



Security analysts' earnings forecasting performance based on information transmission network

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HIGHLIGHTS

- We construct an information transmission network using analysts' research reports.
- Visual diagram shows the change of analysts' network position from 2008 to 2016.
- The degree distribution of the networks obeys right skew power-law distribution.
- We assess the information connection stability based on May–Wigner stability theorem.
- Analysts with a more central network position have a better forecasting performance.

ARTICLE INFO

Article history:

Received 15 December 2017

Received in revised form 22 March 2018

Available online xxx

Keywords:

Network analysis

Research reports

Information connection

Earnings forecasting performance

ABSTRACT

Security analysts' research reports are important information resources in financial markets. To investigate the relationship between information connection among analysts and earnings forecasting performance, we construct an information transmission network based on all research reports issued on stocks of Shanghai Stock Exchange and Shenzhen Stock Exchange from 2008 to 2016. Visual network figure presents the change of analysts' network position during the sample period. Moreover, information connection stability is defined to assess network stability, which is negatively correlated with stock market volatility. Empirical results show that analysts with a more central position in the network will get better earnings forecasting performance with less forecasting volatility and higher forecasting accuracy.

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1. Introduction

Earnings forecasting, released in research reports, has been shown to move stock prices and impact investment decisions [1–3]. Furthermore, earnings forecasting performance mainly relies on both analysts' forecasting behavior and information precision [4]. For the latter, as information intermediaries in stock markets [5–8], security analysts pay close attention to research reports issued on the same coverage stocks, which promotes information transmission among analysts and weaves a unique information network based on research reports. Whether and how this information transmission network affects analysts' earnings forecasting performance? To investigate this issue, we capture information transmission among analysts from the perspective of social network, and examine the relationship between analysts' information connection and earnings forecasting performance.

Social network analysis has been widely used in financial markets, such as venture capital industry [9–11], industrial structure [12], global value chains [13] and stock markets [14–16], which provides a figurative and visual approach to

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Table 1

Descriptive statistics of analysts' research reports data.

Year	Valid analysts	Valid research reports	Reports per analyst
2008	1063	16903	15.90
2009	1190	17041	14.32
2010	1387	25048	18.06
2011	1180	29303	24.83
2012	1427	38387	26.90
2013	1640	45946	28.02
2014	1517	48994	32.30
2015	1342	43541	32.44
2016	1370	55004	40.15

understand what the financial problem is and how it evolves. The key point of social network analysis is how to determine network connections. Especially in this paper, although there are many information communication forms among analysts, it is hard to objectively quantify the process and channel of information transmission. Luckily, as analysts' information output and important information resources in stock markets [17,18], research reports provide suitable evidence to measure the information link among analysts. Therefore, it is reasonable to regard research reports on the same coverage stocks as a special information connection among analysts to construct the network.

In this paper, we select research reports on all stocks of Shanghai Stock Exchange and Shenzhen Stock Exchange from January 1, 2008 to December 31, 2016, and construct information transmission network based on analysts' connection of research reports issued on the same coverage stocks. A visual network figure is provided to generally describe analysts' network position, which shows that analysts' network centrality raises gradually with growing network connectivity from 2008 to 2016. After constructing the network, we discuss network characteristics in degree distribution and network stability in detail. Right skew power-law distribution, consistent with literature experience of most real networks, well reflects the situation of analysts' network position. In addition, a global network indicator, information connection stability, is designed to capture the whole network stability of information exchange based on May–Wigner stability theorem. Finally, we empirically examine the impacts of analysts' network centrality on earnings forecasting performance. The regression results address that analysts with a more central position will have less forecasting volatility and higher forecasting accuracy.

Our study contributes to the literatures as follows. First, we construct analysts' information transmission network and quantify the process and channel of information transmission among security analysts from a novel perspective. There are many common communication forms among analysts, such as private communication and public meeting, hardly measured with inaccessible data. Research reports on the same coverage stocks are alternative and realistic data evidence to describe information transmission among security analysts. Second, we enrich academic research on earnings forecasting performance from analysts' information status and confirm previous conclusions that information precision determines earnings forecasting performance. Specifically, dominant position in analysts' information transmission network will improve forecasting performance.

The paper is organized as follows: Section 2 describes the data and sample; Section 3 introduces the construction of security analysts' information transmission network; Section 4 generates security analysts' information transmission network and analyzes network characteristics. And Section 5 concludes the paper.

2. Data and sample

We collect research reports on all stocks of Shanghai Stock Exchange and Shenzhen Stock Exchange from China Stock Market & Accounting Research (CSMAR) database. All research reports are announced from January 1, 2008, to December 31, 2016, covering *China Stock Bubble of 2008* and *China Stock Market Disaster of 2015*. Missing or error data is checked by manual reading of original research reports from Great Wisdom Database. We define three principles to select valid research reports for network construction as follows.

First, we remove research reports that analysts only make one earnings forecasting on the same stock in one year. With the constant release of information, security analysts may update and revise earnings forecasting based on newly acquired information. Only one earnings forecasting in one year means possibly low or unsustainable attention on coverage stock, barely strong enough to support the establishment of network connection.

Second, we remove research reports on stocks that only one analyst follows in one year. If no analysts else pay close attention to research reports issued on ignored stocks, those research reports will not transmit information to other analysts. That is, no network connection is constructed based on the research reports above.

Third, we remove research reports on stocks under suspension or termination. For example, if Stock A is suspended for listing from June 15, 2015 to September 11, 2015, then all research reports issued on Stock A in 2015 are not considered in the sample for information discontinuities.

Finally we get 320167 valid research reports published by 4802 security analysts during sample period. As shown in Table 1, the amount of valid research reports experiences a continuous and rapid growth from 2008 to 2016 with a sharp drop in 2015. Changes in the number of valid analysts reflect analysts' response to changes in the stock market. The steep rise

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