

# Quantification of Firm-Analyst Relationship: Evidence from China

Jianlei Hou<sup>1,2</sup>

<sup>1</sup>Postdoctoral Workstation of China Construction Bank, Beijing, China

<sup>2</sup>Postdoctoral Research Station of Renmin University of China, Beijing, China

Email: houjianlei0130@163.com

**How to cite this paper:** Hou, J. L. (2022). Quantification of Firm-Analyst Relationship: Evidence from China. *Open Journal of Business and Management*, 10, 1936-1951. <https://doi.org/10.4236/ojbm.2022.104100>

**Received:** June 29, 2022

**Accepted:** July 25, 2022

**Published:** July 28, 2022

Copyright © 2022 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

---

## Abstract

With a Chinese dataset of 166,689 research reports with 3014 stocks and 4510 analysts from 2007 to 2017, we quantify the firm-analyst relationship based on an informational characteristic-model of analyst coverage. Furtherly, we investigate the research rationality from the perspective of the reciprocity between analyst and listed firms by examining the impact of firm-analyst relationship on stock recommendation and earnings forecasting performance. Empirical results suggest that close relationship between analysts and firms' managers may prompt security analysts to render relatively positive rating for target listed firms, which may get more firm-specific information for improving analysts' earnings forecasting performance. Our paper provides an effective approach to quantifying the firm-analyst relationship, and contributes to the literature on the reciprocity between analysts and listed firms.

## Keywords

Firm-Analyst Relationship, Reciprocity, Stock Recommendation, Earnings Forecasting Performance, China

---

## 1. Introduction

Security analysts are accepted as the important external constituents of listed firms (Westphal & Clement, 2008; Chen et al., 2016). As the information intermediaries, security analysts collect, summarize and interpret public and private information of covered firms (Gilbert et al., 2006), and report stock recommendations (e.g., buy, hold and sell) to guide investment behavior. Considering the wide-ranging impact of stock recommendations on corporate market valuations and corporate strategies (Graham et al., 2005; Hansen, 2015), prior literatures on corporate governance find that listed firms' favors on analysts may prompt ana-

lysts to reciprocate by issuing relatively positive ratings and advise corporate managers to develop relationships with analysts (Wiersema & Zhang, 2011; Washburn & Bromiley, 2014; Brauer & Wiersema, 2018).

Similarly, analysts are also motivated to maintain good relationship with listed firms. Accumulating evidence shows that security analysts attach great importance to frequently and timely privately contact with corporate managers (Kuperman, 2003; Groysberg et al., 2011), which is perceived to enhance analysts' stature with the firms (Mayew, 2008). Close relationship with firms' managers has a positive effect on analysts' information environment and improves analysts' access to firm-specific information (Cohen et al., 2010). For example, firms' managers are confirmed to disclose important nonpublic information (e.g., advance warnings of earnings results) to securities analysts (Soltes, 2014). More access to firm-specific information means higher earnings forecasting accuracy, which is tied to analysts' compensation, reputation and career prospects (Hong et al., 2000; Hong & Kubik, 2003).

All the public and private interactions between analysts and corporate management should be considered as the best choice to measure the firm-analyst relationship comprehensively. Considering the private nature of the interaction between analysts and firms' managers, it is difficult to measure the firm-analyst relationship directly. Existing literature has generally tried to measure analysts' interactions with firms' managers based on a multi-item survey (Westphal & Clement, 2008) and observable conference data (Mayew & Venkatachalam, 2012; Green et al., 2014; Washburn & Bromiley, 2014). However, the subjective survey can not necessarily capture the firm-analyst relationship precisely and objectively. And inferring analysts' linkages with firms' managers from publicly observable conferences events leads to biased interpretations, for the reason that conferences account for only a fraction of the total amount of interactions between firms' managers and analysts (Soltes, 2014). Limited by the availability of data, it seems not feasible to directly and accurately measure the firm-analyst relationship.

Given the informativeness of analyst coverage proxies which reflects all observable and unobservable information between analysts and target firms (Asquith et al., 2005; Chen & Jiang, 2006; Lee & So, 2017), we try to separate the firm-analyst relationship 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 relationship between analysts and target firms' managers. Thus, we measure the firm-analyst relationship by eliminating the technical analysis information attributable to the firms' financial characteristics and analysts' characteristics from analyst coverage based on a characteristic-based model.

Further, we investigate the indicator rationality of firm-analyst relationship from the perspective of reciprocity between analysts and firms' managers with a

Chinese data set on analysts' earnings forecasting and stock recommendations from 2007 to 2017. Compared with the cultural orientation in the West, China is a typical relationship-oriented emerging market economy (Guo et al., 2018). The Chinese stock market provides an ideal environment to study the relations and reciprocity between analysts and listed firms' managers. More concretely, analysts may issue positive stock recommendations for closely related listed firms, boosting stock trading volume and future prospects. Besides, analysts also get access to the competitive firm-specific information from listed firms by close interaction, which improves analysts' earnings forecasting performance. Based on above discussion on reciprocity between analysts and firms, we examine the effect of firm-analyst relationship on analysts' stock recommendation and earnings forecasting accuracy. The empirical results suggest that analysts tend to issue a strong buy rating for closed related firms. Meanwhile, close firm-analyst relationship is also confirmed to be effective in decreasing the likelihood of downgrades on the stock recommendation. In addition, analysts who maintain intense interactions with target firms' managers have better earnings forecasting performance with less forecasting volatility and higher forecasting accuracy on the covered firms.

The main contributions of our paper are as follows. First, we propose a novel perspective to quantify the firm-analyst relationship based on an informational characteristic-model of analyst coverage. Prior literature generally measures the firm-analyst relationship through subjective survey (Westphal & Clement, 2008) or conference calls data (Soltes, 2014; Green et al., 2014; Washburn & Bromiley, 2014), which cannot capture all the interaction information between analysts and listed firms' managers. To address the above concern, we reversing engineer the firm-analyst relationship by separating the observable technical components attributable to firms' financial characteristics and analysts' characteristics from analyst coverage. Meanwhile, we also verify the rationality of our method based on empirical research on the reciprocity between analysts and firms' managers. Second, we contribute to the research that explores informativeness of analyst coverage. As an aggregate of analysts' information output, analyst coverage decisions have been proved to reveal valuable information (Hong et al., 2000; Tehrani et al., 2014; Lee & So, 2017). We develop the literature by reversing engineer the information of firm-analyst relationship based on individual analyst coverage. Thirdly, our paper adds directly to the growing literature that frequent interaction with listed firms' managers remains an important source of analysts' informational advantage.

The remainder of the paper is as follows. Section 2 describes the data and methodology. Section 3 reports the empirical results. Section 4 concludes.

## 2. Data and Methodology

### 2.1. Data

Considering that analyst coverage reflects the cumulative record of analysts' research reports across the forecasted fiscal periods, we select all the research re-

ports announced from January 1, 2007, to December 31, 2017 on all Chinese A-shares stocks listed on the Shanghai and Shenzhen Stock Exchange as the initial samples. All the original data of research reports and firm financial characteristics are obtained from China Stock Market and Accounting Research (CSMAR) database.

Then we process the research reports data based on the following principles: 1) We remove the research reports that analysts only make one earnings forecasting on the same stock in one year, which means possibly low or unsustainable attention on coverage stock; 2) Considering the lack of comparison between different analysts, we remove the research reports on those stocks that only one analyst follows in one year. 3) We also remove the research reports on stocks under suspension or termination or with missing financial data.

Finally, we obtain the sample of 166,689 research reports with 3014 stocks and 4510 analysts from 2007 to 2017.

## 2.2. Methodology

As analysts' information output and information resources in stock markets, research reports contain the observable and unobservable information between analysts and stocks (Asquith et al., 2005; Chen & Jiang, 2006; Lee & So, 2017). Further, we assume that analysts focus on the listed firms with frequent interaction, and divide the information of analyst coverage into technical components driven by observable characteristics and abnormal components driven by relationship between analysts and target firms. Based on this assumption, we reverse engineer the firm-analyst relationship by separating the observable technical components attributable to firm's financial characteristics and analysts' characteristics from analyst coverage proxies based on the following regressions:

$$\begin{aligned} Coverage_{i,j,t} = & \beta_0 + \beta_1 Size_{j,t} + \beta_2 Turnover_{j,t} + \beta_3 Return_{j,t} + \beta_4 VO_{j,t} \\ & + \beta_5 MB_{j,t} + \beta_6 Star_{i,t} + \beta_7 Exp_{i,t} + \beta_8 Gender_{i,t} + \beta_9 Degree_{i,t} \quad (1) \\ & + \beta_{10} Brokerage_{i,t} + \beta_{11} Year_{i,j,t} + \beta_{12} Industry_{j,t} + \varepsilon_{i,j,t} \end{aligned}$$

where  $Coverage_{i,j,t}$  denotes analyst coverage of analyst  $i$  for stock  $j$ , calculated as the natural logarithm of one plus the number of research reports published by analyst  $i$  on stock  $j$  in the year  $t$ . Considering that analysts from the same brokerage are heterogeneous and share information with each other, we further choose  $BroCoverage$ , analyst coverage of all analysts from the same brokerage firms on the same listed firms, as the alternative variable of  $Coverage$ , which eliminates concerns from the analyst style (i.e. some analysts might like to issue reports more often than others, just because of their own way of working) and the geographic proximity of the analyst to the firm (i.e. analysts are usually scattered in their headquarters in Beijing, Shanghai or Shenzhen).

Meanwhile, the firms' characteristics including  $Size$  (natural logarithm of market value),  $Turnover$  (share turnover),  $Return$  (cumulative market-adjusted return),  $VO$  (price volatility),  $MB$  (market-to-book ratio), and the analysts' cha-

racteristics including *Exp* (analysts' career experience), *Star* (dummy variable of star analysts), *Gender* (dummy variable of analysts' gender), *Degree* (dummy variable of analysts' education level), *Brokerage* (natural logarithm of the number of analysts employed by the same brokerage firm) are also considered as the control variables. In addition, the fixed effects of year and industry are considered in the regression. Detailed variable definitions are provided in **Table 1**.

The residual component of analyst coverage after removing technical analysis and analysts' characteristics Relations, calculated as the standard residuals of the Equation (1), is selected as the proxy of the relations between analysts and firms.

### 2.3. Data Description

The summary statistics of firms' characteristics and analysts' characteristics are provided in **Table 2**. Panel A shows the descriptive statistics of continuous variables. During the sample period from 2007 to 2017, the average analyst coverage of the 166,689 observations is 1.085 (corresponding to average 1.959 research reports issued by individual analyst per year). For the stock characteristics, the mean value of firm size (*Size*), share turnover (*Turnover*), cumulative market-adjusted return (*Return*), price volatility (*VO*) and market-to-book ratio (*MB*) are 23.720, 4.339, 0.097, 0.029 and 0.522, respectively. In terms of analyst characteristics, the analysts' average career experience is 3.414 years.

Panel B shows the descriptive statistics of dummy variables. Among the 166,689 observations, 37,356 (22.41%) research reports are issued by star analyst, with 129,333 (77.59%) research reports issued by non-star analysts. We are also concerned about the proportion of research reports issued by female analysts in the sample. There are 45,856 (27.51%) and 120,833 (72.49%) research reports issued by female analysts and male analysts, respectively. In view of the education level, analysts with a master's degree are the principal force in our sample. Specifically, 133,482 (80.08%) research reports issued by analysts with a master's degree, 15,312 (9.18%) for a bachelor's degree, 16,795 (10.08%) for a doctoral degree, and only 1100 (0.66%) for a junior college degree and below.

Panel C 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. That is, analysts are inclined to issue optimistic recommendations, which is consistent with the empirical findings of prior literature (Barber et al., 2001; Barber et al., 2006; Berkman & Yang, 2019).

## 3. Empirical Results

### 3.1. Main Results

Column (1) of **Table 3** reports the indicator construction of firm-analyst relationship based on Equation (1) using a panel data model with two-way fixed effects,

**Table 1.** Variable definitions.

Variable	Variable definitions
<i>Coverage</i>	the natural logarithm of one plus the number of research reports published by analyst <i>i</i> on firm <i>j</i> in year <i>t</i> .
<i>BroCoverage</i>	the alternative variable of <i>Coverage</i> , calculated as the natural logarithm of one plus the number of research reports published by analysts in the same brokerage firm who cover firm <i>j</i> in year <i>t</i> .
<i>Size</i>	the natural logarithm of market value, while market value = $\ln$ (the number of A-share * current close price of A share + the number of B-share * current close price of B share * current close exchange rate + total liabilities at the end of the period).
<i>Turnover</i>	the share turnover, calculated as the trading volume scaled by shares outstanding of stock <i>j</i> in year <i>t</i> .
<i>Return</i>	the firm's cumulative market-adjusted return of stock <i>j</i> in year <i>t</i> .
<i>VO</i>	the standard deviation of annual returns of stock <i>j</i> in year <i>t</i> .
<i>MB</i>	the market-to-book ratio, calculated as total assets divided by market value at the end of the period of stock <i>j</i> in year <i>t</i> .
<i>Exp</i>	analysts' career experience, calculated as the years between first forecast of analyst <i>i</i> and the last forecast in year <i>t</i> .
<i>Star</i>	a dummy variable that equals one if analyst <i>i</i> is selected as the best analyst by <i>The New Fortune Magazine</i> in year <i>t</i> , else zero.
<i>Gender</i>	a dummy variable of analysts' gender, which equals one if analyst <i>i</i> is female, else zero.
<i>Degree</i>	the education level of analyst <i>i</i> , junior college's degree and below for 1, bachelor's degree for 2, master's degree for 3, doctoral degree for 4.
<i>Brokerage</i>	the number of analysts employed by the brokerage firm which analyst <i>i</i> works for in year <i>t</i> .
<i>Year</i>	a dummy variable of years.
<i>Industry</i>	a dummy variable of industry factors, referring to SFC 2012 Edition Industry Classification.
<i>Relations</i>	the firm-analyst relationship, which is calculated as the standard residuals of regression by separating the observable technical components attributable to firm's financial characteristics and analysts' characteristics from analyst coverage proxies.
<i>BroRelations</i>	the alternative variable of <i>Relations</i> , which is corresponding to <i>BroCoverage</i> and measures the relations between analysts' brokerage firm and targeted firms.
<i>Recommendations</i>	the rating information of stock recommendations which ranges from 1 to 5, specifically, 1 for "Strong Buy", 2 for "Buy", 3 for "Hold", 4 for "Sell", and 5 for "Strong Sell".
<i>Downgrades</i>	a dummy variable of recommendations downgrades, which equals one if the last stock recommendation of analyst <i>i</i> in year <i>t</i> involved a downward change from the previous recommendation, else zero.
<i>Anal</i>	the analyst coverage, is calculated the natural logarithm of one plus the number of analysts who cover firm <i>j</i> in year <i>t</i> .
<i>Level</i>	the asset-liability ratio, calculated as total liabilities divided by total assets at the end of the period of stock <i>j</i> in year <i>t</i> .
<i>Volume</i>	the natural logarithm of the trading volume of stock <i>j</i> in year <i>t</i> .
<i>Indnum</i>	the natural logarithm of the number of firms in the industry of stock <i>j</i> .
<i>Stocknum</i>	the natural logarithm of stocks number covered by analyst <i>i</i> in year <i>t</i> .
<i>Brokerage</i>	the number of analysts employed by the brokerage firm which analyst <i>i</i> works for in year <i>t</i> .
<i>RFA</i>	the relative forecasting accuracy of analyst <i>i</i> on stock <i>j</i> in year <i>t</i> .
<i>RFA_Mean</i>	the mean value of <i>RFA</i> of analysts with the same value of <i>Relations</i> in year <i>t</i> .
<i>RFA_Volatility</i>	the volatility of <i>RFA</i> of analysts with the same value of <i>Relations</i> in year <i>t</i> .

**Table 2.** Descriptive statistics of firms' financial characteristics and analysts' characteristics.

Panel A. Continuous variables							
Variable	Mean	Std.Dev	Min	5%	50%	95%	Max
<i>Coverage</i>	1.085	0.450	0.693	0.693	1.099	1.946	3.850
<i>Size</i>	23.720	1.509	20.301	21.913	23.417	26.631	30.895
<i>Turnover</i>	4.339	3.814	0.000	0.380	3.342	11.720	42.562
<i>Return</i>	0.097	0.516	-1.679	-0.468	-0.003	0.979	14.604
<i>VO</i>	0.029	0.024	0.007	0.016	0.027	0.048	2.095
<i>MB</i>	0.522	0.264	0.011	0.159	0.479	0.996	4.565
<i>Exp</i>	3.414	2.581	0	0.400	2.775	8.605	15.213
<i>Brokerage</i>	6.379	0.858	0.000	4.796	6.485	7.498	7.766
<i>Stocknum</i>	3.031	0.830	0.000	1.609	3.091	4.331	5.394

  

Panel B. Dummy variables					
Variable	0	1	2	3	4
Star	129,333 (77.59%)	37,356 (22.41%)			
Gender	120,833 (72.49%)	45,856 (27.51%)			
Degree		1100 (0.66%)	15,312 (9.18%)	133,482 (80.08%)	16,795 (10.08%)

  

Panel C. Stock recommendations					
	Stock recommendations				
	1	2	3	4	5
NO.	65,036 (39.34%)	88,181 (53.34%)	11,690 (7.07%)	112 (0.07%)	300 (0.18%)

Panel A and Panel B show the descriptive statistics of continuous variables and dummy variables, respectively. Panel C illustrates the ratings information of stock recommendations during the sample period from 2007 to 2017.

**Table 3.** The empirical results of firm-analyst relationship.

Variable	(1)	(2)
	<i>Coverage</i>	<i>BroCoverage</i>
<i>Size</i>	0.053*** (49.071)	0.078*** (54.157)
<i>Turnover</i>	-0.005*** (-12.797)	-0.006*** (-11.823)
<i>Return</i>	0.020*** (8.208)	0.028*** (8.718)

## Continued

<i>VO</i>	-0.234*** (-4.649)	-0.379*** (-5.623)
<i>MB</i>	-0.141*** (-26.149)	-0.222*** (-30.810)
<i>Star</i>	0.094*** (34.871)	0.139*** (38.534)
<i>Exp</i>	0.015*** (34.872)	-0.012*** (-20.416)
<i>Gender</i>	0.005* (1.915)	0.016*** (5.056)
<i>Degree</i>	-0.001 (-0.361)	-0.012*** (-3.801)
<i>Brokerage</i>	0.075*** (54.004)	0.260*** (139.345)
Constant	-0.706*** (-22.831)	-1.991*** (-48.192)
Year	control	control
Industry	control	control
Observations	166,689	166,689
R-squared	0.081	0.203

**Table 3** reports the construction results of the relations between analysts and target firms, which is donated by the standard residuals. The t-statistics are reported in parentheses under the estimated coefficients. \*, \*\* and \*\*\* indicate statistical significance at the 10%, 5% and 1% levels, respectively.

which suggests that analyst coverage is significantly increasing in firms' size, firms' cumulative return, the title of star analysts, analysts' career experience, education level and the brokerage size, and decreasing in share turnover, price volatility, market-to-book ratio. Then, we get the proxy indicator of firm-analyst relationship *Relations*, which is denoted by the standard residuals of regression in Column (1).

Considering the information sharing among analysts from the same brokerage institutions, we choose the analyst coverage of all analysts from the same brokerage firms on the same target firms, *BroCoverage*, as the alternative variables of *Coverage*. Corresponding to *BroCoverage*, the standard residuals of regression in Column (2), *BroRelations*, is denoted as the alternative variable of *Relations*.

### 3.2. Firm-Analyst Relationship and Stock Recommendation

We shed further light on the rationality of our novel approach to measure the

firm-analyst relationship based on the intuitive literature experience of reciprocity between analysts and firms' managers. Analysts may reciprocate favors to closely related firms in order to reinforce the firms' generosity on competitive information and increase the likelihood of receiving more information in the future (Westphal & Clement, 2008). A close relationship may prompt analysts' positive stock recommendations, which has been found to be profitable toward target firms (Jegadeesh et al., 2004; Brauer & Wiersema, 2018). Then, we investigate the effect of firm-analyst relationship on stock recommendations.

**Table 4** presents the cross tabulation between firm-analyst relationship and stock recommendations. Firm-analyst relationship is divided into 3 quantiles in Panel A and 5 quantiles in Panel B for robustness. In Panel A, the lowest quantile (1) comprised the 1/3 lowest values, quantile (2) contained the next 1/3 values, and quantile (3) comprised the 1/3 highest values. **Table 4** shows that almost of all recommendations are neutral (11,690) or favorable (153,217). And the highest quantiles, quantile (3) in Panel A and quantile (5) in Panel B, has the highest proportion of "Strong Buy" rating (47.48%, 51.53%). That is, analysts with the highest quantiles of *Relations* are more likely to report recommendations with a "Strong Buy" rating than analysts with other quantiles of *Relations*.

**Table 5** reports the t-test results on the differences in *Relations* between adjacent recommendation ratings. Considering the fewer recommendation of "Strong Sell" and "Sell", we only report the t-test results of "Strong Buy vs. Buy" and "Buy vs. Hold". **Table 5** shows that the mean values of firm-analyst relationship for analysts who issue "Strong Buy", "Buy" and "Hold" recommendation ratings are 0.171, -0.098, and -0.146, respectively. And the results suggest that the *Relations* of analysts with more positive recommendation ratings on target firms is significantly higher than that of analysts with less positive recommendation ratings

Meanwhile, we also examine the effect of firm-analyst relationship on analysts' stock recommendation and stock downgrades in **Table 6**. Column (1) shows the results of analysts' stock recommendation on firm-analyst relationship. 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". And the significant negative coefficient of *Relations* (-0.069) verifies the conclusion that analysts with close firm-analyst relationship issue more positive recommendation ratings for their target listed firms.

Column (2) examines the effect of firm-analyst relationship on the change of stock recommendation, where *Downgrades* is a dummy variable coded as 1 if analyst's last stock recommendation in year  $t$  involved a downward change from the previous recommendation, else zero. The significant negative coefficient of *Downgrades* (-0.396) in Column (2) shows that analysts are less likely to downgrade the stock recommendation of firms with good firm-analyst relationship.

**Table 4.** Firm-analyst relationship and stock recommendation.

Panel A. 3 quantiles of <i>Relations</i>					
3 quantiles of <i>Relations</i>	Stock recommendations				
	Strong Buy	Buy	Hold	Sell	Strong Sell
Lowest (1)	20,030	31,218	3570	31	77
	(36.47%)	(56.84%)	(6.50%)	(0.06%)	(0.14%)
(2)	18,685	30,985	5107	39	138
	(34.00%)	(56.38%)	(9.29%)	(0.07%)	(0.25%)
Highest (3)	<b>26,321</b>	25,978	3013	42	85
	<b>(47.48%)</b>	(46.86%)	(5.43%)	(0.08%)	(0.15%)
Total	65,036	88,181	11,690	112	300
	(39.34%)	(53.34%)	(7.07%)	(0.07%)	(0.18%)

  

Panel B. 5 quantiles of <i>Relations</i>					
5 quantiles of <i>Relations</i>	Stock recommendations				
	Strong Buy	Buy	Hold	Sell	Strong Sell
Lowest (1)	12,513	18,698	1727	10	36
	(37.94%)	(56.69%)	(5.24%)	(0.03%)	(0.11%)
(2)	10,507	19,186	3073	27	76
	(31.97%)	(58.37%)	(9.35%)	(0.08%)	(0.23%)
(3)	11,465	18,371	3025	29	78
	(34.78%)	(55.72%)	(9.18%)	(0.09%)	(0.24%)
(4)	13,394	17,359	2362	24	64
	(40.34%)	(52.28%)	(7.11%)	(0.07%)	(0.19%)
Highest (5)	<b>17,157</b>	14,567	1503	22	46
	<b>(51.53%)</b>	(43.75%)	(4.51%)	(0.07%)	(0.14%)
Total	65,036	88,181	11,690	112	300
	(39.34%)	(53.34%)	(7.07%)	(0.07%)	(0.18%)

**Table 4** presents the cross tabulation between firm-analyst relationship and stock recommendation, where Panel A shows the 3 quantiles of *Relations* and Panel B shows the robustness results of 5 quantiles of *Relations*.

**Table 5.** The results of t-test on recommendation rating.

Recommendations	NO.	Mean	Difference	t-statistic	
Strong Buy	65,036	0.171	Strong Buy vs Buy	0.270***	51.821
Buy	88,181	-0.098	Buy vs Hold	0.048***	5.257
Hold	11,690	-0.146			

**Table 5** reports the t-test on the differences in *Relations* between adjacent recommendation rating. \*, \*\* and \*\*\* indicate statistical significance at the 10%, 5% and 1% levels, respectively.

**Table 6.** Empirical results of *Relations* on stock recommendation and recommendation change.

Variable	(1)	(2)
	<i>Recommendations</i>	<i>Downgrades</i>
<i>Relations</i>	-0.069*** (-49.593)	-0.396*** (-30.330)
<i>Anal</i>	-0.112*** (-39.326)	-0.216*** (-10.197)
<i>Size</i>	-0.018*** (-9.826)	-0.143*** (-10.015)
<i>MB</i>	0.217*** (24.636)	0.419*** (6.963)
<i>Level</i>	-0.118*** (-11.596)	0.002 (0.031)
<i>Volume</i>	0.011*** (5.409)	0.079*** (5.564)
<i>Indnum</i>	0.052*** (4.023)	0.084 (0.838)
<i>Star</i>	-0.089*** (-25.071)	-0.284*** (-9.742)
<i>Exp</i>	0.005*** (8.890)	0.005 (1.048)
<i>Gender</i>	0.053*** (16.006)	0.049** (1.963)
<i>Degree</i>	-0.030*** (-9.814)	-0.027 (-1.179)
<i>Stocknum</i>	0.021*** (10.779)	0.111*** (6.957)
<i>Brokerage</i>	-0.069*** (-49.593)	-0.166*** (-10.560)
Constant	2.308*** (40.473)	1.803 (1.508)
Year	control	control
Industry	control	control
Observations	165,319	128,582
R-squared/Pseudo R2	0.119	0.043

**Table 6** reports the effect of firm-analyst relationship on analysts' stock recommendation. 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". And *Downgrades* is a dummy variable that equals one if the last stock recommendation of analyst *i* in year *t* involved a downward change from the previous recommendation, else zero. The t-statistics are reported in parentheses below the estimated coefficients. \*, \*\* and \*\*\* indicate statistical significance at the 10%, 5% and 1% levels, respectively.

### 3.3. Firm-Analyst Relationship and Forecasting Performance

We further investigate the rationality of *Relations* by examining whether a good tie between analysts and firms generally leads to analysts' better forecasting performance. The simple measure of earnings forecasting accuracy, absolute forecasting accuracy, is calculated as the absolute difference between forecasted earnings per share (*EPS*) and the actual *EPS* based on the following model (Hong & Kubik, 2003):

$$AFA_{i,j,t} = \left| FEPS_{i,j,t} - AEPS_{j,t} \right| / AEPS_{j,t} \tag{2}$$

where *FEPS* denotes the forecasted *EPS*, *AEPS* denotes the actual *EPS*. Furthermore, we measure the relative forecasting accuracy *RFA* by scaling the absolute forecasting accuracy to be 1 for the most forecasting accuracy and 0 for the least forecasting accuracy, which mitigates stock characteristic effects on forecasting accuracy for the comparison between different stocks.

Next, we examine the impact of the firm-analyst relationship on analysts' forecasting accuracy following the estimated regression in Equation (3):

$$\begin{aligned} RFA_{i,j,t} = & \beta_0 + \beta_1 Relations_{i,j,t} + \beta_2 Anal_{j,t} + \beta_3 Size_{j,t} + \beta_4 MB_{j,t} \\ & + \beta_5 Level_{j,t} + \beta_6 Volume_{j,t} + \beta_7 Indnum_{j,t} + \beta_8 Star_{i,t} \\ & + \beta_9 Exp_{i,t} + \beta_{10} Gender_{i,t} + \beta_{11} Degree_{i,t} + \beta_{12} Stocknum_{i,t} \\ & + \beta_{13} Brokerage_{i,t} + \beta_{14} Year_{i,j,t} + \beta_{15} Industry_{j,t} + \varepsilon_{i,j,t} \end{aligned} \tag{3}$$

The regression results of the firm-analyst relationship on earnings forecasting accuracy are shown in Column (1) of **Table 7**. The significantly positive coefficient of *Relations* suggests close firm-analyst relationship improves analysts' earnings forecasting accuracy. Columns (4) reports the robustness results of *BroRelations* on forecasting accuracy.

To eliminate concerns of non-information-driven forecasting on results, we employ the *RFA\_Mean* and *RFA\_Volatility*, the mean value and volatility of relative earnings forecasting corresponding to the same value of *Relations* (Hou et al., 2018). Columns (2) and (3) examine the effect of *Relations* on *RFA\_Mean* as well as *RFA\_Volatility*. The results show that, for every 1% increase in the degree of *Relations* (*BroRelations*), analysts' earnings forecasting accuracy significantly increases by 0.059% (0.041%), which indicates that maintaining close firm-analyst relationship improves analysts' forecasting performance with less forecasting volatility and higher forecasting accuracy.

**Table 7.** Firm-analyst relationship and earnings forecasting accuracy.

Variable	(1)	(2)	(3)	(4)
	<i>RFA</i>	<i>RFA_Mean</i>	<i>RFA_Volatility</i>	<i>RFA</i>
<i>Relations</i>	0.059*** (74.430)	0.063*** (602.732)	-0.025*** (-565.951)	
<i>BroRelations</i>				0.041*** (48.963)

## Continued

<i>Anal</i>	0.059*** (32.668)	0.001*** (10.251)	-0.000*** (-9.591)	0.060*** (33.135)
<i>Size</i>	0.012*** (12.083)	0.001*** (12.141)	-0.001*** (-43.903)	0.012*** (12.250)
<i>MB</i>	-0.054*** (-11.157)	-0.000 (-1.619)	0.002*** (21.847)	-0.051*** (-10.501)
<i>Level</i>	-0.009 (-1.472)	-0.001*** (-3.324)	-0.000 (-0.428)	-0.011* (-1.925)
<i>Volume</i>	-0.007*** (-6.444)	-0.000*** (-7.324)	0.000*** (7.037)	-0.007*** (-6.991)
<i>Indnum</i>	0.007 (0.941)	-0.001* (-1.740)	0.000* (1.835)	0.003 (0.348)
<i>Star</i>	0.006*** (2.873)	0.001*** (13.073)	-0.002*** (-32.097)	0.004** (2.123)
<i>Exp</i>	-0.005*** (-14.079)	0.000*** (11.463)	-0.000*** (-33.984)	-0.005*** (-15.810)
<i>Gender</i>	0.009*** (4.679)	0.001*** (5.838)	-0.000*** (-3.798)	0.009*** (5.042)
<i>Degree</i>	0.004** (2.194)	-0.000 (-0.722)	0.000 (1.636)	0.004** (2.271)
<i>Stocknum</i>	0.010*** (8.635)	0.000*** (7.428)	-0.025*** (-565.951)	0.018*** (14.928)
<i>Brokerage</i>	0.009*** (8.093)	0.001*** (17.265)	-0.000*** (-9.591)	0.007*** (6.394)
Constant	0.234*** (7.479)	0.618*** (406.048)	0.369*** (513.313)	0.244*** (7.720)
Year	control	control	control	control
Industry	control	control	control	control
Observations	166,689	166,689	166,681	166,689
R-squared	0.057	0.937	0.917	0.042

**Table 7** reports the effect of firm-analyst relationship on analysts' earnings forecasting accuracy. The t-statistics are reported in parentheses below the estimated coefficients. \*, \*\* and \*\*\* indicate statistical significance at the 10%, 5% and 1% levels, respectively.

## 4. Conclusion

The research on measuring the firm-analyst relationship has been plagued by the data availability of unobservable interaction between securities analysts and listed firm. To eliminate the above concern, we innovatively use the analysts' behavior to reverse engineer the information of firm-analyst relationship by removing the mechanical component summarized by observable firm characteristics and analyst characteristics from the individual analyst coverage proxies.

We also investigate the rationality by investigating the reciprocity in a close relationship between analysts and firms. Specifically, analysts tend to issue strong buy ratings for closely related firms, and in return they obtain easy access to firm-specific information and produce better earnings forecasting. In addition, we examine the impact of firm-analyst relationship on stock recommendation and forecasting performance. The empirical results suggest that analysts with close firm-analyst relationship issue more positive recommendation ratings for their target firm. As a reward, analysts maintain easy access to firm-specific information, which improves information precision and leads to better earnings forecasting performance with less forecasting volatility and higher forecasting accuracy.

Our paper proposes a novel approach to quantifying the relationship between analysts and firms, which contributes to the literature on the informativeness of analyst coverage and the reciprocity in firm-analyst relationship. Undeniably, there are still some limitations in our paper as follows: First, it lacks sufficient support from the existing literature in terms of our method by using the analysts' behavior to reverse engineer the firm-analyst relationship. Second, limited by the availability of data, indirect methods to measuring the firm-analyst relationship have errors that are difficult to eliminate. Subsequent research can directly measure the firm-analyst relationship by obtaining unique data such as survey or private meeting between analysts and firms' managers.

## Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

## References

- Asquith, P., Mikhail, M. B., & Au, A. S. (2005). Information Content of Equity Analyst Reports. *Journal of Financial Economics*, *75*, 245-282. <https://doi.org/10.1016/j.jfineco.2004.01.002>
- Barber, B. M., Lehavy, R., McNichols, M., & Trueman, B. (2006). Buys, Holds, and Sells: The Distribution of Investment Banks' Stock Ratings and the Implications for the Profitability of Analysts' Recommendations. *Journal of Accounting and Economics*, *41*, 87-117. <https://doi.org/10.1016/j.jacceco.2005.10.001>
- Barber, B., Lehavy, R., McNichols, M., & Trueman, B. (2001). Can Investors Profit from the Prophets? Security Analyst Recommendations and Stock Returns. *The Journal of*

- Finance*, 56, 531-563. <https://doi.org/10.1111/0022-1082.00336>
- Berkman, H., & Yang, W. (2019). Country-Level Analyst Recommendations and International Stock Market Returns. *Journal of Banking & Finance*, 103, 1-17. <https://doi.org/10.1016/j.jbankfin.2019.03.018>
- Brauer, M., & Wiersema, M. (2018). Analyzing Analyst Research: A Review of Past Coverage and Recommendations for Future Research. *Journal of Management*, 44, 218-248. <https://doi.org/10.1177/0149206317734900>
- Chen, J., Cumming, D., Hou, W., & Lee, E. (2016). Does the External Monitoring Effect of Financial Analysts Deter Corporate Fraud in China? *Journal of Business Ethics*, 134, 727-742. <https://doi.org/10.1007/s10551-014-2393-3>
- Chen, Q., & Jiang, W. (2006). Analysts' Weighting of Private and Public Information. *The Review of Financial Studies*, 19, 319-355. <https://doi.org/10.1093/rfs/hhj007>
- Cohen, L., Frazzini, A., & Malloy, C. (2010). Sell-Side School Ties. *The Journal of Finance*, 65, 1409-1437. <https://doi.org/10.1111/j.1540-6261.2010.01574.x>
- Gilbert, A., Tourani-Rad, A., & Wisniewski, T. P. (2006). Do Insiders Crowd out Analysts? *Finance Research Letters*, 3, 40-48. <https://doi.org/10.1016/j.frl.2005.12.001>
- Graham, J. R., Harvey, C. R., & Rajgopal, S. (2005). The Economic Implications of Corporate Financial Reporting. *Journal of Accounting and Economics*, 40, 3-73. <https://doi.org/10.1016/j.jacceco.2005.01.002>
- Green, T. C., Jame, R., Markov, S., & Subasi, M. (2014). Access to Management and the Informativeness of Analyst Research. *Journal of Financial Economics*, 114, 239-255. <https://doi.org/10.1016/j.jfineco.2014.07.003>
- Groysberg, B., Healy, P. M., & Maber, D. A. (2011). What Drives Sell-Side Analyst Compensation at High-Status Investment Banks? *Journal of Accounting Research*, 49, 969-1000. <https://doi.org/10.1111/j.1475-679X.2011.00417.x>
- Guo, Y., Rammal, H. G., Benson, J., Zhu, Y., & Dowling, P. J. (2018). Interpersonal Relations in China: Expatriates' Perspective on the Development and Use of Guanxi. *International Business Review*, 27, 455-464. <https://doi.org/10.1016/j.ibusrev.2017.09.012>
- Hansen, R. S. (2015). What Is the Value of Sell-Side Analysts? Evidence from Coverage Changes—A Discussion. *Journal of Accounting and Economics*, 60, 58-64. <https://doi.org/10.1016/j.jacceco.2015.08.005>
- Hong, H., & Kubik, J. D. (2003). Analyzing the Analysts: Career Concerns and Biased Earnings Forecasts. *The Journal of Finance*, 58, 313-351. <https://doi.org/10.1111/1540-6261.00526>
- Hong, H., Lim, T., & Stein, J. C. (2000). Bad News Travels Slowly: Size, Analyst Coverage, and the Profitability of Momentum Strategies. *The Journal of Finance*, 55, 265-295. <https://doi.org/10.1111/0022-1082.00206>
- Hou, J., Zhao, S., & Yang, H. (2018). Security Analysts' Earnings Forecasting Performance Based on Information Transmission Network. *Physica A: Statistical Mechanics and Its Applications*, 509, 611-619. <https://doi.org/10.1016/j.physa.2018.06.093>
- Jegadeesh, N., Kim, J., Krische, S. D., & Lee, C. M. (2004). Analyzing the Analysts: When Do Recommendations Add Value? *The Journal of Finance*, 59, 1083-1124. <https://doi.org/10.1111/j.1540-6261.2004.00657.x>
- Kuperman, J. C. (2003). Using Cognitive Schema Theory in the Development of Public Relations Strategy: Exploring the Case of Firms and Financial Analysts Following Acquisition Announcements. *Journal of Public Relations Research*, 15, 117-150. [https://doi.org/10.1207/S1532754XJPRR1502\\_2](https://doi.org/10.1207/S1532754XJPRR1502_2)

- Lee, C. M., & So, E. C. (2017). Uncovering Expected Returns: Information in Analyst Coverage Proxies. *Journal of Financial Economics*, *124*, 331-348. <https://doi.org/10.1016/j.jfineco.2017.01.007>
- Mayew, W. J. (2008). Evidence of Management Discrimination among Analysts during Earnings Conference Calls. *Journal of Accounting Research*, *46*, 627-659. <https://doi.org/10.1111/j.1475-679X.2008.00285.x>
- Mayew, W. J., & Venkatachalam, M. (2012). The Power of Voice: Managerial Affective States and Future Firm Performance. *The Journal of Finance*, *67*, 1-43. <https://doi.org/10.1111/j.1540-6261.2011.01705.x>
- Soltes, E. (2014). Private Interaction between Firm Management and Sell-Side Analysts. *Journal of Accounting Research*, *52*, 245-272. <https://doi.org/10.1111/1475-679X.12037>
- Tehrani, H., Zhao, M., & Zhu, J. L. (2014). Can Analysts Analyze Mergers? *Management Science*, *60*, 959-979. <https://doi.org/10.1287/mnsc.2013.1796>
- Washburn, M., & Bromiley, P. (2014). Managers and Analysts: An Examination of Mutual Influence. *Academy of Management Journal*, *57*, 849-868. <https://doi.org/10.5465/amj.2011.0420>
- Westphal, J. D., & Clement, M. B. (2008). Sociopolitical Dynamics in Relations between Top Managers and Security Analysts: Favor Rendering, Reciprocity, and Analyst Stock Recommendations. *Academy of Management Journal*, *51*, 873-897. <https://doi.org/10.5465/amj.2008.34789647>
- Wiersema, M. F., & Zhang, Y. (2011). CEO Dismissal: The Role of Investment Analysts. *Strategic Management Journal*, *32*, 1161-1182. <https://doi.org/10.1002/smj.932>