**THE RELATION BETWEEN FINANCIAL FRAUD AND GOVERNMENT
SUBSIDY OF CHINESE LISTED COMPANINES**

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2018

PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF SCIENCE IN FINANCE

In the Master of Science in Finance Program
of the
Faculty
of
Business Administration

Approval

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Degree: **Master of Science in Finance**

Title of Project: **The relation between financial fraud and government subsidy of Chinese listed companies**

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Dec 4th, 2019.

Abstract

Nowadays, financial fraud of the public firms draws serious attention in developing countries. We focus on the relation between financial fraud and government subsidy of Chinese public firms, as in China government subsidy is an important factor for companies' performance.

We provide four hypotheses concerning the relation between the magnitude of the subsidy depending on different firm characteristics. We find that we cannot reject the null, and for the most part, government subsidies are affected not only by fraud, but also on the degree to which the executives and firms are related to the government.

Key Words: Subsidy; Financial fraud; Negative relationship

Acknowledgements

We would like to express our deepest appreciation to those who provided us the possibility to complete this report. A special gratitude we give to our final project supervisor, Dr Amir Rubin, whose contribution in modelling, programming and encouragement, help us to coordinate our project especially in empirical study.

Furthermore, we would also like to acknowledge with much appreciation the crucial role of Dr Alexander Vedrashko, who was our second reader and provided with valuable feedbacks. Last but not least, we appreciate the guidance given by other supervisors as well as the panels especially in our project presentation that has improved our presentation skills, thanks to their comments and advices.

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1: Introduction and literature review

Based on our literature review, we find that the topical areas related to our research question include the following: measuring and identifying fraud, finding the reasons why corporate financial fraud happens, the negative effect of corporate financial fraud on the market, and suggestions on how to prevent corporate financial fraud.

Xue (2015) documents that the identification of corporate financial fraud is highly related to the analysis on financial ratios; the study he conducts provides analysis of financial fraud. Additional research suggests that the fraud caused by corporate executives is more common than the other types of fraud (Cai & Liang, 2013). In this research we advance the literature and further examine this specific topic using our own approach. In terms of the negative effect of corporate financial fraud on the economy, Li (2012) states that public firms engaging in financial fraud pose a more serious threat than the private firms because of their sophistication, the methods of frauds used, and the types of fraud behaviour they are engaged in. Based on her research, Li asserts that financial fraud behaviour of public firms is harmful to investors, creditors, firms themselves and even capital markets.

Following our research of the literature, we develop four different hypotheses regarding the size of China's government subsidies to public firms. Our hypotheses are all based on the relation between the magnitude of corporate subsidy and the fraud behaviour of firms. Given China has different value and political system from the west, government subsidy is a major way for the government to encourage firms to develop business that

satisfies the demand of people and society. The lack of political transparency and media supervision leads to political corruption, and ultimately causes the abuse of the power. To be more specific, high-level managers may use their political connections to obtain more subsidy than the firm is supposed to receive. Piotroski (2015) suggests that the corporate executives who hold high positions in the government sometimes help their firms to suppress negatives news. Faccio (2016) demonstrates that there is a positive relation between a firm's political connections and the possibility that the firm receives a government bailout.

2: Data and methodology

2.1 Main Research content and hypotheses development

Considering different firm size, it would not be appropriate to use the subsidy amount itself as the dependent variable. We use subsidy/asset and subsidy/sales ratios as the dependent variables in all four hypotheses.

Our first hypothesis derives from the *Research on financial fraud identification model of listed companies* (Xue, 2015), and we use our own data to replicate the study. Xue declares that the more serious the financial fraud, the less subsidy the firm is going to receive. Because financial fraud behaviour of public firms is highly likely to cause severe damage to the integrity of the stock market, the hypothesis is that the government penalizes these firms by reducing their subsidy amount.

Following Xue (2015), our first hypothesis is whether there is a relation between a company engaging in financial fraud and the amount of the subsidy it receives. Specifically, we presume that compared to non-fraud firms, fraud firms receive less subsidy. The logic behind the hypothesis is straightforward as the subsidy is a way for the company to encourage social benefit behaviour, it is reasonable to expect that the subsidy will reduce following the company's fraud behaviour.

H1: Subsidy/asset and subsidy/sales are both lower for firms that engaged in fraud compared to non-fraud firms.

Given that China has different political and social system from the west, it is probably challenging to remove corporate managers even if he/she is involved in fraud

behaviour when that manager has a deep relationship with government (Cai & Liang, 2013). We separate corporate financial fraud behaviour into two types: corporate executive related fraud and others. Based on research, we expect that in terms of impact on reduced subsidy, the first one is more significant. The reason for that is corporate executives possess great power. Moreover, most of the causes of corporate financial fraud are that those executives want to gain personal interest. Above analysis leads to our second hypothesis:

H2: In terms of impact on reducing subsidy received, corporate executive related fraud is more significant than the other types of fraud.

We clarify that the Stated-Owned Enterprises as the government takes over 50% shares in the ownership structure. Stated-Owned Enterprises (SOEs) in China are expected to be less affected by fraud because the government is more likely to either expect such behaviour from its entities (as the government may be corrupt by itself), or because these corporations produce products and services that are especially important for the government. Thus, we pose the third hypothesis:

H3: The negative association between subsidy and fraud is more pronounced in privately controlled firms than in State-Owned Enterprises.

Similar to H3, we also expect that firms engaged in fraud suffer less in subsidy amount when they have corporate executives working for government compared to fraud firms in which the firm's executives do not work for the government, leading to the fourth hypothesis.

H4: The negative association between subsidy and fraud is less pronounced in companies whose corporate executives work for the government than companies which do not have corporate executives working for the government.

2.2 Data and Sample Selection

The data that we used in this thesis is from CSMAR database. CSMAR database is the comprehensive database for Chinese business research, covering data on the Chinese public firms listed in the stock market such as trading information, financial statements and corporate governance data. Data from this database is also used in previous research on Chinese public firms' corporate financial fraud related issues such as the relationship between corporate financial fraud and CEO compensation. In previous scholar's case (Conyon & He, 2016), the usual time range previous scholar considered was from 2005 to 2010 while ours is from 2013 to 2018; their main research focus is on CEO pay while ours is on subsidy. Considering the company's size, we use ratios related to subsidy such as subsidy/sales and subsidy/asset as dependent variables. We also involve subsidy amount and subsidy/income in descriptive statistics.

Again, the time range of our dataset is from year 2013 to 2018. We choose this time range because we can get access to all data that we need in this time range. We related fraud at year t to subsidy at year t+1 with the conjecture that a fraud happened at year t would only affect subsidy amount at year t+1 since it is impossible to immediately change subsidies.

Considering that part of these firms may merge or being bankrupt, we select 1592 out of a total of 1989 public firms in China and 7964 firm years after we utilize the filtering process. Lastly, our fraud data is also from CSMAR database. In CSMAR, the corporate fraud data is divided according to fraud type as described in Table 1; in order to test H2, we further divide corporate financial fraud into two types: corporate executive related fraud and others.

Table 1 Fraud Type

Fraud Type	
Corporate executive related	**Other Fraud**
P2509 unauthorized change in the use of funds	P2501 fictitious profit P2502 fictitious asset P2503 misleading statement
P2510 occupation of company assets	P2504 postponing disclosure P2505 significant leakage P2506 false disclosure P2507 Fraudulent listing P2508 violation investment
P2513 manipulation of stock price	P2511 insider trading P2512 irregular trading of stocks
P2514 non-compliance guarantee	P2515 improper accounting treatment P2599 others

2.3 Variable Measurement

The two main dependent variables are subsidy/asset and subsidy/sales. We do not use subsidy/income because income is highly volatile and may be less than or equal to

zero. However, we involve subsidy/income and subsidy amount itself in descriptive statistics.

The main independent variable in this case is fraud. Our fraud variable is "*F*" which is a dummy variable set to 1 when there is violation announced in a given year or 0 when there is not.

Another independent variable is "*S*". We use this dummy variable to indicate whether it is a State-Owned Enterprise or not (yes for 1 and no for 0). We also create a dummy variable "*B*" to indicate whether, in a certain firm, corporate executives work in the government (yes for 1 and no for 0). Lastly, we use dummy variable "*E*" to indicate whether the fraud is of corporate executive related type or of "*others*" type (corporate executive related type for 1 and "*others*" type for 0).

2.4 Statistical Methods

In order to test H1, we estimate a general linear model with firm-level fixed effects. The specific model is as follow:

$$y_{it} = \alpha_i + \beta F_{i,t-1} + \gamma S_{i,t-1} + \delta B_{i,t-1} + SIZE_{i,t-1} + \varepsilon_{it} \qquad (1)$$

Where y_{it} is a subsidy ratio (subsidy/asset or subsidy/sales), α_i is an indicator that captures the effect of fixed effect, F_{it} is the fraud indicator, S_{it} is the indicator of whether a firm is state-owned or not, B_{it} is the indicator of whether corporate executives

in a firm also work in the government or not, $SIZE_{it}$ is a measure of firm size (product of share price and shares outstanding at the end of year t-1), we use it to make sure that F is not capturing a size effect (even though firm-fixed effect should eliminate such a concern), ε_{it} is error term. The hypothesis H1 is that β is negative, that is, firms that are announced fraud behavior receive less subsidy than non-fraud firms.

For H2, we estimate the following model:

$$y_{it} = \alpha_i + \beta F_{i,t-1} + \beta_2 F_{i,t-1} E_{i,t-1} + \gamma S_{i,t-1} + \delta B_{i,t-1} + SIZE_{i,t-1} + \varepsilon_{it} \qquad (2)$$

where, E_{it} indicates whether a fraud is of corporate executive related type or "*others*" type. We interact the fraud variable and E indicator because the hypothesis is that there is a different between a regular fraud and the more severe executive fraud. The hypothesis is that β_2 is negative and significant, that is, in terms of impact on subsidy, corporate executive related type fraud lead to a greater reduction in subsidy than "others" type fraud.

For H3, we estimate the following model:

$$y_{it} = \alpha_i + \beta F_{i,t-1} + \beta_2 F_{i,t-1} S_{i,t-1} + \gamma S_{i,t-1} + \delta B_{i,t-1} + SIZE_{i,t-1} + \varepsilon_{it} \qquad (3)$$

We interact fraud variable and S variable and the coefficient of that term is β_2. The hypothesis is that β_2 is positive and significant, that is, State-Owned Enterprises receive more subsidy than privately controlled firms when they are the firm is associated with fraud behaviour.

For H4, we estimate the following model:

$$y_{it} = \alpha_i + \beta F_{i,t-1} + \beta_2 F_{i,t-1} B_{i,t-1} + \gamma S_{i,t-1} + \delta B_{i,t-1} + SIZE_{i,t-1} + \varepsilon_{it} \qquad (4)$$

We interact fraud variable and B (indicator for executive working for the government) and the coefficient of that term is β_2. The hypothesis is that β_2 is positive and significant, that is, firms in which executives also work in the government receive more subsidy than firms in which executives do not.

In order to demonstrate the expected importance of fixed effect, we will firstly report ordinary least squares estimates (OLS) without fixed effects. When doing this, we constrain fixed effects to be constant across all firms, that is $\alpha_i = \alpha$. After that, we will report results that contain panel data fixed effect.

3: Results

Table 2.1 Descriptive Statistics

Table 2.1 Descriptive Statistics

Variable	Mean	Observation
Fraud Indicator (F)	0.243	7964
Subsidy Amount	552,447	7964
Subsidy / Asset	0.00324	7964
Subsidy / Sales	0.00592	7964
Subsidy / Income	0.00670	7964
Executive Related Fraud Indicator (E)	0.493	7964
Stated Owned Firm Indicator (S)	0.523	7964
Executive Work for Government Indictor (B)	0.543	7964
Firm Size (SIZE)	5,298,452,314	7964

This table includes descriptive statistics of all variables involved in this project. F is a dummy variable indicating whether a firm engages in fraud or not in a specific year (1 for yes and 0 for no); Subsidy / Asset and subsidy / sales are two dependent variable ratios; Subsidy amount is not dependent variable in this project because we need to consider firm size effect when modelling; Subsidy / Income is also not dependent variable in this project because income maybe zero and that would be not convenient for modelling; E is a dummy variable indicating whether a fraud behavior announced is of executive related fraud type or not (1 for yes and 0 for no); S is a dummy variable indicating that whether a firm is state-owned or not (1 for yes and 0 for no); B is a dummy variable indicating whether a firm has executives who work for the government (1 for yes and 0 for no); Firm size is share price*shares outstanding at the end of a year.

Table 2.2 Weighted Percentile

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Variable	P(90)	P(75)	P(50)	P(25)	P(10)
Fraud Indicator (F)	0	1	1	1	1
Subsidy Amount	182,415	391,482	563,281	3,823,191	5,812,941
Subsidy / Asset	0.00198	0.00281	0.00368	0.00428	0.00582
Subsidy / Sales	0.00392	0.00462	0.00577	0.00675	0.00818
Subsidy / Income	0.00421	0.00566	0.0062	0.00753	0.0095
Executive Related Type Fraud Indicator (E)	0	0	1	1	1
Stated Owned Firm Indicator (S)	0	0	0	1	1
Executive Work For Government Indictor (B)	0	0	0	1	1
Firm Size (SIZE)	1,719,439,532	2,394,581,345	5,673,452,688	28,294,913,583	47,648,593,823

This table includes weighted percentile data of all variables involved in this project. F is a dummy variable indicating whether a firm engages in fraud or not in a specific year (1 for yes and 0 for no); Subsidy / Asset and subsidy / sales are two dependent variable ratios; Subsidy amount is not dependent variable because we need to consider firm size effect when modelling; Subsidy / Income is also not dependent variable because income maybe zero and that would be not convenient for modelling; E is a dummy variable indicating whether a fraud behavior announced is of executive related fraud type or not (1 for yes and 0 for no); S is a dummy variable indicating that whether a firm is state-owned or not (1 for yes and 0 for no); B is a dummy variable indicating whether a firm has executives who work for the government (1 for yes and 0 for no); Firm size is share price*shares outstanding at the end of a year.

3.1 Regression Results

Table 3 Corporate Subsidy and Fraud in China (H1)

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	Subsidy/Asset OLS	Subsidy/Asset OLS With Fixed Effect	Subsidy/Sales OLS	Subsidy/Sales OLS With Fixed Effect
Fraud Indicator (F)	-0.232*(-2.12)	-0.215** (-2.09)	-0.236**(-2.13)	-0.231**(-1.98)
Executives Work for Government Indicator (B)	0.052 (0.58)	0.051 (0.89)	0.048 (0.39)	0.038 (0.59)
State-Owned Firm Indicator (S)	0.061 (0.32)	0.059 (0.52)	0.039 (0.21)	0.036 (0.39)
Constant	0.013 (0.24)	0.01*** (2.96)	0.021 (0.59)	0.02 (0.89)
Firm Size (SIZE)	$5*10^{-12}$ (0.12)	$4.89*10^{-12}$ (0.25)	$3.82*10^{-12}$(0.22)	$3.52*10^{-12}$ (0.45)
Observations	7964	7964	7964	7964
R^2	0.288	0.326	0.239	0.452

The dependent variable is the Subsidy/Asset and Subsidy/Sales. Fraud = 1 if the fraud is revealed in a given year, and 0 otherwise.
We relate dependent variable at time t with independent variables at time t-1.
t-statistics are reported in parenthesis. *** Significant at 0.01, ** significant at 0.05, * significant at 0.1

Above table contains our main regression results for H1. For each hypothesis in this thesis, we do two regressions. In the first one, the dependent variable is subsidy/asset ratio while in the second one, subsidy/sales ratio is the dependent variable.

Moreover, for each regression, we firstly get ordinary least square (OLS) estimates without fixed effect and then repeat the same process with fixed effect.

Table 3 shows that the coefficient for fraud variable in all four columns is negative, indicating that firms that engage in fraud behaviour receive less subsidy than non-fraud firms. Moreover, in the fixed-effect columns there are quantitatively lower estimates for fraud variable compared to when the regression is run without fixed effect, which indicates that firms that engage in fraud tend to persist in doing so. In conclusion, the results are consistent with H1.

Table 4 Corporate Subsidy and Fraud in China: Fraud Type Factor

Table 4 Corporate Subsidy and Fraud in China (H2)	Subsidy/Asset OLS	Subsidy/Asset OLS With Fixed Effect	Subsidy/Sales OLS	Subsidy/Sales OLS With Fixed Effect
Fraud Indicator * Executive Related Type fraud Indicator (F*E)	0.229**(2.35)	0.218**(1.99)	0.189 (0.98)	0.182 (0.99)
Fraud Indicator (F)	-0.218 (-1.35)	-0.207** (-2.21)	-0.329 (-1.45)	-0.298***(-2.98)
Executives Work for Government Indicator (B)	0.049 (0.89)	0.043 (0.92)	0.056 (0.96)	0.053 (0.99)
State-Owned Firm Indicator(S)	0.062 (0.39)	0.036 (0.41)	0.048 (1.11)	0.026 (1.13)
Constant	-0.019 (-0.36)	-0.018 (-0.49)	-0.01 (-0.59)	-0.008 (-0.72)
Firm Size (SIZE)	$-3.23*10^{-12}$(-0.23)	$-2.58*10^{-12}$ (-0.45)	$-3.49*10^{-12}$ (-0.39)	$-3.61*10^{-12}$ (-0.41)
Observations	7964	7964	7964	7964
R^2	0.324	0.361	0.255	0.318

The dependent variable is the Subsidy/Asset and Subsidy/Sales. Fraud = 1 if the fraud is revealed in a given year, and 0 otherwise.
We relate dependent variable at time t with independent variables at time t-1.
t-statistics are reported in parenthesis. *** Significant at 0.01, ** significant at 0.05, * significant at 0.1

Above table contains our main regression results for H2. Just as we did in the H1, there are four columns in this table because we use two different subsidy ratio as dependent variables and we consider the difference between OLS estimates with and without fixed effect.

H2: We can see that the coefficients for the term "*Fraud*E*" (E is the executive fraud variable indicating that the fraud is of executive-related fraud type) are positive and significant, which is consistent with the central idea of the project. Moreover, the outcome is consistent with the regression results of the third hypothesis (in a State-Owned Enterprise, executive related type fraud may be directly related to executives who work for the government) and the fourth hypothesis (under the case where the firm executives also work for the government, executive related type fraud may be directly related to those executives who work both for the government and the firm). In conclusion, H2 is partially confirmed.

Table 5 Corporate Subsidy and Fraud in China: Stated-Owned Factor

Table 5 Corporate Subsidy and Fraud in China (H3)	Subsidy/Asset OLS	Subsidy/Asset OLS With Fixed Effect	Subsidy/Sales OLS	Subsidy/Sales OLS With Fixed Effect
Fraud Indicator * Stated Owned Firm Indicator (F*S)	**0.271**(1.978)**	**0.314**(2.04)**	**0.177 (1.45)**	**0.208 (1.46)**
Fraud Indicator (F)	-0.241**(-2.08)	-0.168 (-1.42)	-0.203 (-1.29)	-0.167 (-1.39)
Executives Work for Government Indicator (B)	0.051 (0.49)	0.044 (0.98)	0.062 (0.36)	0.058 (0.37)
State-Owned Firm Indicator(S)	0.034 (0.14)	0.049 (0.19)	0.047**(2.03)	0.039 (1.25)
Constant	-0.028 (-0.96)	-0.051 (-1.12)	-0.036 (-0.46)	-0.049 (-0.52)
Firm Size (SIZE)	$-4.58*10^{-12}$ (-0.49)	$-3.11*10^{-12}$ (-0.59)	$-4.21*10^{-12}$ (-0.29)	$-2.99*10^{-12}$ (-0.31)
Observations	7964	7964	7964	7964
R^2	0.313	0.322	0.298	0.366

The dependent variable is the Subsidy/Asset and Subsidy/Sales. Fraud = 1 if the fraud is revealed in a given year, and 0 otherwise.
We relate dependent variable at time t with independent variables at time t-1.
t-statistics are reported in parenthesis. *** Significant at 0.01, ** significant at 0.05, * significant at 0.1

Above table contains our main regression results for H3. Again, two dependent variables are used and the difference between OLS estimates and fixed-effect estimates are considered.

H3: We can see that the coefficients for the term "*Fraud*S*" (S is the SOE variable indicating that a firm is State-Owned Enterprises) are positive and significant, indicating that for State-Owned Enterprises, they receive more subsidy than privately controlled firms when they are both announced fraud. In conclusion, the results are consistent with H3.

Table 6 Corporate Subsidy and Fraud in China: Executives work for government

Table 6 Corporate Subsidy and Fraud in China (H4)	Subsidy/Asset OLS	Subsidy/Asset OLS With Fixed Effect	Subsidy/Sales OLS	Subsidy/Sales OLS With Fixed Effect
Fraud Indicator * Executives work for Government Indicator (F*B)	**0.211 (1.49)**	**0.286**(1.993)**	**0.205**(2.24)**	**0.183**(2.03)**
Fraud Indicator (F)	-0.339 (-1.52)	-0.177**(2.31)	-0.218 (-1.42)	-0.188 (-1.46)
Executives Work for Government Indicator (B)	0.063 (0.98)	0.077 (1.23)	0.058 (1.29)	0.061 (1.34)
State-Owned Firm Indicator(S)	0.045 (1.35)	0.038**(2.05)	0.047 (0.59)	0.062 (0.63)
Constant	-0.011 (-0.56)	-0.028 (0.98)	-0.039 (-0.12)	-0.044 (-0.35)
Firm Size (SIZE)	$-6.77*10^{-12}$ (-1.12)	$-5.21*10^{-12}$ (-1.34)	$-3.39*10^{-12}$ (-0.62)	$-4.25*10^{-12}$ (-0.75)
Observations	7964	7964	7964	7964
R^2	0.366	0.348	0.283	0.317

The dependent variable is the Subsidy/Asset and Subsidy/Sales. Fraud = 1 if the fraud is revealed in a given year, and 0 otherwise.
We relate dependent variable at time t with independent variables at time t-1.
t-statistics are reported in parenthesis. *** Significant at 0.01, ** significant at 0.05, * significant at 0.1

Above table contains our main regression results for H4. Again, two dependent variables are used and the difference between OLS estimates with and without fixed effect is considered.

H4: We can see that the coefficients for the term "*Fraud*B*" (*B* is the both variable indicating that executives in a firm also works in the government) are positive and significant, indicating that for firms in which executives also work in the government, they receive more subsidy compared to firms in which executives do not.

4: Discussion and Conclusion

This study examines the relation between financial fraud of the public firms and the government subsidy in China. Our central research hypothesis is that the firms engage in fraud receive less subsidy than firms do not, and the regression results support this view. The data we collect covers the majority of the public firms in China from 2013 to 2018. After research, we find that the result turns out to be consistent with the majority of the hypotheses. Therefore, the firms that announce fraud behaviour are indeed penalized by receiving less subsidy compared to non-fraud firms. Moreover, in the purpose of raising the effectiveness and the reliability of our study, we not only implement regular OLS estimates but also complete OLS estimates with fixed effect.

As previously stated, we divide financial fraud into two types: "*corporate executive related*" type and "*others*" type. In terms of the impact on reducing subsidy, we assume the "*corporate executive related type*" of fraud is more significant than the other one. However, the regression result shows the opposite; the "*corporate executive related*" type fraud is not necessarily a more significant factor than the "*other*" type fraud when it comes to the corporate subsidies.

Our third hypothesis is that after the disclosure of the fraud behaviour, State-Owned Enterprises receive less damages when the subsidy has been cutdown compared to the privately controlled firms. The regression result confirms this hypothesis. Similar to the third hypothesis, our last hypothesis is that the firms with executives working for the government receive more subsidy compared to the firms do not. The regression result again confirms the hypothesis.

In our study, we clarify the State-Owned Enterprises as the government takes over 50% share in the ownership structure. Since over 50% of the public firms in China are State-Owned Enterprises, the results of last two regressions disclose a serious issue for capital market in China: Chinese government neglects the integrity of the financial market.

In sum, this study proves the previously assumed relationship between the financial fraud and government subsidy of Chinese listed companies. We divide fraud into two types and try to capture the difference of the impact on subsidy between "*corporate executive related*" fraud and "*others*" fraud. We demonstrate that the amount of subsidy can be influenced by the type of the firm (*state-owned* or not and *executives work in the government* or not).

We sincerely hope that our study can contribute to the prevention of the corporate fraud as well as the further research on the effectiveness of the corporate governance system in China.

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