy-and-hold returns for the recommended stock minus the average of three-day buy-and-hold return for the relevant size decile centered on the recommendation date
Affiliated	A dummy variable which equals 1 if a recommendation is issued by an analyst belonging to a Chaebol-affiliated brokerage and simultaneously the recommended stock is also invested by a mutual fund within the same Chaebol-group with the brokerage and 0 otherwise
Funded	A dummy variable which equals 1 if a recommended stock is funded by a mutual fund and 0 otherwise

(Continued)

Appendix - *Continued*

FAMT	Log of the total dollar amounts funded by a mutual fund at the issuance of the recommendation on the stock
Chaebol broker	A dummy variable which equals 1 if an analyst belongs to a Chaebol broker and 0 otherwise
Chaebol firm	A dummy variable which equals 1 if a chaebol affiliated analyst issues a stock recommendation on a firm belonging to the same chaebol group with the analyst's brokerage and 0 otherwise
Affiliation_Start	A dummy variable which equals 1 if it is the beginning year of our hypothesized relationship and 0 otherwise
Affiliation_Quit	A dummy variable which equals to 1 if it is the beginning year after the end of our hypothesized relationship and 0 otherwise
December	A dummy variable which equals 1 if the recommendation is issued in December and 0 otherwise
Strong buy	A dummy variable which equals to 1 if the recommendation is 'Strong Buy' and 0 otherwise
Buy	A dummy variable which equals to 1 if the recommendation is 'Buy' and 0 otherwise
Hold	A dummy variable which equals to 1 if the recommendation is 'Hold' and 0 otherwise
Underperform	A dummy variable which equals to 1 if the recommendation is 'Underperform' and 0 otherwise
Sell	A dummy variable which equals to 1 if the recommendation is 'Sell' and 0 otherwise
Firm size	Log of market capitalization
Firm coverage	Number of companies covered by an analyst for a year
Industry coverage	Number of industries covered by an analyst for a year
Broker size	Number of analysts at a brokerage firm
Analyst following	Number of analysts following the recommended firm at the end of the year
Career experience	Number of years from the analyst as first listed on the DataguidePro database
Firm-specific experience	Number of years of experience related to a particular firm, since the analyst's first recommendation in the DataguidePro database
Forecast horizon	Number of years between the earnings forecasting date and the corresponding report date of the actual earnings on the TS-2000 database
Number of strong buy	Number of strong buy recommendations issued by other analysts for the same company and year

(Continued)

Appendix - *Continued*

Number of buy	Number of buy recommendations issued by other analysts for the same company and year
Number of hold	Number of hold recommendations issued by other analysts for the same company and year
Number of underperform	Number of underperform recommendations issued by other analysts for the same company and year
Number of sell	Number of sell recommendations issued by other analysts for the same company and year
Broker industry coverage	Ratio of the number of all recommendations from the brokerage firm that cover stocks belonging to the given stock's industry to the total number of all recommendations issued by that brokerage firm

Note. This table describes the detailed definitions of all variables used in this paper.

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Table 1. Sample construction

Sample selection procedure	# of stock recommendations		% of stock recommendation
All stock recommendations on DataguidePro from July 2001 to February 2008	666,787		
Funded=0		285,653	42.84%
Funded=1		381,134	57.16%
Affiliated =0		286,443	42.96%
Affiliated =1		94,691	14.20%
Less: Leave the most recent recommendation before the actual earnings announcement date for a year.	(611,155)		
Less: Stock recommendations for firms followed by less than two analysts	(1,607)		
Less: Stock recommendations without control variables	(432)		
Final sample	53,593		
Funded=0		22,264	41.54%
Funded=1		31,329	58.46%
Affiliated=0		25,349	47.30%
Affiliated =1		5,980	11.16%

Note. Table 1 shows the sample selection process. See the Appendix for variable definitions.

Table 2. Sample distribution

Panel A: Distribution by year		
Year	Frequency (#)	Percentage (%)
2001	3,740	6.98
2002	7,379	13.77
2003	6,771	12.63
2004	6,763	12.62
2005	7,611	14.20
2006	6,438	12.01
2007	8,452	15.77
2008	6,439	12.01
Total	53,593	

Panel B: Distribution by industry		
Industry	Frequency (#)	Percentage (%)
Construction	1,933	3.61
Mining and quarrying	15	0.03
Education	301	0.56
Financial and insurance activities	4,422	8.25
Agriculture, forestry and fishing	45	0.08
Wholesale and retail service	3,132	5.84
Real estate, renting, and leasing	48	0.09
Business facilities and management services	544	1.02
Accommodation and food service	38	0.07
Arts, sports and leisure services	475	0.89
Transportation	878	1.64
Electricity, gas, steam and water supply	954	1.78
Professional, scientific and technical activities	6,358	11.86
Manufacturing	28,227	52.67
Information and communications	6,063	11.31
Sewerage, waste management, materials recovery and remediation activities	51	0.10
Membership organizations, repair and other personal services	109	0.20
Total	53,593	

Table 3. Descriptive statistics

Variables	N	Mean	Median	S.D.	Q1	Q3
Level of recommendation	53,593	2.658	3.000	0.527	2.000	3.000
Relative recommendation	53,593	-0.046	0.000	0.454	0.000	0.000
ΔRelative recommendation	53,593	-0.008	0.000	0.345	0.000	0.000
Absolute forecast accuracy	53,593	-0.126	-0.043	0.266	-0.112	-0.012
Forecast optimism	53,507	0.000	0.124	0.928	-0.693	0.681
Buy and hold 3-day abnormal return	53,593	0.003	-0.001	0.054	-0.030	0.031
Affiliated	53,593	0.112	0.000	0.315	0.000	0.000
Funded	53,593	0.585	1.000	0.493	0.000	1.000
FAMT	53,593	1.246	0.000	3.615	0.000	0.000
Chaebol broker	53,593	0.628	1.000	0.483	0.000	1.000
Chaebol firm	53,593	0.008	0.000	0.089	0.000	0.000
Firm size	53,593	13.008	12.862	1.828	11.559	14.349
Firm coverage	53,593	14.475	13.000	8.017	9.000	18.000
Industry coverage	53,593	2.747	2.000	1.449	2.000	3.000
Broker size	53,593	22.651	22.000	10.177	15.000	29.000
Analyst following	53,593	16.730	16.000	9.931	8.000	23.000
Career experience	53,593	2.743	2.000	2.064	1.000	4.000
Firm-specific experience	53,593	1.537	1.000	1.753	0.000	2.000
Forecast horizon	53,593	1.132	1.000	1.044	0.000	2.000
Number of strong buy	53,593	0.092	0.000	0.332	0.000	0.000
Number of buy	53,593	7.013	4.000	7.780	0.000	11.000
Number of hold	53,593	0.304	0.000	1.706	0.000	0.000
Number of underperform	53,593	0.005	0.000	0.113	0.000	0.000
Number of sell	53,593	0.001	0.000	0.027	0.000	0.000

Note. This Table presents the descriptive statistics of the variables used in our research. S.D. represents standard deviation. Q1 and Q3 represent the first and third quartile, respectively. N represents the number of observations. All detailed definitions of variables in this table are described in the Appendix.

Table 4. Pearson and Spearman correlation among variables of interest

#	Variables	1	2	3	4	5	6
1	*Level of recommendation*		0.530	0.161	0.052	0.083	0.025
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
2	*Relative recommendation*	0.520		0.381	-0.025	0.034	-0.039
		(0.000)		(0.000)	(0.000)	(0.000)	(0.000)
3	Δ*Relative recommendation*	0.141	0.368		0.009	0.007	0.006
		(0.000)	(0.000)		(0.047)	(0.111)	(0.195)
4	*Absolute forecast accuracy*	0.014	-0.050	0.007		-0.073	0.046
		(0.001)	(0.000)	(0.086)		(0.000)	(0.000)
5	*Forecast optimism*	0.098	0.035	0.007	0.047		-0.003
		(0.000)	(0.000)	(0.115)	(0.000)		(0.502)
6	*Affiliated*	0.027	-0.037	0.005	0.047	0.001	
		(0.000)	(0.000)	(0.250)	(0.000)	(0.746)	

Note. Table 4 presents Pearson (Upper-right triangle) and Spearman (Lower-left triangle) correlations among the variables of interest used in our regression analysis. The number of observations of the variables is 53,593, except for *Forecast optimism* which has 53,507 observations. All detailed definitions of variables in this table are described in the Appendix. Figures in parentheses are p-values.

Table 5. Main regression results

	Dependent variable:					
			Heckman Selection Model			
	Relative recommendation OLS	*Level of recommendation* Ordered Logit	*Funded* = 1 1st Step	*Relative recommendation* 2nd Step	*Relative recommendation based on average recommendations* *OLS*	*Relative recommendation* OLS Sample with all recommendations
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)
Affiliated	-0.036***	-0.138***		-0.035***	-0.031***	-0.033***
	(-5.52)	(-3.46)		(-5.51)	(-5.87)	(-18.52)
Funded	0.003	0.016		0.003	0.010***	0.005***
	(0.63)	(0.57)		(0.58)	(2.76)	(3.57)
Firm size	-0.006***	-0.029***	-0.169***	-0.034***	0.001	0.009***
	(-3.73)	(-2.78)	(-38.47)	(-3.14)	(0.41)	(18.88)
Firm coverage	-0.001***	-0.017***	-0.018***	0.021***	-0.002***	-0.001***
	(-4.46)	(-10.00)	(-21.74)	(2.61)	(-6.74)	(-7.47)
Industry coverage	0.005***	0.051***	0.084***	-0.017***	0.008***	0.001*
	(3.13)	(4.89)	(18.19)	(-2.66)	(5.41)	(1.83)
Broker size	-0.001***	-0.015***	-0.002***	-0.007*	-0.001***	-0.001***
	(-4.32)	(-12.71)	(-2.72)	(-1.79)	(-8.27)	(-8.62)
Analyst followings	0.003***	0.047***	0.018***	-0.004***	0.005***	0.001**
	(11.34)	(23.96)	(23.09)	(-3.62)	(21.35)	(2.54)
Career experience	0.001	0.030***	0.131***	0.019***	0.001	-0.001
	(0.29)	(2.84)	(32.93)	(3.45)	(0.55)	(-0.79)
Firm-specific experience	-0.001	-0.098***	-0.105***	-0.001***	-0.002*	0.002***
	(-0.58)	(-10.03)	(-23.07)	(-5.04)	(-1.73)	(3.72)
Forecast horizon	-0.016***	-0.100***	0.056***	0.006***	-0.018***	0.001
	(-8.54)	(-8.37)	(10.07)	(5.46)	(-11.50)	(0.74)
Absolute forecast accuracy	-0.002	0.165***	0.241***	0.039**	-0.013**	-0.033***
	(-0.27)	(3.57)	(10.81)	(2.23)	(-2.10)	(-12.76)
Number of strong buy	-0.109***	-0.411***	-0.240***	-0.151***	-0.127***	-0.005***
	(-17.39)	(-9.81)	(-13.05)	(-8.73)	(-24.46)	(-47.48)
Number of buy	-0.016***	-0.107***	0.003***	-0.016***	-0.016***	-0.001***
	(-52.93)	(-56.18)	(3.56)	(-42.59)	(-62.16)	(-160.47)
Number of hold	-0.046***	-0.359***	0.005	-0.045***	-0.048***	-0.004***

	(-40.62)	(-52.88)	(1.35)	(-38.75)	(-51.11)	(-58.49)
Number of underperform	-0.285***	-1.841***	0.235***	-0.251***	-0.268***	-0.022***
	(-17.07)	(-18.39)	(4.10)	(-11.97)	(-19.36)	(-24.22)
Number of sell	-1.391***	-21.013	1.002***	-1.304***	-1.281***	-0.201***
	(-20.15)	(-0.29)	(2.58)	(-16.96)	(-22.35)	(-35.22)
Median stock recommendation		2.967***				
		(111.13)				
Broker industry coverage			0.146***			
			(5.20)			
Inverse Mill's ratio				0.283***		
				(2.60)		
Intercept1	0.029	-12.148***	1.891***	0.119**	0.089**	-0.277***
	(0.59)	(-37.25)	(32.43)	(1.98)	(2.20)	(-18.56)
Intercept2		-5.176***				
		(-16.15)				
Intercept3		0.381				
		(1.18)				
Intercept4		2.821***				
		(8.38)				
Industry fixed effect	Yes	Yes	No	Yes	Yes	Yes
Year fixed effect	Yes	Yes	No	Yes	Yes	Yes
Adj. R^2	0.090	0.515	0.079	0.266	0.112	0.057
N	53,593	53,593	53,593	53,593	53,593	584,150

Note. Table 5 presents the regression results of examining the optimistic bias in the stock recommendations stemming from the Chaebol-affiliated mutual fund-brokerage firm business relationship. In column (1), we perform OLS regression with *Relative recommendation* as the dependent variable. In column (2), we estimate ordered logit regression with *Level of recommendations* as the dependent variable. To control for general optimism in analysts' stock recommendations, *Median stock recommendation* is additionally included in the model. In columns (3) and (4), we estimate the Heckman selection model. Column 3 performs the first-stage logit regression with *Funded* as the dependent variable. Following Firth et al. (2013), *Broker industry coverage* is used as an instrumental variable. Column (4) reports the second stage regression result, additionally controlling for the *Inverse Mill's ratio* obtained from the first stage. In column (5), we perform OLS regression in which the dependent variable is *Relative recommendation* calculated using the mean recommendation instead of median recommendation. In column (6), we perform OLS regression in which the dependent variable is *Relative recommendation* as the dependent variable on the full sample to allow the reiteration recommendations during a year. Numbers in parentheses are t-values. All detailed definitions of variables in this table are described in the Appendix. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 6. Forecast accuracy and optimism

	Dependent variables:	
	Absolute forecast accuracy	*Forecast optimism*
Independent variables	(1)	(2)
Affiliated	0.006*	-0.025**
	(1.83)	(-2.01)
Average forecasted earnings	0.001**	0.001***
	(2.31)	(-5.34)
Firm size	0.039***	-0.006*
	(45.9)	(-1.88)
Career experience	0.001	-0.024***
	(0.16)	(-8.91)
Firm-specific experience	-0.002***	-0.017***
	(-2.68)	(-5.44)
Forecast horizon	-0.049***	0.229***
	(-46.31)	(60.94)
Firm coverage	0.001	-0.006***
	(0.43)	(-11.51)
Industry coverage	0.005***	0.003
	(5.86)	(1.07)
Broker size	-0.001***	-0.003***
	(-4.08)	(-7.32)
Analyst followings	-0.001	0.010***
	(-0.23)	(20.98)
Intercept	-0.576***	-0.109***
	(-54.98)	(-2.93)
Adj. R^2	0.116	0.087
N	53,593	53,593

Note. Table 6 presents the OLS regression results of examining the accuracy and optimism in the forecasted earnings by an analyst in the Chaebol-affiliated mutual fund-brokerage firm business relationship. In columns (1) and (2), the dependent variables are *Absolute forecast accuracy* and *Forecast optimism*, respectively. The greater value of *Absolute forecast accuracy* (*Forecast optimism*) means more accurate (optimistic) forecasts. Numbers in parentheses are t-values. All detailed definitions of variables in this table are described in the Appendix. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 7. Additional tests for alternative explanations

Independent variables	Dependent variables: *Relative recommendation*			
	Chaebol broker pooled	Chaebol broker chaebol only	Chaebol firm pooled	Chaebol firm pooled
	(1)	(2)	(3)	(4)
Affiliated	-0.016**	-0.012*	-0.037***	-0.037***
	(-2.33)	(-1.71)	(-5.68)	(-5.78)
Chaebol broker	-0.044***			
	(-10.40)			
Chaebol firm			0.113***	0.099***
			(5.32)	(4.02)
Affiliated Chaebol firm*				0.056
				(1.15)
Funded	-0.001	-0.003	0.003	0.003
	(-0.26)	(-0.59)	(0.78)	(0.75)
Firm size	-0.007***	-0.008***	-0.007***	-0.007***
	(-3.94)	(-3.93)	(-3.98)	(-3.98)
Firm coverage	-0.001***	0.000	-0.001***	-0.001***
	(-3.76)	(-0.93)	(-4.41)	(-4.41)
Industry coverage	0.005***	0.001	0.005***	0.005***
	(2.96)	(0.37)	(3.08)	(3.07)
Broker size	0.000**	-0.001**	-0.001***	-0.001***
	(-2.31)	(-2.47)	(-4.78)	(-4.78)
Analyst followings	0.003***	0.003***	0.003***	0.003***
	(11.19)	(8.24)	(11.31)	(11.33)
Career experience	0.001	0.002	0.000	0.000
	(0.65)	(1.11)	(0.27)	(0.28)
Firm-specific experience	0.000	-0.001	-0.001	-0.001
	(-0.20)	(-0.58)	(-0.48)	(-0.49)
Forecast horizon	-0.016***	-0.015***	-0.016***	-0.016***
	(-8.48)	(-6.13)	(-8.49)	(-8.50)
Absolute forecast accuracy	-0.003	-0.009	-0.002	-0.002
	(-0.33)	(-0.99)	(-0.24)	(-0.25)
Number of strong buy	-0.109***	-0.101***	-0.109***	-0.109***
	(-17.48)	(-12.36)	(-17.41)	(-17.41)
Number of buy	-0.016***	-0.016***	-0.016***	-0.016***
	(-53.01)	(-41.78)	(-52.83)	(-52.84)
Number of hold	-0.046***	-0.047***	-0.046***	-0.046***
	(-40.61)	(-33.11)	(-40.59)	(-40.61)
Number of underperform	-0.281***	-0.261***	-0.284***	-0.284***
	(-16.88)	(-14.97)	(-17.06)	(-17.06)
Number of sell	-1.387***	-1.592***	-1.391***	-0.102
	(-20.10)	(-19.77)	(-20.14)	(-24.19)
Intercept	0.040	0.080	0.036	0.036
	(0.83)	(1.15)	(0.73)	(0.74)
Industry fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
Adj. R^2	0.092	0.093	0.112	0.090
N	53,593	33,641	53,593	53,593

Note. Table 7 presents the OLS regression results with *Relative recommendation* as the dependent variable, controlling for the possible omitted variables which may cause an endogeneity problem. In columns (1) and (2), we control for the systematic difference between Chaebol and non-Chaebol affiliated analysts. Particularly, in column (1), *Chaebol broker* is additionally included to our original model. In column (2), we exclude stock recommendations issued by non-Chaebol affiliated analysts. In column (3), we control for the relationship between the brokerage and target firm within the same Chaebol group by including *Chaebol firm*. In column (4),

we included the interaction between *Chaebol firm* and *Affiliated*. Numbers in parentheses are t-values. All detailed definitions of variables are described in the Appendix. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 8. The effect of funding amounts on affiliated analyst recommendations

	Dependent variable:			
	Relative recommendation OLS pooled	*Level of recommendation* Ordered Logit pooled	*Relative recommendation* OLS affiliated only	*Level of recommendation* Ordered Logit affiliated only
Independent variables	(1)	(2)	(3)	(4)
FAMT Affiliated*	0.008***	0.054***	0.008***	0.061***
	(3.75)	(3.82)	(3.62)	(3.93)
Affiliated	-0.108***	-0.736***		
	(-4.56)	(-4.61)		
Funded	0.005	0.019		
	(1.35)	(0.70)		
Firm size	-0.005***	-0.027***	-0.018***	-0.117***
	(-3.48)	(-2.65)	(-4.01)	(-3.95)
Firm coverage	0.005***	0.030***	0.003	0.006
	(3.34)	(2.83)	(0.79)	(0.19)
Industry coverage	-0.014***	-0.095***	-0.005	-0.007
	(-10.37)	(-9.67)	(-1.24)	(-0.27)
Broker size	-0.014***	-0.133***	-0.018***	-0.127***
	(-8.25)	(-11.24)	(-3.53)	(-3.74)
Analyst followings	-0.003***	-0.018***	-0.003***	-0.021***
	(-9.91)	(-10.17)	(-3.07)	(-3.32)
Career experience	0.008***	0.054***	0.005	0.051
	(5.21)	(5.17)	(1.01)	(1.57)
Firm-specific experience	-0.002***	-0.016***	-0.002***	-0.014***
	(-12.83)	(-13.53)	(-3.37)	(-3.72)
Forecast horizon	0.006***	0.045***	0.008***	0.055***
	(22.25)	(23.05)	(8.77)	(9.00)
Absolute forecast accuracy	0.026***	-0.006***	-0.015	-0.006***
	(3.71)	(-16.64)	(-0.52)	(-5.58)
Number of strong buy	-0.061***	-0.400***	-0.080***	-0.527***
	(-10.66)	(-9.52)	(-3.86)	(-3.35)
Number of buy	-0.015***	-0.107***	-0.018***	-0.119***
	(-55.88)	(-55.81)	(-23.67)	(-22.77)
Number of hold	-0.060***	-0.358***	-0.076***	-0.432***
	(-57.85)	(-52.71)	(-22.22)	(-18.40)
Number of underperform	-0.424***	-1.873***	-0.688***	-2.539***
	(-27.81)	(-18.66)	(-12.33)	(-6.01)
Number of sell	-1.564***	-21.178	-1.410***	-19.483
	(-24.88)	(-0.29)	(-14.05)	(-0.08)
Median stock recommendation	-0.413***	2.959***	-0.494***	2.567***
	(-105.43)	(110.81)	(-35.97)	(29.13)
Intercept1	1.375***	-11.825***	1.515***	-12.016***
	(29.75)	(-36.31)	(13.11)	(-16.29)
Intercept2		-4.817***		-4.155***
		(-15.03)		(-5.94)
Intercept3		0.763**		1.464**
		(2.37)		(2.04)
Intercept4		3.207***		3.093***
		(9.52)		(4.02)
Industry fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
Adj. R^2	0.246	0.520	0.296	0.520
N	53,593	53,593	5,980	5,980

Note. Table 8 presents the OLS regression results of examining the effect of funding amounts on our hypothesized

relationship. In columns (1) and (2), we use full sample with *Relative recommendation* and *Level of recommendation* as the dependent variable, respectively. In columns (3) and (4), we restrict our sample to only our hypothesized relationship (*Affiliated* = 1). The dependent variables in columns (3) and (4) are with *Relative recommendation* and *Level of recommendation* as the dependent variable, respectively. Numbers in parentheses are t-values. All detailed definitions of variables are described in the Appendix. *** and ** indicate significance at the 1% and 5%, respectively.

Table 9. Change in recommendations around a start and a termination of fund coverage

Independent variables	Dependent variables:		
	ΔRelative recommendation	*Upgrade*	*Downgrade*
	OLS	Logit	Logit
	(1)	(2)	(3)
Affiliation_Start	0.019*	0.331**	0.233
	(1.94)	(1.99)	(1.44)
Affiliation_Quit	-0.008	-0.100	0.029
	(-0.89)	(-0.62)	(0.20)
Affiliated	-0.001	-0.078	0.034
	(-0.10)	(-0.73)	(0.35)
Funded	0.006*	0.076	-0.121**
	(1.75)	(1.23)	(-2.33)
Firm size	0.003*	-0.015	-0.164***
	(1.95)	(-0.64)	(-8.28)
Firm coverage	0.002	-0.006	0.069***
	(1.57)	(-0.23)	(3.12)
Industry coverage	-0.005***	0.218***	0.010
	(-4.00)	(9.37)	(0.49)
Broker size	0.001	-0.003	0.161***
	(0.30)	(-0.13)	(6.86)
Analyst followings	0.001	0.007*	-0.009**
	(0.07)	(1.83)	(-2.42)
Career experience	0.002	-0.015	-0.013
	(1.27)	(-0.65)	(-0.65)
Firm-specific experience	-0.001	-0.022***	-0.041***
	(-1.36)	(-7.97)	(-16.29)
Forecast horizon	0.002***	0.024***	0.005
	(9.29)	(5.98)	(1.47)
Absolute forecast accuracy	0.021***	0.001	0.001
	(3.57)	(0.43)	(1.36)
Number of strong buy	0.006	-0.443***	0.121
	(1.27)	(-5.14)	(1.42)
Number of buy	-0.003***	-0.048***	0.058***
	(-11.69)	(-10.55)	(16.84)
Number of hold	-0.015***	-0.274***	0.103***
	(-16.81)	(-5.96)	(12.48)
Number of underperform	-0.092***	-11.245	0.276**
	(-7.07)	(-0.06)	(2.44)
Number of sell	-0.324***	-12.588	1.381***
	(-6.04)	(-0.02)	(3.39)
Median stock recommendation	-0.167***	0.173***	-0.927***
	(-50.17)	(2.89)	(-20.41)
Intercept	0.538***	-3.819***	1.210*
	(13.68)	(-6.72)	(1.77)
Industry fixed effect	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes
Adj. R^2	0.050	0.046	0.089
N	53,593	53,593	53,593

Note. Table 9 presents the regression results of examining the change in recommendations around our hypothesized affiliations' start and quit. In column (1), we perform OLS regression with Δ*Relative recommendation* as the dependent variable. In columns (2) and (3), we perform logit regressions with *Upgrade* and *Downgrade*, respectively. Numbers in parentheses are t-values. All detailed definitions of variables are described in the Appendix. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 10. Additional test for window dressing of fund managers

	Dependent variable:	
	Relative recommendation	*Level of recommendation*
	OLS	Ordered Logit
Independent variables	(1)	(2)
Affiliated	-0.028***	-0.195***
	(-16.62)	(-17.57)
December	-0.001	-0.014
	(-0.54)	(-0.98)
*Affiliated*December*	0.014**	0.112***
	(2.41)	(2.96)
Funded	0.002*	-0.012
	(1.86)	(-1.44)
Firm size	0.016***	0.122***
	(35.98)	(39.48)
Firm coverage	-0.001***	-0.008***
	(-13.05)	(-13.28)
Industry coverage	0.001*	0.001
	(1.81)	(0.17)
Broker size	-0.001***	-0.009***
	(-23.61)	(-23.65)
Analyst followings	0.003***	0.022***
	(37.53)	(39.82)
Career experience	0.006***	0.038***
	(10.62)	(9.97)
Firm-specific experience	-0.012***	-0.080***
	(-26.37)	(-25.83)
Forecast horizon	0.005***	0.039***
	(8.43)	(9.17)
Absolute forecast accuracy	-0.004*	-0.048***
	(-1.79)	(-3.00)
Number of strong buy	-0.002***	-0.014***
	(-23.42)	(-19.91)
Number of buy	-0.001***	-0.004***
	(-173.32)	(-165.00)
Number of hold	-0.005***	-0.030***
	(-80.61)	(-67.12)
Number of underperform	-0.034***	-0.129***
	(-40.09)	(-23.75)
Number of sell	-0.230***	-18.806
	(-43.66)	(-0.70)
Median stock recommendation	-0.379***	2.973***
	(-318.54)	(381.63)
Intercept1	0.865***	-14.975***
	(60.74)	(-154.23)
Intercept2		-8.035***
		(-84.84)
Intercept3		-2.859***
		(-30.19)
Intercept4		0.141
		(1.35)
Industry fixed effect	Yes	Yes
Year fixed effect	Yes	Yes
Adj. R^2	0.197	0.475
N	584,150	584,150

Note. Table 10 presents the regression results of examining the effect of December on our hypothesized relationship. In column (1), we perform OLS regression with *Relative recommendation* as the dependent variable. In columns (2), we perform ordered logit regressions with *Level of recommendation* as the dependent variable. Numbers in parentheses are t-values. All detailed definitions of variables are described in the Appendix. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 11. Market return test

	Dependent variable: *Buy and hold 3 day abnormal return*	
Independent variables	Full sample	Subsample with funded stocks
Strong buy	0.030***	0.034***
	(10.55)	(7.86)
Buy	0.007***	0.007***
	(24.42)	(16.75)
Hold	-0.005***	-0.006***
	(-10.68)	(-10.00)
Underperform	-0.009***	-0.009***
	(-4.19)	(-3.04)
Sell	-0.033***	-0.040***
	(-6.95)	(-6.25)
*Strong buy*Affiliated*	0.014	0.011
	(1.14)	(0.83)
*Buy*Affiliated*	-0.003***	-0.002**
	(-2.96)	(-2.47)
*Hold*Affiliated*	-0.003**	-0.002
	(-2.32)	(-1.14)
*Uerperform*Affiliated*	0.013	0.012
	(1.47)	(1.33)
*Sell*Affiliated*	-0.001	0.005
	(-0.11)	(0.40)
Adj. R^2	0.015	0.016
N	53,593	31,329
F-value for test1: *Strong buy* + *Strongbuy*Affiliated*=0		[13.85]***
F-value for test2: *Buy* + *Buy*Affiliated*=0		[33.72]***
F-value for test3: *Hold* + *Hold*Affiliated*=0		[35.85]***
F-value for test4*: Underperform* + *Underperform*Affiliated*=0		[0.17]
F-value for test5: *Sell* + *Sell*Affiliated*=0		[10.62]***

Note. Table 11 presents the OLS regression results of examining the stock market reaction upon the issuance of recommendations. The dependent variables in this test are *Buy and hold 3 day abnormal return*. The test sample used in column (1) includes all recommendations issued on both funded and unfunded stocks and it in column (2) includes recommendations on funded stocks only. Numbers in parentheses are t-values. Numbers in parentheses in square bracket are F-values. All detailed definitions of variables are described in the Appendix. *** and ** indicate significance at the 1% and 5%, respectively.