Analyst Recommendation Bias and Brokerage House Shareholding

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October 2016

Discussion Paper No.1635

GRADUATE SCHOOL OF ECONOMICS

KOBE UNIVERSITY

ROKKO, KOBE, JAPAN

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Abstract

When a brokerage house owns a firm's stock, a capital relationship is created between the brokerage house and that firm. This paper examines the effect the capital relationship between a brokerage house and a firm has on the content of a recommendation, and the results are as follows. First, the capital relationship between a brokerage house and a firm creates an optimistic bias in recommendations. Second, the stronger the capital relationship between a brokerage house and a firm, the larger the optimistic bias in recommendations.

JEL Classification: G10, G14, G24

Keywords: Analyst, Recommendation, Conflicts of interest, Brokerage house, Shareholdings

1. Introduction

It is required that a security analyst (hereinafter "analyst") should be a fairness. However, the fairness of analysts employed by brokerage houses is sometimes hindered by the variety of pressures they face within the brokerage house.

A brokerage house consists of various departments. One of these departments, the investment banking department, primarily performs underwriting services such as equity financing and advisory services for M&As. The investment banking department sometimes uses analysts to develop friendly business relationships with firms providing such works. Lin and McNichols (1998) and Michaely and Womack (1999) have shown that analysts make optimistic recommendations to firms with which the investment banking department is entering into an underwriting contract[1]. The same is true of underwriting contracts for debt financing and advisory contracts for M&As, with analysts making optimistic recommendations to firms that are clients of the investment banking department (Kolasinski and Kothari (2008), Ljungquvist et al. (2007)). In addition to using analysts to develop friendly business relationships with client firms, investment banking departments sometimes use them to acquire new client firms. Ellis et al. (2011) and Boudry et al. (2011) have shown that the analyst behavior (in particular, offering optimistic recommendations) prior to equity financing is a factor that affects how firms decide on an underwriter[2]. Cliff and Denis (2004) have shown that when the underwriter's analyst does not cover the firm after equity financing, there is an increased chance that the underwriter will be changed in the subsequent equity financing.

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[1] New York Attorney General, Elliot Spitzer revealed that US Merrill Lynch analysts had provided optimistic investment information to client firms of the investment banking department. Why did these analysts release false investment information to market participants? An investigation by Elliot Spitzer showed that analyst compensations and promotions at Merrill Lynch were connected to the results of the investment banking business. (Nihon Keizai Shimbun, 5/10/2003).

[2] There is also a research that optimistic recommendations do not affect the obtaining of underwriting services (Ljungquvist et al. (2006)).

Analyst fairness is also sometimes damaged by pressure within the brokerage department of a brokerage house. The primary job of a brokerage department is to distribute market participant orders in the stock market. As brokerage departments receive a brokerage commission that corresponds to market participant orders, increasing the number of orders leads to higher earnings for the brokerage department. Therefore, analysts sometimes make optimistic recommendations to increase market participant orders (Cowen et al. (2006), Agrawal and Chen (2008)).

This paper focuses on how the pressure within the self-dealing departments of a brokerage house affects analysts. The primary job of self-dealing departments is to make stock investments and bond investments with the brokerage house's own funds to obtain investment income. If the market price of an owned share becomes higher than it was at the time of purchase, a self-dealing department can take the margin as investment income[3]. In addition, holding a share whose value has gone up compared to its purchase price increases the value of a brokerage house's assets, even if the share is not sold off. Just as in investment banking departments and brokerage departments, self-dealing departments are likely to put pressure on analysts to make optimistic recommendations to increase investment income or boost asset value in the stock market.

This paper investigates the correlation in Japanese firms between brokerage house shareholding and optimistic bias in recommendations. The stock owned by brokerage houses is primarily obtained through self-dealing by self-dealing departments. Japan relaxed regulations regarding self-dealing through the financial system reforms of 1998, and self-dealing has since emerged as one of the core businesses of brokerage houses. With this background, Japan is an extremely appropriate subject for this paper to conduct its investigation. Moreover, plenty of detailed data regarding brokerage house shareholding can be obtained in Japan. Accordingly, this paper investigates the correlation between brokerage house shareholding and optimistic bias in

[3] In the case of short selling, if the market price of an owned share becomes lower than it was at the time of purchase, a self-dealing department can take the margin as investment income.

recommendations using recommendations made to firms that were listed on the Japanese stock market from March 2003 to February 2015 (the period for which data were available).

The results of the investigation are as follows. First, brokerage house shareholding creates an optimistic bias in recommendations. Second, the more the value of shares (value base) held by a brokerage house, the larger the optimistic bias in recommendations. Third, the more the percentage of shares held by a brokerage house and the more its shareholder rights are strengthened, the larger the optimistic bias in recommendations. All these results demonstrate that analysts change the content of recommendations to be optimistic for the benefit of the self-dealing department, and such analyst behavior may have been influenced by the pressure in the self-dealing department. Fourth, recommendations made for firms in which the brokerage house is a shareholder are less informative than recommendations made for firms in which the brokerage house is not a shareholder. This result can be interpreted to mean that market participants are aware that brokerage house shareholding leads to optimistic bias in recommendations.

Prior research has revealed that analysts employed by brokerage houses experience pressure from various departments within the brokerage house, rendering them unable to make recommendations from a fair perspective. This paper investigates the correlation between pressure in self-dealing departments and optimistic bias in recommendations, focusing on self-dealing departments, which have not been addressed by such existing research. The results show that when a brokerage house owns a certain firm's stock and a capital relationship forms between the brokerage house and that firm, analysts create optimistic bias in recommendations. The said point is this paper's contribution.

IOSCO[4] has offered a variety of opinions meant to increase analyst fairness. In the Global Analyst Research Settlement of September 2003, proposals for measures to eliminate pressure

[4] IOSCO stands for the International Organization of Securities Commissions, an international organization made up of institutions such as securities regulators and security exchanges from various countries around the world.

primarily in investment banking departments and brokerage departments were presented. Kadan et al. (2009) and Corwin et al. (2016) compared optimistic bias in recommendations before and after the Global Analyst Research Settlement, and the results revealed that there was less optimistic bias following the settlement. Meanwhile, most of the recommendations used as samples for this paper were released after the Global Analyst Research Settlement. However, the analysis results include recommendations in which the optimistic bias was due to pressure in the self-dealing department. In addition, it was found that market participants are aware of the bias and take these recommendations with skepticism when evaluating. These issues must be improved in the future.

This paper is structured as follows. The next chapter explains data and samples, while Chapter 3 analyzes them. Chapter 4 provides additional analysis, and the final chapter gives conclusions.

2. Data and Samples

This paper primarily uses two databases: *Nikkei Needs Financial Quest* and *Bloomberg*. *Nikkei Needs Financial Quest* is a database that records shareholder data for firms listed on the Japanese stock market. It was used to obtain the names of the top 30 shareholders and the number of shares held at the settlement term (full-year settlement and midterm settlement) for each firm from March 2003. *Bloomberg* is a database that records analyst recommendations. It was used to obtain information on recommendations released from 1996, and it included the content of the recommendation, the analyst's name, and the name of the brokerage house in which the analyst was employed.

The data set was created through the following steps. First, it was decided that the data set would be formatted so that the brokerage house, firm, and settlement term (full-year settlement and midterm settlement) were differentiated. *Nikkei Needs Financial Quest* was used to identify the brokerage houses that owned a firm's stock. This revealed that 13 brokerage houses owned a firm's

stock through self-dealing. However, among these 13 brokerage houses, the amount of self-dealing was extremely small in 5. Since, for the purpose of the analysis, it was more appropriate to use brokerage houses in which self-dealing had a certain amount of influence on the earnings structure of the brokerage house, the data set was created using 8 brokerage houses and excluding those 5[5]. The firms and their settlement terms were identified using *Nikkei Needs Financial Quest*. Second, recommendation data were obtained from *Bloomberg* and merged into the corresponding areas of the data set. Recommendations can be released at a variety of times other that settlement terms. For settlement term recommendations, Ljungquvist et al. (2007) and Corwin et al. (2016) looked at recommendations released in the one-year period before the settlement term and selected the recommendation that was released at the time closest to that settlement term. This paper also adopts their method and specifies recommendations at the settlement term. Among the set of firms, there are some firms that are not the subject of analyst recommendations and some for which, by coincidence, no recommendations were released in the one-year period before the settlement term. Samples for which these circumstances apply are excluded from the data set. Furthermore, samples for which relative recommendations (to be defined later) could not be created are excluded from the data set. Lastly, brokerage house shareholding data were obtained from *Nikkei Needs Financial Quest* and merged into the corresponding areas of the data set. Table 1 shows the data set used in the analysis. From March 2003 to February 2015, the period in which the use of *Nikkei Needs Financial Quest*. shareholder date could be maximized, there were 46,768 recommendations regarding listed Japanese firms. Of these, 1,800 (3.85%) recommendations were about firms whose shares the brokerage house held.

Recommendations are defined using either the five ranks StrongBuy (5), Buy (4), Hold (3), Sell (2), and StrongSell (1) or the three ranks Buy (5), Hold (3), and Sell (1). These qualitative data

[5] Even when 13 brokerage houses are included in the analysis, the results are similar to the analysis results that will be shown later.

were converted into the numerical values shown next to the recommendations above in parentheses, and then used for the analysis. The correlation between brokerage house shareholding and recommendations is shown in the second column of Table 2. Recommendations for firms in which the brokerage house held stock were scored 3.80 (mean value), while recommendations for firms in which the brokerage house did not hold stock were scored 3.71. This score shows that recommendations released were between Buy and Hold, and it reveals that analysts gave recommendations that were about 0.09 points closer to Buy for firms in which the brokerage house held stock.

The correlation between brokerage house shareholding and relative recommendation is shown in the third column of Table 2.

$$\text{relative recommendation} = \text{recommendation} - \text{consensus recommendation}$$

A relative recommendation is the difference between a recommendation and a consensus recommendation. It is also an indicator that shows how recommendations by a certain analyst and another analyst differ. A consensus recommendation is the median value of a recommendation released by other analysts during the same settlement period. However, if multiple recommendations were released by other analysts in the same period, the recommendation that was released at the time closest to that settlement term was used. The third column of Table 2 shows that analysts release recommendations that are more optimistic than the consensus recommendation for firms whose shares the brokerage house holds.

3. Analysis

This paper examined the effect that a brokerage house shareholding has on recommendations,

controlling for the characteristics of the analyst who released the recommendation, the characteristics of the brokerage house that employed the analyst, and the characteristics of the firm that was the subject of the recommendation.

$$RelRec_{ijkt} = \alpha + \beta \times Broker's\ Shareholding_{jkt} + \sum_{i=1}^{I} \gamma_i \times AnalystChar_i$$

$$+ \sum_{j=1}^{J} \delta_j \times BrokerChar_i + \sum_{k=1}^{K} \theta_k \times FirmChar_k + \varepsilon_{ijkt} \qquad \cdots (A)$$

(The meaning of the subscripts is as follows: *i* is analyst, *j* is brokerage house, *k* is firm, and *t* is settlement term.)

The explained variable $RelRec_{ijkt}$ is the relative recommendation. The explanatory variable $Broker's\ Shareholding_{jkt}$ shows the capital relationship between the firm and the brokerage house and is the variable being focused on most. This paper uses three variables: ① a dummy variable ($ShDummy_{jkt}$) that takes the value of 1 if the brokerage house held stock in the firm and takes the value of 0 if it did not; ② the market value of the shares held by the brokerage house ($ShValue_{jkt}$); and ③ the percentage of shares held by the brokerage house ($ShOwnership_{jkt}$). Other explanatory variables, which were used as control variables, include variables related to analyst characteristics, brokerage house characteristics, and firm characteristics.

$Seniority_{it}$, $Seasoning_{it}$, $Ranking_{it}$, $Nfollow_{it}$, and $Jobmove_{it}$ are used to represent analyst characteristics[6]. $Seniority_{it}$ is the length of an analyst's career, while $Seasoning_{it}$ is the

[6] Hong and Kubik (2003), Ljungquvist et al. (2007), and Corwin et al. (2016) use the precision of analyst earnings forecasts (*Relative Forecast Accuracy*) to control for the effect of analyst reputation building (Reputational Concern) on recommendations. However, as analyst earnings forecasts cannot be obtained from the *Bloomberg* database, *Relative Forecast Accuracy* has been excluded from the variables.

length of an analyst's career for a firm; both are indicators of analyst experience. Hong and Kubik (2001) have demonstrated that analyst experience is positively correlated with the boldness of earnings forecasts. $Ranking_{it}$ is a dummy variable that takes the value of 1 if the analyst is in the top 3 of the analyst rankings in his/her industry and takes the value of 0 if that is not the case. Jackson (2005) has demonstrated that when there is pressure within an investment banking department or brokerage department, an analyst with a good reputation (all-star analysts and the like) provides accurate investment information rather than biased investment information. $Nfollow_{it}$ is the number of firms an analyst is responsible for and is an indicator of an analyst's workload. Clement (1999) has demonstrated that the analyst workload is negatively correlated with the accuracy of investment information. $Jobmove_{it}$ is a dummy variable that takes the value of 1 if an analyst is transferred from one brokerage house to another during the settlement term and takes the value of 0 if that is not the case.

$Brokersize_{jt}$, $IBRel_{jkt}$, and $IBShare_{jt}$ are used to represent brokerage house characteristics. $Brokersize_{jt}$ is the total number of analysts working in a brokerage house and is a proxy variable showing the brokerage house size. Cowen et al. (2006) has demonstrated that investment information (provided by analysts) employed at major brokerage houses has less affiliation bias. This is because major brokerage houses are averse to damaging their reputation by misleading market participants with optimistic recommendations. $IBRel_{jt}$ is a dummy variable that takes the value of 1 if an underwriting contract exists between a firm and a brokerage house within the three-year period before the settlement term and takes the value of 0 if that is not the case. $IBShare_{jt}$ is the proportion of equity financing that the brokerage house was involved in as an underwriter out of all equity financing in the one-year period before the settlement term. $IBRel_{jt}$ and $IBShare_{jt}$ are both proxy variables for the pressure put on an analyst by the investment banking department. Corwin et al. (2016) has demonstrated that pressure from the investment banking department is positively correlated with the optimism of recommendations.

MV_{kt}, ANF_{kt}, $Proceeds_{kt}$, and $InstHoldings_{kt}$ are used to represent firm characteristics. MV_{kt} is the market value of equity for the firm that is the subject of the recommendation. ANF_{kt} is the analyst coverage for that firm in the one-year period before the settlement term. $Proceeds_{kt}$ is the total value of equity financing that the firm conducted in the three-year period before the settlement term. $InstHoldings_{kt}$ is the percentage of shares held by institutional investors at the time of the settlement term. Ljungquvist et al. (2007) has shown that optimistic bias in recommendations decreases when the pressure from institutional investors is strong.

Table 3, panel A shows the full sample, while Table 3, panel B shows descriptive statistics for the sample divided based on whether or not the brokerage house held stock in the firm. RecBias was 0.17 for the entire sample. Dividing the sample based on whether or not the brokerage house is a shareholder demonstrates that analysts release optimistic recommendations for firms whose shares the brokerage house holds (0.28 vs. 0.17). ShValue and ShOwnership always take the value of 0 when ShDummy takes a value other than 1. When the characteristics of these variables were checked only for the sample in which brokerage houses were shareholders, the mean value of ShValue was 8.8 billion yen and ShOwnership was 1.06%. This means that, on average, a single brokerage house owns 8.8 billion yen worth of a firm's stock and owns 1.06% of all the shares of that firm, making the brokerage house a major shareholder. Trends like the following can be seen in the other variables. In the sample in which brokerage houses were shareholders, InstHoldings, Brokersize, IBShare, and Ranking values were higher than in the sample in which brokerage houses were not shareholders, while Proceeds and Seniority values were lower. Table 4 shows the correlations between variables.

Table 5 shows the results of an analysis based on the model (A) regarding the effect of brokerage house shareholding on the recommendations. In (1)–(3) in Table 5, ShDummy is used as the variable representing the capital relationship between the firm and the brokerage house. (1)-(3) show the results when the fixed effects of (1) firm, (2) analyst, and (3) brokerage house are

analyzed through model (A). The coefficient of ShDummy is always a positive value in (1)-(3). These results show that even when controlling for a variety of factors that affect recommendations, analysts release recommendations that are more optimistic than the consensus recommendation for firms whose shares the brokerage house holds.

In (4)-(6) in Table 5, ln(ShValue) is used as the variable representing the capital relationship between the firm and the brokerage house. (4)-(6) show the results when the fixed effects of (4) firm, (5) analyst, and (6) brokerage house are each analyzed through model (A). In each of these sections, the coefficient of In(ShValue) is a positive value. Firth et al. (2013) has shown that when a business relationship exists between a brokerage house and a mutual fund, analysts release optimistic recommendations for the firms that are heavily weighted in the fund's stock portfolio. The ln(ShValue) is the market value of shares owned by a brokerage house. Accordingly, the results of (4)-(6) show that analysts make more optimistic recommendations as the market value of shares held by the brokerage house increases.

In (7)-(9) in Table 5, ShOwnership is used as the variable representing the shareholding relationship between the firm and the brokerage house. (7)-(9) show the results when the fixed effects of (7) firm, (8) analyst, and (9) brokerage house are each analyzed through model (A). In each of these sections, the coefficient of ShOwnership is a positive value. These results show that analysts make more optimistic recommendations as the brokerage house continues to increase the number of shares it holds and strengthens the influence it has over the firm as a major shareholder.

4. Additional Analysis

The previous chapters have shown that analysts release recommendations that are more optimistic than the consensus recommendation due to the capital relationship between the brokerage house and the firm. In that case, how do market participants—the users of analyst

recommendations—react to recommendations that include this optimistic bias? Recommendations were tested for informativeness using the below model (B).

$$ABS\_AbnormalReturn(0\ to\ 2) = \alpha + \beta \times Broker's\ Shareholding + \sum \beta \times AnalystChar + \sum \beta \times BrokerChar + \sum \beta \times FirmChar + \sum \beta \times RecChar + \varepsilon_{ijkt} \quad \cdots (B)$$

The explained variable $ABS\_AbnormalReturn(0\ to\ 2)$ is the absolute value of the difference between the cumulative share price returns for the day the recommendation was released and two days later, and the cumulative market returns for the same periods. $Broker's\ Shareholding$ uses ShDummy, ShValue, and ShOwnership. The definitions of these variables are omitted here because they were explained in the previous chapter. $BrokerChar_i$, $AnalystChar$, $BrokerChar$, and $FirmChar$ also use the same variables as in the previous chapter. $RecChar$, which is a new addition here, uses Tier5, Change, Horizon, RecBias, and Rec. Tier5 is a dummy variable that takes the value of 1 if recommendations are defined by the five ranks StrongBuy, Buy, Hold, Sell, and StrongSell, and takes the value of 0 if that is not the case. Change is the value of change from the previous recommendation to the most recent recommendation. Horizon is the number of months until settlement term t. RecBias is the difference between the recommendation and the consensus recommendation. Rec is the content of the recommendation.

Table 6 shows the analysis results. In (1), ShDummy is the variable that represents the capital relationship between the firm and the brokerage house, while ShValue is the variable that represents this in (2). The coefficient of ShDummy is -0.193 and the coefficient of ShValue is -0.009, both of which are statistically significant under the 5% standard. Meanwhile, the coefficient of ShOwnership in (3) took a negative value just as in (1) and (2), but this value was not statistically significant. Consistent results could not be obtained from these three variables.

However, (1) shows that recommendations made to firms in which the brokerage house is a shareholder are less informative than recommendations made to firms in which the brokerage house is not a shareholder. (2) shows that the informativeness of a recommendation drops as the market value of shares held by the brokerage house goes up. These results suggest that when a brokerage house owns shares in a certain firm and analysts from the brokerage house release recommendations about that firm, market participants will use the recommendations while viewing them with a fair amount of skepticism.

In Table 7, the sample is separated into buy recommendations (StrongBuy or Buy), neutral recommendations (Hold), and sell recommendations (Sell or StrongSell). The table shows the results of an investigation that studied the correlation between share price response to recommendations in each category and brokerage house shareholding. In panel A, the coefficients of (1) ShDummy, (2) ShValue, and (3) ShOwnership are all negative values, and all of these values are statistically significant. These results show that the informativeness of buy recommendations drops due to brokerage house shareholding. Meanwhile, panels B and C demonstrate that neutral and sell recommendations are not affected by brokerage house shareholding.

Market participants can recognize that the capital relationship between a brokerage house and a firm creates optimistic bias in recommendations. However, market participants cannot perfectly identify the recommendations that have optimistic bias. In such cases, market participants are likely to take the capital relationship between a brokerage house and a firm as a signal of optimistic bias and use recommendations for all firms that have a capital relationship with the brokerage house by undervaluing the portion with optimistic bias. Therefore, as the same undervaluing ends up being applied even to fair recommendations when there is a capital relationship between the brokerage house and the firm, recommendations may not be used effectively in the pricing process of the stock market.

5. Conclusions

Since the regulations on self-dealing were relaxed, self-dealing departments have gained a large amount of influence within Japanese brokerage houses. The goal of a self-dealing department is to make stock investments with the brokerage house's own funds to obtain investment income. Prior research has reported that analysts release optimistic recommendations to increase the earnings of the brokerage house's investment banking department or brokerage department. This paper examined the effect the capital relationship between a brokerage house and a firm had on recommendations, focusing on self-dealing departments, which have not been studied so far. The results of this study demonstrated that the capital relationship between a brokerage house and a firm creates an optimistic bias in recommendations. Furthermore, they showed that the stronger the capital relationship, the larger the optimistic bias in recommendations.

Although market participants are aware of such optimistic bias in recommendations, they cannot accurately distinguish the recommendations that have an optimistic bias. As a result, they perceive the capital relationship between a brokerage house and a firm as a signal of optimistic bias and use the recommendations with some skepticism. These conditions mean that when there is a capital relationship between the brokerage house and the firm, the same suspicions are applied to the content of fair recommendations as well. There is an urgent need for future measures that will allow recommendations to be effectively used in the pricing process of the stock market.

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Table 1 Samples

brokerage house	Available data period	# of recommendations	# of recommendations for the firm shareheld by the brokerage house	%
Nomura Securities	Mar. 2003 ~ Feb. 2015	12042	944	7.84%
Daiwa Securities	Mar. 2003 ~ Feb. 2015	9160	115	1.26%
Mizuho Securities	Mar. 2003 ~ Feb. 2015	5600	125	2.23%
Mitsubishi UFJ Securities	Mar. 2003 ~ Feb. 2015	8251	216	2.62%
Shinko Securities	Mar. 2003 ~ Mar. 2010	3967	40	1.01%
JPMorgan Securities Japan	Mar. 2003 ~ Feb. 2015	3519	176	5.00%
Barclays Security Japan	Mar. 2003 ~ Feb. 2015	1075	19	1.77%
Deutsche Securities Japan	Mar. 2003 ~ Sep. 2013	3154	165	5.23%
Total		46768	1800	3.85%

Table 2　Differences in recommendations for firms in which the brokerage house is a shareholder and firms in which it is not

	Raw Recommendation （Rec）	Relative Recommendation （RelRec)
Shareheld firm by broker house (N=1800)	3.80	0.28
Non-shareheld firm by broker house (N=44968)	3.71	0.17
Difference	0.09 ***	0.11 ***
t-value	3.28	3.40
z-value	3.29	3.61

***, **, * indicate significance at the 1%, 5%, 10% level, respectively.

Table 3, Panel A Full sample summary statistics

N=46768	Mean	Median	Minimum	Maximum	Std. Dev.
RecBias	0.17	0.00	-4.00	4.00	1.37
SHDummy	0.04	0.00	0.00	1.00	0.19
SHValue (billion yen)	0.34	0.00	0.00	257.43	4.04
SHOwnership (%)	0.04	0.00	0.00	8.42	0.25
Seniority (months)	78.98	74.00	1.00	213.00	44.96
Seasoning (months)	46.95	36.00	1.00	209.00	40.25
Ranking	0.25	0.00	0.00	1.00	0.43
Nfollow	16.66	16.00	1.00	108.00	8.56
Jovmove	0.02	0.00	0.00	1.00	0.13
Brokersize	53.52	55.00	13.00	85.00	17.38
IBRel	0.02	0.00	0.00	1.00	0.13
IBShare (%)	15.61	11.57	0.00	64.53	15.37
MV (billion yen)	676.49	265.43	0.92	27255.48	1369.82
ANF	9.93	9.00	1.00	30.00	5.17
Proceeds (billion yen)	2.50	0.00	0.00	537.16	16.24
InstHoldings (%)	27.61	26.65	0.08	90.95	12.471

Panel B Sub-sample summary statistics

	the firm shareheld by the brokerage house (N=1800)	the firms non-shareheld by the brokerage house (N=44968)	p-value for difference
RecBias	0.28	0.17	**0.00**
SHDummy	1.00	0.00	**0.00**
SHValue (billion yen)	8.80	0.00	**0.00**
SHOwnership (%)	1.06	0.00	**0.00**
Seniority (months)	74.06	79.18	**0.00**
Seasoning (months)	48.01	46.91	0.26
Ranking	0.27	0.25	**0.01**
Nfollow	16.62	16.66	0.85
Jovmove	0.02	0.02	0.94
Brokersize	60.48	53.24	**0.00**
IBRel	0.02	0.02	0.42
IBShare (%)	21.61	15.37	**0.00**
MV (billion yen)	724.58	674.57	0.13
ANF	10.02	9.93	0.46
Proceeds (billion yen)	1.53	2.54	**0.01**
InstHoldings (%)	31.39	27.46	**0.00**

Table 4　Correlation matrix

	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯
① RecBias	1.00															
② SHDummy	0.02	1.00														
③ SHValue	0.03	0.42	1.00													
④ SHOwnership	0.02	0.81	0.55	1.00												
⑤ Seniority	0.01	-0.02	0.00	-0.01	1.00											
⑥ Seasoning	-0.01	0.01	0.02	0.01	0.65	1.00										
⑦ Ranking	0.02	0.01	0.03	0.01	0.29	0.31	1.00									
⑧ Nfollow	-0.01	0.00	0.00	0.01	0.20	0.12	0.02	1.00								
⑨ Jovmove	0.01	0.00	0.00	0.00	0.00	0.01	-0.01	-0.01	1.00							
⑩ Brokersize	0.01	0.08	0.06	0.08	-0.04	-0.11	0.08	-0.10	-0.05	1.00						
⑪ IBRel	0.02	0.00	-0.01	0.00	-0.01	-0.03	0.01	-0.02	-0.01	0.06	1.00					
⑫ IBShare	0.03	0.08	0.04	0.07	0.00	-0.10	0.09	-0.06	-0.09	0.47	0.09	1.00				
⑬ MV	0.07	0.01	0.13	0.02	0.02	0.08	0.02	-0.08	0.02	-0.02	-0.03	-0.08	1.00			
⑭ ANF	0.03	0.00	0.07	0.03	0.19	0.21	0.06	-0.09	0.02	-0.03	-0.02	-0.18	0.46	1.00		
⑮ Proceeds	0.02	-0.01	0.00	-0.01	0.00	0.02	0.01	-0.02	0.00	0.00	0.27	-0.01	0.07	0.09	1.00	
⑯ InstHoldings	0.05	0.06	0.03	0.05	-0.07	0.02	-0.02	-0.02	0.00	-0.02	-0.02	-0.08	0.08	0.18	-0.03	1.00

Table 5 Analysis results: Effect of brokerage house shareholding on recommendations

	Dependent Variable: RelRec								
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Intercept	-8.299***	-3.482***	-2.825***	-8.287***	-3.478***	-2.822***	-8.279***	-3.478***	-2.823***
	(0.413)	(0.256)	(0.246)	(0.413)	(0.256)	(0.246)	(0.413)	(0.256)	(0.246)
ShDummy	0.111***	0.060*	0.078**						
	(0.033)	(0.032)	(0.033)						
ln(ShValue)				0.005***	0.003**	0.004***			
				(0.002)	(0.001)	(0.002)			
ShOwnership							0.094***	0.068***	0.073***
							(0.025)	(0.024)	(0.024)
ln(Seniority)	0.008	0.038***	0.027**	0.008	0.039***	0.027**	0.008	0.039***	0.027**
	(0.011)	(0.015)	(0.011)	(0.011)	(0.015)	(0.011)	(0.011)	(0.015)	(0.011)
ln(Seasoning)	0.005	-0.022***	-0.027***	0.005	-0.022***	-0.027***	0.005	-0.022***	-0.027***
	(0.006)	(0.007)	(0.006)	(0.006)	(0.007)	(0.006)	(0.006)	(0.007)	(0.006)
Ranking	0.052***	0.063***	0.020	0.052***	0.063***	0.020	0.052***	0.063***	0.020
	(0.016)	(0.022)	(0.016)	(0.016)	(0.022)	(0.016)	(0.016)	(0.022)	(0.016)
ln(Nfollow)	-0.015	-0.070***	-0.036**	-0.015	-0.070***	-0.036**	-0.015	-0.070***	-0.036***
	(0.015)	(0.023)	(0.014)	(0.015)	(0.023)	(0.014)	(0.015)	(0.023)	(0.014)
Jovmove	0.058	0.019	0.109**	0.058	0.019	0.109**	0.058	0.019	0.109**
	(0.052)	(0.054)	(0.052)	(0.052)	(0.054)	(0.052)	(0.052)	(0.054)	(0.052)
ln(Brokersize)	-0.020	0.074	0.130***	-0.021	0.074	0.131***	-0.021	0.075	0.132***
	(0.021)	(0.046)	(0.048)	(0.021)	(0.046)	(0.048)	(0.021)	(0.046)	(0.048)
IBRel	0.005	0.133**	0.113**	0.005	0.133**	0.113**	0.004	0.133**	0.113**
	(0.053)	(0.055)	(0.054)	(0.053)	(0.055)	(0.054)	(0.053)	(0.055)	(0.054)
IBShare	0.003***	0.000	-0.001*	0.003***	0.000	-0.001*	0.003***	0.000	-0.001*
	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)
ln(MV)	0.313***	0.132***	0.098***	0.313***	0.132***	0.098***	0.313***	0.132***	0.098***
	(0.015)	(0.007)	(0.006)	(0.015)	(0.007)	(0.006)	(0.015)	(0.007)	(0.006)
ln(ANF)	-0.010	-0.097***	-0.095***	-0.010	-0.097***	-0.095***	-0.010	-0.097***	-0.095***
	(0.020)	(0.015)	(0.014)	(0.020)	(0.015)	(0.014)	(0.020)	(0.015)	(0.014)
ln(Proceeds)	0.003**	0.004***	0.005***	0.003**	0.004***	0.005***	0.003**	0.004***	0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
InstHoldings	0.009***	0.006***	0.006***	0.009***	0.006***	0.006***	0.009***	0.006***	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Fixed effects	firm	analyst	broker	firm	analyst	broker	firm	analyst	broker
Adjusted R-squared	0.127	0.062	0.019	0.127	0.062	0.019	0.127	0.062	0.019
N	46768	46768	46768	46768	46768	46768	46768	46768	46768

The value in parenthesis is robust standard error. ***, **, * indicate significance at the 1%, 5%, 10% levels, respectively.

Table 6 Informativeness of recommendation

	Dependent Variable: ABS_AbnormalReturn(0 to 2)		
Independent variables	(1)	(2)	(3)
Intercept	5.320***	5.303***	5.317***
	(0.450)	(0.450)	(0.450)
ShDummy	-0.193**		
	(0.080)		
ln(ShValue)		-0.009**	
		(0.004)	
ShOwnership			-0.084
			(0.069)
ln(Seniority)	0.061**	0.061**	0.061**
	(0.028)	(0.028)	(0.028)
ln(Seasoning)	-0.020	-0.020	-0.021
	(0.015)	(0.015)	(0.015)
Ranking	0.003	0.003	0.003
	(0.037)	(0.037)	(0.037)
ln(Nfollow)	-0.052	-0.052	-0.052
	(0.036)	(0.036)	(0.036)
Jovmove	-0.121	-0.120	-0.122
	(0.126)	(0.126)	(0.126)
ln(Brokersize)	0.014	0.015	0.010
	(0.051)	(0.051)	(0.051)
IBRel	-0.122	-0.122	-0.122
	(0.134)	(0.134)	(0.134)
IBShare	0.009***	0.009***	0.009***
	(0.001)	(0.001)	(0.001)
ln(MV)	-0.085***	-0.085***	-0.084***
	(0.017)	(0.017)	(0.017)
ln(ANF)	0.089**	0.089**	0.089**
	(0.036)	(0.036)	(0.036)
ln(Proceeds)	-0.002	-0.002	-0.001
	(0.003)	(0.003)	(0.003)
InstHoldings	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)
Tier5	-0.060*	-0.060*	-0.058
	(0.036)	(0.036)	(0.036)
Change	-0.028	-0.028	-0.027
	(0.025)	(0.025)	(0.025)
Horizon	0.001	0.001	0.001
	(0.008)	(0.008)	(0.008)
Recbias	0.011	0.011	0.011
	(0.019)	(0.019)	(0.019)
Rec	0.027	0.027	0.027
	(0.024)	(0.024)	(0.024)
year dummy	yes	yes	yes
Adjusted R-squared	0.005	0.005	0.004
N	46768	46768	46768

The value in parenthesis is robust standard error. ***, **, * indicate significance at the 1%, 5%, 10% levels, respectively.

Table 7, Panel A Informativeness of buy recommendations

	Dependent Variable: AbnormalReturn(0 to 2)		
Independent variables	(1)	(2)	(3)
ShDummy	-0.310*		
	(0.175)		
ln(ShValue)		-0.016**	
		(0.008)	
ShOwnership			-0.458***
			(0.153)
Analyst Characteristics	yes	yes	yes
Broker Characteristics	yes	yes	yes
Firm Characteristics	yes	yes	yes
Rec Characteristics	yes	yes	yes
Adjusted R-squared	0.004	0.004	0.004
N	18980	18980	18980

The value in parenthesis is robust standard error. ***, **, * indicate significance at the 1%, 5%, 10% levels, respectively.

Panel B Informativeness of neutral recommendations

	Dependent Variable: AbnormalReturn(0 to 2)		
Independent variables	(1)	(2)	(3)
ShDummy	-0.004		
	(0.164)		
ln(ShValue)		-0.002	
		(0.008)	
ShOwnership			0.043
			(0.116)
Analyst Characteristics	yes	yes	yes
Broker Characteristics	yes	yes	yes
Firm Characteristics	yes	yes	yes
Rec Characteristics	yes	yes	yes
Adjusted R-squared	0.001	0.001	0.001
N	25075	25075	25075

The value in parenthesis is robust standard error. ***, **, * indicate significance at the 1%, 5%, 10% levels, respectively.

Panel C Informativeness of sell recommendations

	Dependent Variable: AbnormalReturn(0 to 2)		
Independent variables	(1)	(2)	(3)
ShDummy	0.015		
	(0.527)		
ln(ShValue)		0.001	
		(0.025)	
ShOwnership			0.215
			(0.495)
Analyst Characteristics	yes	yes	yes
Broker Characteristics	yes	yes	yes
Firm Characteristics	yes	yes	yes
Rec Characteristics	yes	yes	yes
Adjusted R-squared	0.011	0.011	0.011
N	2713	2713	2713

The value in parenthesis is robust standard error. ***, **, * indicate significance at the 1%, 5%, 10% levels, respectively.