A GAME THEORY APPROACH TO ANTIFRAUD LEGISLATION IN CHINA'S SOCIAL INSURANCE FUNDS

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Social insurance fraud is a worldwide phenomenon; the deterrence of it is one of the most important tasks for governments and social insurance agencies. This paper develops a mixed strategy Game model of regulators and the regulated beneficiaries (regulatees) in the disbursal of social insurance benefits, and establishes each side's best strategies during the game process. Based on China's civil law, criminal law and social insurance law, using the results of mixed strategy Nash Equilibrium analysis, it is possible to conclude that fraud punishment should be specified by law and regulations when regulatees commit malpractices; regulators should pursue low-cost offsite regulation in the mean time use the rules of rewards and punishments according to work efficiency. Based on the analysis of game theory, legislative suggestions should be provided to develop laws and regulations in China, such as social insurance funds supervision and management regulation, and social insurance antifraud regulation.

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INTRODUCTION

Social insurance fraud is a general problem all over the world, both in developed and developing countries. The UK Fraud Act 2006 of introduced a new offence of fraud which can be committed in three ways: by false representation, by failing to disclose, and by abuse of a position of trust.[1] In the UK, although pension fund fraud has been relatively rare, its impact on individuals in these rare cases can be significant.[2] Recent research by Levi and Burrows has conservatively estimated the extent of fraud at £14 billion per annum.[3] A more recent report has indicated that fraud costs the UK over £30 billion a year, in which the Department for Work and Pensions (DWP) loses £1.1 billion through benefit fraud.[4]

In the US, the conventional wisdom is that as much as 10 percent of total spending on health care, i.e. approximately $115 billion a year, is lost to fraud, waste, and abuse.[5] According to the US Attorney General Eric Holder, health care fraud remains a significant problem, costing the public and private sectors more than $60 billion each year.[6]

In China, violation of social insurance funds management law incurred increasingly with the rapid enlargement of funds scale, with the astonishing case of the Shanghai social security funds in 2006 serving as a prime example.[7] Since then, the public, scholars and legislatures have reached a

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[1] Fraud Act, 2006, c. 35 (U.K.). This Act provides for criminal liability for fraud and obtaining services dishonestly.

[2] David Blake, *UK Pension Fund Management after Myners: The Hunt for Correlation Begins*, 4 JOURNAL OF ASSET MANAGEMENT, 32-72 (2003).

[3] Michael Levi & John Burrows, *Measuring the Impact of Fraud in the UK: A Conceptual and Empirical Journey*, 3 BRITISH JOURNAL OF CRIMINOLOGY, 293-318 (2008).

[4] *See* Helen Pow's report, *Fraud Costs the UK £30bn a Year*, January 22, 2010, THE MONEY MARKETING's website at: http://www.moneymarketing.co.uk/politics/fraud-costs-the-uk-%C2%A330bn-a-year/1005404.article.

[5] David A. Hyman, *Health Care Fraud and Abuse: Market Change, Social Norms, and the Trust "Reposed in the Workmen"*, 2 THE JOURNAL OF LEGAL STUDIES, 531-567 (2001).

[6] The first National Summit on Health Care Fraud, "Health Care Fraud Costs U.S. More Than $60 Billion Annually: DOJ (Department of Justice)", January 28, 2010, CCH INTERNET RESEARCH NETWORK's website at: http://hr.cch.com/news/benefits/021210.asp.

[7] The 2006 Shanghai case is one of the worst scandals concerning social insurance funds in China. Chen Liangyu, secretary of the Shanghai Municipal Committee of Communist Party of China, was sacked for his involvement in a social security fund scandal. Zhu Junyi, director of the Shanghai Municipal Bureau of Labour and Social Security, was stripped of his post in August 2006. The 55-year-old city official is suspected of misconduct involving a 3.2 billion yuan (400 million dollars) loan of social security funds to a private toll road operator. *See* report of Xinhua news agency at: http://news.xinhuanet.com/english/2006-09/25/content_5134994.htm.

consensus that relevant laws should be enacted as soon as possible, which could supervise the social insurance funds' collection, management and distribution. The newly adopted *Social Insurance Act* prescribes in general terms that "the state takes strict supervision on social insurance funds", and sets up a specific chapter to rule the funds, but there remains a lack of effective measures in antifraud. According to our site survey on social insurance funds legislation in 18 provinces across China, social insurance fraud exists in all of the provinces, and occurs at every stage-from collection to payment. Some entities and individuals practice fraud by taking advantage of leaks in social insurance business, leading to a loss in social insurance funds.[8] So far because of no specific social security law was enforced, the highest rank of administrative rule is "Interim Regulations on the Collection and Payment of Social Insurance Premiums"; consequently, lack of relative law and penalties usually impede punishment for violations. As a result, Zhou and Lang advised to enact legal explanation or amendment of Criminal Law so as to build and develop social insurance funds criminal protection system.[9] Further study from Chen and Cheng put forward the idea of adding "social security fraud" in Criminal Law, on the ground of improving social security legal system, and raising judicial supervision effectiveness.[10]

Prevention of the worldwide fraud in social insurance field is an enormous task for regulators. The elements which are important in the deterrence of fraud should influence the direction of endeavour and the allocation of resources to fight it. Some economist used the principal-agency model to describe the relationship between auditor and auditee. Melumad and Mookherjee showed that the principal might implement any optimal random audit strategy by delegating responsibility for audits to an independent auditor, and committing instead to a simple incentive contract

[8] From 2007-2010, sponsored by the Carter Center of the former US President Jimmy Carter, and organized by the author and the Center for Law and Economics of China University of Political Science and Law, a group of teachers and students conducted a site survey on social insurance funds legislations in 18 provinces across China. The sites include Beijing, Shanghai, Heilongjiang, Liaoning, Jilin, Hebei, Inner Mongolia, Ningxia, Shanxi, Shaanxi, Henan, Hunan, Chongqing, Sichuan, Jiangsu, Guangdong, Guangxi, and Zhejiang.

[9] Zhou Baomei (周宝妹) & Lang Junyi (郎俊义), *Shilun Shehui Baoxian Jijin de Xingfa Baohu* (试论社会保险基金的刑法保护) [*Criminal Law Protection of Social Insurance Funds*], 4 FAXUE ZAZHI (法学杂志) [JOURNAL OF LAW SCIENCE] (2001).

[10] Chen Xinyong (陈信勇) & Cheng Min (程敏), *Lun Shehui Baoxian Qizha de Xingfa Guizhi*, (论社会保险欺诈的刑法规制) [*Criminal Regulation of Social Insurance Fraud*], 4 GUIZHOU SHIFAN DAXUE XUEBAO (贵州师范大学学报(社会科学版)) [JOURNAL OF GUIZHOU NORMAL UNIVERSITY] (2006).

for this auditor.[11] Mookherjee and Png specified an objective function and showed that the audit strategy should always be probabilistic, in addition to establishing some common properties of the reporting strategy.[12]

Some scholars attempted to solve the problem from the view of law. Hyman distinguished between raw fraud and other fraud or errors related problems: when dealing with raw fraud, an aggressive fraud control regime is absolutely essential.[13] The regulator should begin the hard work of establishing the antifraud system for ensuring compliance accordingly. Krause considered in making health care fraud recovery more patient-centered, the better way is amendments of current US's federal law to permit either direct compensation of injured patients or a broader co-payment fund.[14] Button and Brooks suggested the government could develop an antifraud culture by two strategies: staff awareness training and screening procedures were explored in depth.[15]

Most social security beneficiaries may in fact be honest and understand that fraud means a lower level of benefits for them, so it is iffy to presuppose that most beneficiaries are or want to be dishonest. But as the regulator and regulatee are in opposing positions, as rational economic individuals, they will play to the maximum how they can get the most payoffs, in similar situations to the policeman and the thief, or the auditor and the audited. That is why some scholars use Game Theory to describe the procedure of regulation or auditing, and to investigate a better way to deter fraud.

Game Theory is trying to explain human behavior through mathematical techniques. It has been applied successfully in some research areas like biology, psychology, and behavior analysis. Currently, its core principle is not only utilized in nearly all aspects of economic activity, but has also been introduced in a wide range of classic economics textbooks. Nobel Prize laureate Myerson believes that formulation of the Nash equilibrium has had a fundamental and pervasive impact on economics and

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[11] Nahum D. Melumad & Dilip Mookherjee, *Delegation as Commitment: The Case of Income Tax Audits,* 2 THE RAND JOURNAL OF ECONOMICS, 139-163(1989).

[12] Dilip Mookherjee & Ivan P. L. Png, *Optimal Auditing, Insurance, and Redistribution*, 2 THE QUARTERLY JOURNAL OF ECONOMICS, 399-415(1989).

[13] *See supra* note 6.

[14] Joan H. Krause, *A Patient-Centered Approach to Health Care Fraud Recovery*, 2 THE JOURNAL OF CRIMINAL LAW AND CRIMINOLOGY, (2006).

[15] Mark Button & Graham Brooks, *'Mind the Gap', Progress towards Developing Antifraud Culture Strategies in UK Central Government Bodies*, 3 JOURNAL OF FINANCIAL CRIME, 229-244 (2009).

social sciences, which is comparable to that of discovery of the DNA double helix in the biological sciences.[16]

According to the general hypothesis of game theory, players are all rational economic actors, which mean that they pursue the maximization of payoff or advantage under certain constraints. The derivation of individual utility functions rely not only on ones own choice, but also on his antagonist; in other words, an individual's best choice functionally decided by choices both of himself and his antagonist's. No matter how people decide, what they do consists with certain fundamental principles, which include strictly dominant strategy.[17] A rational economic actor will maximize the expected utility function after choosing strictly dominant strategy.[18] The true meaning of rationality is that people will choose the best countermeasure considering what his antagonist's potential decision is. Otherwise, they would have no motivation to react when rivals keep still, just like a chess game ends with stalemate. Nash Equilibrium is one of the best ways to maximize legal effect; otherwise expected efficiency is not easy to achieve. From the point view of microeconomics, in a certain legal relationship, the power that affects a party's behavior from both sides. As a result, it is more precise to define people's behavior as countermeasures than as reactions under legal rules. Meanwhile, no other instruments are better than game theory in analyzing non-market systems and imperfectly competitive markets, such as law. That's why game theory is becoming the leading analyzing formula in law and economics.[19]

Some scholars take game theory as a useful tool to solve problems in the analysis of regulation and audit. Morton established his own Game model and found that only a costly audit can directly verify the report and impose penalties when fraud is discovered. The optimal audit policy was found to involve a stratified random audit, together with prior analytical review which provides a reasonableness check on the findings of the audit report in the light of prior information. Morton's results show the auditor's strategy to be both probabilistic and contingent. The owner decides to audit

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[16] Roger B. Myerson, *Nash Equilibrium and the History of Economic Theory*, 37 JOURNAL OF ECONOMIC LITERATURE, 1067-1082 (1999).

[17] DOUGLAS G. BAIRD, ROBERT H. GARTNER & RANDAL C. PICKER, GAME THEORY AND THE LAW (Harvard University Press 1998).

[18] In-Koo Cho & David M. Kreps, *Signaling Games and Stable Equilibria*, 102 QUARTERLY JOURNAL OF ECONOMICS, 179-221 (1987).

[19] Wei Jian (魏建), *Lixing Xuanze yu Fajingjixue de Fazhan* (理性选择理论与法经济学的发展) [*Rational Choice Theory and Development of Law and Economics*], 1 ZHONGGUO SHEHUI KEXUE (中国社会科学) [JOURNAL OF CHINA SOCIAL SCIENCE], 101-113 (2002).

with a positive probability or not to audit at all.[20] Cushing used the well-known prisoner's dilemma game in an audit context to construct a mathematically complex model in a specific audit issue. Cushing's advantage is in its intuition and understandability to those less familiar with more mathematical or rigorous game theory applications.[21] Coate et al built up a chicken Game model to describe client-auditor financial reporting and audit effort strategies. By modeling the client decision to misstate or not misstate financial statements and the auditor decision to provide or not provide the effort to detect misstatements, the authors found that if the client is ethical but not competent, failed audits and over auditing are become unavoidable.[22]

Game Theory's method is to simplify a situation by describing it in terms of players, actions, payoffs, after which the players' strategic interactions can be described. Whether used explicitly or implicitly, this is a highly useful approach to law.[23] Johnston designed a sequential Game model in regulatory cost-benefit analysis, to study a regulatory agency's incentive in considering both the costs and benefits of a potential regulation. His sequential Game model generates a number of non-intuitive insights into the regulatory process: The regulatory agency generally will internalize some of the compliance costs; lobbying itself may generate socially valuable information.[24]

This paper aims to apply another Game model to analyze legal problems concerning social insurance funds antifraud in China. Not like Johnston's regulation model, here we use mixed strategy Game model just as a simplified tool to analyze the regulating process. Considering weakness of research on social security funds antifraud theory, the questions are: which elements are more important in antifraud regulation? How do various interest groups maximize their benefit during enacting process? From microeconomic point of view, and based on interest groups' game strategies, how can opportunism of both regulator and regulatee are eliminated?

The rest of the paper is organized as follows. Part I establishes the mixed strategy Game model which simplifies the regulator and regulated into two parties, and calculates the optimal probability of action for each

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[20] Sanford Morton, *Strategic Auditing for Fraud*, 4 THE ACCOUNTING REVIEW, 825-83(1993).
[21] Barry E. Cushing, *Economic Analysis of Accountant' s Ethical Standards: The Case of Audit Opinion Shopping*, 18 JOURNAL OF ACCOUNTING AND PUBLIC POLICY, 339-363 (1999).
[22] Charles J. Coate, Robert E. Florence &Kristi L. Kral, *Financial Statement Audits, a Game of Chicken?*, 1/2 JOURNAL OF BUSINESS ETHICS, 1-11(2002).
[23] ERIC B. RASMUSEN, GAME THEORY AND THE LAW (Edward Elgar Pub. 2008).
[24]Jason Scott Johnston, *A Game Theoretic Analysis of Alternative Institutions for Regulatory Cost-Benefit Analysis*, 5 UNIVERSITY OF PENNSYLVANIA LAW REVIEW, 1343-1428 (2002).

side. Part II surveys the implications of the Game model for the real world, and sets out the regulatory application of the model. Part III based on the above analysis, review legal elaboration and amendment, and give suggestions for the legislation of antifraud in social insurance funds of China. Finally is the conclusion in Part IV.

I. A GAME THEORY MODEL OF ANTIFRAUD

Premium collection is the first step of building up social insurance funds. As a result, collection regulation is of crucial importance; otherwise, it is almost impossible to establish well functioning social security system. In fact, collection is conducted by local tax bureaus in most areas of China, while collection of social insurance premium and tax collection are similar; the tax examination model suggested by Zhang can therefore be borrowed to build a regulation model of social insurance premium collection.[25]

The distribution procedures of benefit payment are the same important process in social insurance funds. As a matter of fact, pension benefits are often falsely claimed by relatives after pensioners have died; fraud offences happen even more commonly in medical insurance area, such as refunding other person's medical fee, buying cosmetics and daily necessities by using the medical insurance card.[26] Even though the *Interim Regulations on the Collection of Social Insurance Premiums* and *Regulations on the Auditing of Social Insurance Premiums* have been issued to regulate fraud offences, the lack of systematic legal support makes difficult to solve frauds, and a large amount of pension and Medicare fraud has not been detected or has gone unpunished.

Analyzing the parties' relationship under game theory in social insurance benefit claim, we can build a model which has two sides: regulator and regulated (regulatee). We assume they are both rational economic actors, the goals of regulator are to detect fraudsters and punish them; for the other side, goals of regulatee clients are to maximize their utility, by falsely claiming as much as possible under the condition of weak supervision. Therefore, the game of complete information model between regulator and regulate can be constructed as Figure 1.

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[25] ZHANG WEIYING (张维迎), BOYILUN YU XINXI JINGJIXUE (博弈论与信息经济学) [GAME THEORY AND INFORMATION ECONOMICS] 108-110 (Shanghai People' s Publishing House 1996).

[26] This kind of cases are commonly observed nationwide; for example, Medical Insurance Centre in Anhui Province detected 92 false claim cases first quarter in 2005, more than 300,000 RMB wee involved. *See* He Cong (何聪), *Pianbao Zhidu Pinfa Tuxian Yibao Jizhi Loudong* (骗保频发凸显医保机制漏洞) [*So Many False Claims Strongly Indicates the Loopholes of Medical Insurance Mechanism*], RENMIN RIBAO (人民日报) [PEOPLE'S DAILY] (July 28, 2005).

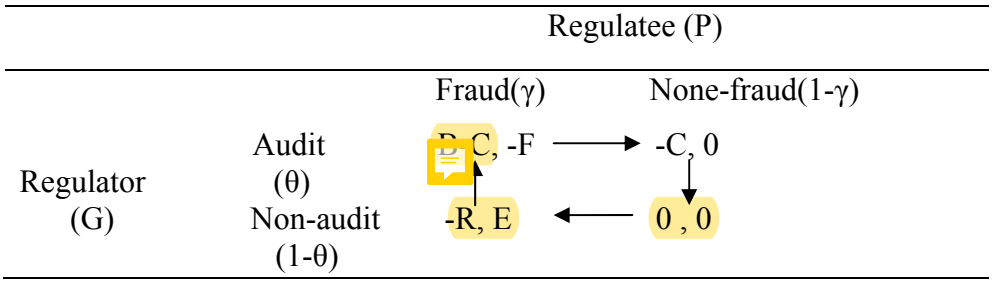

Figure 1 Game between regulator and regulatee

The game is a static closed game. There are two types of strategies in front of the claimant: to defraud or not; two options also can be selected by the regulator: to audit or not. Game players make their decisions all based on the common knowledge and information they share, then the game begins.

Let us begin with both sides choosing to maintain the status quo, the consequent result is that regulatee receives ordinary benefit, while regulator gains ordinary reputations, promotion and even income; neither of them get unexpected extra benefit or loss, and we quantify the payoffs as "0" for regulator and regulatee.

The second combination is that the regulator does nothing when the regulatee defrauds; as a result, the regulatee received the payoff of extra illegal income E (Extra income), while the regulator received the payoff of losing reputation–R (Reputation). Reputation here involves higher honour, getting promotion, and respect by the public.

The third combination is that the regulator effectively detects when fraud happens and the regulatee must pay a fine in addition to extra illegal benefits (E) confiscated, thus receiving the payoff of net income for regulatee is-F (Fine), which is calculated as a multiple of E in the real world. Meanwhile, the regulator needs to pay audit cost C (Cost), such as pay for staff, running expenses, the opportunity cost of time not spent and so on. Besides, the regulator is rewarded with a B (Bonus) for their excellent work; hence the total received payoff of benefit for regulator now is B-C. An assumption here is $B-C > -R$, or $B+R > C$, showing that for regulator, aggregation of reputation R and bonus B is more important than audit cost C. This is an extremely fundamental assumption: considering the reputation of himself and bonus, the regulator will not avoid his responsibilities; in other words, once fraud can be ascertained, the regulator definitely will react to deal with it.

The fourth-also the last combination is that the regulator spends audit cost C but no offence happens therefore there is no bonus B for the

regulator; consequently he received payoff of income is-C, at the same time extra income for the regulatee received payoff is 0.

Here E, R, F, C and B are all positive.

The game matrix as following shows different benefits of regulator and regulatee we described above; data in the left panel of each column represents regulator's payoff, while data in the right panel is regulatee's gain. Vertical arrows follow the dominant strategy for the regulator; horizontal ones follow the dominant strategy for the regulatee. Here θ represents audit probability for the regulator, 1-θ means non-audit probability; γ represents fraud probability of the regulatee, 1-γ represents non-fraud.

In this game there is not a pure-strategy of Nash equilibrium such as the famous game of prisoners' dilemma; but more like a game of policeman and thief. The regulator could be considered as policeman, whereas the regulatee thief. Once the regulatee chooses to defraud, the best strategy for regulator obviously is audit, then they perfectly undertake their job conscientiously and thoroughly even though a certain level of cost is incurred. On the contrary, when regulator takes measure of auditing, the best choice for regulatee is not to defraud. In that case, the regulator is prone to non-audit when the regulatee's behaviour is legitimate, and they finish their duty without any payment.

From the game matrix we can assume the regulatee's highest payoff comes from an undetected fraud, which is E. The regulatee's lowest payoff comes from a detected fraud, which is-F. The regulatee wishes to attempt a fraud only, when it will not be detected and non-fraud only when the regulator performs non-audit. The regulator's highest payoff is when the regulatee defrauds and he detects, which is B-C. The regulator's lowest payoff is-R, in fact negative, occurs when there is an audit failure and the regulatee's fraud goes undetected.

However, regulatee will never give up the chance to defraud when he understand that regulator is negligent in auditing. For that reason, the result of this game cannot be predicted, because of no automatic equilibrated strategy combination exists in such one-shot game as coin toss. What is crucial for both sides is to keep individual strategy confidential inside, make decisions randomly outside, and the decisions one made cannot be viewed by the other side. Practically speaking, the regulator randomly checks claims using probability/statistical analysis, and the regulatee defrauds by following the regulator's auditing approach and strategy. As a random game, just like Morton described, the key issue is calculating the probabilities when the mixed strategy Nash equilibrium reached, i.e., the optimum value of probabilities θ and γ.

Assuming the regulatee's probability of fraud is γ, the regulator's expected benefits realized through auditing (in the upper line) or not (in the under line) are, respectively:

In the upper row: $\pi_G(1,\gamma) = (B-C)\gamma + (-C)(1-\gamma) = \gamma B - C$ (1)

In the lower row: $\pi_G(0,\gamma) = -R\gamma + 0(1-\gamma) = -R\gamma$ (2)

According to the assumption of the Regulatee does his best to escape from auditing, γ^* represents the optimum probability of fraud. Then the Regulator' expected benefits are the same no matter how he audits or not. Given that (1)=(2), we can calculate the optimum probability of γ^*:

$$\gamma^* = \frac{C}{B+R} \quad (3)$$

We could illustrate the above result on the following chart (Figure 2):

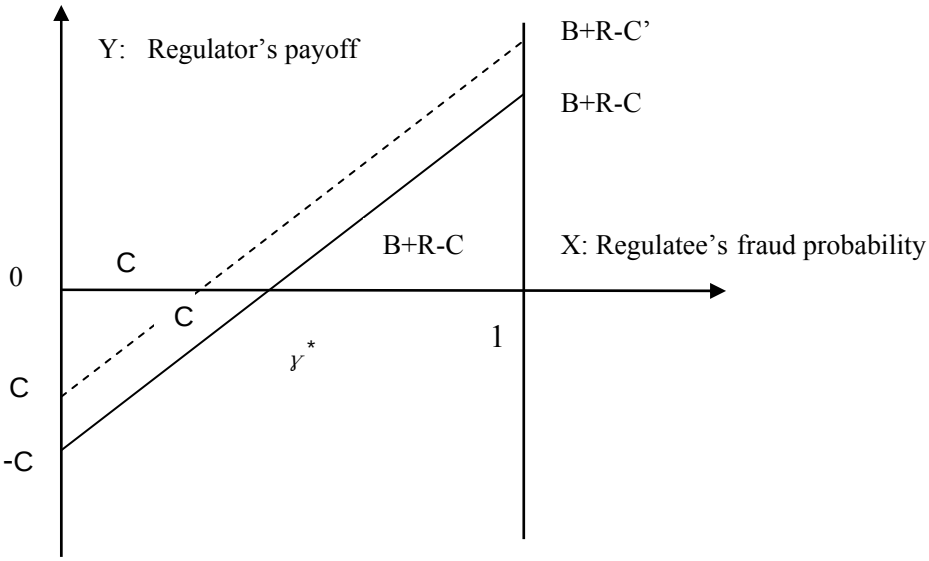

Figure 2 The regulator' payoff varying from regulatee's fraud probability

From the diagram we can see: when regulatee's fraud probability is 0, i.e. no fraud, the regulator's payoff is-C; when regulatee's false probability is 1, or definitely fraud, the regulator's payoff is B+R–C. The line-C—B+R-C cross the X axis on γ^*, that is the regulatee's optimum fraud probability. If the regulator's audit cost C decreases to C', the line-C—B+R-C will mean move to-C'—B+R-C'. Then γ decreases, which means regulatee's optimum false probability reduces when the regulator's audit cost decreases.

Similarly, we can calculate the regulator's optimum audit probability. Given the probability of auditing θ, the regulatee's expected benefits with fraud (in the left column) or not (in the right column) are, respectively:

In the left column: $\pi_G(\theta,1) = (-F)\theta + E(1-\theta) = E - \theta(E+F)$ (4)

In the right column: $\pi_G(\theta,0) = 0\theta + 0(1-\theta) = 0$ (5)

Assuming that (4) = (5), we can calculate the optimum value of probability in auditing:

$$\theta^* = \frac{E}{E+F} \quad (6)$$

We can illustrate the above result on the following drawing(Figure 3):

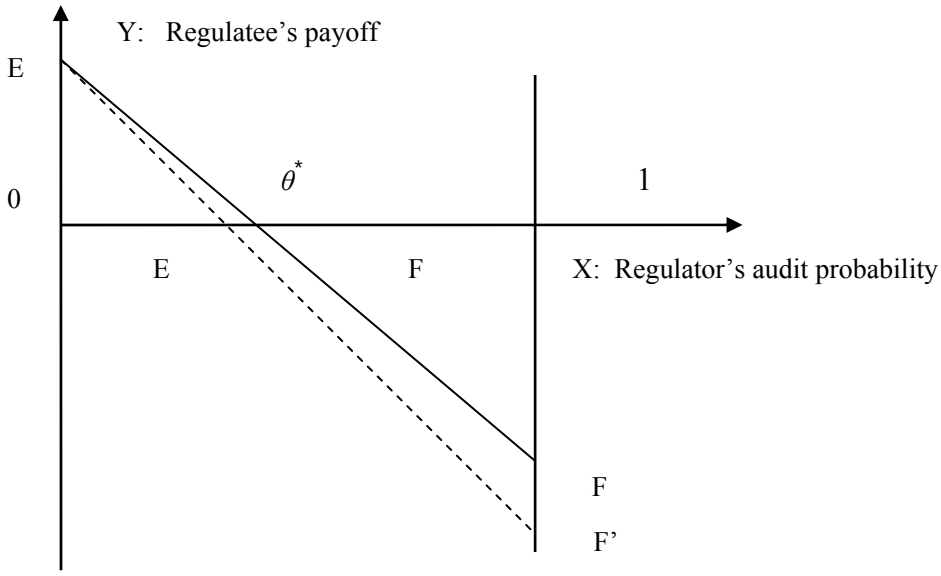

Figure 3 The regulatee's payoff varying from regulator's audit probability

From the diagram we can conclude that when the regulator's audit probability is 0, or there is no audit, the regulatee's payoff is E; when regulator's audit probability is 1, or there is a (statutory) requirement for audit, the regulatee's payoff is–F. The line EF cross the X axis on θ^*, that is the regulator's optimum audit probability. If the regulatee's punishment F increases to F', the line EF will move to EF'. Then θ decreases, which means regulator's optimum audit probability reduces when the regulatee's detected fine increases.

Based on separate analyses with mixed strategy on both sides above, we can establish the mixed strategy of Nash equilibrium in this game is:

$\theta^* = \frac{E}{E+F}$ and $\gamma^* = \frac{C}{B+R}$

This means, unlike Morton's (1993) "random audit", the probability of a regulator audit is $\frac{E}{E+F}$; and the probability of a regulatee committing fraud is $\frac{C}{B+R}$ accordingly.

For social insurance clients (regulatees), the illegal profit from fraud is E and loss F after being detected represents power of law execution. The relationship between E and F all are important elements for regulatees. The constraints assumed here are common in the literature on the economics of crime (Becker 1968 and Stigler 1970), namely that the "punishment must fit the crime" or that the loss that can be imposed on the fraudster is some increasing function of the size of the fraud. Linear penalties are the most plausible approximation to the outcome of a complex and uncertain judicial process. So obviously, when E >F, the regulatee chooses to violate law because the punishment counts for little even if he is detected. Only if the legal penalty F is much greater than the illegal profit E, does the regulatee choose to obey the law, therefore the stronger legal penalty F is, the lower the probability of offences happening and the need for auditing to take place. As F>>E, we can assume that $\theta^* = \frac{E}{E+F} << 0.5$, which means that the regulator's probability of finding violations is a small one, which is accord with the situation in real world. As an example, the newly adopted *Social Insurance Act* of China stipulates the fraud penalty will be 2-5 times of the amount of involved money.[27]

For the other side in game, the regulator pays the auditing cost to get honour, reputation and promotion. It is difficult to qualify intangible assets like honour, reputation and promotion from higher authorities and public; thus the cost-efficiency of audit becomes vital, as well as for lower offence probability. Reputation accumulates as an intangible asset and signals is very important for the regulator. For example, strict antifraud thorough examination of benefit awards transactions and (for collection purposes) payroll become a deterrent for the regulatee, otherwise, lenient or non examination leads to the spread of fraud. Considering all the above, establishing effective supervision by legislation should encourage the regulator themselves to fulfill their duties. Furthermore, a rising reputation from public means increasing the denominator of $\frac{C}{B+R}$, therefore discouraging frauds.

To see how the model works, consider the following example. Suppose all that the regulator and the regulatee know about regulatory benefits and

[27] Shehui Baoxian Fa（社会保险法）[Social Insurance Law of China] (promulgated by the Standing Comm. Nat'l People's Cong., Oct. 28, 2010, effective July 1, 2011) (P. R. C.), Art. 87: "whoever commits fraud of social insurance funds payment by using forged or altered certificates or any of other means, the department in charge of social insurance administration shall order he/she returns the benefits, imposes a fine at an amount equivalent to two to five times the amount of involved money."

costs in this game: C=$25, B=$500, R=$500, E=$2,000 and F=$6,000, while we could get:

$$\theta^* = \frac{E}{E+F} = \frac{2000}{2000+6000} = 25\%$$

$$\gamma^* = \frac{C}{B+R} = \frac{25}{500+500} = 2.5\%$$

It means that a regulator's optimum audit probability θ^* is 25%, depends on the regulatee's fraud benefits (E) and punishment (F). Here the quantity of E($2,000) and F($6,000) are reasonable, so the regulator must do his best to deter fraud at a probability of 25% to do locale audit work, although this kind of work must costs his $25 every time. A regulatee's optimum fraud probability γ^* is 2.5%, only depends on the regulator's auditing cost(C), reputation(R) and bonus (B). The quantity of C ($25), B ($500) and R ($500) maybe not so reasonable because of the B and R are very difficult to measure, the fraud probability 2.5% is a reasonable one. If B and R are larger, the fraud probability will become smaller. It will imitate the real world's situation: there are rare fraudsters dare to cheat the regulators to get the extra illegal benefits, but the regulator must do some checking, auditing and monitoring work in their routine regulating process.

In light of the analysis above, we can conclude that the key points in the game between regulator and regulatee consist of excess illegal benefits of frauds (E), severity of punishment F, the regulator's auditing cost C, bonus B and reputation R. This gives rise to another problem called "paradox in regulation": the regulator's audits in the probability varies directly with regulatee's fraud benefits E and punishment F, but has nothing to do with his own elements C, B, or R; the regulatee's likelihood of committing an offence mainly depends on the regulator's audit Cost (C), Bonus (B) and Reputation (R), but are unrelated to his own fraud benefits (E) and punishment (F). This paradox in regulation indicates that both players' optimum decisions are driven by their opponents' strategy and tactics, showing further characteristics of "strategy theory" in this mixed strategy game.

II. What the Game Theory Model Implies to the Real World

Mixed strategy Nash Equilibrium is based on the assumption of the game is static. Practically speaking, this model doesn't exist in reality just like a frictionless world exists only in physics theory. Models can approach the facts very closely, but they can never be reflected the real world itself. However, there is no doubt that the analytical model provides us effective ways to solve what happens in practice.

A. Fortify Legal Executive Power and Reduce the Temptation of Fraud

The opportunity to gain illegal excess benefits drive the regulatee to violate the law. According to Becker[28] and Stigler[29], the optimal amount of enforcement is shown to depend on the cost of catching and convicting frauds, the nature of punishments and the responses of fraudsters to changes in enforcement. It means an independent decision maker weighing the costs and benefits of a criminal act, chooses to commit the crime only when the expected gain exceeds the expected cost of punishment. The truth is that potential fraudsters are reluctant to break the law when strict punishment is in place. They can weigh illegal benefits and legal consequences before action. They choose to commit offences when legal power is weak, or vice versa.

The model also tells us that maintaining normal claim order not only depends upon enforcing legal power F, but also on dropping down illegal profits as much as possible; only by these ways can we deter the regulatee from committing frauds. To do so, we need to establish a social insurance legal system, leaving no loophole for fraudsters. In addition to the antifraud law making powers, law enforcement powers must be allocated.[30] Especially in China, as there are a plenty of social insurance beneficiaries viewed fraud just as a default then criminal, and there are not enough "incomplete" laws to deter social insurance fraud, law enforcement is one of the most important elements to deter fraud.

The current situation of social insurance funds in China is characterized by a lack of superior norms as a framework, there are no charges related to social insurance in *Criminal Law* that is why it is difficult for the regulator to convict or sentence fraudsters. Actually, the current maximum fine for fraudsters is just RMB20,000 (or $3,000) in *Interim Regulations on the Collection of Social Insurance Premiums*.[31] Considering

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[28] Gary S. Becker, *Crime and Punishment: An Economic Approach*, 76 JOURNAL OF POLITICAL ECONOMY, 169-217 (1968).

[29] George J. Stigler, *The Optimum Enforcement of Laws*, 78 JOURNAL OF POLITICAL ECONOMY, 526-536 (May/June 1970).

[30] Katharina Pistor & Xu Chenggang, *Incomplete Law*, JOURNAL OF INTERNATIONAL LAW AND POLITICS, 931-1013 (2004).

[31] Shehui Baoxianfei Zhengjiao Zanxing Tiaoli(社会保险费征缴暂行条例) [Interim Regulations on Collection and Payment of Social Insurance Premiums] (promulgated by the St. Council, January 22, 1999, effective Jan. 22, 1999) (P. R. C.), art. 24: If a unit paying premiums violates relevant financial, accounting or statistics laws or administrative regulations or relevant State regulations, or forges, alters or intentionally destroy relevant account books or documents, or fails to keep accounts, thereby making it impossible to determine the base number for the collection and payment of social insurance premiums, it shall not only be subjected to administrative penalties, disciplinary punishment and/or criminal prosecution in accordance with the provisions of the relevant laws and administrative

the background of rapid economic development in China, this amount is far too small to deter fraudsters. For that reason, confirming fine in relation to some regularly updated standard (such as the average locality wage) as a principle must be mentioned when laws are enacted or amended. Consequently, the opportunity cost becomes high enough to stop the regulatee from committing offences.

B. Choosing Off-site Supervision by the Reason of Lower Cost

A strategically rational regulator will realize that the higher is the regulatee's compliance cost, the higher will be the amount that the regulatee will spend challenging the regulation in court, and hence the higher will be the regulator's optimal cost in defending the regulation.[32] According to the above Game model, we know that auditing costs significantly affect offence probability: The higher auditing cost, the higher probability of offences. Here we must have the presuppositions: Audit is primarily post event, not preventive ex ante; audit is ineffective at discovering fraud; and detection leads either to no sanction or low sanction. In these cases high cost audit may indicate that the system is weak and ineffective and therefore encourage more fraud than if there was low regulation. This reminds us to cut down auditing cost as the best measure to deal with premium evasion and fraud. Locale (on-site) auditing costs more because greater human resources, operational expenses, and down-time are spent. The off-site auditing measures principle in *the Law of the People's Republic of China on Regulation and Supervision over the Banking Industry* are reasonable enough to be borrowed.[33] At the local governmental level, Beijing Local Taxation Bureau has applied internet audit system to personal income tax, comparing, analyzing and examining tax application submissions by specific computer procedures, so the tax evasions of withholding payers and tax payers can be detected and corrected promptly.

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regulations, but it shall also make payment in accordance with Article 10 of these Regulations. If it delays payment, the administrative department of labor security or the tax authority shall decide to impose a late-payment fine in accordance with Article 13 of these Regulations and impose a fine of not less than 5,000 yuan and not more than 20,000 yuan on the person in charge who are directly responsible and other directly responsible persons.

[32] *See supra* note 22.

[33] Yinhangye Jiandu Guanli Fa (银行业监督管理法) [The Law of the People's Republic of China on Regulation and Supervision over the Banking Industry] (promulgated by the Standing Comm. Nat'l People's Cong., Oct. 31, 2006, effective Jan. 1, 2007) (P. R. C.), art. 23: The banking regulatory authority shall conduct off-site supervision of the business operations and risk profile of the financial institutions of the banking industry, for which it shall establish an information system to analyze and assess the risk profile of such institutions.

It is valuable for China to borrow successful regulation and execution experiences of other countries. The Social Security Agency "Centrelink" in Australia mainly uses off-site auditing, specifically, applying technology of data matching with the cooperation of tax bureaus and security exchange commission to check stockholders' records (including all directors and top twenty shareholders), identify social insurance contribution collection and benefits claims by analyzing their revenues, assets declarations and cross checking stockholding records. Once a mismatch is found among these data, further cross examinations on their tax declarations will be taken to detect potential problems. At the same time, the Agency also examines health care data by further data matching, to detect excess use of medical resources and deceptions. During 2005-2006, The Agency analyzed over 1.9 million data by cross examining 43627 social insurance benefits payments; they detected 28,114 cases of over payment, and recovered funds equivalent to 135 million Australia dollars, the Cost-Benefit Ratio is 1:9.3.[34]

According to Johnston, how and whether the US's federal regulators consider both the costs and benefits of regulation has become a central issue in proposals to reform the federal administrative state. Executive orders requiring agency cost-benefit analysis have been a significant feature of the regulatory landscape since 1970s.[35] Sunstein has argued that by frequently either requiring cost-benefit analysis in statutes or interpreting existing statutes to at least allow agencies to consider compliance costs in standard-setting, the federal courts and Congress may have made such a statutory super mandate unnecessary: the "cost-benefit" state may already be here.[36] Today's China is trying to us cost-benefit analysis for reference in legislation, the cost of regulation is becoming one of increasingly important elements. Both mixed strategy game theory analysis and experiences home and abroad show that, off-site auditing can cut down on regulatory cost. Therefore off-site auditing should be taken as the leading instrument in social insurance funds regulation.

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[34] Centrelink and the Data-matching Agency, Australian Government, *Data-Matching Program Report on Progress 2004-2007*, reported by Carolyn Hogg, Acting Chief Executive Officer, October 20, 2009.

[35] For overviews of the history of executive orders that have attempted to require agencies to consider regulatory compliance costs, s*ee* EDWARD PAUL FUCHS, PRESIDENTS, MANAGEMENT AND REGULATION (Prentice Hall Professional Technical Reference 1988); THOMAS O. MCGARITY, REINVENTING RATIONALITY: THE ROLE OF REGULATORY ANALYSIS IN THE FEDERAL BUREAUCRACY 17-25 (New York: Cambridge University Press 1991); Harold H. Bruff, *Presidential Management of Agency Rulemaking*, 57 GEO. WASH. L. REV., 533-551 (1989).

[36] Cass R. Sunstein, *The Arithmetic of Arsenic*, 2 GEORGETOWN LAW JOURNAL, 255 (2002).

C. Solving the Problem of "Paradox in Regulation"

It is harmful for social insurance funds operation when offences committed by contribution payers and customers escape detection and/or punishment; it will encourage fraudsters in other areas so that the whole social system may be jeopardized. To avoid the situation where the government suffers both a loss of prestige and funds, the only way to lessen loss is to detect and punish offences on time. However, auditing incurs cost; even bribing the regulator may be treated as an opportunity cost of auditing. Then regulator also takes the risk of being punished for slack regulation and corruption.

Many factors impact on the evaluation of the regulator's auditing and detection work in addition to staff selection and cultivation of key relationships What is more important for regulator is to build through legislation a good incentive and restraint mechanism and reward the good and punish the bad. In the UK for example, the NHS Counter Fraud and Security Management Service proved frauds had been reduced 60% by introducing more stringent checks, such as pharmacists being required to ask people for proof they are entitled to free prescriptions, with a £70 reward being offered to pharmacists who spot fraudulent claims.[37]

According to the above Game model, we can find that the higher bonus B for offences detected by the regulator, the more valuable their own reputation R, the lower the probability of offences being committed. One example of that is anti-corruption by considerably increasing income in Hong Kong and Singapore where Chinese are in the majority; B and R are extremely high for regulators in both cities. Especially the Independent Commission Against Corruption (ICAC) of Hong Kong, whose principle is "to nourish honesty with high salary", i.e. preventing anti-corruption by considerably increasing income, the B is large enough for the regulator. ICAC fulfills the result in this game theory model.[38]

There are also conflicts between the temptation be bribed and enforcing rules as far as the regulator is concerned. We all know detecting violations is the duty of the regulator; however, lots of serious offences escape from punishment in reality in some cases with the connivance of the authorities. The reason for that are regulatory agencies as practical bureaus of administrative social insurance regulator, based on agency relation

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[37] *See* BBC news: *Prescription Fraud Cut by 60%* (last Updated Wednesday, February 18, 2004), website at: http://news.bbc.co.uk/1/hi/health/3499017.stm.

[38] PETER HARRIS, HONG KONG: A STUDY IN BUREAUCRACY AND POLITICS (Hong Kong: Macmillan Publishers (HK) Ltd. 1988).

between bureaus and governments, and the same situation exists between regulators and bureaus. Regulators must balance benefits related themselves before deciding how to deal with offences. As rational economic actors, extremely severe punishment for misconduct probably discourages regulations and encourages offences. Here appears another problem, which is "who regulates the regulator". The newly adopted *Social Insurance Act* provides a unique clause for regulatee by the National and Local Peoples Congress, which more independent than government, thus solving the problem "who regulates the regulator" to some degree.[39]

III. Legal Elaboration and Amendment of the Model

The model in this paper builds on an assumption of static game theory, i.e. only two sides in the game: one side is regulator, and the other is regulatee; but in real world one regulator will face a large amount of regulatees. Because information between realistic Game players is not symmetrical, incomplete information games are much more common in the real world, therefore corrections need to be made in this Game model. Meanwhile, current Chinese laws have established levels of punishment for serious fraud offences through the social insurance regulation legislation, and it is therefore precisely appropriate to elaborate game theory from the point of law.

A. Modification of the Model and the Review of Rational Economic Assumption

This model is a single and static one; but in reality, dynamic games take place between one regulator and a large amount of beneficiaries, that is because once a kind of strategy is taken by a single regulatee customer to fight one single regulator, other beneficiaries take it into account and moderate it by adjusting to their individual circumstances. Even though dynamic game theory is superficially repetitive, player's behaviors and results may be different, because during this process, both sides may make their decisions with evolving judgments on benefits and costs. An example is a fraudster successfully escapes from being detected and punished; copycats follow him and frauds spread rapidly, this is what so called

[39] *See supra* note 27, act. 76: "All of the various levels of the people's congress Standing Committee debriefs the same level's government on the income and expenses to social insurance funds, the work managing, investing and superintending results of the review, through organizing the inspection of law enforcement and implementation etc., to exercises supervision on the government authority to rule by law."

"broken window theory" by American famous political scientist Wilson and criminologist Kelling: If a window is broken up intentionally without it being repaired on time, it actually allows others to break more and cause bigger problems.[40] We can apply it in our case, if one offender is punished on time, the other potential fraud beneficiaries will be deterred. Consequently, the repetitive game is much more complex than simply aggregation of basic games, it is essential to consider the outcome as a whole; each game without any definite end can be modeled as an infinite repeated game.

If game players are not of "living only at the moment" kind, they expect more in the future, they will value their reputation more when the discount factor is big enough. Any individually rational payoff vector of a one-shot game of complete information can arise in a perfect equilibrium of the infinitely-repeated game if players are sufficiently patient.[41] That means today's $100 equals to tomorrow's $60 or more, at least not null. Because contributions are collected and benefits disbursed everyday, dynamic repeated game is closer to the reality which means it is very important for any party to develop its reputation. Hong Kong's ICAC plays an important role in the field of antifraud and corruption only because it has developed a sound reputation in its year after year working process. Its reputation has been developed through professional investigations uncovering evidence of how fraud has been undertaken, through sanctions being applied if fraud has been found, and the broader effectiveness of the sanctions imposed.

Generally speaking, the reputation shaped by an always strict regulator can persuade the beneficiaries to obey the law, and beneficiaries with lasting good records can be encouraged by a less intense inspection regime. Looking back into the history, we can find that almost all laws are based on dynamic games. The legal system delineates boundaries for human behaviour. So social insurance regulation should encourage strict auditing and observation, punish opportunism by both sides, and prevent contribution evasion and frauds.

It is necessary to correct the premise of game theory— "rational economic men". Selten, who was one of the Nobel Prize winners in 1994, has devoted himself to creating a dynamic game theory's basis—sub-game perfect Nash equilibrium. He put forwarded that:

"Traditional economics is what so called mainstream economics in past 50 years before the World War II. Before that time, rational

[40] James Q. Wilson & George L. Kelling, *Broken Windows*, THE ATLANTIC MONTHLY (March 1982).
[41] Drew Fudenberg & Eric S. Maskin, *The Folk Theorem in Repeated Games with Discounting or with Incomplete Information*, 3 ECONOMETRICA, 533-554 (1986).

assumptions are much less than right now. Later, the model produced from super rational assumption is kind of immature rationalism. In the past 50 years, infantile rationality suffused every article of economics."[42]

This clearly shows that the "rational economic men" assumption of this model must be corrected. Both sides in a game may take irrational decisions; probability in this type of model is just an approximation under strict hypothesis and must be carefully adopted by legislation. For example, the strength of peer group pressure is also a factor, i.e. the extent to which the honest majority is mobilized and vocal in their view that fraud is wrong. Even if it is rational to undertake fraud on the basis of game theory, the wider social pressure that it is unacceptable (this works particularly in healthcare and social insurance where there is a direct negative impact on the quality of life for some) can lead many not to do it. That is why Button and Brooks suggest the government should focus on developing an antifraud culture; given the size of the problem of fraud in government, the fruits of antifraud culture "may well lead to greater resources been released to provide government services."[43]

B. An Elaborate of the Model

After thirty years reform and opening up, China's economy is now the second largest in the world after the United States, overtaking in the second half of 2010 reach Japan with a nominal GDP over US$5 trillion; universal increases in living standards that have elevated hundreds of millions people from absolute poverty. With the economy developing, China's current multi-pillar pension system (established in the later 1990s) was supposed to introduce individual accounts to top up the basic pension, but due to problems in implementation (including fraud), this objective has only been partially realized in a number of provinces With the further expansion of social insurance, the social insurance funds' collection, operation, and payment systems are becoming increasingly complicated, with a large amount of money involved. Through the working procedure of social insurance funds is complex, the risk points increase naturally. The process must be governed through the rule by law.

Social insurance fraud is not yet generally viewed as a criminal matter in China. In the collection process, entities conceal the real collection base;

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[42] Cui Keliang (崔克亮), *Zhongguo Jingji de Zuida Wenti zaiyu Fangdichan Paomo* (中国经济的最大问题在于房地产泡沫) [*The Key Problem of Chinese Economy Is Real Estate Bubble*], ZHONGGUO JINGJI SHIBAO (中国经济时报) [*China Economic Times*] (Nov. 8, 2009).

[43] *See supra* note 16.

the date of employees joined, employees' real number, and distorts employees' ID deliberately to escape contribution. Fraud is even more common in the payment process. For example, benefits are still claimed after death of the beneficiaries (typically by their family members or relatives); frauds and collusions are even more widely observed concerning medical insurance.

According to current laws in China, social insurance frauds violate laws like "General Principles of The Civil Law" and "Contract Law". Related provisions in "The General Principles of The Civil Law" are: that civil dispositions made by fraudulence shall be null and void, for example, "those performed by a person against his true intentions as a result of cheating, coercion or exploitation of his unfavorable position by the other party, those that performed through malicious collusion are detrimental to the interest of the state, a collective or a third party, those that violate the law or the public interest".[44] The Supreme People's Court defines fraud in judicial interpretations as follows: 'a person tells false situation to the others intentionally, or hides the real situation behind intentionally, leading the other party to perform against his true intentions as a result of cheating, shall be defined as fraud'.[45] Obviously, "intention" is an indispensable component affirmed by both theory and interpretation of the Supreme Court. Negative acts of omission to inform not always constitutes fraud, except that where notification is a legal responsibility or may be considered as an intrinsic part of those particular type of transactions ; in that case, silence may be held as fraud because of hiding truth. It shall be defined as "hiding the real situation intentionally"; pensioner's relatives keep receiving benefits after the receptor's death is a type of typical fraud of omission for instance.

According to the newly adopted *Social Insurance Law*, social insurance agencies' duties are providing social insurance services, registering and keep social insurance records and paying social insurance

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[44] Minfa Tongze (民法通则) [General Principles of the Civil Law] (promulgated by the Nat'l People's Cong., Apr. 12, 1986, effective Jan. 1, 1987) (P. R. C.), art. 58: Civil acts in the following categories shall be null and void: (1) those performed by a person without capacity for civil conduct; (2) those that according to law may not be independently performed by a person with limited capacity for civil conduct; (3) hose performed by a person against his true intentions as a result of cheating, coercion or exploitation of his unfavorable position by the other party; (4) those that performed through malicious collusion are detrimental to the interest of the state, a collective or a third party; (5) those that violate the law or the public interest; (6) economic contracts that violate the state's mandatory plans; and (7) those that performed under the guise of legitimate acts conceal illegitimate purposes. Civil acts that are null and void shall not be legally binding from the very beginning.

[45] Art. 68 of Remarks on Execution of "The General Principles of the Civil Law (P. R. C.)" (Interim), SUP. PEOPLE'S CT., issued 2, 1988.

benefits, while the only way for them to prevent fraud relies on developing business, financial, security and risk management systems.[46] In fact, social insurance agencies currently belong to those kind of public institutions without enforcement power; it leads to no action done to deal with fraud except through "Contract Law", meaning they have the right to request the people's court or an arbitration institution to modify or revoke the fraudulent contract or agreement...[47] The government does not manage this process itself; it is brand new step for the government to build powerful, professional, and public participation mechanics. For these reasons, the regulator in this model is just conceptual, and cannot be treated as the same as either the current social insurance agencies or government departments. Meanwhile, all parties are well aware of this information, and the chances for unscrupulous beneficiaries to take advantage of this flaw continue to increase significantly.

We can find from the model that self-interested parties make their decisions based on opportunism: the regulator will accept strategy of auditing randomly at the optimum audit probability, while the regulatee absolutely chooses to evade contributions as well as commit frauds. As there are loopholes in supervision, the regulatee's opportunity to commit fraud often survives. The requirement of the law is to close the loophole by putting in place indispensable clearly defined and watertight supervision legislation.

C. The Reference Viewpoint of Criminal Law and Tax Law

Besides civil law, we can also learn corresponding supervision legislative principles from tax law for the similar reason of compulsion. F in the model, representing fine for frauds, could be considered equivalent to "tax evasion" defined in article 63 and 64 of *Law on the Administration of Taxation Collection*. Through the approval of "the seventh amendments to the Criminal Law of the PRC" in February 28, 2009, "crime of tax evasion" was amended to cover a broader range, "A taxpayer who fails to pay or

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[46] *See supra* note 27, art. 8: Social insurance agency provides social insurance services, responsible for social insurance registration, participants' benefits recording, and social insurance benefits paying. Art. 73: Social insurance agency shall build and improve business, financial, security and risk management systems.

[47] Hetong Fa (合同法) [Contract Law] (promulgated by the Nat'l People's Cong., Mar. 15, 1999, effective Oct. 1, 1999) (P. R. C.), section 2 of art. 54, if a contract is concluded by one party against the other party's true intentions through the use of fraud, coercion or exploitation of the other party's unfavorable position, the injured party shall have the right to request the people's court or an arbitration institution to modify or revoke it. Where a party requests for modification, the people's court or the arbitration institution may not revoke the contract.

underpays the amount of tax payable by means of forging, concealing, or filling a false tax declaration, shall be sentenced to be deemed to have committed tax evasion."[48]

There is no specific crime for social insurance contribution evasion and frauds in Criminal Law, but declaration and measurement of penalty related to crime of fraud and crime against tax collection and management could be borrowed as references. The relevant article in the Criminal Law is: A person who, under any of the following circumstances, conducts swindling activities of insurance: (1) An insurance policy holder intentionally fabricates the object of insurance to defraud the insurance money; (2) An insurance policy holder, insurant or policyholder fabricates false reasons for or exaggerate the degree of loss on an insurance accident which has happened to defraud the insurance money. [49] However, "swindling activities of insurance" refers to commercial insurance, based on a common principle which is the law of large number, these articles are very valuable to social insurance antifraud work. In addition, article 266 of Criminal Law defines the crime of swindle public and personal assets as: a person who swindles a relatively huge amount of public or private property for illegal encroachment. Considering all above mentioned it is fundamental for Criminal Law to embrace the crime of social insurance fraud.

When comparing social insurance fraud to ordinary fraud, we can find that a unique outcome of social insurance fraud is that its victims are the rest of other social insurance participants, who means damages to a majority of people in society. For this reason, it would be appropriate to add social

[48] Xingfa Xiuzheng An (刑法修正案（八) [Amendment Ⅷ to the Criminal Law] (promulgated by the Nat'l People's Cong., Feb. 25, 2011, effective May 1, 2011) (P. R. C.), art. 201: A taxpayer who fails to pay or underpays the amount of tax payable by means of forging, altering, concealing or destroying accounting books or vouchers for the accounts without approval, or overstating expenses or omitting or understating incomes in accounting books, or refusing to fill a tax declaration after notification by the tax authority, or filling a false tax declaration, shall be sentenced to fixed-term imprisonment of not more than three years or criminal detention and concurrently to a fine of not less than one time and not more than five times the amount of tax evaded if the amount of tax evaded amounts to not less than 10% and not more than 30% of the amount of tax payable and the amount of tax evaded is not less than 10,000 RMB and not more than 100,000 RMB or if he commits tax evasion again after having been twice subjected to administrative sanctions by the tax authority for tax evasion; and if the amount of tax evaded amounts to not less than 30% of the tax payable and the amount of tax evaded is not less than 100,000 RMB, to fixed-term imprisonment of not less than three years and not more than seven years and concurrently to a fine of not less than one time and not more than five times the amount of tax evaded.

[49] The rest of Amendment Ⅷ to the Criminal Law arti. 198 is: 3. An insurance policy holder, insurant or a beneficiary fabricates an insurance accident which never happens to defraud the insurance money; 4. An insurance policy holder or insurant intentionally causes an insurance accident with property loss to defraud the insurance money; or 5. An insurance policy holder or a beneficiary intentionally causes death, injury, disability or disease of the insurant to defraud the insurance money.

insurance fraud crime directly to the Criminal Law Statute Book. In this way, the benchmark for further antifraud legislation will be shaped, especially for social insurance contribution collection. Game theory researches punishment mechanism with perfect legal system assumption (meaning value of F in formula is uncertain), in fact, value of F is undetermined for there is no social insurance fraud crime in Criminal Law. It is urgent to specify relevant crimes in laws so as to build a system of deterrence for beneficiaries and decrease the likelihood of violations.

In order to prevent fraud in social security, especially in contribution collection and payment, the State Council, and the previous Labour and Social Security Ministry issued *Interim Regulations on Collection and Payment of Social Insurance Premiums*, *Social Security Contribution Collecting Inspect and Audit Rules, Social Security Audit Rules* and some other administrative rules and department regulations, for the proposes of reinforcing social insurance funds audit. But when conducting audit work in reality, obstacles in social insurance antifraud exist as follows:

Firstly, the lacks of laws and primary regulations have limited the operation of antifraud work. Even though a few of relevant social insurance regulations have been issued in the last decade, it does not constitute a complete social insurance legal system. The newly adopted *Social Insurance Act* only has a framework on antifraud, thus fixing emerging problems like frauds by law is difficult especially in local government's daily work. Furthermore, articles of antifraud borrowed from Criminal Law and Contract Law cannot match situations exactly.

Secondly, regulations of different social insurance are not uniform. Antifraud is important for social insurance regulation; however, so far the social insurance regulation system still hasn't emerged due to the fragmented assessment and collection of different social insurance types. Generally speaking, antifraud work in social insurance contribution collection and payment is undertaken by social insurance agencies themselves, A common occurrence is that is that external fraud is facilitated through the collusion of some of the employees of agencies. Antifraud should be undertaken therefore by a specific independent social insurance funds regulation bureau, so that management and supervision are separated from each other.

The third facts are weaknesses in internal control systems, which decrease the ability of preventing social insurance fraud. The internal control system is a kind of self discipline of social insurance agencies. Obviously, a well-functioning internal control system plays an important role in the social insurance regulation system, as well as being the key point

of preventing various risks. Even though some advanced agencies have been enacting internal control rules, most of other agencies still ignore the importance of internal control. As a result, colluding behaviors happen frequently and make investigation more difficult.

Current civil law, tax law, and criminal law of China have established legal precedents for antifraud for social insurance funds, but the legal framework still needs to be developed further. An ordinary and acceptable international convention in this area is "light fraud isn't fraud". For example, in the UK, according to official figures, carousel fraudsters accounted for £7.4bn worth of EU imports in the first quarter of 2006, out of a total of £45.7bn. [50] But in 2005-2006, there were only 130 prison sentences in income tax, new tax credit, VAT fraud cases, and excise fraud totally. [51] In 2003 in Sweden, 244,000 decisions were made concerning tax surcharges, but only 470 persons were fined, sent to prison, put on probation or given suspended sentences for offences against the Tax Fraud Act.[52] Considering legislation and amendment tendency in China, legislators think and put more weight on the regulatee's attitude and potential damage to his or her business that excessive punishment may bring. For instance, the Seventh Amendment to Criminal Law rules: A person, who has received administrative punishments for tax evasion, shall be exempted from criminal liability. That is used to recover tax losses and cultivate a pay tax consciousness, as well as embodying criminal principles like tempering justice with mercy and adjusting to international tendency on dealing with commercial crimes.

CONCLUSION

China's *Social Insurance Act* has now been adopted by the Congress and was put into force from July 1, 2011. It takes the highest position in social insurance funds supervision legal field. What we need to do now is to focus on new emergent problems and cases in social insurance fraud field, and solve them case by case. In practice, we can borrow from comparable articles in "*The General Principles of the Civil Law*", "*Law on the Management of Tax Revenue Collection*" and the latest version of the Criminal Law to build up an implementation system by laws and

[50] Simon Wilson, How carousel fraud is putting the VAT system in a spin, MONEY WEEK, Aug 31, 2006. website at: http://www.moneyweek.com/personal-finance/how-carousel-fraud-is-putting-the-vat-system-in-a-spin

[51] Michael Levi, *Sentencing Frauds: A Review* (Paper commissioned by the Government Fraud Review, School of Social Sciences, Cardiff University, July 2006.) website at: http://www.cardiff.ac.uk/socsi/resources/Levi_GFR_Sentencing_Fraud.pdf .

[52] SWEDISH TAX AGENCY, TAXES IN SWEDEN 2004 (An English Summary of Tax Statistical Yearbook of Sweden, Dec. 2004).

regulations under the current legal system. Taking into account microeconomic analysis of game party's violation probability, practical laws, regulations, and rules might be enacted more effectively, to protect social insurance funds more efficiently. Based on what has been mentioned above, relative legislative consultation in future will concern "*Regulation on Social Insurance Funds Supervision and Management*" and "*Social Insurance Antifraud Regulation*".

In the Game model we know that the fraud punishment F is one of the most important elements, so a better way for future amendment on "Criminal Law" could be to borrow current crimes like "crime of tax evasion" and "crime of insurance swindling", to introduce "crime of social insurance contribution evasion" and "crime of social insurance fraud", eventually form strong powerful deterrence to the committing of social insurance fraud. Additionally, reinforcing the supervision powers of the regulator and punishing corruption and malpractices severely are also helpful to shape the independent, effective, and transparent regulatory body.

The conclusion drawn from analyzing the Game model is that auditing cost varies positively in relation to the probability of violation. Therefore, decreasing costs is the key to lowering violation probability. Experiences of domestic local tax auditing and Australian Centrelink show that most illegal actions can be detected by modern internet technology and data-matching technology, thus reducing auditing cost significantly by achieving off-site auditing. We may also consult off-site auditing rules in the "*Law of Regulation and Supervision over the Banking Industry*", insisting on off-site supervision as the leading work principle. By means of social insurance information management system based on the current "Golden Insurance Project", [53]the authorities are capable of discovering, analyzing and evaluating supervisee's situations, lowering cost effectively and undertaking on-site auditing in a selective way, and eventually cutting down the probability of fraud and offences.

The regulator's reputation is another key point we can identify through the Game model. An independent, incorruptible, and outstanding regulator will be the best deterrent of social insurance fraud. We can learn from the independent UK Pensions Regulator, Hong Kong ICAC and China Security Regulatory Commission in, reconstructing the current social insurance regulatory system. But the development of reputation is not an easy or short term venture; it will need a long term effort.

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[53] Golden Social Insurance Project, or in Chinese 金保工程（*Jinbao Gongcheng*）, is an e-government labor and social security projects that using advanced information technology to support the social security works. The project covered labor and social security, public services, funds monitoring and macro decision-making process through the central, provincial and city levels, is a nationwide unified network.