

# *Identifying Financial Report Fraud of U.S. Listed Chinese Companies*

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**Abstract:** A key feature of publicly listed companies all over the world is that the people who own the company, its investors, do not typically participate in the day-to-day management of the company. This separation of ownership and control can become a problem when investors and management have different objectives. Disclosure is a primary means through which investors can understand what managers are doing and ensure that managers serve the objectives of the company's owners. However, since management is responsible for preparing the company's financial statements, they could misreport the numbers to mislead investors. Previous research showed managers had discretion in manipulating the numbers in the financial report. In this paper, we collected samples of Chinese companies listed in the United States, such as Luckin Coffee, and assessed whether there were any signs that might help investors identify fraud earlier than they were discovered, and what mechanisms prevented managers from doing so.

**Keywords:** Financial report fraud, accounting, manipulating, prevention.

## 1. Introduction

Nowadays, the global economy is linked all together. Over the last few decades, China surpassed Japan and became the second largest economy in 2010. China, the world's largest exporter, is the top trading partner of the United States. Due to China's unique economic model, state-owned enterprises consist of a critical part of the domestic economy. Chinese companies listed in the U.S. are made of both privately-owned companies and state-owned enterprises. These state-owned enterprises operate and report directly to the central government. Those privately-owned enterprises serve as the economic innovators, as well as the cooperator of these state-owned businesses. Lots of them sought to list themselves abroad, mainly NYSE and NASDAQ. Even though they are listed in the U.S, their main business is in China, so there will be information asymmetry between investors and managers. Previous research by Graham et al. showed managers had discretion in manipulating the numbers in the financial report. Furthermore, due to the different rules established by SEC and CSRC (China

Securities Regulatory Commission), it could be difficult for SEC to inspect Chinese companies listed in the U.S [1].

Due to China's huge economy, inspecting will be a problem. Hitherto, we found that none of the state-owned companies listed in the U.S. committed fraud; all of them were privately owned. By manipulating the financial report through misstating the revenue and etc, more investors will be falsely attracted to increase the share price. Then here comes a question to consider: Do other Chinese companies listed in the U.S. also have abnormal financial statements? For a long time, due to the restrictions of the Chinese capital market, the U.S. market has been an important financing channel for Chinese Internet companies and innovative companies. If Chinese concept stocks are generally questioned for having serious financial problems, then this may affect the U.S. capital market's healthy development, as well as the future financing possibilities for high-quality Chinese enterprises.

In the past, academic research on financial fraud has paid less attention to Chinese companies, and the data is relatively old. In this paper, we use the latest financial data of Chinese concept companies listed in the United States, MScore to calculate the company's potential financial risks, and T-Test to examine the financial risk differences between Chinese concept companies and other leading companies in the same industry.

## 2. Research Design

### 2.1. Fraud Detection: M-score

M-score is a numerical indicator used to indicate the predisposition or likelihood of corporate financial fraud. It was proposed by Beneish, whose full name is Messod D. Beneish, so this indicator is called M-Score for short. To put it simply, the method of M-Score is to put forward 8 indicators that can represent the financial manipulation behavior of managers and use the Probit model regression to estimate the probability of financial manipulation predicted by the indicators. Up to now, M-Score is still the most popular quantitative index to identify financial manipulation [2].

Eight indicators were considered to be correlated with the possibility of earnings manipulation. In order to help people who are not familiar with M-Score understand our article, we describe the calculation methods and meanings of the eight indicators.

**DSRI (Days Sales in Receivables Index):** The DSRI is the ratio of daily sales based on accounts receivable to the corresponding T-1 year in the year of earnings manipulation (year T). The DSRI estimates whether accounts receivable and revenue balance between two consecutive years. The large increase in daily sales of accounts receivable is considered to be most likely related to the overestimation of revenue and profit.

**GMI (Gross Margin Index):** GMI is the ratio of gross margin in t minus 1 year to gross margin in t year. When the gross margin index is greater than 1, it means that the gross margin has shrunk.

**AQI (Asset Quality Index):** AQI refers to the ratio of non-current assets, excluding real estate and machinery and equipment (PPE), to total assets in a given year. It measures the proportion of total assets whose future benefits are uncertain. If AQI is greater than 1, the company is likely to increase cost deferral.

**SGI (Sales Growth Index):** SGI is the ratio of sales in year T to sales in year T-1. Sales growth by itself does not mean earnings manipulation, but experts say companies that grow faster are more likely to commit financial statement fraud.

**DEPI (Depreciation Index):** DEPI is the ratio of the rate of depreciation in t minus 1 years to the rate of depreciation in t years. A depreciation index greater than 1 means that assets depreciate at a lower rate, making it more likely that a company will extend the life of its assets or adopt new ways to increase revenue.

**SGAI (Sales General and Administrative Expenses Index):** SGAI refers to the ratio of selling and administrative expenses in year T to expenses in year T-1. Because the analyst may give inaccurate information about the selling expenses. Therefore, SGAI is correlated with the possibility of earnings manipulation.

**LVG (Leverage Index):** LVGI is the ratio of total liabilities to total assets in year T and the corresponding ratio in year T-1. LVGI greater than 1 means greater leverage. The index measures the incentive for a company to breach its debt covenants.

**TATA (Total Accruals to Total Assets):** TATA measures changes in the working capital account other than the difference between cash and depreciation. Higher significant accrued expenses (net of cash) are associated with a higher likelihood of earnings manipulation.

We use classical parameters to calculate:

$$\text{M-Score} = -4.840 + 0.920 \cdot \text{DSRI} + 0.528 \cdot \text{GMI} + 0.404 \cdot \text{AQI} + 0.892 \cdot \text{SGI} + 0.115 \cdot \text{DEPI} - 0.172 \cdot \text{SAI} - 0.327 \cdot \text{LVGI} + 4.679 \cdot \text{TATA}.$$

After calculating and counting the data we collected from the company's financial statements, according to Beneish's suggestions: Higher M associated with higher probability of manipulation;  $M > -2.22$  indicates potential manipulator (higher M than average non-manipulator);  $M > -1.89$  cutoff to balance error of not when manipulator versus error of manipulator when not. The higher the Mscore is, the higher the possibility of financial manipulation is. We will use the data of our sample companies to test whether it is feasible.

## 2.2. Comparison and Analysis

### Test: T-test.

There are two types of T-tests we will use—the Independent two-sample t-test and the Dependent t-test for paired samples. In the analysis section, we will explain the specific methods we examine.

### Scatter Diagram.

In order to more intuitively display the changes of data from fraud years and non-fraud years, and to help understand the test effect. A horizontal comparison between companies in the same industry and the degree to which the M-Score of all sample companies deviates from the cutoff point are graphically shown.

## 3. Sample Selection

### 3.1. Coffee Industry

Luckin Coffee is the first and only Chinese coffee company that is listed in the United States. It broke the record of least time taking to process Initial Public Offering but was forced to be suspended after only one year due to financial fraud. The case of Luckin Coffee accounting fraud started with the short selling report provide by Muddy Water Research, a short selling institution, and ended with self-exposing fraud. To give investors more confidence in order to raise more capital, Luckin Coffee manipulated its financial report by inflating sales [3]. That's why we chose Luckin Coffee as one of the samples. To compare with Luckin Coffee, we picked Starbucks, the most well-known coffee shop, and Dutch Bros. They are both chain coffee shops that provide similar products and services as Luckin Coffee does, and they have not been caught or accused as financial manipulators by sec in the past 10 years.

### 3.2. Logistics Industry

In order to get an advantage in the fierce market competition, on October 27, 2016, ZTO Express was successfully listed on the New York Stock Exchange, creating the largest IPO in the U.S. stock market

that year. However, in 2017, ZTO and its underwriters are being sued for allegedly inflating profit margins to make it look better than peers to attract investors. We chose two other famous American Express companies UPS and FedEx as control companies. Both companies are among the world's top 500 express companies, which means their data can represent the stable level of this industry. And they operate similar businesses and are affected by a similar macro-economy with ZTO.

### **3.3. Online Education Industry**

Online education has been a trend these days, especially during the pandemic. Lots of students moved to online instead of studying at school in person. One company that offers online education and tutoring is TAL Education Group. It was founded in August 2003 and based in Beijing. In 2010, TAL was listed on the NYSE, to attract more foreign investors. It was the first educational institution in China to be listed in the U.S. Coursera and Chegg are another 2 companies in the same industry as TAL Education Group. The difference is that Coursera and Chegg are based and founded in the United States. They all provide services like online classes and homework help.

### **3.4. Network Security Industry**

In modern society, Cyber security is not only about national security, but also about each of us. In cyber security industry, we choose NQ mobile as the fraud company, and NLOK and FTNT are used for comparison. Starting with the mobile security business, NQ Mobile is the first company in China dedicated to mobile phone antivirus. Fortinet and NortonLifeLock are two American companies as control groups. Despite some differences in their specific businesses, they are both committed to the field of cyber security. They are all pioneers in this industry, providing solutions for cyber security from the perspective of risk prevention, detection, and recovery.

### **3.5. NEVs Industry**

With the development of technology and economics, more and more people are aware of the pollution that brought by fuel vehicles does do harm to the whole environment. So the NEVs now are becoming popular among the world and most of the countries are encouraging people to buy NEV and company to build them. However, facing the huge profits brought by the new industry, some of the companies were caught up in a fraud scandal. This is the reason why I choose NEV industry to analyze.

## **4. Analysis and Results**

Since the facts that Chinese enterprises are rooted in the Chinese market environment, which is quite different from American's, and other differences, we assume that M-score does not apply to Chinese companies. To start, we created line charts of M-scores representing the variations of M-scores within several years for each industry to see if M-scores could help us to distinguish fraud companies from companies that did not commit accounting fraud in an intuitive way. And then, we use two T-tests to further examine whether M-score is applicable to Chinese companies listed in America.

## 4.1. Data

### 4.1.1. Coffee Industry.

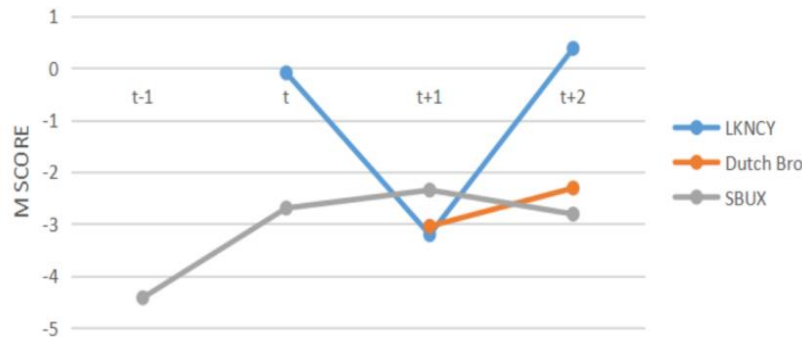


Figure 1: M-score changes in the coffee industry.

In Figure 1, blue dots, representing the change of m-score for fraud company LKNCY, fluctuate much more strongly than others and 2/3 of blue dots are above others. The gray line and the orange line are relatively smooth and both below -2. So, we can find that LKNCY corresponds to M-score to some extent, and so do the other two American companies.

### 4.1.2. Network Security Industry.

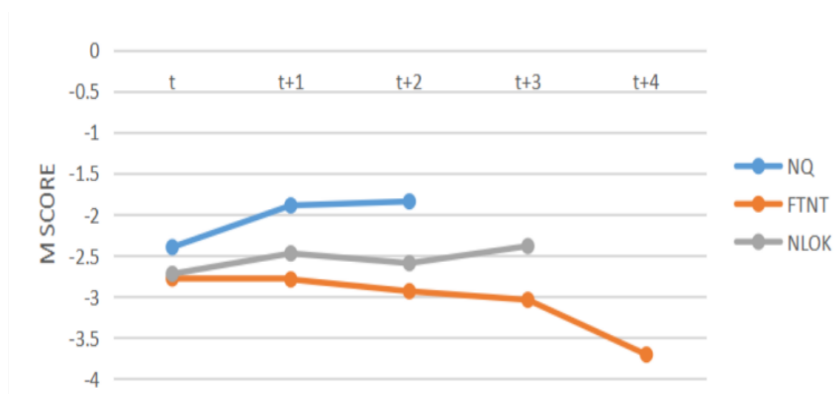


Figure 2: M-score changes in the network security industry.

As shown in Figure 2, the blue line, representing the change of m-score for fraud company NQ, is above the others, and it is relatively smooth. The other two companies showed little sign of increasing numbers or even a downward movement. Therefore, the companies from the cybersecurity industry match Beneish's result to some extent.

### 4.1.3. Education Industry.

In Figure 3, blue dots, representing the change of m-score for fraud company TAL, do not fluctuate drastically, but more than half of the blue dots are above most of the others. We may say that blue dots remain at relatively high M-scores in the education industry. In spite of the insufficient data from COUR, we still can't tell that data from TAL is correspond with Beneish's result.

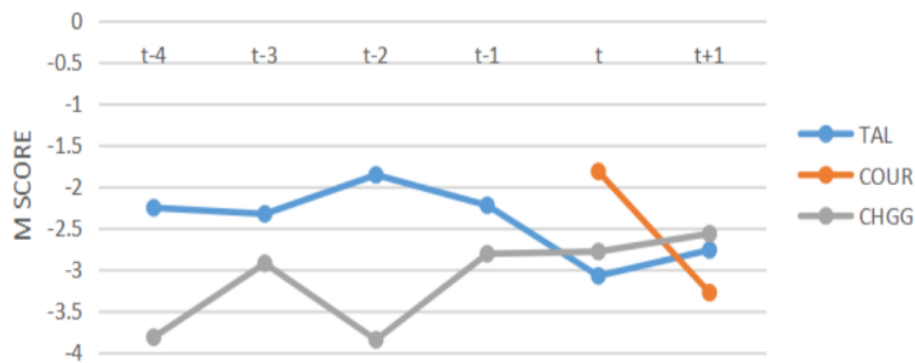


Figure 2: M-score changes in the education industry.

#### 4.1.4. New Energy Vehicle Industry.

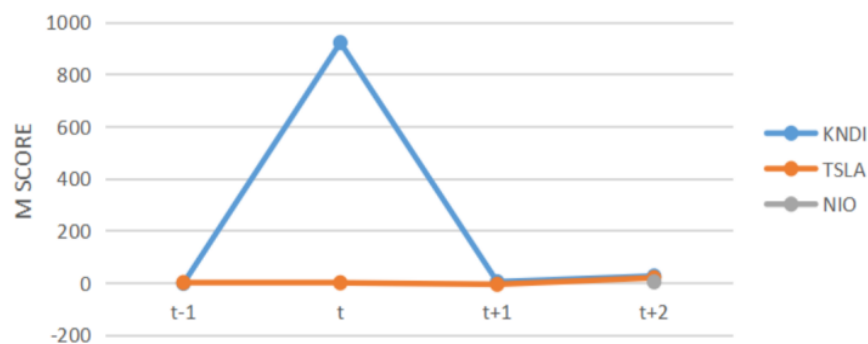


Figure 1: M-score changes in the NEV industry.

As we can see from Figure 4, the blue line, representing the change of m-score for fraud company KNDI, is above others and the blue dots fluctuate drastically while two other companies share the same trend. We can see from the data chart we collected that KNDI's unusually high can be mainly ascribed to the abnormal AQI and TATA. To be more specific, they are generated from the huge drop in assets, including both current and total assets compared with the previous year, and exorbitant total accruals.

#### 4.1.5. Express Industry.

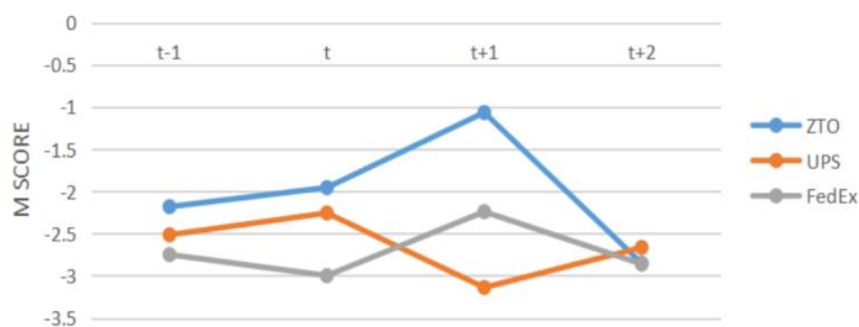


Figure 3: M-score changes in the express industry.

Figure 5 shows that although the M-score of two normal companies fluctuates to some extent, the fraud company ZTO's M-score has been above them most of the time. The two American companies match the prediction of the likelihood of fraud in Beneish's M-score, and the Chinese one shows some inclination to fraud, which also matches Beneish's result.

## 4.2. Analysis

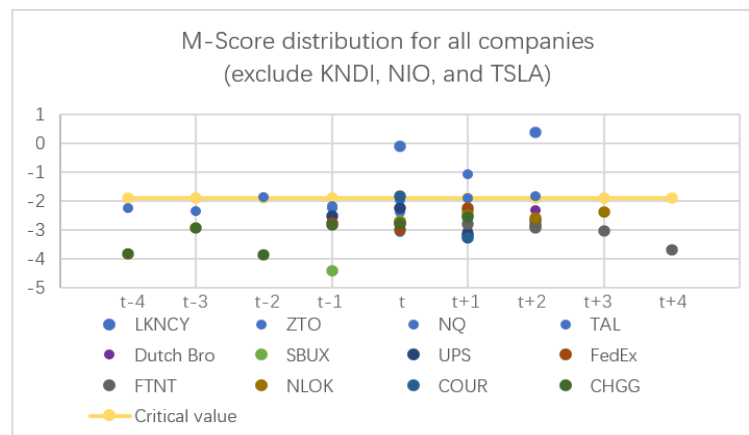


Figure 4: M-Score distribution.

As shown in Figure 6, to analyze the M-score we collected, firstly, we put it into a chart to better see the results. We define  $t$  as the year of fraud, and  $t-1$ ,  $t+1$ , etc., representing the year before or after the cheating year respectively. Since the data of KNDI is too large, we removed it to see the distribution of values more specifically and clearly from the scatter diagram, and also the two other companies in its industry – NIO, and TSL. Moreover, we color-coded the data from the fraud companies to better distinguish them from the control group – no fraud companies.

### Comparison.

In addition to the observation of line charts, we could separate the fraud companies and normal companies into 2 groups and make a comparison as shown in Table 1. We could observe that 3/5 companies of Group A show up a m-score that is above -2.2 in year  $t$  while only 2/8 companies of Group B show up a m-score that is above -2.2 in year  $t$ . Due to these evidence, we believe that M-score could help us in the fraud detection of American-listed Chinese companies. So now we are going to test if there is a significant difference existing between the average m-scores of these two groups (Group A and Group B) and the average m-scores of Group A(year  $t$ ) and Group A(years exclude  $t$ ), using the T-test.

$$H_0: (\mu_1 - \mu_2) = 0$$

$$H_a: \mu_1 \neq \mu_2$$

$$\alpha = 0.05 \text{ or } 0.1$$

In the Unequal Variance T-test,  $\mu_1$  is the mean of the M-score for Group A – fraud companies in their fraud years, and  $\mu_2$  is the mean of the average M-score for Group B – non-fraud companies.

In the Paired T-test,  $\mu_1$  remains the same as above, and  $\mu_2$  is the mean of the average M-score for Group A excluding year  $t$ .

According to Table 2, since  $p > 0.05$ , we fail to reject  $H_0$ , which means samples from Group A ( $M = 182.76$ ,  $SD = 412.89$ ) and Group B ( $M = -1.60$ ,  $SD = 2.53$ ) both consist of normal distribution, and the difference between these two groups is insignificant.

Although the independent T-test did not indicate a significant difference between fraud and normal companies, the difference between the means of these two groups is apparently large ( $182.764 - (-$



1.601)=184.365). From the formula we use to calculate t-value, we know that a higher mean difference will result in a higher t-value, and it is easier to reject H0 as we have a higher t-value. The reason that we fail to reject our hypothesis is that the difference in variance is so large (170474.430-6.419=170468.011) that it lowers the t-value which means there are some significant interference factors such as the abnormal M-score of KNDI in year t.

Table 1: Comparison of fraud companies and non-fraud companies.

A- Fraud Com panies	t-4	t-3	t-2	t-1	t	t+1	t+2	t+3	t+4
LKNCY					- 0.095	- 3.208	0.376		
ZTO				- 2.182	- 1.956	- 1.066	- 2.853		
NQ					- 2.399	- 1.891	- 1.842		
TAL	- 2.260	- 2.335	- 1.864	- 2.231	- 3.082	- 2.770			
KNDI				- 2.543	921.3 54	3.466	25.49 6		
B- Non Fraud Companies									
Dutch Bro						- 3.046	- 2.311		
SBUX				- 4.421	- 2.696	- 2.350	- 2.812		
UPS				- 2.515	- 2.257	- 3.140	- 2.665		
FedEx				- 2.750	- 3.000	- 2.241	- 2.862		
FTNT					- 2.780	- 2.791	- 2.936	- 3.040	- 3.705
NLOK					- 2.723	- 2.475	- 2.594	- 2.385	
COUR					- 1.822	- 3.285 3			
CHGG	- 3.823	- 2.931	- 3.853	- 2.816	- 2.789	- 2.574			
TSLA				0.381	- 0.423	- 6.327	18.79 6		
NIO							3.270		

Furthermore, we also compared the statistics of group A from an internal perspective. A paired-samples t-test was performed to compare M-score between fraud years and normal years within group A.

As shown in Table 3, since  $p > 0.05$ , we fail to reject H0, which means samples of M-score from cheating years of Group A ( $M = 1182.76$ ,  $SD = 4412.89$ ) and samples of average M-score from normal years of Group A ( $M = 0.24$ ,  $SD = 4.80$ ) both consist with normal distribution and the difference between these two groups is insignificant.



Table 2 : Unequal Variance T-test.

	group A M-score in year t	group B average M-score
	-0.095	-2.678
	-1.956	-3.070
	-2.399	-2.645
	-3.082	-2.713
	921.354	-3.050
	-	-2.544
	-	-2.553
	-	-3.131
	-	3.107
	-	3.270
Mean	182.764	-1.601
StDev	412.885	2.534
Variance	170474.430	6.419
n	5	10
t-value	0.998	
df	21.676	
t-test (p)	0.375	

Table 3: Paired T-test.

	group A M-score in year t	group A avg M-score exclude year t
	-0.095	-1.416
	-1.956	-2.034
	-2.399	-1.867
	-3.082	-2.292
	921.354	8.806
Mean	182.764	0.240
StDev	412.885	4.800
Variance	170474.430	23.035
n	5	5
t-value	0.988	
df	4	
t-test(p)	0.374	

Although the paired T-test did not indicate a significant difference between the M-score of Group A companies from fraud and normal years, the difference between the means of these two groups is apparently large ( $182.764 - 0.240 = 182.524$ ). The reason that we fail to reject our hypothesis is the

same as we fail to reject the independent T-test: the difference in variance is so large ( $170474.430-23.035=170352.395$ ) that it lowers the t-value.

Besides, we still failed to reject  $H_0$  in both T-Tests when we tried to exclude the extreme data (921.354). Such extreme data is not the only reason that caused the failure of rejection.

### 4.3. Result

Both T-Tests failed to reject  $H_0$ , which means M-score is not applicable to Chinese companies listed in America. We also failed to reject  $H_0$  in both T-Tests when we tried to exclude the extreme data (921.354). Such extreme data is not the only reason that caused the failure of rejection. There might be some other possible reasons that could affect the results:

- Some M-scores of Group B are also pretty high which means M-Score is not always applicable for American native companies.

- Insufficient samples. We should involve more companies, more years, and more pairs to improve the accuracy of our result. The insufficient samples might cause the bias of result.

However, according to those diagrams of M-Scores dispersing within each industry, there are still some pieces of evidence that could help in fraud detection. Investors may create the line charts to observe the change of m-score. A smoother line may lead to a lower probability of conducting fraud. Therefore, although M-Score is not applicable for Chinese companies listed in America, it provides good references.

## 5. How to Prevent Frauds

In this part, I will use GONE theory as a tool to analysis the motivations that causes frauds in the financial report and how to prevent frauds base on the GONE theory. The GONE theory is proposed by G. Jack Bologna and Robert J. Lindquist (1993). The theory claims that the reason why frauds will occur in the financial statement can be summarized into four aspects-- Greed, Opportunity, Need and Exposure. Those four aspects build up the GONE theory and every one of them is indispensable.

### 5.1. The Brief Introduction of GONE Theory

GONE theory is mainly used in the field of motivation analysis of frauds in the financial statements. Firstly, G means greed, greed is inborn and if the managers and stake holders of the company or the external auditors do not have the right values towards the disclosure of financial report. Secondly, O means opportunity, under the conditions which opportunity comes into effects is that there exist loopholes in the law of auditing or other laws. Thirdly, N means needs, only if the manager or auditors have information will they window dressing the financial report. Last but not least, E means exposure, commonly, the fraudsters will compare the cost of making frauds and the profits that can bring to the company or individuals. If the profits are outweighing the cost, the frauds are possibly happened. In conclusion, only when those four factors are present can financial frauds occur.

### 5.2. The Reason Why I Choose GONE Theory

Comparing to other theory like Fraud Triangle that presented by W. Steven Albert, I think that Fraud Triangle has its limits compare to the GONE theory because Albert's theory only considers the fact that affect the fraudsters but not consider the external factors. So choosing the GONE theory as a tool to analysis the motivation of frauds can benefits me more to solve the problem that how to prevent frauds in the financial reports.

## 6. Types of Frauds

### 6.1. Types of Frauds Related to ‘Greed’

Commonly, we hold the view that the possibility of fraud has positive correlation with the degrees of greed. What affect the degrees of the greed including the moral level of the employees and manager. **Using ‘inflated profits’.**

The SFC will set a profit goal for an enterprise according to its development scale, if the company cannot meet the standard, it will face the withdraw risk of listed firm. In order to achieve this goal, some company may use illegal means to change the actual income of the company.

### 6.2. Type of Frauds Related to ‘Opportunity’

With the rapid development of the company and financial market, many laws and policies are lagging. So, the fraudsters have chance to use those loopholes to make illegal profits. Here are some examples of using loopholes of laws to make ‘adjustments’ in the financial statement.

**Use improper accounting policies and accounting estimates.**

The company may change their accounting estimates secretly like changing the depreciation of the assets and way to estimate inventory. The company may use FIFO at first and then change the method into LIFO in order to inflate the profit or reduce the cost of capital.

**Change the accounting period.**

Some of the company will change their accounting period frequently to contain the prior year’s profit or put off this year’s fee to next year in order to show a better performance in this year’s financial statement.

**To set a ‘ghost’ employees or other things do not exist.**

Some of the company will set some employees that do not exist to increase the expense or make many orders that even not occurred to increase profits. E.g. Luckin coffee.

### 6.3. Type of Frauds Related to ‘Need’

Due to the poor management of the company, the profit of the year in the financial statement may look unsatisfied, so the need of window dressing the financial statement to persuade the investors that the company is performing great occurred. The ‘Need’ also leads to fraud.

**Use improper adjustment to change the cost and fee.**

The company may increase the fee of advertisement to change the statement of profits. E.g. Luckin coffee change.

### 6.4. Type of Frauds Related to ‘Exposure’

The reason why the listed company want to cheat on the financial statement is that the benefits brought by cheating is extraordinarily high. In addition, the lack of supervision also indirectly increases the possibilities of fraud in the financial statement.

**To hide the disclosure of ‘significant matters.**

**Have improper relation with the external audit.**

Some company will bribe the auditors in order to cheat on the financial statement.

## 7. How to Prevent Fraud from the Aspect of GONE Theory

### 7.1. To Prevent ‘Greed’ from Top to the Bottom

The SEC needs to establish the laws to increase the aware of importance of moral level. From the case of Luckin coffee we can know that the board and managers want to make more profits for their own. If the top or the management level of company wants to cheat, their employees must be the same. To sum up, the company should build a culture that encourage people to show their integrity and strengthen the professional ethic of the auditors. What’s more the supervision of society should be encourage. Finally, from the internal control, the company should establish and improve the supervision and authorization mechanism among all departments. The supervision between the superiors and subordinates is also important. If all those goals can achieve, it can reduce the possibilities of fraud objectively.

### 7.2. To Reduce ‘Opportunity’ of the Listed Company

To prevent the fraud, optimizing the internal structure and relevant system of the company can improve the internal control in order to reduce the possibilities of fraud.

#### **Optimizing the equity structure of listed company.**

When systematically analyzing the case of Luckin coffee, I found that the unreasonable internal equity structure would also lead to the risk of fraud. Especially the structure that contain a person who owns most of the stock. Once the proportion of a certain stake holder is beyond the normal condition (e.g. more than 51%), the control will be taken by him and risk of cheating on financial statement will dramatically increase.

In conclusion, the company should bring more external investors because they can exert a good restriction on the internal major shareholders of the company. To reduce the possibilities of ‘dormant shareholders can reduce the possibilities of frauds.

#### **To perfect the internal control.**

Firstly, to perfect the internal control, the company should follow the rules that every year the general meeting of the shareholders should be hold and to make sure that every shareholders have opportunity to attend the meeting.

Secondly, improve the internal governance mechanism of the board of directors. Company must attach more importance to the independent board of directors and provide them with more opportunities to participate in corporate governance. In order to give full play to the role of the independent board of directors, special rewards can be given to them. In addition, we should pay attention to the structure of the board of directors and resolutely resist the concentration of control rights.

Thirdly, improve the internal governance mechanism of the board of Supervisors. When selecting the members of the board of Supervisors, enterprises should fully listen to the opinions of internal staff groups, uphold the concept of free and democratic personnel selection, and deprive the major shareholders of the direct right to appoint the organization. In addition, in order to fully mobilize the work enthusiasm of the members of the board of supervisors and give full play to the supervision effect of the organization, it is necessary for the enterprise to establish a scientific compensation incentive system for them.

### 7.3. Eliminate the ‘Need’ of Fraud

The financial fraud of listed companies has obvious characteristics of purpose. Therefore, if the fraud needs to be reasonably satisfied and the survival pressure of enterprises can be reduced, it is believed that the financial fraud problem that plaguing the development of the market will be solved.

### **Making long-term strategy for the company.**

Suitability and scientificity of strategic decision is the basic premise for the company to maintain normal operation, once the strategy do not work well, the company itself will face the dilemma and affect its profitability at the same time. What is more it may cause more serious withdraw risk, thus, strategic mistake may also induce the enterprise financial fraud? Combined with the financial fraud incident of Luckin Coffee, the enterprise faced financial crisis due to improper operation mode. In order to recover the current loss of the enterprise, it had to choose the illegal ways to change the profit. Therefore, it is very important to formulate a scientific and reasonable business strategy for the development of enterprises. I believe that specific work can be started from the following three aspects:

First, improve the comprehensiveness of strategic analysis. In the implementation of strategic analysis, company can focus on the application of the following analysis models, such as SWOT analysis model, PEST model, value chain analysis model, scientific and objective completion of strategic analysis, which is conducive to improve the accuracy and suitability of enterprise strategic layout. The author believes that SWOT analysis model is very suitable for the strategic analysis of the management, and this model helps them to carry out the accurate At the same time, the correct self-positioning will also present various potential risks in the external environment in front of the management.

Secondly, enhance the appropriateness of strategic choice. On the basis of strategic analysis, combined with the actual results, complete the strategic selection. At the enterprise level, the analysis of enterprise suitable development strategy, or contraction strategy, may be stable strategy. When viewed from the perspective of business units, the "strategy clock" model is significantly more applicable and can help enterprises select the optimal development strategy.

## **8. Use Block-chain Tech to Prevent Frauds in the Financial Statement**

### **8.1. To Prevent the Employees or Managers to Change the Data**

From the cases of frauds of listed companies, most of the cases are related to the managers of employees who change the data of financial statement. However, the application of the block-chain tech can prevent this situation from happening.

When transporting information that use block-chain technology, there exist two keys that can prevent other people falsify the financial information. After the information is transported and preserved, the information cannot be changed unless two of the keys are collected. What's more, other nodes in the block chain can observe the process of information transporting but then can't window-dressing those data. In conclusion, thanks to the asymmetric cryptographic algorithm, the transportation of information is safe and unchangeable.

### **8.2. Decentralization**

Comparing to the centralization, the block chain applied the method of decentralization, so every node contained part of the account book's information. Because of the decentralization, the central node does not have enough power to change the data without permission. So, the people like manager or CFO might not have ability to change the data that made by external auditors.

### **8.3. To Prevent What Kind of Fraud Using Block-chain Tech**

From the information mentioned above, the application of block-chain tech can prevent frauds from the aspects of 'Opportunity', 'Need' and 'Exposure'. However, to prevent frauds that related to 'Greed' might depend on the SEC and NEDs of the company.

## 9. Conclusion

In conclusion, we collected samples of Chinese companies listed in the United States of five different industries and use the latest financial data of Chinese concept companies listed in the United States, MScore to calculate the company's potential financial risks, and T-Test to examine the financial risk differences between Chinese concept companies and other leading companies in the same industry.

Although we fail to reject  $H_0$  in both independent T-test and Paired T-test, it is unfair to say that M-Score is meaningless in fraud detection since when we compare the M-Scores of the fraud company with its rivals in the scatter diagrams and line charts, there are still some evidence such as the degree of fluctuation of M-Scores that can help us to distinguish the abnormal company.

And about how to prevent financial fraud, we could further assume that, if all companies record daily economic business of the company on block chain, then according to the characteristics of the block chain tech, this information will be recorded in the block chain and can't be changed, traceable and totally transparent. With the pressure of supervision department and all the societies, the possibilities that company will cheat on the financial statement will dramatically decreased.

We hope that the research conclusion can prompt more scholars to pay attention to the differences between financial fraud of listed companies in China and the United States, so as to enrich the theoretical research content and provide empirical evidence for the regulatory authorities to manage corporate financial fraud and prevent financial risks.

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## References

- [1] Graham, John R., et al.(2005) *The Economic Implications of Corporate Financial Reporting*. *Journal of Accounting and Economics*, North-Holland, 15 Sept.
- [2] Messod D. Beneish. (1999) *The Detection of Earnings Manipulation*. *Financial Analysts Journal* 55 (5):10-12.
- [3] Tonhuashun Financial Research Center. 2022.Financial reports for BROS. <http://stockpage.10jqka.com.cn/BROS/finance/>