



# Institutional ownership and analysts' earnings forecasts

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## ABSTRACT

This paper selects the data of China's A-share market from 2011 to 2022 to explore the impact of institutional shareholding on analysts' earnings forecasts. The findings indicate the following: institutional shareholding enhances analysts' earnings forecast accuracy and reduces analysts' forecast optimism bias; institutions with small geodesic pits will be more helpful for analysts to improve the quality of earnings forecasts; and institutional shareholding improves the quality of analysts' earnings forecasts by promoting the quality of firms' information disclosure.

## 1. Introduction

The main content in a research report centers on a target listed company or target industry segment by researching and analyzing its history, current development status, and possible future direction, as well as issuing certain rating opinions and forecast data. Research reports communicate analysts' findings to investors and serve as a reference for their investment decisions (Kaldoński et al., 2020). Analysts are essential to the process of information delivery in both mature and emerging capital markets. For example, in 2019, two leading brokerage firms, CITIC and Huatai, issued bearish reports on two listed companies, which caused sharp fluctuations in the market and declines in the stocks of several companies, including the two companies covered in the analyst reports. This vital feedback from the capital market also confirms the critical reference value that sell-side analysts' investment opinions and forecast indicators provide to the overall market (Bonsall et al., 2020).

In practice, although analysts' earnings forecasts are relatively rational based on their professional knowledge and information sources, they inevitably deviate from the actual data (Kong et al., 2021). Past research shows that analysts tend to be optimistic in their earnings forecasts for both subjective and objective reasons, with a certain degree of optimism bias (Fink, 2021). Despite this, market participants evidently reference analysts' earnings forecasts when making their investment decisions. Thus, tremendous value could be gained from exploring the factors and mechanisms influencing those forecasts, especially to understand their forecasting behavior and accuracy.

As with sell-side analysts, institutional investors are essential participants in capital markets, and their investment behavior significantly affects market volatility and investor expectations (Li, 2020). In the stock market, making the right investment decisions requires professional judgment, so it is difficult for retail investors to achieve sustained profitability (Yu et al., 2020). The advantages enjoyed by institutional investors, such as professional reserves, long-term experience, and substantial information-acquisition ability, make their participation in the capital markets more consequential and critical (Jung et al., 2019).

Based on this, this paper selects data for China's A-share market from 2011 to 2022 to explore the impact of institutional shareholding on analysts' earnings forecasts. The findings indicate that institutional shareholding enhances the accuracy of earnings

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forecasts by analysts and reduces the optimism bias in their forecasts. In addition, institutions with small ground pits are more helpful in improving the quality of analysts' earnings forecasts. Moreover, institutional shareholding appears to improve the quality of analysts' earnings forecasts by promoting quality in corporate disclosure.

At this stage, the research related to institutional shareholding and analysts' earnings forecasts has mainly focused on all institutional investors or a specific institutional body, such as securities investment funds or Qualified Foreign Institutional Investor (QFIIs). This paper not only analyzes from the perspective of institutions as a whole but also classifies them as resistant or sensitive according to the impact on investors' decision-making, supplementing the research related to the economic consequences of institutional shareholding.

## 2. Theoretical analysis and research hypotheses

First, based on the "monitoring effect," institutions' external monitoring role gives them influence over analysts' earnings forecasts. Institutions may have principal-agent relationships with analysts and refer to analysts' opinions and ratings when making decisions. Institutions are substantial shareholders of companies, and their influence and transaction sizes are more significant than those of individual investors (Garel et al., 2021). Therefore, the quality of the information in analysts' research reports has a greater effect on the trading judgment, efficiency, and consequences of institutional investors, who are more motivated to assess analysts' earnings forecasts so they can use the information in analyst reports to make more rational judgments and optimize investment decisions (Ong et al., 2020). In addition, institutional investors have scale effects and multiple ways to increase their familiarity with the development status of participating companies, especially concerning company investments in R&D projects. Institutional investor tools include field surveys, sell-side road shows, and research reports, which form the basis for their effective monitoring of analysts' forecasting behavior (Cheng et al., 2019). Therefore, compared with individual investors, institutions are more inclined to actively supervise analysts' earnings forecasting behavior.

Second, based on the "reputation mechanism," the voice of institutions over analysts' rankings determines the basis of analysts' intrinsic constraints on forecasting behavior. In the short term, analysts may make optimistic forecasts and create favorable situations to please institutional investors. However, in the long term, this kind of whitewashing behavior will lead not only to an increase in the bias of their earnings forecasts but also to a decrease in their credibility, as well as affecting their professional reputation (Lee et al., 2020). For sell-side analysts, professional reputation affects the number and quality of clients they can serve, thus affecting their income and long-term career development. Therefore, after comparing potential long- and short-term games, rational analysts will choose the long-term benefits, maintain their reputation, and improve the accuracy of their earnings forecasts (Goh et al., 2020). As for analysts' optimism bias in earnings forecasts, institutional ownership can similarly have an impact from two perspectives. From the standpoint of external monitoring, the institutional monitoring of analysts, as mentioned above, can reduce analysts' overoptimistic tendencies. Similarly, analysts' considerations of personal reputation and career development lead them to monitor themselves, which also has the effect of reducing their optimism bias (Call et al., 2021).

Based on the foregoing, this paper proposes the following hypotheses:

**H1.** *The greater the institutional ownership, the higher the accuracy of analysts' earnings forecasts.*

**H2.** *The larger the institutional ownership, the smaller the optimism bias of analysts' earnings forecasts.*

In the real market, the impact of different types of institutional investors on the accuracy of analysts' earnings forecasts may vary based on differences in investment behavior, such as reference basis, holding size, and risk tolerance (El Diry et al., 2020). For example, funds are subject to supervision by regulators, such as the government and the market itself. Their fund managers use a unified management approach with a degree of managerial professionalism (Kim et al., 2019). Independence is substantial, subject to performance pressure, and inclined toward long-term investment; social security funds, although potentially affected by a certain degree of administrative intervention, are large in scale, have a strict regulatory system, and do not have business dealings with listed companies (Babar et al., 2021). Conversely, the QFIIs introduced into China's stock market are subject to more conditions and limitations by relevant authorities, with profitability as the primary objective for these otherwise independent entities (Huynh et al., 2020). Departments of securities companies operate various businesses—for example, investment banking and securities brokerage businesses and SSE will have various connections, are used for investment activities by their self-owned departments, have a relatively small scale of funds, and are easily affected by listed companies as business partners. In addition, the existence of finance companies usually relies on the existence of a large group of companies and may be affected by listed companies during the investment process, which may interfere with the group's investment decisions (Kong et al., 2020). After analyzing institutional heterogeneity, this paper divides institutions according to the presence or absence of business affiliation, i.e., resistance and sensitivity. Securities investment funds, QFIIs, and social security funds are categorized as resistant institutions due to their relative independence in investment decision-making, as well as their greater focus on corporate governance and long-term development, while the rest of the institutions, such as brokerage firms, insurance companies, and trusts, may be more concerned with short-term operations due to the involvement of other interests. They are thus categorized as sensitive institutions (Loncan, 2020).

Based on the foregoing, this paper proposes the following hypotheses:

**H3.** *Resistant institutions' holdings have a more significant effect on analysts' earnings forecast accuracy than sensitive institutions' holdings.*

**H4.** *Resistant institutions' holdings play a more significant role in reducing optimism bias in analysts' earnings forecasts than sensitive*

*institutions' holdings.*

Concerning the impact of disclosure quality on analysts' earnings forecasts, first, high-quality disclosure by listed firms includes a broad range of operational information that plays a role in alleviating information asymmetry, enhances the transparency of firms, and provides analysts with richer information for making earnings forecasts (Sangiorgi et al., 2021). Second, because high-quality disclosure can provide more detailed information, analysts can identify it by comparing it with standard disclosures by listed companies and can use it to confirm details that are not explicitly disclosed in standard disclosures, which in turn deepens analysts' use and understanding of full disclosure. Finally, in terms of predicting optimism bias, high-quality disclosure allows analysts to be more objective in their analysis and reduces their tendency to be overly optimistic (Griffin et al., 2020). In summary, it is hypothesized that the higher the quality of disclosure by listed companies, the higher the forecast accuracy, which will reduce forecast optimism bias. In terms of the impact of institutional shareholding on corporate disclosure quality, the literature review and research hypotheses mention that information asymmetry and principal agents are important reasons for analysts' biased earnings forecasts. However, institutional investors can supervise the improvement of disclosure quality, which will in turn alleviate these two problems.

Based on the foregoing, this paper proposes the following hypothesis:

**H5.** *Improved disclosure quality can increase analysts' earnings forecast accuracy and reduce analysts' earnings forecast optimism bias, while institutional ownership can enhance disclosure quality.*

### 3. Study design

#### 3.1. Sample selection

This paper selects the data of all A-share listed companies from 2011 to 2022 as the original sample and processes it as follows: (1) financial listed companies are excluded; (2) ST and ST\* listed companies are excluded; (3) companies with missing data samples are excluded; and (4) the upper and lower 1% of the continuous variables are shrunk. Finally, 21,837 data points are obtained, mainly from the CSMAR and Wind databases.

#### 3.2. Definition of variables

##### 3.2.1. Dependent variable

Analyst earnings forecasts (*Analyst*): This paper uses analyst earnings forecast accuracy (*Analyst\_A*) and earnings forecast optimism bias (*Analyst\_O*).

Analyst earnings forecast accuracy (*Analyst\_A*) is measured by the difference between the earnings per share forecast of analyst *j* tracking listed company *i* and actual earnings per share in period *t*. The absolute value of the lag is obtained and then divided by actual earnings per share of listed company *i* in period *t*.

Analyst earnings forecast optimism bias (*Analyst\_O*) uses the difference between the FEPS of the EPS forecast of analyst *j* tracking listed company *i* in period *t* and the actual value of EPS, divided by the closing price of the stock on the trading day before the date of the analyst's forecast.

##### 3.2.2. Independent variables

Proportion of institutional shareholders (*PIS*): This paper adopts the proportion of the total number of shares held by all institutional investors to the total shares of the listed company. In addition, taking into account the heterogeneity that exists among

**Table 1**  
Variable definitions.

Type	Name	Symbol	Definition
Dependent variable	Analyst earnings forecast accuracy	<i>Analyst_A</i>	Difference between analysts' EPS forecast FEPS and EPS actual EPS
	Analysts' earnings forecasts optimism biased	<i>Analyst_O</i>	Measuring optimism bias in analysts' forecasts
Independent variable	Proportion of institutional holders	<i>PIS</i>	Shareholding of institutional holders
	Resistant institutional holdings	<i>PIS_R</i>	The sum of the shareholdings of securities investment funds, social security funds, and QFIIs
	Sensitive institutional holdings	<i>PIS_S</i>	Sum of shareholdings of institutional investors other than securities investment funds, social security funds, and QFIIs
Control variable	Company size	<i>Size</i>	Ln (total assets at the end of the period)
	Gearing	<i>Lev</i>	Total liabilities at end of period / total assets at end of period
	Company age	<i>Age</i>	Last year – Year of incorporation + 1
	Net profit margin on total assets	<i>Roa</i>	Net profit after tax / total assets at the end of the period
	Capital expenditure	<i>Cap</i>	Expenditures incurred to acquire long-term assets / total assets at end of period
	Shareholding ratio of top ten shareholders	<i>Top10</i>	Shareholding ratio of top ten shareholders
	Net working capital	<i>Nwc</i>	(Working capital – money funds – short-term investments) / total assets at end of period
	Tobin's Q	<i>Tq</i>	Market value of total assets / book value of total assets

institutional investors, including the differences that exist in various aspects such as the reference basis for investment decisions, the source of funds, and the motivation to invest, institutions are further categorized into resistant institutional shareholding (*PIS\_R*) and sensitive institutional shareholding (*PIS\_S*) according to whether they have a commercial relationship with the reference company. The leading investor of the fund is the fund manager, who has an agency relationship with the source of funds and whose remuneration system is directly linked to the fund's returns, so it is more independent and more motivated to put investment interests first. The social security fund is centralized by the government, even though administrative interventions may have a certain degree of impact on its operation. Resistant institutions include securities investment funds, QFIIs, and social security funds, while sensitive institutions are other types of institutional investors such as brokerage firms, insurance companies, and trust companies.

### 3.2.3. Control variables

In this paper, firm size (*Size*), gearing ratio (*Lev*), firm age (*Age*), net profit margin on total assets (*Roa*), capital expenditures (*Cap*), the shareholding ratio of the top ten shareholders (*Top10*), net working capital (*Nwc*), and Tobin's Q value (*Tq*) are selected as control variables. In addition, the paper controls for industry effect (*Ind*) and year effect (*Year*).

See Table 1 for the definitions of specific variables.

### 3.3. Model construction

To test hypotheses H1 and H2, the following model is constructed:

$$Analyst_{i,t} = \beta_0 + \beta_1 PIS_{i,t} + \beta Control_{i,t} + \sum Ind + \sum Year + \varepsilon_{i,t} \quad (1)$$

To test hypotheses H3 and H4, the following model is constructed:

$$Analyst_{i,t} = \beta_0 + \beta_1 PIS\_R_{i,t} + \beta Control_{i,t} + \sum Ind + \sum Year + \varepsilon_{i,t} \quad (2)$$

$$Analyst_{i,t} = \beta_0 + \beta_1 PIS\_S_{i,t} + \beta Control_{i,t} + \sum Ind + \sum Year + \varepsilon_{i,t} \quad (3)$$

## 4. Empirical analysis

### 4.1. Descriptive statistical analysis

The descriptive statistical analysis is shown in Table 2. The minimum value of *Analyst\_A* is 0.046, the maximum value reaches 33.827, and the standard deviation is 4.895, which indicates that the ideal degree of the prediction result is not the same due to a change in the company's operating condition or a difference in analysts' abilities. The minimum value of *Analyst\_O* is -0.053, and the maximum value reaches 0.216, which shows that a pessimistic deviation given by analysts will be relatively more promoted. The maximum value of *PIS* is 0.915, with a maximum of 91.5 % institutional investors and a minimum of only 0.3 %. The mean value of *PIS\_R*, 0.053, is much smaller than that of *PIS\_S*, 0.416, which suggests that the proportion of sensitive institutional investors is higher, as it includes a more significant number of institutional types.

### 4.2. Main test regression results

Table 3 presents the results of the regression between institutional shareholdings and the quality of analysts' earnings forecasts. The results show that *PIS* is significantly negatively correlated with *Analyst\_A* at the 1 % level—the higher the proportion of institutions among the firm's participating shareholders, the smaller the value of analysts' earnings forecast accuracy and the higher the degree of accuracy; *PIS* is significantly negatively correlated with *Analyst\_O* at the 1 % level—the higher the ratio of institutional shareholdings

**Table 2**  
Descriptive statistical analysis.

	N	Mean	Std	Min	Max
<i>Analyst_A</i>	21,837	2.439	4.895	0.046	33.827
<i>Analyst_O</i>	21,837	0.036	0.041	-0.053	0.216
<i>PIS</i>	21,837	0.437	0.263	0.003	0.915
<i>PIS_R</i>	21,837	0.053	0.067	0.003	1.895
<i>PIS_S</i>	21,837	0.416	0.273	0	0.983
<i>Size</i>	21,837	21.317	1.134	18.975	25.903
<i>Lev</i>	21,837	0.447	0.198	0.053	0.886
<i>Age</i>	21,837	18.285	5.763	3.000	56.000
<i>Roa</i>	21,837	0.053	0.039	-0.147	0.216
<i>Cap</i>	21,837	0.059	0.063	0.000	0.286
<i>Top10</i>	21,837	0.617	0.153	0.275	0.915
<i>Nwc</i>	21,837	0.031	0.227	-0.548	0.664
<i>Tq</i>	21,837	2.086	1.213	1.127	6.695

**Table 3**  
Results of main regression test (1).

	Analyst_A	Analyst_O
PIS	-2.173*** (-6.75)	-0.089*** (-13.28)
Size	-0.536*** (-5.06)	0.003*** (3.23)
Lev	2.192*** (7.76)	0.075*** (9.93)
Age	-0.217** (-2.20)	0.001 (1.36)
Roa	-10.283*** (-14.96)	-0.085*** (-15.38)
Cap	0.057*** (3.66)	0.049** (2.19)
Top10	-0.006 (-0.07)	-0.003 (-0.95)
Nwc	-1.089*** (-6.74)	-1.364*** (-5.63)
Tq	0.045 (0.73)	0.039* (1.69)
Ind	Yes	Yes
Year	Yes	Yes
Cons	9.937*** (7.95)	-0.023 (-1.15)
N	21,837	21,837
Adj.R <sup>2</sup>	0.173	0.225

among the firm's participating shareholders, the lower the optimism bias in analysts' earnings forecasts, which suppresses analysts' excessive optimism. Hypotheses H1 and H2 are confirmed.

Next, the relationship between heterogeneous institutional holdings and analysts' earnings forecasts is analyzed, with the results shown in Table 4. In addition, to verify possible differences in the impact of heterogeneous institutions on analysts' earnings forecasts, this paper uses the SUR model to perform a SUEST test on the difference in the coefficients of the shareholdings of resistant and sensitive institutions. The result indicates that *PIS\_R*, *PIS\_S*, and *Analyst\_A* are significantly correlated at the 1 % level and that an increase in the shareholding ratio of both can improve the accuracy of analysts' earnings forecasts. However, the coefficients are

**Table 4**  
Results of main regression test (2).

	Analyst_A (1)	Analyst_A (2)	Analyst_O (3)	Analyst_O (4)
PIS_R	-8.273*** (-11.95)		-0.076*** (-13.89)	
PIS_S		-0.895*** (-4.07)		-0.023*** (-9.95)
Size	-0.519*** (-5.57)	-0.447*** (-6.69)	0.001 (1.32)	0.001*** (3.35)
Lev	1.836*** (6.35)	2.075*** (6.05)	0.023*** (7.76)	0.016*** (9.95)
Age	-0.329*** (-3.65)	-0.215*** (-3.07)	-0.000 (-1.15)	0.000 (0.63)
Roa	-10.328*** (-14.36)	-8.938*** (-17.55)	-0.075*** (-16.53)	-0.083*** (-19.37)
Cap	0.043* (1.69)	0.125** (2.21)	0.315*** (3.23)	0.367** (2.19)
Top10	-1.327*** (-3.96)	-0.556 (-1.15)	-0.023*** (-7.73)	-0.006* (-1.89)
Nwc	0.047* (1.71)	0.036* (1.69)	0.053*** (3.77)	0.086*** (4.45)
Tq	0.033* (1.69)	0.146** (2.21)	0.369*** (4.25)	0.316*** (4.49)
Ind	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Cons	11.273*** (10.75)	10.964*** (9.96)	0.025 (1.67)	-0.007 (-0.83)
N	21,837	21,837	21,837	21,837
Adj.R <sup>2</sup>	0.107	0.095	0.126	0.118
SUEST-P	0.000		0.000	

significantly different, and the p-value of the difference is 0.000, which is significantly different between the two, indicating that an increase in the shareholding ratio of resistant institutions contributes more significantly to improvements in analysts' earnings forecasting accuracy. *PIS\_R* and *PIS\_S* are significantly correlated to *Analyst\_O* at the 1 % level. However, the coefficients are significantly different between the two, which suggests that increased ownership by resistant institutions causes a more pronounced reduction in optimism bias in analysts' earnings forecasts. Hypotheses H3 and H4 are confirmed. Resistant institutions often focus more on long-term value investing than short-term market volatility. They typically conduct in-depth fundamental analyses of companies to find undervalued stocks. This investment strategy is usually more closely related to company fundamentals. As a result, the holdings of resistant institutions are more likely to improve the accuracy of analysts' earnings forecasts. In contrast, sensitive institutions are more likely to be affected by market sentiment and short-term volatility, so their boost to analysts' earnings forecast accuracy may be limited.

#### 4.3. Mechanism testing

Institutional ownership can effectively improve analysts' forecast accuracy and reduce optimism bias, but there is still room to explore the inner mechanism of its impact. This paper analyzes two aspects, disclosure quality (*Degree*) and earnings management quality (*DA*). The specific results are shown in Table 5. The institutional ownership of shares improves the overall quality of disclosure and reduces analysts' earnings forecast optimism bias. The quality of disclosure is the mediator variable of institutional ownership of shares and analysts' forecast optimism bias. Institutional ownership of shares improves the quality of earnings information and is the mechanism by which analysts' earnings forecast optimism bias is reduced.

#### 4.4. Endogeneity

The source of endogeneity may have two-way causality, where institutional holdings promote analyst forecast accuracy, and the more accurate the analysts' forecasts, the greater the company's value for institutional investment references and the less uncertainty about investment returns, thus attracting more institutional references. This situation leads to a more complex endogeneity that may have a greater impact on the results. To mitigate the endogeneity, this paper chooses "institutional holdings lagged two periods" to construct the instrumental variable (*PIS\_IV*). Institutional holdings lagged by two periods theoretically have less impact on analysts' earnings forecasts in the current period. However, they are more related to institutional holdings lagged by one period, which is a suitable instrumental variable. The 2SLS is then used to identify the causal relationship between institutional holdings and analysts' surplus forecasts. The regression results are shown in Table 6, and the results are unchanged, indicating that the findings of this paper are robust.

**Table 5**  
Mechanism testing.

	Degree (1)	Analyst_A (2)	Analyst_O (3)	DA (4)	Analyst_A (5)	Analyst_O (6)
<i>PIS</i>	0.275*** (5.06)	-1.416*** (-5.73)	-0.027*** (-9.97)	-0.016** (-2.35)	-1.307*** (-6.67)	-0.027*** (-13.26)
<i>Degree</i>		-0.953*** (-9.95)	-0.005*** (-13.67)			
<i>DA</i>					3.293*** (4.96)	0.025*** (5.57)
<i>Size</i>	0.115*** (9.95)	-0.363*** (-4.03)	0.003*** (3.69)	0.017*** (4.36)	-0.426*** (-6.57)	0.003*** (3.37)
<i>Lev</i>	-0.517*** (-9.93)	1.669*** (5.59)	0.027*** (6.09)	-0.043*** (-6.05)	3.165*** (5.59)	0.027*** (7.75)
<i>Age</i>	-0.047*** (-3.37)	-0.225*** (-3.37)	0.000 (0.97)	-0.016*** (-3.99)	-0.159** (-2.15)	0.001 (1.53)
<i>Roa</i>	1.095*** (12.63)	-9.086*** (-11.64)	-0.075*** (-15.73)	0.337*** (16.29)	-9.956*** (-16.63)	-0.093*** (-11.65)
<i>Cap</i>	1.173** (2.29)	0.359*** (5.96)	0.407*** (4.75)	1.385*** (3.47)	0.375** (2.26)	0.518*** (3.37)
<i>Top10</i>	0.115 (1.47)	0.057 (0.23)	-0.003 (-0.79)	-0.019* (-1.83)	0.056 (0.06)	-0.003 (-0.89)
<i>Nwc</i>	1.053* (1.74)	0.236** (2.29)	0.153*** (3.89)	1.073*** (3.71)	0.302*** (5.53)	0.259*** (4.47)
<i>Tq</i>	1.045* (1.78)	0.216** (2.23)	0.493*** (3.56)	1.476*** (4.23)	0.327*** (3.95)	0.295*** (3.36)
<i>Cons</i>	1.183*** (6.63)	10.372*** (9.95)	-0.003 (-0.36)	-0.057** (-2.25)	11.382*** (7.79)	-0.015 (-1.16)
<i>N</i>	21,837	21,837	21,837	21,837	21,837	21,837
<i>Adj.R<sup>2</sup></i>	0.175	0.103	0.141	0.225	0.107	0.136
<i>Sobel-Z</i>		-7.08***	-6.23***		-2.26**	2.53**

**Table 6**  
Endogeneity test.

	Phase I	Phase II	
	PIS_IV	Analyst_A	Analyst_O
<i>PIS</i>	0.053*** (8.95)		
<i>PIS_IV</i>		-1.275*** (-2.83)	-0.026*** (-8.79)
<i>Controls</i>	Yes	Yes	Yes
<i>Ind</i>	Yes	Yes	Yes
<i>Year</i>	Yes	Yes	Yes
<i>N</i>	19,827	21,837	21,837
<i>Adj.R<sup>2</sup></i>		0.216	0.195
<i>Cragg–Donald Wald F test:</i>		32,832.95	

## 5. Conclusion

This paper selects the data of China's A-share market from 2011 to 2022 to explore the impact of institutional shareholding on analysts' earnings forecasts. It finds that institutional shareholding enhances analysts' earnings forecast accuracy and reduces analysts' forecast optimism bias. Institutions with small ground pits will be more helpful in improving the quality of analysts' earnings forecasts. In addition, institutional shareholding improves the quality of analysts' earnings forecasts by promoting the quality of corporate disclosure.

Analysts play an essential role in promoting the smooth flow of market information. However, because securities firms have many departments, it is difficult for analysts' research departments to achieve complete objectivity and independence. Instead, they may become a stepping-stone for other departments to conduct their business so that analysts' public reports not only are not conducive to the communication of information but also mislead investors and lead them to make wrong decisions. Therefore, the regulator can formulate rules for the internal business departments of brokerage firms to realize the independence of their business development and reduce the possibility of analysts being forced by the rest of the departments to make nonobjective predictions. Analysts should also have professional ethics, stick to the bottom line, and contribute to developing the capital markets.

## CRedit authorship contribution statement

**Wenjun Liu:** Conceptualization, Formal analysis, Funding acquisition, Investigation, Project administration, Resources, Software, Validation. **Aoyun Chen:** Data curation, Formal analysis, Funding acquisition, Supervision, Validation, Visualization.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Data availability

The authors do not have permission to share data.

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