Analyst-Firm Relations and Reciprocity:Evidence from China

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Abstract—This paper quantifies the analyst-firm relations based on an informational characteristic-model of analyst coverage innovatively. Furtherly, the rationality of analyst-firm relations is investigated based on the reciprocity between analysts and target firms by examining the impact of analyst-firm relations on stock recommendation and analysts' earnings forecasting performance. Empirical results suggest that analysts are prompted by close analyst-firm relations to render relatively positive rating for target firms and reciprocated by more firm-specific information for better earnings forecasting performance.

1 INTRODUCTION

Close analyst-firm relations provide a context for positive reciprocity in financial market. Prior literatures find that firms' favors prompt analysts to reciprocate by issuing relatively positive ratings and advise corporate managers to develop relationships with analysts [1]. Similarly, analysts are motivated to maintain good relations with public firms for that close relations with target firms have a positive effect on analysts' information environment and improve analysts' access to firm-specific information [2].

Considering the private nature of interactions between analysts and firms, analyst-firm relations have been proved difficult to investigate directly. Existing literature measures analysts' interactions with firms based on multi-item survey [3] and observable conferences data [4, 5]. However, the subjective multi-item survey can not necessarily capture the analyst-firm relations precisely. In addition, inferring analyst-firm relations from publicly observable conferences events leads to biased interpretations for that conferences account for only a fraction of the total amount of interactions between firms and analysts [2].

This paper tries to separate the information of analyst-firm relations from analyst coverage based on the backstepping method. Our empirical research is based on the assumption that analysts with limited resources pay more attention to those listed firms with frequent communication. Based on this assumption, analyst coverage is considered to consist of technical components driven by observable characteristics and abnormal components driven by relations between analysts and

firms. Thus, this paper measures the analyst-firm relations by eliminating the technical analysis information attributable to the firms' financial characteristics and analysts' characteristics from analyst coverage based on a characteristic-based model.

Furtherly, this paper investigates analyst-firm relations from the perspective of reciprocity between analysts and firms with a Chinese data set on analysts' earnings forecasting and stock recommendations from 2007 to 2017. The empirical results suggest that analysts tend to issue strong buy rating for the closed related firms. Meanwhile, close analyst-firm relations are also confirmed to be effective in decreasing the likelihood of downgrades on stock recommendation. In addition, analysts who maintain intense interactions with target firms have better earnings forecasting performance with less forecasting volatility and higher forecasting accuracy on the covered firms.

2 DATA AND METHODOLOGY

2.1 Data and and samples

All the research reports announced from 2007 to 2017 on all A-shares stocks listed on the Shanghai and Shenzhen Stock Exchange are selected as the initial samples. Then this paper removes the research reports that (1) analysts only make one earnings forecasting on the same stock in one year; (2) only one analyst follows in one year. Earnings forecasting data and firm financial data are obtained from China Stock Market and Accounting Research (CSMAR) and Resset database.

TABLE I. ANALYST-FIRM RELATIONS AND STOCK RECOMMENDATION

Panel A							
Variable	Mean	Std.Dev	Min	5%	50%	95%	Max
Accuracy	0.624	0.343	0	0	0.729	1	1
Cover	1.060	0.444	0.693	0.693	1.099	1.946	3.850

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Panel A							
Variable	Mean	Std.Dev	Min	5%	50%	95%	Max
MV	23.614	1.520	20.301	21.749	23.317	26.491	30.895
Turnover	4.967	4.609	0.000	0.408	3.674	13.821	49.118
Return	0.097	0.516	-1.679	-0.468	-0.003	0.979	14.604
VO	0.029	0.024	0.007	0.016	0.027	0.048	2.095
MB	0.505	0.263	0.011	0.152	0.457	0.991	4.565
Level	0.438	0.223	0.008	0.099	0.428	0.821	2.579
Volume	21.210	1.264	13.347	19.193	21.197	23.347	26.265
Exp	3.397	2.567	0	0.400	2.753	8.553	15.213
Star	0.223	0.416	0	0	0	1	1
Gender	0.276	0.447	0	0	0	1	1
Education	2.996	0.470	1	2	3	4	4
Brokerage	6.368	0.860	0	4.779	6.483	7.482	7.766
Stocknum	3.039	0.835	0	1.609	3.091	4.344	5.394
Panel B							
Stock recommendations							
	1	2	3	4	5		
NO.	65036	88181	11690	112	300		

The summary statistics of all variables are provided in Table 1. Panel A shows the descriptive statistics of firm's financial characteristics and analysts' characteristics during the sample period from 2007 to 2017. Panel B illustrates the ratings information of stock recommendations, which range from 1 to 5 (specifically, 1 for "Strong Buy", 2 for "Buy", 3 for "Hold", 4 for "Sell", and 5 for "Strong Sell"). Descriptive statistics suggest that analysts make more positive recommendations (Strong Buy and Buy) than negative recommendations (Strong Sell and Sell) during the sample period [6].

2.2 Empirical model

Analyst coverage is considered to contain the observable and unobservable information between analysts and stocks [7, 8]. This paper assumes that analysts focus on the listed firms with frequent interaction, and divide analyst coverage into technical components driven by observable characteristics and abnormal components driven by analyst-firm relations. Further, this paper reverses engineer the analyst-firm relations by separating the observable technical components attributable to firms' financial characteristics and analysts' characteristics from analyst coverage proxies (Cover) as follows:

$$Cover_{i,j,t} = \beta_0 + \beta_1 MV_{j,t-1} + \beta_2 MB_{j,t-1} + \beta_3 ROA_{j,t-1} + \beta_4 Return_{j,t-1} + \beta_5 Turnover_{j,t-1} + \beta_6 VO_{j,t-1} + \beta_7 Distance_{i,t} + \beta_8 Star_{i,t} + \beta_9 Gender_{i,t} + \beta_{10} Brokerage_{i,t} + \beta_{11} Stocknum_{i,t} + \beta_{12} Year_{i,j,t} + \beta_{13} Industry_{j,t} + \varepsilon_{i,j,t} \quad (1)$$

Considering that analyst coverage is the result of analysts assessing firms' previous financial characteristics, the one-year-lagged term of firms' financial variables including MV (market value), MB (market-to-book ratio), ROA (return on asset), Return (abnormal returns), Turnover (share turnover) and VO (price volatility) are introduced into Eq.(1). In addition, the financial variables

capture analysts' expectations over firms' future returns, which eliminate the concerns of reciprocity between analysts and firms driven by firms' better performance rather than close analyst-firm relations.

Meanwhile, the analysts' characteristics including Distance (geographic distance between analysts and firms), Star (star analysts), Gender (analysts' gender), Brokerage (the size of brokerage firms) and Stocknum (the number of stocks covered by an analyst in one year) are also considered as the control variables.

The residual component of analyst coverage after removing technical components driven by firms' characteristics and analysts' characteristics is selected as the proxy of the analyst-firm relations, Relations, which is calculated as the standard residuals of the Eq. (1).

TABLE II. THE EMPIRICAL RESULTS OF ANALYST-FIRM RELATIONS.

	Cover
<i>LI.MV</i>	0.045*** (21.736)
<i>LI.MB</i>	-0.051*** (-4.107)
<i>LI.ROA</i>	0.554*** (11.046)
<i>LI.Return</i>	0.040*** (8.911)
<i>LI.Turnover</i>	-0.006*** (-8.997)
<i>LI.VO</i>	-0.414*** (-7.684)
<i>Distance</i>	-0.009*** (-8.787)
<i>Star</i>	0.088*** (17.776)

<i>Gender</i>	0.006 (1.255)
<i>Brokerage</i>	0.061*** (20.804)
<i>Stocknum</i>	0.075*** (25.208)
<i>Constant</i>	-0.307*** (-5.384)
<i>Year</i>	control
<i>Industry</i>	control
<i>Observations</i>	56,642
<i>R-squared</i>	0.114

Note: *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

3 EMPIRICAL RESULTS

Table 2 reports the indicator construction of analyst-firm relations based on Eq. (1) using panel data model with two-way fixed effects. Significant estimation coefficients are consistent with the empirical experience, which enhances the rationality of our method to measure

analyst-firm relations. Then, this paper gets the *Relations* based on the standard residuals of regression in Table 2. Furtherly, this paper sheds further light on the rationality of our novel approach to measure the analyst-firm relations based on the intuitive literature experience of reciprocity between analysts and firms.

Table 3 presents the cross tabulation between analyst-firm relations and stock recommendations. Analyst-firm relations are divided into 3 quantiles. The lowest quantile (1) comprised the 1/3 lowest values, quantile (2) contained the next 1/3 values, etc. Table 3 shows that analysts with the highest quantiles of *Relations* are more likely to report recommendations with “Strong Buy” rating. Meanwhile, the results of t-test on the differences in *Relations* between adjacent recommendation rating are reported in Table 4. Considering the fewer recommendation of “Strong Sell” and “Sell”, this paper only reports the t-test results between “Strong Buy” and “Buy” as well as “Buy” and “Hold”, which suggest that the *Relations* of analysts with more positive recommendation rating on target firms is significantly higher than that of analysts with less positive recommendation rating.

TABLE III. ANALYST-FIRM RELATIONS AND STOCK RECOMMENDATION

3 quantiles of <i>Relations</i>	Stock recommendations				
	<i>Strong Buy</i>	<i>Buy</i>	<i>Hold</i>	<i>Sell</i>	<i>Strong Sell</i>
Lowest (1)	6749 (35.86%)	10411 (55.32%)	1619 (8.60%)	6 (0.03%)	33 (0.18%)
(2)	7424 (39.41%)	9727 (51.63%)	1616 (8.58%)	14 (0.07%)	57 (0.30%)
Highest (3)	9528 (50.49%)	8289 (43.92%)	998 (5.29%)	17 (0.09%)	40 (0.21%)
Total	23701 (41.93%)	28427 (50.29%)	4233 (7.49%)	37 (0.07%)	130 (0.23%)

TABLE IV. THE T-TEST ON THE DIFFERENCES IN RELATIONS BETWEEN ADJACENT RECOMMENDATION RATING.

<i>Recommendations</i>	<i>Difference</i>	<i>t-statistic</i>
Strong Buy vs Buy	0.267***	30.231
Buy vs Hold	0.085***	5.509

Note: *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively

Meanwhile, this paper also examines the effect of *Relations* on analysts’ stock recommendation and stock downgrades in Table 5. Column (1) shows the regression results of analysts’ stock recommendation on analyst-firm relations. Stock recommendation, *Recommendations*, ranges from 1 to 5 (specifically, 1 for “Strong Buy”, 2 for “Buy”, 3 for “Hold”, 4 for “Sell”, and 5 for “Strong Sell”). Control variables include MV (market value), MB (market-to-book ratio), Level (asset-liability ratio), ROA (return on asset), Star (star analysts), Exp (career experience), Gender (analysts’ gender) and Education (analysts’ education level). The negative coefficient of *Relations* verifies the conclusion that analysts with close analyst-firm relations issue more positive recommendation on their target firms. Column (2) examines the effect of analyst-firm relations on the change of stock recommendation, where *Downgrades* is a dummy variable coded as 1 if analysts’ last stock

recommendation involves a downward change from the previous recommendation in year t, else zero. The regression results of logit model suggest that analysts are less likely to downgrade the recommendation on the firms with good relations.

TABLE V. THE EMPIRICAL RESULTS OF ANALYST-FIRM RELATIONS.

<i>Variable</i>	(1) Recommendations	(2) Downgrades
<i>Relations</i>	-0.074*** (-30.276)	-0.426*** (-20.308)
<i>MV</i>	-0.026*** (-6.138)	-0.088*** (-3.749)
<i>MB</i>	0.251*** (8.686)	0.308** (2.198)
<i>Level</i>	-0.241*** (-9.540)	-0.334** (-2.138)
<i>ROA</i>	-1.295*** (-5.804)	-3.163*** (-3.030)
<i>Star</i>	-0.082*** (-14.954)	-0.327*** (-7.512)
<i>Exp</i>	0.013*** (12.379)	0.014* (1.810)
<i>Gender</i>	0.048***	0.086**

	(8.320)	(2.144)
<i>Education</i>	-0.050***	-0.116***
	(-8.854)	(-2.999)
<i>Constant</i>	2.685***	0.851*
	(34.618)	(1.695)
<i>Year</i>	control	control
<i>Industry</i>	control	control
<i>Observations</i>	56528	53413
<i>R-squared</i>	0.111	0.051

Note: *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Finally, the impact of the analyst-firm relations on analysts' forecasting performance is examined based on the model in Eq. (2) as follows:

$$Accuracy_{i,j,t} = \beta_0 + \beta_1 Relations_{i,j,t} + \beta_2 MV_{j,t} + \beta_3 MB_{j,t} + \beta_4 Level_{j,t} + \beta_5 ROA_{j,t} + \beta_6 Star_{i,t} + \beta_7 Exp_{i,t} + \beta_8 Gender_{i,t} + \beta_9 Education_{i,t} + \beta_{10} Year_{i,j,t} + \beta_{11} Industry_{j,t} + \epsilon_{i,j,t} \quad (2)$$

where *Accuracy* denotes relative forecasting accuracy, which is calculated as the relative difference between forecasted earnings per share (EPS) and actual EPS.

The regression result of the analyst-firm relations on earnings forecasting accuracy is shown in Column (1) of Table 6. The significantly positive coefficient of *Relations* confirms that close relations with firms improves analysts' earnings forecasting accuracy. To eliminate concerns of non-information-driven forecasting on empirical results, this paper designs the alternative variables *Accuracy_M* and *Accuracy_V*, the mean value and volatility of *Accuracy* corresponding to the same value of *Relations*. Columns (2) and (3) examine the relationship between *Relations* and *Accuracy_M* as well as *Accuracy_V*, which indicate that maintaining close relations with the target firm improves analysts' earning forecasting performance with less forecasting volatility and higher forecasting accuracy.

TABLE VI. THE EMPIRICAL RESULTS OF ANALYST-FIRM RELATIONS.

<i>Variables</i>	(1)	(2)	(3)
	<i>Accuracy</i>	<i>Accuracy_M</i>	<i>Accuracy_V</i>
<i>Relations</i>	0.094*** (70.330)	0.096*** (256.823)	-0.030*** (-163.207)
<i>MV</i>	0.017*** (12.261)	0.002*** (8.553)	-0.001*** (-10.406)
<i>MB</i>	-0.015* (-1.781)	0.000 (0.127)	0.001 (1.001)
<i>Level</i>	0.020* (1.763)	-0.003** (-2.023)	-0.001 (-1.242)
<i>ROA</i>	0.361*** (9.321)	0.026*** (6.230)	-0.015*** (-6.787)
<i>Star</i>	0.033*** (10.867)	0.007*** (15.758)	-0.003*** (-13.030)
<i>Exp</i>	0.004*** (6.957)	0.000* (1.779)	-0.000** (-2.110)
<i>Gender</i>	0.015*** (4.874)	0.001*** (2.914)	0.000 (0.194)
<i>Education</i>	-0.001 (-0.307)	-0.001 (-1.528)	0.000* (1.655)

<i>Constant</i>	0.198*** (5.962)	0.615*** (118.479)	0.336*** (125.785)
<i>Year</i>	control	control	control
<i>Industry</i>	control	control	control
<i>Observations</i>	56642	56642	56601
<i>R-squared</i>	0.097	0.810	0.665

Note: *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

4 CONCLUSION

The research on measuring analyst-firm relations has been plagued by the data availability of unobservable interaction between analysts and firms. To eliminate the concern above, this paper innovatively uses analysts' behavior to reverse engineer the analyst-firm relations by removing the mechanical component summarized by observable firm characteristics and analyst characteristics from the individual analyst coverage. This paper also verifies the rationality by investigating the reciprocity between analysts and firms, including analysts' more positive recommendation ratings on target firms and better earnings forecasting performance. Our paper proposes a novel approach to quantify analyst-firm relations, and contributes to the literature on the informativeness of analyst coverage and the reciprocity in close analyst-firm relations.

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