News media coverage and market efficiency research based on Fredholm integral equation algorithm

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Abstract: Due to the lack of perfect management, the difference in media literacy between users and enterprises, entertainment to death, rampant consumer culture and many other factors, the network media reports are chaotic. For example, some websites intentionally exaggerate the elements of news in the production of content, resulting in 'fake news', 'click bait', spreading junk news, and using the power of media to carryout 'media trial' and so on. In addition, some companies publish local advertisements through news media reports to attract users, and the line between information, news and advertising is completely confused. Therefore, we should build a set of news ethics matching it. Based on Fredholm integral equation algorithm, it is gradually combined with UGC (user content production) and OGC (brand content production), replacing the one-way and multi-direction media communication mode to promote the improvement of news media reporting and market efficiency.

Keywords: Fredholm integral equation; news media reports; market efficiency.

Biographical notes: An Shi studied at Fujian Normal University in 2003 and obtained his Master's degree in 2006. Since graduation in 2006, he has been working at Fujian Business University and has published more than ten papers on news communication in journals. His main research fields are communication studies, new media, brand planning, etc.

1 Introduction

In China, research on concepts related to the behaviour of the media began in 2008. Guo-ping he first on the press 'non-standard' made a general definition, namely: 'news media' means in the absence of clear violation of existing laws and regulations, in its own subjective or intentional manner, goes against the industry rule and the work of professional ethics and communication, so that to laid a solid basis for the later research. Then, some researchers divided the professionalisation of the media into the professionalisation of the news media and the professionalisation of the media, and defined them. For example, Mr. Wu Yixian believes that the lack of professional ethics in

media refers to the fact that media workers are unable to fulfil their national or social responsibilities due to violations of ethics and standards in the process of news dissemination. Media ethics is a behaviour that produces negative effects between society and its audience (Xia et al., 2016; Gong, 2021; Li and Ma, 2018; Zhdanov et al., 2011).

The China Internet Network Information Centre (CNNIC) published the 44th Statistic Provide on the Growth of the internet in China, which states that as of June 2018, there were 686.1 million web page visits, or exactly 80.3% of all visits. At present, the audience of news on the mobile internet has reached 660 million, accounting for 78% of all mobile internet users. With the development of network technology, the traditional media such as TV, newspaper and radio has become a new form of news media, which has completely changed the traditional single channel from 'media' to 'audience', thus creating a more complex and diversified new way of information dissemination. At present, the traditional news has changed from 'old' to 'new'. It can effectively improve the production efficiency of the newspaper, increase the output of the newspaper, increase the form of expression of the newspaper, broaden the way of communication of the newspaper, so that the information dissemination of the newspaper presents a new type of media reporting mode supported by internet technology. Network media, we media, individual or organisation micro-blog, WeChat public account, etc. have become a new way out of network news dissemination. The original sole PGC (production of specialised content), users, and enterprises with the change of the mode of transmission and achieve the change their roles, they are in every communication plays a 'pass' and 'recipients' role, they get in the spread of the network more say, they parted ways with the media, alternating with each other, They are constantly producing a large number of news and information, plundering the audience's eyeballs, causing a certain impact on the traditional information transmission.

However, dozens of experts based on 'ethics' have applied Emile Durkheim's moral ethics theory and empirical analysis, combined with Kurd Lewin's ideas and Bourdieu's knowledge of 'field', The 'ethics of internet public opinion', 'technical ethics', 'humanistic ethics', 'moral norms of traditional media' and the ethical differences between 'internet' and other issues were sorted out. This paper further interprets the new meaning of moral corruption in network media. He pointed out that in the 'post-truth' era, the power of the internet has broken the limits of news dissemination, and the media properties of the internet have brought new moral conundrum to it. In addition, from the point of view of The Times, some people point out the reconstruction of the role, behaviour and role of the audience in the process of media transformation, so as to reveal the lack of moral characteristics in the new media environment (Molabahrami, 2013; Hesameddini et al., 2017; Huyck et al., 2005; Chen et al., 2014; Chi et al., 2020).

Under the 'Fredholm integral equation algorithm', the related studies show a high degree of convergence. Most scholars believe that the ethical misconduct of internet news media refers to the destruction of individual or group's ethical concepts and behavioural norms on the internet. Professor Li Shenzhen of Beijing University of Posts and Telecommunications made a detailed review of his own work, combined the ethics of online media with social responsibility, and reconstructed the related ethical issues with the term 'social responsibility'.

In addition, the past literature mostly examined its overall effect on Fredholm integral equation algorithm from a macro perspective, but lacked in-depth and detailed discussion. In fact, from the perspective of the actor (media), the scope of information disclosure is very wide, including business and performance, illegal punishment,

reorganisation and merger, etc. Which news has the greatest volatility on the stock market? At the subject (company) level, there are differences in the characteristics of enterprises, especially in different industrial fields, which enterprises are most likely to be affected by information? From the perspective of managers, some managers have a large interaction with the external media, while some managers pay more attention to the operation of the enterprise. Therefore, what about the role of managers in the media? This is an issue that needs to be considered and discussed in depth. In this paper, the role of media in Fredholm integral equation algorithmic trading is analysed in detail from different perspectives, such as agents, recipients and operators (Liu and Zhang, 2019; Jiang et al., 2016; Chen et al., 2014, 2011; Fan, 2020).

2   Research method

The study of the similarities and differences between the Hosoya polynomial technique (HPM) and the Haar wavelet method (HWM) for the numerical solution of Fredholm integral equations is presented in this research. For the purpose of determining performance, demonstrative cases are put through false analysis. The integral equations of Abel0 are solved using a numerical approach which is developed and published here. The foundation of this strategy is to use Hermite bandwidth approximations. Abel 0 is minimised by using the Hermite bandwidth approach. The answer is obtained by combining the equation involving algebra. To demonstrate its validity, effectiveness and usefulness, several examples are presented as illustrations. The proposed techniques are when compared to alternative ways of doing things; algorithms provide a higher level of accuracy. The study investment performance and media news at the company level. Advertising industry reduces low investment but increases high investment. The media amplifies the low investment in companies with knowledge asymmetry and inefficient corporate governance. Media popularity increases the CEO's over confidence and over-investment. The results show that news related to investments and non-investments reduce under investment.

The study proposed a HWM for calculating the nonlinear and linear simultaneous-Volterra integrated equation (SIVIE) fuelled by fractional Brownian motion (FBM) with hazard parameter. The Haar wavelet basis (HWB) functional matrix and the stochastic functional matrix are used to solve the linear and nonlinear system of algebraic equations related to the material under consideration. Method integration and error estimation are also detailed. Several numerical examples demonstrate the applicability and effectiveness of the method. The study presented to Glenshaw-Curtis rule for the highly oscillating Fredholm integral-differential equation (FIDE) with Cauchy moderate weak similarities. With a single integral, anun detected interpolated polynomial-valued function is expressed as a Taylor series expansion. A system of FIDE linear equations with equal spacing points is solved to determine the unknown function. Error estimation and numerical examples show that proposed method is very accurate (Shiralashetti et al., 2019; Mundewadi and Kumbinarasaiah, 2019; Gao et al., 2021; Wen and Huang, 2021; SAIRA and Ma, 2022).

2.1 Application of Fredholm integral equation algorithm in news media reports

From the perspective of the web site of the internet financial news release (as shown in Table 1), news release quantity more than the most website is sine finance and economics (share), the second is the flush of finance and economics (share), once again is chic online (share), and then the chicken (ratio) of finance and economics, Oriental wealth is again in the future, in turn, mesh, NetEase finance, Hexane, soju net, in addition to these sites, other 28 financial website news release quantity of all the news, please refer to Table 1.

Table 1   Statistics on the number of internet financial news of listed companies based on Fredholm integral equation algorithm

The total number of Xianzhi	Shanghai	Shenzhen	The two cities
Number of listed companies	476,346	671,206	1,147,552
Average number of public company news	941	1,612	2,553
Average number of new gates per day	506.21	417.38	449.49
Average daily number of new locks for listed companies	435.02	612.97	1,047.99

Judging from the number of online financial information issued (see Table 1), the number of latest news in Shenzhen market is 671,206, while that of Shanghai market is 476,346. The amount of news in Shenzhen market is more than that of Shanghai market, because there are 1,612 Shenzhen markets and 941 extra Shanghai markets. Generally speaking, the companies in Shenzhen stock market have more news than those in Shanghai Stock market during the survey period, because the company's deep learning technology has a strong ability to transmit information, and CNN has a very good performance in image processing, which can better grasp the connection between words and sentences' are usually constructed by several convolutions and a pool, Each convolution layer has multiple different convolution kernels which are the row dimension of the convolution kernel and the row dimension of the convolution kernel (i.e., 200). The convolution kernel slides down in step 1 and the convolution operation is performed when each text vector is passed to produce a new feature value. The calculation is as shown in the formula:

$$c_i = f\left(w \cdot W_{i:i+h} + b\right) \tag{1}$$

where is the word sequence of length is the weight parameter of the convolution kernel matrix, is the bias term, and the operator (.) Is the convolution calculation, is the activation function. $W_{i:i+h}h(W_i, W_{i+1}, \ldots, W_{i+h})$, $wb(b \in R)f$. A convolution kernel processes the text matrix to obtain a feature map that is the number of words in the text (i.e., 831); $c = (c_1, c_2, \ldots, c_{n-h+1})$, n secondly, the pooling layer, which uses max-pooling to perform maximum pooling operation on the feature map, realises the re-extraction of key information in the feature map, and realises the re-constraint of model parameters ($\hat{c} = \max\{c\}$). The input of the fully connected layer is the feature output of the pooling layer, and the input is the type of convolution kernels and the number of each convolution kernels $v = \left(\hat{c}_{1,1}, \ldots, \hat{c}_{1,q}, \hat{c}_{2,1}, \ldots, \hat{c}_{2,q}, \ldots, \hat{c}_{p,q}\right)$, pp. Finally, the output layer, which uses the soft max function to determine the category, outputs the probability of the news to be each of the seven categories.

2.2　Fredholm integral equation algorithm promotes market efficiency of news media

Based on the Fredholm integral equation algorithm, the length of the market efficiency is taken as the value of the convolutional kernel matrix weighting, as a bias value, and the operator is a convolution operation, which is an effective function. The eigenvalue of the number of characters (831) in a character can be obtained by the literal matrix operation of one convolution check. Secondly, for the pooling layer, the max-pooling method is used to process the maximum value of the feature map, so as to re-extract the important data in the feature map and re-restrict the parameters of the model. Then, the model is fully connected. The input of all connected layers is the characteristics of a unit, and the input of each unit is the type of a convolution unit. Finally, in the output layer, the software mapping function is used to classify and judge the message, and the possibility of each of the seven categories is analysed.

In order to verify the market's ability to recognise financial news, we must evaluate the Fredholm integral equation algorithm based on its classification to ensure its reliability and validity, so as to ensure its credibility in a large number of final labelled data in the later stage. At present, the commonly used model evaluation indicators are precision, precision, F1 score (F-score), which are calculated using fuzzy matrix (fuzzy matrix for two-class problems), which evaluates the efficiency of the classification machine according to the comparison between the actual sampled values and the model forecast values. The diagonal line represents the number of instances assigned to each class. In a multi-classification problem, its chaotic array can also be viewed as a confusion matrix for a two-class problem. For example, considering it as the manager level of the company and the senior management of the company, three different evaluation criteria can be obtained:

$$\text{Recall}(P) = \frac{TP}{TP + FP} \tag{2}$$

$$\text{Precision}(R) = \frac{TP}{TP + FN} \tag{3}$$

$$\text{F1 value}(F) = \frac{2TP}{2TP + FP + FN} \tag{4}$$

In Fredholm integral equation algorithms, two consecutive academic papers by Tatlock are considered pioneering results in this industry. In this paper, we selected the news materials of Wall Street daily newspapers for 20 years, and used the method of emotion vocabulary to quantitatively quantify the impact of negative media emotions for the first time. In the Financial Weekly magazine Financial Economics, Calami's and Majeska published a report showing that in 51 different national markets for Fredholm integral equation algorithms, It is possible to predict the direction of development of Fredholm integral equation algorithms in a country. In addition, there have also been considerable achievements in computer and management. For example, Cai et al. (2023) published an article that used professional terms to quantify the basic information of news, and used support vector regression model (SVR) to effectively grasp the effect of 20 minutes on the volatility of Fredholm integral equation algorithm. Huang and Lin (2021) show in their paper that this method can effectively solve the overall impact of various market

factors in various time intervals on the price of Fredholm integral equation algorithm. According to a survey published by Li and Yu (2003), unexpected events in a company can cause investors to have different perceptions of the valuation of the company, which in turn can lead to the volatility of the price of Fredholm integral equation algorithm.

3 Analysis of results

3.1 Fredholm integral equation algorithm has an important impact on the news media

According to the analysis of the influence of different information on Fredholm integral equation algorithm, there is no special method for automatic topic classification in China. However, this paper will still sort out and summarise the published related literature to ensure the rigor and completeness of this paper. In particular, in China, there is only one comparative analysis on the impact of five types of network information on the performance of Fredholm integral equation algorithm. This paper argues that, the influence of five types of information, including policy support, merger and acquisition, refinancing, profitability and illegal behaviour, on the stock market is different in terms of direction, intensity and duration of influence. Other literatures mainly discuss the impact of certain types of news on Fredholm integral equation algorithm. There was insider trading in the Fredholm integral equation algorithm market before this information was released. The results showed that news of environmental pollution and fines had a significant negative impact on Fredholm integral equation algorithms. Liu (2023) studied the relevance of environmental, social responsibility, and corporate management news to the Fredholm integral equation algorithm market and showed that negative ESG firms would decrease by 0.1%, while positive ESG firms would receive little benefit.

3.2 Study of market efficiency growth of Fredholm integral equation algorithms

Based on Quantitative Methodology of Financial Information Sentiment (2007) and Quantitative Methodology of Financial Information Sentiment (2008 edition of Financial Times), this paper uses CFSD, two Chinese professional sentiment words specifically for the financial industry, to conduct the analysis. Firstly, for each listed company, all the news on the same day were merged and regarded as one news. Secondly, each news was segmented and stop words were removed. Thirdly, each news was matched with CFSD to obtain the frequency of positive sentiment words, negative sentiment words and the number of all words in the news on the day. Then, according to the method of Tetlock et al. (2008), the news with less than 50 words or less than five emotional words were eliminated. Finally, positive sentiment indicators, negative sentiment indicators and sentiment divergence indicators in the news of the first day of Fredholm integral equation algorithm were obtained by using and certain calculation methods $P_{i,t}$, $N_{i,t}$, $T_{i,t}$, $itpos_{i,t}$, $neg_{i,t}$, $div_{i,t}$. The specific calculation process is as follows:

$$Neg_{i,t} = \frac{N_{i,t}}{T_{i,t}}, \ Pog \ g_i = \frac{P_{i,t}}{T_{i,t}}$$

$$neg_{i,t} = \frac{Neg_{i,t} - \mu Neg_i}{\sigma Neg_i}, \ pog_{i,t} = \frac{Pos_{i,t} - \mu Pos_i}{\sigma Pos_i} \tag{5}$$

$$div_{i,t} = \log \frac{1 + p_{i,t}}{1 + N_{i,t}}$$

where and represent the proportion of positive sentiment words and negative sentiment words in the news of the first day of Fredholm integral equation algorithm in the total number of words $Neg_{i,t}$, Pog_i, $it\mu N$, Neg_i and refer to the average value of the sum of the episodes in the last calendar year; μPos_i, $iNeg_i$, Pos_i, σNeg_i and are the standard deviations of the Fredholm integral equation algorithm and in the previous calendar year, respectively σPos_i, $iNeg_i$, Pos_i.

In the first trading day, and represent the proportion of positive and negative sentiment words; and is the average of the neutralisation stocks in the previous year; And is the benchmark deviation of the neutralisation stock price in the previous year.

The above quantitative method is used to quantify the daily news sentiment of each company. It combines all the news of the same company on the same day, and then measures the daily news sentiment index of the company in a quantitative way. Similarly, for the news of the same subject, the same company of the same type and the same subject will be merged to carry out the sentiment analysis.

3.3   Promotion of news media coverage by Fredholm integral equation algorithm

Differences between the facilitating assets of the Fredholm integral equation algorithm for news media coverage in different situations. Investors allocate assets based on future expectations, that is, possible allocations, and then set a desired index, which ultimately determines the weight of each asset. Assume that the investor's initial capital is, and the expectation is, and assume that the investor's return level is only related to the value level of his capital. In order to maximise the expected return of the investor, our decision procedure is:

$Var(r_p)$ is the variance of the portfolio, is the variance of the asset, and is the covariance of the asset to the asset $Var(r_i)iCov(r_i, r_j)ij$. The investor's allocation of assets is based on the expectation of the future, that is, the probability distribution of, and then the expected target is set. Finally, the weight of each asset in the portfolio is determined $r_1, r_2, \ldots, r_n, w_1, w_2, \ldots, w_n$. It is assumed that the initial asset of the investor is and the expected goal is. At the same time, it is assumed that the utility level of the investor is only related to the asset level, and is $W_0(1 + r_p)U(r_p)$. From the perspective of maximising the investor's expected utility, the decision-making process is as follows.

$$\begin{cases} \max\limits_{wi} E\left[U\left(W_0 r_p\right)\right] \\ \text{s.t.} \sum\limits_{i=1}^{n} w_i = 1 \end{cases} \tag{6}$$

The above equation can be simplified as follows.

$$\begin{cases} \max_{wi} E\left[U\left(r_p\right)\right] \\ \text{s.t. } \sum_{i=1}^{n} w_i = 1 \end{cases} \tag{7}$$

After Taylor expansion of the equation, it can be found that if it follows a normal distribution, the investor's expected utility completely depends on the mean and variance of the portfolio return rate $r_1, r_2, \ldots, r_n$. Assuming that the investor utility function is a concave function, the decision problem is as follows.

$$\begin{cases} \lim_{w_i}^{Var} Var\left(r_p\right) \\ \text{s.t. } \sum_{i=1}^{n} w_i = 1, \overline{r_p} = \sum_{i=1}^{n} w_i E\left(r_p\right) \end{cases} \tag{8}$$

The CAPM model assumes that all investors invest according to Markowitz's portfolio theory. Its main purpose is to find the return and the amount of risk in the portfolio, that is, to cover the risk caused by a larger part of the investor. This particular expression is as follows:

$$E(r_i) = R_f + \beta_i \left[E(R_m) - R_f\right] \tag{9}$$

where is the expected rate of return on the asset, is the rate of return on the risk-free asset with constant value, is the expected rate of return on the market portfolio, is the sensitivity of the asset to market risk, and is the return on the market risk premium. $E(r_i) i R_f E(R_m) \beta_i i \beta_i = \text{Cov}(R_i, R_m)/\text{Var}(R_m)$, $\beta_i[E(R_m) - R_f]$ CAPM points out that this refers to the expected rate of return of an asset, it is a return on investment without danger, it is a fixed value, one is the expected return of a portfolio, one is a very sensitive return on investment risk of a market, one is the rate of return on investment of a market. According to CAPM, the expected return rate of a single portfolio is divided into two categories: one is the interest without risk, the other is the price of risk; the real return of market risk is determined by the size of the asset. The larger the size, the higher the systemic risk (portfolio) it bears and the less the reward it gets. If there is no return, the non-systematic risk can be reduced or eliminated through diversification.

4   Conclusions

The information and transmission rate of news media are getting faster and faster. Network media has become the main way for investors to obtain information, and it is also a new 'risk source', which has a huge impact on the stability of the stock market. This paper mainly analyses the media influence in Fredholm integral equation algorithm trading in China from the perspective of big data. In order to collect massive news materials, this paper uses a self-developed distributed web search tool to analyse more than 1.1 million news items from 36 major financial portals in China during 2015–2017, and uses advanced automatic recognition technology to classify and quantify the news titles. Therefore, the traditional financial measurement model can be studied from three different perspectives (participants, recipients and operators).In view of the various complex dynamic changes in the current trading of Fredholm integral equation algorithm in China, based on this, this paper proposes a statistical model based on the whole

continuous rather than a single one to analyse the composite information in the stock market. Based on the above empirical analysis, this paper proposes policy recommendations, governance schemes and policy recommendations for market regulators, company managers and investors of Fredholm integral equation algorithm in China.

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