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Financial Fraud in China Concept Stock: Identification, Reasons, and Solutions

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Abstract: In recent years, with the fraud of Luckin Coffee, the financial fraud of China concept stock has become the focus of attention again. In this regard, This work first analyzed the characteristics and causes of financial fraud, and then tried to use M and F scores to test the data collected, to see whether M and F scores could warn people before fraud. After that, reflecting on our research, this work pointed out some characteristics and reasons of financial fraud in China concept stock, and finally gave some solutions to financial fraud.

Keywords: fraud, detection, M score, F score, Chinese concept stock

1. Introduction

Fraud refers to intentionally deceptive action designed to provide the perpetrator with an unlawful gain or to deny a right to a victim. Types of fraud include tax fraud, credit card fraud, wire fraud, securities fraud, and bankruptcy fraud. Fraudulent activity can be carried out by one individual, multiple individuals or a business firm as a whole [1].

There are three main reasons why fraud occurs. First is information asymmetry between the company's investors and management. It comes from the separation of the company's ownership and management. The separation of ownership and operation of a modern company can lead to significant information asymmetry between the company's investors and management. Information asymmetry is one of the causal factors in financial fraud. Second is information asymmetry inside and outside the company. It comes from trade secrets and industry particularity. Information about the company cannot be disclosed because of trade secrets and industry-specific factors, leading to information asymmetries within and outside the company and giving managers the opportunity to commit financial fraud. And the third is the imperfection of the supervision system. Serious deficiencies in the regulatory regime could damage the independence of accountants' audits and lead to insufficient control over the rights of company management to prepare financial statements, thus giving managers the ability to make fraud [2].

There are three main motivations for managers to commit financial fraud. First is the different financial goals between managers and stockholders. When financial objectives differ between managers and shareholders, The managers may defend their own interests at the expense of

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shareholders' interests. The second component is covering up a bad financial situation. The company does not have enough management capacity to create a larger profit margin, but the managers want more profit than they can get at the moment. And the last component is an asymmetry between the costs and benefits of financial fraud. Due to the imperfection of the supervision system, managers are easy to manipulate financial fraud, and outsiders are difficult to check the cost-benefit asymmetry of managers' fraud [2]. In addition, the information asymmetry between cost and benefit will bring huge economic benefits to managers, thus making managers have the motivation of fraud. The relationship between fraud and disclosure is that disclosure is used to disclose information to reduce fraud [3]. But problems can also arise when disclosures are actively falsified and there is a lack of external oversight and review.

The purpose of this study is to see if detecting fraud in advance and to determine whether a company has committed financial fraud mainly by means of M and F scores is possible. The expectation is that the M and F scores for this company will rise during the fraud period against the normal company. The research methodology is to collect data from 15 counterfeits US Chinese companies and find 15 normal US Chinese companies in the same industry for the same accounting period.

2. How Analysis Was Conducted

This work used two types of accounting-based models to detect different companies' fraud. The first model is M score model and the other is F score model.

M score model uses eight financial ratios weighted by coefficients to identify whether a company has manipulated its profits, which has strong out-of-sample power not only to detect fraud, but also to predict cross-sectional returns. M score Model represents a systematic distillation of forensic accounting principles described in the practitioner literature. It is shown that this model correctly identified, in advance of public disclosure, a large majority (71%) of the most famous accounting fraud cases that surfaced subsequent to the model's estimation period. Moreover, the probability of manipulation generated by the M score Model could be informative to a firm's future prospects because the profile of a "typical earnings manipulator" which defined by Beneish (1999) is a firm that (1) is growing quickly (with high year-to-year sales); (2) is experiencing deteriorating fundamentals (a decline in asset quality, eroding profit margins, and increasing leverage); (3) is adopting aggressive accounting practices (receivables growing much faster than sales; large income-inflating accruals; decreasing depreciation expense) [4].

F score (F is for "fudging") is a scaled logistic probability from each firm-year's output of models about variables that are obtained from the primary financial statements, off-balance-sheet and nonfinancial measures, and market-related variables, which are prediction models that can synthesize the financial statement variables that examining and providing insights into which variables are relatively more useful for detecting misstatements. The research investigated that while only 20 percent of the public firms have an F score greater than 1.4, over 50 percent of misstating firms have F scores of 1.4 or higher, so it can be used a red flag or signal of the likelihood of earnings management or misstatement [5].

For the data collection, total of 30 companies data was collected to calculate the M score and the F score ---15 U.S. -listed Chinese companies that have been exposed as fraudulent and 15 corresponding U.S.-listed normal Chinese companies in the same industry and same period of accounting time (if we could not find corresponding U.S.-listed normal Chinese companies in the same period, we would use the data from other U.S.-listed companies which in the same industry with the fraud companies).

The companies with fraud are China Huishan Dairy Holdings Company Limited, RINO International Corp, Focus Media Information Technology, DEER INTERNATIONAL LIMITED,

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Man Wah Holdings Limited, Tomorrow Advancing Life, New Oriental English School, Gaotu Techedu, NIO, Global Data Solutions Limited, iQiyi, Fushi Copperweld, Spreadtrum Communications, China Finance Online Co. Limited and Origin Agritech Limited.

The other normal companies are Mengniu Corp, China Yuchai International Limited, Haier Smart Home Co, Lee Enterprises, Incorporated, Imperium Technology Group Limited, BYD, Kingdee International Software Group, RYB Education, 51talk Online Education Group, Bright Scholar Education Holdings Limited, Tencent Holdings Limited, China Aluminum Corp, ChinaUnicom, Trip.com Group and DuPont.

Table 1 shows brief information about all companies chosen --- the nationality; the year of listing; whether they fraud or not; the year of fraud and the industry which we used to categorize different companies.

Table 1: Companies' brief information.

Company name	Nationality	Year of listing	Fraud or not	Year of fraud	Industry
ChinaHuishanDairyHoldingsCompanyLimited	China	2013	yes	2016	Dairy manufacturing
Mengniu Corp	China	2004	no	/	
RINO International Corp	China	2007	yes	2009	Internet and e-commerce industry
China Yuchai International Limited	China	1994	no	/	
Focus Media Information Technology	China	2004	yes	2011	Media industry
Lee Enterprises	China	2002	no	/	
DEER INTERNATIONAL LIMITED	China	2011	yes	2011	Smart furniture industry
Haier Smart Home Co	China	1993	no	/	
Man Wah Holdings Limited	China	2010	yes	2017	Production and sales industry
Imperium Technology Group Limited	China	2008	no	/	
Tomorrow Advancing Life	China	2010	yes	2018	Education industry
Bright Scholar Education Holdings Limited	China	2017	no	/	
New Oriental English School	China	2006	yes	2012	English education industry
51talk Online Education Group	China	2016	no	/	
Gaotu Techedu	China	2019	yes	2020	Education industry
RYB Education	China	2017	no	/	
NIO	China	2018	yes	2022	Electric vehicle manufacturing industry
BYD	China	2011	no	/	
Global Data Solutions Limited	China	2016	yes	2020	Data software industry
Kingdee International Software Group	China	2001	no	/	
iQiyi	China	2018	yes	2019	Video service websites

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Table 1: (continued).

Tencent Holdings Limited	China	2004	no	/	
Fushi Copperweld	China	2005	yes	2012	Steel parts manufacturing industry
China Aluminum Corp	China	2001	no	/	
SpreadtrumCommunications	China	2007	yes	2011	Communication industry
ChinaUnicom	China	2000	no	/	
China Finance Online Co. Limited	China	2004	yes	2007	Service website
Trip.com Group	China	2003	no	/	
Origin Agritech Limited	China	2005	yes	2009	Planting industry
DuPont	the USA	1802(established)	no	/	

3. Data Analysis

Through SEC and other relevant websites, the financial statements of fraud companies and normal companies in the year of Fraud and the years before was found, through which the account contents related to M and F scores was extracted, and M and F scores of these companies in the years between was calculated. After average processing on these data, vertical and horizontal analysis was carried out on these data, and t-test was conducted. Since there isn't much data, α was chosen to be 0.2. During data processing, some obviously abnormal data was removed.

3.1. Vertical Analysis

The first study was about whether the M and F scores of fraud companies will change as time gradually approaches the year of fraud.

For M score analysis, the results are the following data. Intuitive speaking, in the year before the fraud year, M-score increased.

Table 2: M score data of fraud companies through different years.

fraud company	fraud year	1 year before	2 years before
average	-2.233498688	-1.406052083	-2.175479568
Var	0.609366965	6.863848871	5.598240886
Std Dev	0.780619603	2.619894821	2.366060203

As shown in Table 2, the two null hypotheses are (1) there is no difference between the fraud year and the year before. (2) there is no difference between 2 years before the fraud and the year before. Both failed to reject the null hypotheses, so from a rational point of view, there wasn't a significant change in M-score in the year before the fraud.

For the F score analysis, the results are the following data. Intuitively speaking, like M-score, scored high in the year before fraud.

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Table 3: F score data of fraud companies through different years.

fraud company	fraud year	1 year before
average	0.910274982	1.253069129
var	1.541604657	3.497684548
Std Dev	1.241613731	1.87020976

As shown in Table 3, the null hypothesis is 'there is no difference between the fraud year and the year before'. It failed to reject the null hypothesis, so from a rational point of view, there wasn't a significant change in F-score in the year before the fraud.

3.2. Horizontal Analysis

The second study is whether the M and F scores of fraud companies are different from those of normal companies in the overall perspective.

To this end, for each fraud company, the following data are collected (1) the score of the fraud year, (2) the average of the fraud year and the previous year, and (3) the overall average of the fraud company, and collect the same data for each fraud company corresponding to a company in the same industry in China and the same year. Then average the data of the two types of companies, respectively, and the results are as follows.

The average M score data of fraud company is as follows: Total 13 data, 12 degrees of freedom.

Table 4: M score data of fraud companies in horizontal analysis

M-score	-2.606517978	var	1.631465736	Std Dev	1.277288431
M-score average in 2 years	-2.244343244	var	2.891954879	Std Dev	1.700574867
M-score average	-1.743979444	var	3.809899793	Std Dev	1.951896461

The average M-score data of Normal company is as follows: Total 13 data, 12 degrees of freedom.

Table 5: M score data of normal companies in horizontal analysis

M-score	-2.612626752	var	1.37818433	Std Dev	1.173960958
M-score average in 2 years	-2.573383619	var	0.544466482	Std Dev	0.737879721
M-score average	-2.488059792	var	0.329339507	Std Dev	0.573881092

Intuitively judging, in Table 4 and 5, the average M score of a fraud company even gets lower when it is closer to fraud, which seems to be contrary to our expectations. At the same time, the variance of the normal company is smaller and the score is more stable, which also indicates that the M score of the normal company is relatively stable at different time. In general, the average values of M scores of fraud companies are higher than those of normal companies.

The three null hypotheses are (1) the average of M score is no difference between the fraud company and the normal one. (2) the average of M score's average in 2 years is no difference between the fraud company and the normal one. (3) the average of M score's average is no different between the fraud company and the normal one. (1)(2) failed to reject the null hypotheses while (3) rejected. That means that, only when α=0.2, the average of M score's average of the fraud company is different from that of the normal company.

The average F score data of Fraud company is as follows: 15 data in total and 14 degrees of freedom.

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Table 6: F score data of fraud companies in horizontal analysis

F-score	0.910274982	var	1.651719276	Std Dev	1.285192311
F-score average in 2 years	1.441036223	var	2.547099099	Std Dev	1.595963376
F-score average	1.000604586	var	2.538602359	Std Dev	1.593299206

The average F score data of Normal company is as follows: 14 data in total, with 13 degrees of freedom.

Table 7: F score data of normal companies in horizontal analysis

F-score	0.725470205	var	0.119607261	Std Dev	0.345842826
F-score average in 2 years	0.730387631	var	0.095776494	Std Dev	0.309477776
F-score average	0.718272939	var	0.095412198	Std Dev	0.308888651

Through direct observation on Table 6 and 7, meanwhile, the variance of normal company is smaller and the score is more stable, which also indicates that the F score of normal company is relatively stable at different time. In general, the average F scores of fraud companies are higher than those of normal companies.

The three null hypotheses are (1) the average of F score is no difference between the fraud company and the normal one. (2) the average of F score's average in 2 years is no difference between the fraud company and the normal one. (3)the average of F score's average is no different between the fraud company and the normal one. (1)(3) failed to reject the null hypotheses while (2) rejected. That means that, only when α=0.2, the average of F score's average in 2 years of the fraud company is different from that of the normal company.

3.3. Conclusion

As far as our current investigation results are concerned, although it can be seen intuitively that M and F score are higher in the year before fraud, and also higher than normal company level, with large variance, this result is indeed not significant. At α=0.1, there isn't any significant difference between the year and the company.

3.4. Deficiencies, Explanations and Expectations

After reflecting on our experimental data, and following deficiencies and explanations are proposed. The first deficiency is that our model didn't take enough data in to account. For one thing, only 15+15 company's data were collected; For another, due to many fraud company committed fraud shortly after being listed in America, there isn't enough data from different years.

It is worth noting that there are many companies that committed fraud long before when they didn't have consistent financial statement format and data. Because of this these companies had to be let go.

To improve our investigation in the future, more companies should be found, over more years, using a more uniform database closer to the present.

The second deficiency is that the results weren't significant enough, so that the experiments cannot be used as solid empirical evidence for the reliability of M and F scores.

To explain the insignificant results, the following reasons were offered.

The first reason is that the assessment of financial fraud is not quantifiable. There are companies operating normally but was accused of fake financial fraud; There are more companies that their frauds weren't discovered or they didn't admit yet. The problems to be solved include quantifiable

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and standardized assessment of fraud, undetected fraud, unconfirmed fraud and false identified fraud. Therefore, the difference between fraud and the normal companies was narrowed.

The second reason is that there are many important events happening in the world today, such as covid-19, wars, etc. These global events many have significant and different impacts on different companies, which would result in unpredictable financial changes.

To sum up, it is not possible to only judge the company's financial fraud through M and F scores. More specific investigations must be used to identify financial fraud. Actually, shorting companies does these things. In the case where Muddy Waters proved Luckin Coffee's fraud, it sent 92 full-time and 1,400 part-time investigators to monitor and record 981 stores for the report. It also collected 25,843 receipts, recorded 11,260 hours of store video and collected a large amount of internal WeChat chats. The figure that eventually showed Luckin's average per-store sales inflated by 88% in the fourth quarter of 2019. Through this example it is apparent that by specific investigation can we have a precise estimation of the company, which is needed to expose financial fraud.

4. The Uniqueness of Chinese Concept Stocks

Since the result deliberately selected Chinese concept stocks, we also have some understanding of Chinese concept stocks in the research. Through the relevant investigation, we also found that China concept shares were often short and committed financial fraud.

4.1. Data

Luo Wei and Lu Hai, professors of Guanghua School of Management, Peking University, tracked and analyzed 326 Chinese companies listed in the United States from 1999 to 2017 and found that among the 269 enterprises from 1999 to 2011, 15 were punished by the United States Securities and Exchange Commission, accounting for 6%. 70, or 26 percent, were hit by investor class action lawsuits.

George Qin is a partner and head of the China practice at Malone Bailey, an American accounting firm. Eight of his 25 Chinese clients were found to have "financial problems," and he estimates the true rate could be much higher. Peter Humphrey, president of ChinaWhys, echoed that estimate: "I think a third of Chinese companies listed in the US are guilty of accounting fraud."

In general, in the nearly 20 years that Chinese concept stocks have been listed in the United States, in fact, this kind of financial fraud has been a wave. In 2011 and 2012, the situation was very serious. As a result, there were no Chinese enterprises listed in the United States in the following year, which is equivalent to the loss of confidence in Chinese enterprises in the entire capital market.

4.2. Chinese Concept Stock's Situation

With the reform and opening up, the Chinese market has opened up to the world, and there were Chinese concept stocks listed in the United States. This is a great opportunity for both Chinese companies and American investors. The first Chinese companies to go public were nation-owned companies. Then the mainstream gradually became private companies.

Until the Rino case in 2010, Wall Street investors paid above-market premiums to Chinese companies since their main business was in China, a market that Americans had little exposure. However, it is precisely because American investors have too high expectations for Chinese companies and Chinese companies have received too much financial support that problems arise [6].

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4.3. Common Means of Chinese Companies' Fraud

4.3.1. Their Gross Margin Is Far Higher than the Same Industry's Level

In a fully competitive market, all companies' gross margin levels would be within an acceptable range. If a company's gross profit margin is significantly higher than its peers, unless it has particularly advanced technology or a monopoly position. Otherwise, it looks very unreal, very much like financial fraud.

4.3.2. Fake Assets and Profit

large amount of assets and profits, can let investors see that the company has strong profitability.

4.3.3. Filings to the Commerce, Industry and Tax Authorities Are Inconsistent with Filings to the SEC

Since tax and accounting are relatively independent systems, the tax basis and accounting basis of general enterprises are different when making accounts, thus forming deferred income tax assets or deferred income tax liabilities on the statement. The companies may exaggerate there differences to make fraud.

4.3.4. Having Undisclosed Related Parties or Relying Heavily on Related Party Transactions for Revenue

These actions may be falsified because it is unfair [6]

4.3.5. The Company Is Doing Well While Management Is Selling Shares

Apparently, the company's performance is fake.

4.3.6. Changing Accounting Firms Frequently

Generally speaking, listed companies will choose an accounting firm for long-term cooperation; Change accounting firms often because of financial fraud [6].

4.3.7. Over-Outsourcing, Reliance on Agents for Sales or Income through Middlemen

Through these means can, the company disclose less [6].

4.3.8. A Corporate Structure that Is More Complex than the Business Needs

Under this circumstance the company is convenient to cook the books and transfer assets [7].

4.4. The Reason Why Financial Fraud Is Common among Chinese Companies

4.4.1. Difference in Laws

The SEC and the PCAOB claim that, because of Chinese law, auditing and supervising are lack of information. Chinese laws (1) require the working papers of Chinese companies listed overseas to remain in China (2) don't allow American watchdogs to take evidence in China (3) prohibit Chinese company offer information of stock exchange transaction voluntarily. These are because many American-listed Chinese companies are nation-owned and their data are classified.

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4.4.2. Difference in Culture

At the heart of the problem is the language difference. Chinese companies have deliberately sought out U.S. auditors to make it more difficult to review Chinese statements for problems in Chinese, or even to understand them. At the same time, a report by the Public Company Accounting Oversight Board acknowledged that the financial problems of Chinese stocks were largely due to small US accounting firms acting as lead auditors and not following relevant practice guidelines. Almost all of the 340 Chinese companies listed on major US stock exchanges employ small, unknown American audit firms.

4.4.3. Different Listing Standards

After some accounting scandals at Chinese companies, some Chinese investors are questioning the U.S. capital markets: These companies would never have passed the audit in China. This shows the difference between US and China capital market. China's stock markets are highly vetting and difficult to list, but delisting is rare once listed. U.S. stock markets are easier to be listed, since the exchange is a profit-making institution, and both the NYSE and Nasdaq are public companies themselves, so they certainly have an incentive to recruit more members. In general, it's actually easier to be listed in the U.S. than in China. Many Chinese companies have great development potential at the beginning, but do not meet the listing standards of the Chinese stock exchange market. In the early stage of a startup, listing in the United States can meet the financing needs faster. However, due to the low requirements of the registration system in the United States, it also brings the problem of financial fraud. Start-up or growth stage of the company itself has investment risk, the return is not stable. Therefore, in order to attract financing, the possibility of fraud will increase.

4.4.4. Lack of Understanding of Equity and Shareholders

Many Chinese companies have not experienced the process of multi-shareholder integration and lack the understanding of equity, shareholders and responsibilities. Due to the low degree of market development, the interest is too large. Some businessmen seize the opportunity to go public. They equate going public with "collecting money". In order to go public, they package and sugarcoat the company in order to get listed and make money. In the Chinese stock market, the penalties for counterfeiters are low. The benefits of violations far outweigh the costs of it. false statements and false statements of performance are countless. This is not going to work in the United States.

4.4.5. Reversed Mergers

A reverse merger is when a private company acquires a sufficient number of shares in an already public company to go public through a backdoor listing. Its advantages are that first, the cost of listing is lower and faster than IPO; second is that it can to avoid SEC's stricter regulatory requirements for IPO. Since it is unable to raise large sums of money, many small private firms prefer reverse mergers. From January 2007 to March 2010, more than 600 companies entered U.S. capital markets through reverse mergers, including 159 from China, or 27 percent, according to PCAOB data. In the same period, 56 IPO came from China, accounting for only 13% of the total. The low requirements and audience of reverse mergers greatly increase the possibility of financial fraud for small enterprises [8].

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5. Prevention of Fraud

5.1. Current American Means

There are four common ways to prevent financial fraud in the United States:

The first is short sellers, who first look for the company in question, then establish a short position, and then spread the word about the problem of the company they are shorting through various channels. The news often causes the stock price to go down, and the short sellers profit from it.

Accounting firms have a legal obligation. If the accounting firm acting as the external audit of listed companies knowingly fail to report or assist in the fraud, the responsible person will be punished by up to 20 years in prison.

In addition, shareholders can use class action to demand compensation from the company and relevant parties.

After Enron in 2001 and the financial crisis in 2008, Congress gave the SEC more enforcement powers to investigate and bring lawsuits against exchanges as well as public companies.

In addition, there is media, the involvement of law firms, and even the U.S. Department of Justice to crack down on fraud and crime

This process fully shows the characteristics of national regulation: as long as there is a problem in listed companies, short sellers, media, accounting firms and lawyers will be held accountable. Securities regulation in the United States can be described as the cooperation between the government and the public, the supervision of the whole society. Facts have proved that this approach is indeed effective, and has well guaranteed the fairness and efficiency of the US capital market.

5.2. Our Recommendations

5.2.1. Inside the company

Pay more Attention to Financial Rules. First of all, attitude should be corrected. The process of listing financing is also the process of being responsible for shareholders.

At the same time, more attention should be paid to carefully learning the differences between Chinese and American listings, and do as the Romans do.

Internal Disclosure, Regulation and Supervision. Strengthen the internal supervision of enterprises. This can find fraud earlier, so as to reduce the loss of passive revelations.

Appointing and Dismissing Managers to Increase Competition. Through the competition between many managers and decentralization, companies can effectively limit the managers of financial fraud.

Paying Managers in Stock. By linking the interests of managers with the interests of shareholders, problem that the separation of management and ownership brings about could be solved.

5.2.2. In the Society

Encouraging to Short, while Regulate Shorting Better as well. Markets exist to make money, and short selling does a positive thing by making markets cleaner and prices more reasonable. Warren Buffett agrees that short sellers help the market uncover problems like accounting fraud.

The SEC's supervision will always face a very important problem, that is, because the SEC's targets are too many, while it is not motivated by interests, and its regulatory power and manpower are not enough. Therefore, driven by the interests of short selling, short sellers can make use of their unique means of information collection and unique understanding to generate judgments on companies, so as to active supervision.

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There are 3 advantages of shorting: (1) Triggering SEC's attention, urging companies to standardize disclosure. (2) Causing stock price to go down, shareholders will hold managers accountable. (3) Asking auditors to remain cautious.

As an important market mechanism of mature capital market, what government need to guard against is the malicious short-selling behavior of the market. In our result, many instances were found where short sellers have released data only to be exonerated. Such malicious slander can have a negative impact on a company's stock price and reputation [9].

5.2.3. National Laws

Unifying Financial Accounts, Format and Other Legal Disclosure Standards. In the process of our investigation, the financial statements of some companies were obviously not standardized. Some accounts that should have been reported did not appear in their financial statements. In order to better discover financial fraud, and increase the difficulty of financial fraud, there should be more standardized financial statements.

Strengthen the Punishment and Blacklist System for Companies and Related Audit Companies. The nation should punish more for financial fraud companies, as well as their external audit firms, while strengthening restrictions on their future re-entry into the market. By these means, can society increasing the risk and cost of financial fraud to reduce it.

5.2.4. International

Strengthening International Cooperation, Disclosure and Information Search. Strengthening international communication, under the premise of cooperation between the two nations, can reduce the information barrier, and increase the difficulty of financial fraud. Of course, it is a long way to go. The core of this issue lies in the relationship between the two countries. It is a political, economic and cultural issue [6].

6. Conclusion

In our study, the results show that although M and F score will change slightly before fraud, but not significantly. In this regard, reflection on three aspects was carried out at the same time: (1) the deficiencies of our own investigation, (2) the major world events ignored by M and F score, and (3) the particularity of Chinese concept stock. Finally, under the mature capital market system in the United States, some solutions to financial fraud were given.

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Siying Chen, and Huanxi Ma contributed equally to this work and should be considered co-second authors.

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