

Firm Compliance with Social Insurance Obligations where there is a Weak Surveillance and Enforcement Mechanism: Empirical Evidence from Shanghai

Pushkar Maitra^{*}, Ingrid Nielsen[†], Chris Nyland[‡], Russell Smyth[§] and Cherrie Zhu^{**††}

ABSTRACT

This paper draws on a unique data set collected in audits in 2001 and 2002 by the Bureau of Labour and Social Security in Shanghai to examine why firms in Shanghai comply or over-comply with social insurance obligations in a regulatory environment where the expected punishment for non-compliance is low. Drawing on Harrington (1988), we test two hypotheses. The first hypothesis is that based on the first audit, the BOLSS will segment firms into low (non-aggressive) and high (aggressive) categories and those in the high category will be more likely to be re-audited. The second hypothesis is that if the identified non-complier is re-audited, it will be more likely to comply with its social insurance obligations in order to be returned from the high (aggressive) category into the low (non aggressive) category. Our first main finding is that firms found to be in non-compliance in the first audit in 2001 were moved into a separate violation category and the probability of being reaudited in 2002 was significantly higher if the firm was in that category. Our second main result is that across the board, firms which were reaudited continued to underpay in 2002 but the extent of underpayment was significantly reduced.

KEYWORDS: social security, enforcement, multi-period game

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^{*} Department of Economics, Monash University

[†] Department of Management, Monash University.

[‡] Department of Management, Monash University.

[§] Department of Economics, Monash University.

^{**} Department of Management, Monash University.

^{††} CORRESPONDING AUTHOR: Professor Russell Smyth, Department of Economics, Monash University, 900 Dandenong Road, Caulfield East, 3145, Victoria, Australia. Telephone: +(613) 99032134; Fax: +(613) 99031128. E-mail: Russell.Smyth@BusEco.monash.edu.au

1. Introduction

One of the central tenets underpinning China's market reforms is the need to establish a social insurance system where the cost is financed jointly by enterprises, individuals and the government. For the social insurance system to work, enterprises need to make those contributions to the fund as a proportion of their wage bill as prescribed by law. The problem China faces, however, is that its surveillance and enforcement regime for identifying and punishing employers who do not make their prescribed social insurance contributions is weak. As a consequence, the rate of non-compliance with social insurance obligations among firms is high. This paper employs a unique data set containing information from two successive audits conducted in 2001 and 2002 by the Bureau of Labour and Social Security (BOLSS) of the social security payments of firms in Shanghai. We use the audited data to examine how the surveillance and enforcement mechanism as well as firm characteristics affect social insurance compliance behaviour.

In Shanghai if firms do not comply with social insurance obligations, the probability of being caught is low and, if caught, the penalty structure is lenient. As a consequence, the rate of non-compliance with social insurance obligations among firms in Shanghai is 70-80 per cent. However, rather than focus on why firms do not comply we address the question: why do 20-30 per cent of firms comply or over-comply with social insurance obligations, given that the expected punishment for non-compliance is so low? Harrington (1988) developed a model where firms may have an incentive to comply with regulations even though their compliance cost each period exceeds the expected penalty if caught. According to this model, compliance occurs if, in a multi-period repeated game, the regulator can segment its enforcement policies into two categories, where firms

that are in non-compliance in one period are placed into a separate category in the next period and subjected to closer scrutiny. Drawing on Harrington (1988), we test two hypotheses. First, based on the first audit, the BOLSS will segment firms into low (non-aggressive) and high (aggressive) categories and those firms in the high category will be more likely to be re-audited in 2002. The second hypothesis is that if the identified non-complier is re-audited, it will be more likely to comply with its social insurance obligations in order to be returned from the aggressive category into the non-aggressive category.

We start in Section 2 with a discussion of social insurance reform in Shanghai and employer compliance with social insurance regulations in Shanghai from the perspectives of the regulator and the employers. We base this discussion on interviews we conducted at the BOLSS and with eight firms in Shanghai. The interviews with the BOLSS took place in November 2003 and February 2005; and the interviews with employers were conducted in late 2003 and early 2004. Each of the interviews at the firms was conducted with senior management and/or the human resources manager with knowledge of the firm's social insurance policies. Section 3 reviews the literature on incentives for voluntary compliance when the enforcement mechanism is weak and concludes that of the various approaches, the Harrington (1988) model is the most appropriate for the compliance regime which exists in Shanghai. The data and hypotheses are set out in Section 4. Section 5 contains the method and results and the final section concludes.

Foreshadowing the results, our first main finding is that firms found to be in violation in 2001 were moved into a separate violation category and the probability of being

re-audited in 2002 was significantly higher if the firm was in that category. Our second main result is that across the board, firms which were re-audited continued to underpay in 2002 but the degree of underpayment was significantly reduced.

2. Employer Compliance with Social Insurance in Shanghai

Social Insurance Reform and Regulations in Shanghai

Prior to the introduction of market-oriented reforms, China's social security system was characterised by separation of urban and rural areas and segmentation of urban enterprises based on their ownership status. As private industry was negligible before the economic reform, no social security programs existed in the private sector. The system in urban areas was predominantly a *danwei*-based (organisation-based), defined-benefit, pay-as-you-go type, primarily covering the employees in the public sector such as state-owned enterprises (SOEs). Coverage was comprehensive, including pension insurance; free health services and paid sickness leave; insurance for injury, disability or death irrespective of whether they were work-related; maternity benefits; funeral subsidies; health insurance and death subsidies for dependents of employees (see Wang, 2001). As a consequence, each organisation in the public sector, such as SOEs, operated like a small society, providing not only social security but also hospitals, housing, schools and retail outlets for their employees (Roy and Chai, 1999). However, the *danwei*-based welfare system proved problematic for the public sector and was non-existent for the private sector with the introduction of market reforms and the increased opening up of the economy in the lead-up to China joining the World Trade Organisation (WTO).

When attention turned to how to make SOEs more competitive in the global market place, it was soon appreciated that the *danwei*-based welfare system impeded the development of the service sector, hindered labour mobility and represented a huge financial burden on SOEs. The two major reasons for the rapid increase in social welfare expenditure in the 1980s and first half of the 1990s were rising medical costs and an aging population. The pressure this placed on the public sector meant that several SOEs facing dire financial straits were unable to meet their traditional commitments. In some provinces, such as Guangdong, this phenomenon occurred as early as 1984 (Saunders and Shang, 2001), but it became widespread throughout China from the mid -1990s.

In response to this mounting financial pressure, the state has adopted a series of social welfare reforms. These reforms centre on the implementation of a number of social insurance programs designed to cover the major risks confronting individuals working in both public and private sectors in a market economy (Saunders and Shang, 2001; Zhu 2002; Whiteford, 2003). The new social insurance regime has been described as establishing an institutional welfare state (Titmuss, 1974) underpinned by welfare pluralism (Gu, 2001). This signifies that the new social insurance system is financed by individuals, enterprises and government with two major objectives. One is to alleviate enterprises in the public sector of the full responsibility for welfare provision and ensure that the burden is shouldered fairly between the major stakeholders. The other is to have the same social security system established in the private sector to protect employees and to contain free riding as many private employers fail to offer their workers any insurance.

There are five principal social insurance schemes covering industrial injury, maternity, medical, pension and unemployment. In Shanghai, employer social security obligations are governed by three sets of regulations, depending on the location of the enterprise and the type of employee. Employer social insurance contributions for those employees with an urban registration are prescribed by *Measures of Shanghai for Contribution to Social Insurance, No. 117 Order of the Government of Shanghai*, which was passed in April 2002, but the formalised policy was first implemented in 2001. These regulations specify minimum required employer contributions for urban residents as a percentage of the previous year's payroll. The actual required contributions have varied slightly since 2001, and as of 2004, employers were required to contribute 22 per cent for pension insurance, 12 per cent for medical insurance, 2 per cent for unemployment insurance and 0.5 per cent each for maternity and industrial injury insurance. If average wages in the enterprise are less than 60 per cent of average wages in Shanghai, the enterprise's social insurance obligations are levied on 60 per cent of average wages in the city. If average wages in the enterprise are greater than three times the average wage in Shanghai, the enterprise's social insurance obligations are capped at three times the average wage.

Employer obligations to migrant workers are prescribed by the *Interim Procedures on Comprehensive Insurance for External Labour Forces in Shanghai*. The social insurance premiums for migrant workers for each firm are levied on a base which is 60 per cent of the average previous year's monthly wage of all workers in Shanghai, multiplied by the number of migrant workers employed by the firm. Employers of migrant workers in Shanghai are required to pay 12.5 per cent of this base, while for outside construction teams the comparable rate is 7.5 per cent. This provides migrant workers with coverage

for work-related injuries, hospital treatment and pensions on retirement, but not coverage for maternity or unemployment insurance. Employer contributions in firms located in the towns of the greater Shanghai region (that is, the towns outside the city proper) are prescribed by the *Interim Social Insurance Procedures for Small Cities and Townships within Shanghai Municipality*. Colloquially known as the ‘25+X’ scheme, employers are required to pay 25 per cent of payroll and whether any contribution greater than 25 per cent is made in practice, is determined by negotiation between employer and employee, although both are offered tax incentives to induce them to lift their total contribution.

Government Attempts to Enforce Compliance in Shanghai

In China employer non-compliance with social insurance obligations is a major problem. Saunders and Shang (2001, p. 282) stated: “Although reliable data on the extent of non-compliance are difficult to obtain, particularly at the national level, there are concerns that many enterprises are not complying with the new arrangements”. Of the audited Shanghai firms analysed in this study for 2001, 72 per cent of the firms paid less than the prescribed social insurance, 5.8 per cent of firms paid the prescribed amount and 22.2 per cent of firms paid more than the prescribed minimum requirement. In 2002, 81.8 per cent of firms paid less than the prescribed social insurance, 1.9 per cent of firms paid the prescribed amount and 16.3 per cent of firms paid more than the minimum amount.

Since 2001, the BOLSS has engaged independent auditors to conduct an annual audit of the total payroll and the numbers of workers employed of a random sample of firms in Shanghai. One likely reason for low compliance rates is that the prospect of a firm getting caught in the annual audit if it is not complying with the regulations, is quite low. This is

because the annual audit only covers a small percentage of the 100,000 firms registered in Shanghai. In 2001, 2600 firms were audited and in each year from 2002 to 2004, 5000-6000 firms were audited (the empirical study below uses the data from 2001 and 2002).¹ An interesting aspect of the auditing process which we build on in the modelling below is that a percentage of the firms which are audited each year are re-audited the following year. Of the 2600 firms audited in 2001, 25 per cent were re-audited in 2002.

A second reason for the high default rate is the lack of an effective enforcement mechanism if firms are audited and found not to have paid. If a firm is found to have paid less than the prescribed minimum social insurance in one of these annual audits, it will be given 15 days to make the outstanding payment. If the firm makes the payment within this period, that is the end of the matter and there is no further penalty. If the firm does not pay outstanding monies after 15 days, the BOLSS charges interest of 0.02 per cent per day and the BOLSS has the power to mortgage property to cover the debt if the firm does not pay after a period of ten months. However, most firms which are in non-compliance do in fact have the ability to pay and make the payment within fifteen days. In addition to the annual audit the BOLSS operates an employee hotline, which allows employees to report to the BOLSS if they suspect that their firm is evading social insurance, prompting the BOLSS to the issue. If the complaint is investigated and proven to be true, the employer could be penalized with a fine of 30,000 to 50,000 RMB.²

Employer Perspectives on Compliance in Shanghai

In late 2003 and early 2004 we interviewed eight firms about their views on the BOLSS enforcement mechanism and the extent to which the firms themselves engaged in non-

compliance. Here we refer to the firms as F1-F8. Before discussing the views of the management, we will briefly describe each of the firms. F1 was a wholly foreign-owned enterprise (WFOE) established in Shanghai in 2001, specialising in medical equipment. The mean monthly salary was 7,000 RMB in 2002, which was in striking contrast to the mean monthly salary of 1,623 RMB in Shanghai at the same time. F2 was another WFOE, established in Shanghai in 1994 with two subsidiaries: one in the manufacturing industry and the other in import and export. The majority of the 600 employees working in F2 were highly skilled professionals with an average salary level of 8,000 RMB per month in 2002. The firm also offered a very high salary package of 25,000 RMB per month to a few overseas trained Chinese (*hai-gui*) who had experience working in companies outside China and were considered globally competitive in the labour market.

F3 was a privately owned investment conglomerate with its head office in Shanghai and global presence in a broad range of businesses, including manufacturing, agribusiness, tourism, entertainment and financial services. The annual salary levels in the firm ranged from 8,000 RMB for a low-skilled worker to over 300,000 RMB for a top level senior manager. The average annual salary at its headquarters in 2002 was over 100,000 RMB (ranging from 60,000 RMB to over 300,000 RMB) because the people employed were either senior managers or highly qualified professionals. F4 was a shareholding firm which was listed on the Shanghai stock-market with 35 percent of its shares held by the state. The firm's main business was real estate, including business offices and residential buildings. In 2002, the average annual salary in F4 was 135,000 RMB.

F5 was a private company manufacturing cables used in the automobile sector. White collar workers made up 25 percent of the total workforce with the rest consisting of migrant workers. F6 was a privately owned shareholding firm located in Greater Shanghai that had been publicly listed on the Shanghai stock market since 1994. Its main business was in printing. The average monthly salary in the firm of 1,500 RMB in 2002 was slightly below the city average. F7 was a pharmaceutical shareholding company established in 2001 and publicly listed on the Shanghai stock market in 2003. Its main shareholders were a local institute of science and a large state-owned investment company. F8 was the largest SOE of its type in China under the planned economy. However, like many other SOEs, the firm struggled for survival following the commencement of economic reforms due to problems of overstaffing.

Of the eight firms, four (F1, F2, F4 and F5) claimed to contribute at least the minimum prescribed social insurance for all their employees. For three (F1, F2 and F4), the high average salary combined with the cap at three times the average wage in the city meant that the prescribed social insurance contributions were only about 20 per cent of the payroll, which was much lower than the 37 per cent for firms which paid lower salaries. F1, F2 and F4 all paid supplemental commercial insurance to attract and retain good staff. F3 and F5 both employed migrant workers. F5 paid social insurance to migrant workers as part of a human resources strategy to attract the best migrant workers available. F3, however, only paid social insurance premiums for urban residents and generally did not pay social insurance contributions for migrant workers. F3 only paid for social insurance for migrant workers if they were working in an industry with high occupational risk such as construction. F6, F7 and F8 had all been audited and found to be in non-compliance.

Several managers we interviewed in late 2003 and early 2004 expressed disenchantment about the role of the BOLSS. A recurring theme voiced by managers was the high transaction costs their firms faced in complying with their obligations. Interviewees in F1, F3, F6, F7 and F8 complained that the definition of what is included in payroll has become too complex with the emergence of different forms of non-monetary income including subsidies and allowances, making it difficult for them to determine their total payroll. Each of these firms complained that the BOLSS was “too bureaucratic”. The reason given by the managers in F6, F7 and F8 for failing the audit was that they did not understand what the BOLSS was including in payroll. For F6 and F7, however, this excuse given to the BOLSS was opportunistic. F6 and F7 were aware of the coverage of payroll, but chose not to include certain subsidies and allowances being paid to their workers as part of a conscious strategy to reduce its social insurance liability because the costs, if caught, were negligible. The firms would only have to pay what they chose not to pay in the first place and if they did pay, would not then face any further action.

A common view expressed in the interviews was that the value of the hotline process is restricted. The managers in F4 and F5 expressed the view that if employees were still working at the company, they would be reluctant to complain in writing to the BOLSS for fear of losing their jobs. The manager in F5 was of the view that if the complaint was verbal and inspectors came to the firm, the managers in the firm could easily make the complaint “go away” by throwing a lavish banquet and writing it off as an entertainment expense. The manager in F5 claimed to know of one firm that owed almost one million RMB in social insurance payments, but managed to evade half of that amount through

corruption and utilizing connections. This ‘connections’ theme was also discussed in the interview at F3. The manager in F3 noted that if the firm was a major taxation contributor to the local government, it could have more negotiating power, which meant that if the firm underpaid social insurance, it would probably not be penalized by the government. Similarly, if the firm was unable to make this contribution due to financial difficulties, particularly if it were a large employer, the local government would often waive the payment to prevent the firm from going bankrupt and the ensuing loss of jobs.

3. Incentives for Voluntary Regulatory Compliance

While the rate of non-compliance is high, based on the audited data in Shanghai 20 to 30 per cent of firms do in fact comply or over-comply in a regulatory environment where there is a real lack of an effective enforcement mechanism. To provide a theoretically based explanation for the kind of firm behaviour that we have observed, it is useful to examine explanations from the literature on compliance with tax and environmental standards. There are, of course, a number of alternative explanations for compliance behaviour (at least in the context of environmental regulations). Decker (1998) argued that firms might agree to voluntary compliance in one policy area in order to obtain reductions in monitoring intensity or enforcement severity in other policy areas, or to convince the regulator to transfer scrutiny to other firms. For example, Welch *et al.* (2000) argued that in the case of CO₂, firms could volunteer to reduce CO₂ emissions in order to gain regulatory ease in other areas such as SO₂. Segerson and Micelli (1998) on the other hand argued that firms engage in voluntary compliance to forestall future, more stringent, regulations. Lutz *et al.* (1998) showed that a firm adopting voluntary compliance might be seeking to reduce rather than pre-empt future regulation.

Alternatively, Salop and Scheffman (1983) and Barrett (1991) argued that firms comply in order to get regulatory agencies to set higher standards for the industry, therefore increasing the costs of their rivals. In the literature on environmental regulation, evidence exists that firms in Europe and the United States which comply with green standards are submitting themselves to voluntary environmental audits of the entire production process (Kirchhoff, 2000) or lobbying for stricter environmental standards (Smart, 1992). Buchanan and Tullock (1975) and Maloney and McCormick (1982) showed that tighter regulation may paradoxically increase profits for a regulated industry with restricted entry. Thus, Moloney and McCormick (1982) argued that an industry might lobby for tighter legal standards if tighter controls represent a barrier to entry.

It has also been argued that firms voluntarily over-comply with environmental regulations to nurture a reputation for being environmentally conscious. Surveys suggest that consumers who care about the environment are willing to pay more for environmentally friendly products (see, for example, Cairncross, 1992). Arora and Gangopadhyay (1995) developed a model of over-compliance that relies on the fact that consumers value environmental quality. These authors showed that firms will over comply with environmental regulations when two conditions are satisfied: 1) consumers are able to perfectly distinguish between clean and dirty firms based on their respective levels of cleanup; and 2) the income differential among consumers is sufficient to support demand for cleaner products at higher prices. Arora and Cason (1996) and Videras and Alberini (2000), who examined participation in the U.S. Environmental Protection Agency's (EPA's) 33/50 program, which is a voluntary pollution prevention program

designed to elicit improvements in environmental performance, found that public recognition of environmental friendliness is important to the success of voluntary regulation.

However, none of these explanations fit the peculiarities of compliance with social insurance regulations in Shanghai. The kind of firm behaviour observed in Shanghai cannot be explained using a static model; instead one needs a dynamic repeated game model in which the firm and the regulatory agency can react to the previous actions of each other, to explain the observed behaviour of firms. One such model is developed by Greenberg (1984) who modelled tax avoidance using a dynamic repeated game framework. Greenberg (1984) is a precursor to Harrington (1988), which is best suited to form the theoretical basis for the observed compliance behaviour of firms in Shanghai.

According to Harrington (1988), firms may have an incentive to comply with regulations even though their compliance cost each period might exceed the expected penalty if caught. This incentive exists if the regulator can segment its enforcement policies into low and high categories. Firms that are found to be in violation in period one are moved into a separate group in period two and subjected to more frequent inspections and/or heavier fines. This strategy makes sense from the regulator's perspective because it implies that given that regulation is costly, regulators would be using information available to them in order to target certain kinds of firms. Because inspections are costly to the firm, firms have an incentive to comply in period one to avoid being moved into the high category in period two and firms in the high category have an incentive to comply, regardless of compliance costs, in order to be returned to the low category. The

theoretical model developed by Harrington (1988) has been used to study over compliance of environmental regulations (see, for example, Scholz and Gray, 1996, Helland, 1998), but not compliance with social insurance regulations. As we argue below, the behaviour of the BOLSS regarding auditing of firms and the response of firms appears to follow the pattern predicted by the Harrington model.

4. Data and Hypotheses

In 2001 the BOLSS engaged independent accountants to audit 2600 firms in Shanghai to ascertain whether they were making their prescribed social insurance payments. In 2002 a corresponding audit was implemented for 5400 firms. The firms audited form a representative sample of enterprises in terms of industry and ownership type and number of employees drawn by stratified random sampling from the population data available to the BOLSS in Shanghai. In both years, firms in Shanghai were not required to contribute to industrial injury insurance, but were required to contribute to the other four insurances – maternity, medical, pension and unemployment. Firms in Shanghai were required to pay the prescribed contribution for the four categories of social insurance in one lump sum. Therefore, there is no separate information on firms' contribution to the four insurances. We obtained the audited information for 2001 and 2002 from the BOLSS once the identities of the firms had been removed to protect anonymity. Of the 2600 firms audited in 2001, there was complete information for 2234 firms and of the 5400 firms audited in 2002, there was complete information for 5212 firms. There were 643 firms which had been audited in 2001, which were also included in the 2002 audit and we were able to identify the firms in the 2002 audit which had been audited the year before.

For each year of the audit, we have data on whether the firm paid less than the prescribed social insurance contribution, paid the exact prescribed social insurance contribution or paid more than the prescribed social insurance contribution. In the case of firms which did not pay the prescribed social insurance contribution, we have data on the amount of underpayment or overpayment as a percentage of the firm's total wage bill. We also have data on the firm's ownership type, industry type and the number of employees for each of the two years of the audit. Descriptive statistics and t-tests for differences across the two survey years are presented in Table 1 for industry type and Table 2 for ownership type.

 Insert Tables 1 & 2

Table 1 contains information for the 12 industries for 2001 and 2002.³ Taken together, firms in three industries (manufacturing, wholesale and retail and social services) constitute approximately three quarters of the firms audited in both years. Over the two years, firms in electricity, gas and water, real estate and scientific research had the highest rates of non-compliance. The rate of non-compliance amongst firms in the banking sector was relatively high in 2001, but did not increase much in 2002 when the rate of non-compliance amongst firms in other industries increased. In 2001 there were no industries in which the rate of non-compliance exceeded 80 per cent; however, in 2002 the rate of non-compliance exceeded 80 percent in 10 of the 12 industries.

Table 2 contains data for five ownership categories: SOEs, collectively-owned enterprises (COEs), shareholding firms, private firms and foreign invested enterprises (FIEs). For FIEs, the data set allowed us to distinguish between firms from "Greater China" (Hong Kong, Macau and Taiwan) and firms from either Europe or the United

States with firms from all other countries lumped together as “other FIEs”.⁴ SOEs and FIEs (from Greater China, Europe, the United States and “other”) constituted approximately three quarters of the sample in both audits. The rates of non-compliance were highest among FIEs. In 2001 shareholding firms, firms from Greater China and ‘other FIEs’ had the highest rates of non-compliance, while in 2002 firms from Greater China, firms from Europe or the United States and ‘other FIEs’ had the highest rates of non-compliance. The low rates of compliance for FIEs is consistent with newspaper reports that municipal governments are turning a blind eye to FIEs which do not contribute to social insurance in order to attract foreign direct investment (see, for example, *Workers’ Daily*, February 25, 2005). In both audits COEs and SOEs had the lowest rates of non-compliance, though the rate of non-compliance among SOEs in particular, showed a marked increase over the two years from 67.2 per cent in 2001 to 78.96 per cent in 2002 (this difference is statistically significant with a p-value = 0.0000).

 Insert Table 3

Table 3 classifies the 643 firms which were re-audited in 2002 according to industry and ownership type. In terms of ownership, SOEs and COEs which had the lowest rate of non-compliance in 2001 accounted for around half of the firms which were re-audited, while FIEs accounted for 37.5 per cent of re-audited firms. If the BOLSS was targeting ownership categories with high default rates, one would expect to see a much higher proportion of FIEs among those firms re-audited rather than COEs or SOEs. Firms in manufacturing and wholesale and retail constitute approximately 52 per cent of those re-audited in 2002. Consistent with the general story which emerged from the ownership

breakdown, firms in manufacturing and wholesale and retail had among the lowest rates of non-compliance in 2001. Among industries with the highest default rates in 2001, real estate firms made up 9 per cent of the re-audited firms, but electricity, gas and water and scientific research together constituted just 4 per cent of re-audited firms.

We used this information to test whether, if the regulatory process occurs in the context of a repeated game, firms have an incentive to comply with regulations even though their compliance cost each period exceeds the expected penalty if caught. Specifically, we use the Harrington (1988) conceptual model to test the following two hypotheses:

Hypothesis 1: Based on the first audit in 2001 the regulator segments firms into low and high categories in terms of their social security contributions, with those in the high category being more likely to be re-audited in 2002.

Hypothesis 2: If the firm is found to be in non-compliance in 2001, it will be more likely to comply with its social insurance obligations in 2002 due to increased likelihood of being placed in the high category in 2001 and being re-audited in 2002.

We test the first hypothesis through examining whether the probability of being re-audited in 2002 is higher if the firm paid less than the prescribed social insurance in 2001. To test the second hypothesis, for those firms which were re-audited we undertake a repeated measures analysis of variance in underpayment from 2001 to 2002. The Harrington (1988) model suggests that a firm would be motivated to return from the high to the low category because firms in the low category are less likely to be audited and

therefore less likely to be caught if in non-compliance. In Shanghai, while the monetary penalties if in non-compliance are low provided the firm pays when caught, there are nonetheless substantial non-monetary costs from being in the high category. The BOLSS has an Inspections Department which contains 138 employees. It consists of four sections and each is assigned a district of the city. The Inspections Department makes random audits of firms on a daily basis, and because staff numbers are limited, it targets firms which are in the high category. Anecdotal evidence from our interviews with firms found to be in non-compliance (F6, F7, F8) suggested that repeated inspections between audits represented substantial transactions costs for the firm. In such cases management needed to make available sizeable blocks of their time to allow for the Inspections Department to look through their books, which diverted time from other activities.

 Insert Table 4

Before undertaking more systematic tests of the two hypotheses, we provide in Table 4 a broad overview of the compliance behaviour of the re-audited firms, which gives a more accurate indicator than just relying on the broad industry and ownership classifications in Table 3. In terms of the first hypothesis, Table 4 suggests that, contrary to the general picture in Table 3, the BOLSS did target firms that were not complying in 2001 for re-audit in 2002. Of the 643 firms which were re-audited in 2002, 80.56 per cent of those paid less than the prescribed social insurance in 2001, compared to 68.57 per cent of those that were not re audited and the difference in proportion is statistically significant at the 1 per cent level. This is an indicator of segmentation into high and low categories. In terms of the second hypothesis, the rate of non-compliance in 2002 did not improve

among re-audited firms. The rate of non-compliance among firms re-audited in 2002 was 82.87 per cent, which was similar to the non-compliance rate of 81.63 per cent among the newly audited firms in 2002 and this difference is not statistically significant. Note that 67.65 per cent of those firms which were re-audited underpaid in both years, while 78.4 per cent of the re-audited firms (98 out of 125) which paid the prescribed amount or overpaid in 2001 underpaid in 2002.

5. Method and Results

Employer Compliance Behaviour in 2001

The starting point of our analysis is employer compliance behaviour in 2001. In some sense this defines the benchmark compliance behaviour. We start by estimating employer compliance behaviour using an ordered probit model where the dependent variable can take one of three values: 0, if it pays less than the prescribed social insurance contribution; 1, if it pays the exact prescribed social insurance contribution; and 2, if it pays more than the prescribed social insurance contribution. In this case, a positive coefficient associated with an explanatory variable increases the probability of over compliance, i.e., the probability that the employer pays more than the prescribed social insurance (which lowers the probability that the employer pays less than or the exact social insurance contribution) and a negative coefficient associated with an explanatory variable increases the probability of violation, i.e., the probability that the employer pays less than the prescribed social insurance contribution. The set of explanatory variables included dummy variables for industry and ownership type and number of employees,

which is a proxy for firm size. We treat SOEs as the reference category for ownership type and manufacturing as the reference category for industry type.

The estimated coefficients (and robust standard errors) from the ordered probit estimation of employer compliance behaviour are presented in Column 1 of Table 5. Several of the ownership dummies and industry type dummies have a statistically significant effect on employer compliance behaviour. First, overall non-state owned enterprises are more likely to be in violation of their social insurance contributions/obligations – all of the ownership dummies are negative though it is worth noting that the estimated coefficients associated with the COEs and private firms are not statistically significant. These results are consistent with the descriptive statistics in Table 2, which indicate that SOEs, COEs and private firms have the lowest rates of non-compliance and, at the same time, have the highest percentage of firms which pay over the prescribed amount of social insurance. Turning to the industry type dummies, we find that firms in construction and real estate are statistically significantly less likely to over-comply compared with firms in manufacturing. Notice also that the firms in banking are also more likely to be in violation compared to manufacturing firms (though the effect is very weak). These findings are also consistent with the descriptive statistics presented in Table 1 with each of these industries having amongst the highest default rates.

One other point is worth noting: the average wage in the banking and real estate sectors in Shanghai is among the highest in China and within Shanghai, real wages in these industries are approximately 80 per cent more than the average paid in manufacturing. This wage differential may well be a critical factor in explaining why firms in the

banking and real estate industries have a high rate of non-compliance. This point was driven home to the authors by the managers interviewed in Shanghai who revealed strong resistance to the notion that benefits should be the same for all workers when high wage employees have to pay up to three times the average contribution and receive no extra benefit. In an environment in which there is little monetary penalty placed on firms if they are caught not meeting their obligations, this perspective is likely to be important. It means high wage employees have little reason to report employers who do not pay above the level required to ensure the worker gains the common benefit. Indeed, if the employer is willing to share the proportion of the premium not paid with the worker, the employee may have a decided interest in colluding in avoidance. In Shanghai high wage industries confront an environment in which the employer who responds to economic incentives will be motivated to reduce the premium paid and the worker has little economic motivation to report non-compliance. Indeed, if workers accept that there should be a close association between what is paid by the employer and what the worker receives, the employee may collude with the employer in non-compliance even if the employee does not gain a share of the benefit that accrues to the employer.

Firms in the construction sector are also significantly more likely to be in violation of their social insurance contributions, compared to firms in the manufacturing sector. The construction sector is one of the biggest employers of migrant labour and other temporary workers in Shanghai. At the interviews at these enterprises, it emerged that often firms will employ migrant workers to avoid paying social insurance. The reason is that migrant workers tend to be less aware of their rights or less willing to enforce those rights because of low job security. While firms in many industries which employ unskilled labour do not

pay social insurance to migrant workers, this is particularly true in the construction sector, given the disproportionate number of migrant labourers which it employs.

Theoretically, firm size could have either a positive or negative effect on employer contribution behaviour. On the one hand, the costs of complying with these kinds of social policies will form a lower proportion of the total labour costs of large firms relative to small firms. Facing tougher financial constraints, small firms will have a lower capacity to meet their compulsory social insurance obligation and little ability to contribute to private social policies such as supplemental social insurance, even if the firm might potentially derive advantage from such policies (Mares, 2002). Haines' (1997) research for the US suggested that small firms are less likely to act proactively in response to workplace accidents and safety issues than large firms because small firms are in a weaker financial position. Haines (1997, pp. 133-134) noted "small firms were essentially reactive, as proactive thinking about long-term risks and costs associated with safety in general become submerged under immediate needs". In the environmental regulation literature, Arora and Cason (1995, 1996) and Videras and Alberini (2000) found positive correlations between firm size and the likelihood that a firm will participate in voluntary compliance programs administered by the EPA. Furthermore, Videras and Alberini (2000) speculated that larger firms may be more likely to comply with voluntary environmental schemes because they are more visible or market leaders.

On the other hand, the incentive to evade is likely to be proportional to the returns from evasion with a monitoring and penalties structure of the kind that exists in Shanghai where the probability of being caught is relatively low and the monetary penalties, if

caught, are lenient. With social insurance evasion there is asymmetric information – ex ante the firm knows if it is evading its social insurance obligations, but the enforcement agency does not. There is likely to be economies of scale and scope in social insurance evasion where the extent of the asymmetry between the enforcement agency and firm is proportional to the size of the firm. One would expect a larger firm to have more resources in the form of accountants and lawyers which it could use to better disguise its evasion activities and deal with the enforcement agency. Moreover, often large firms will be “repeat players” meaning that they routinely deal with government agencies making the transactions costs of doing so low relative to small firms which will usually be “one shotters”, which do not have the same experience or resources to commit to such activities (see Galanter, 1974).

In the case of Shanghai, we find that the second effect dominates: larger firms are more likely to be in violation of social insurance contributions. The marginal effects, which are available on request, show that an increase in 1000 in the number of workers employed by the firm increases the probability of non-compliance by 6.11 percentage points and reduces the probability of over compliance by 5.35 percentage points.

As we argue earlier, in this paper we are particularly interested in examining why some firms actually over-comply with prescribed social insurance contributions. To do so, we estimate a probit model, where the dependent variable takes the value 1 if the firm overpaid in 2001 and 0 otherwise. The regression results are presented in Column 2 of Table 5. The results are qualitatively quite similar to those presented in Column 1 (the ordered probit estimates for compliance behaviour). We find that the probability of over

compliance with social insurance payments is significantly lower for FIEs, shareholding and private firms (compared to SOEs). Relative to firms in the manufacturing sector, the probability of over compliance is significantly lower for firms in the real estate and construction industries. The marginal estimates (available on request) show that relative to firms in the manufacturing sector, the probability of over compliance is lower by more than 8 percentage points for firms in the real estate and construction sector. Finally we again find that the probability of over compliance is significantly lower for larger firms. The marginal estimates show that as the number employed by the firm increases by 1000, the probability of over compliance decreases by more than 6 percentage points.

While the probit specification provides interesting information about the compliance behaviour of firms, it does not use all available information. We also have information on the amount that the firm over- (or under-) pays as a percentage of the firm's wage bill. We use this information to examine the magnitude of over compliance. Remember that the data is censored because the amount is zero if the firm pays the prescribed amount of social insurance or less. Therefore we estimate the magnitude of over compliance using a Tobit model. The coefficient estimates are presented in column 3 in Table 5. The results are consistent with those presented in column 2 (the probit estimates for over compliance). Finally we compute and present in columns 4 and 5 of Table 5, the probit and Tobit estimates of the probability of violation and amount of violation respectively. The results are consistent with those presented in columns 1 – 3.

 Insert Table 5

In order to further flesh out our cross-sectional results we also undertook a 3 x 4 x 4 factorial analysis of variance to determine whether mean differences in the degree of underpayment of social insurance obligations in 2001 were present as a function of group differences in firm size, ownership form or industry. The advantage of this approach is that it allows differences between all levels of the between-subjects factors to be explored; that is, for the categorical factors, all pairwise comparisons can be computed, rather than limiting comparisons to one excluded reference category. In terms of ownership form, cell sizes permitted us to compare SOEs, COEs, privately owned firms and FIE's. In terms of the industry, cell sizes permitted us to compare real estate, wholesale/retail, social services and manufacturing. For the purpose of this analysis, firms with 50 or fewer employees were coded as small, those with 51 to 250 employees were coded as medium and those with over 250 employees were coded as large.

 Insert Tables 7-9

Tests of between-subjects effects indicated statistically significant mean differences in degrees of underpayment as a function of ownership form ($F_{464}^3 = 3.51, p < .05$), industry ($F_{464}^3 = 4.77, p < .01$) and firm size ($F_{464}^2 = 3.35, p < .05$). There were no two-way interaction effects. Within-cell descriptive statistics for underpayment in 2001 are shown in Table 6. For differences across ownership forms, post-hoc comparisons employing the Bonferroni correction for multiple comparisons, which is based on a Student's t statistic and adjusts the observed significance level for the fact that multiple comparisons are made, indicated that COEs and FIEs underpaid significantly more than did SOEs. No other ownership group differences were significant (see Table 7). In terms of differences across industries, post-hoc comparisons employing the Bonferroni correction for multiple

comparisons indicated that firms in both the real estate industry and the social welfare industry underpaid significantly more than did firms in the wholesale/retail industry. No other group differences were significant (see Table 8). In terms of differences as a function of firm size, post-hoc comparisons employing the Bonferroni correction for multiple comparisons indicated that small firms underpaid significantly more than did either medium or large firms (see Table 9). Hence, while the probit model shows that larger firms are more likely to be in violation of social insurance contributions, when we look at those firms who actually do violate the regulations, it is smaller firms who do so to greater effect. This finding is consistent with our earlier regression model that showed the probability of over compliance to be significantly lower for larger firms (i.e., over 6 percentage points).

Is there Systematic Selection of Firms for Re-auditing?

A subset of the firms that were audited in 2001 was re-audited in 2002. The question that immediately arises is whether firms were randomly chosen to be re-audited in 2002. This is an important issue because it enables us to examine whether the BOLSS indeed segments firms into low and high categories. The first column in Table 10 examines the probability of firms being re-audited in 2002 (remember that the sample here is restricted to firms that were audited in 2001). We use a probit model where the dependent variable is 1 if re-audited in 2002 and zero otherwise. The explanatory variables are the firm specific characteristics in 2001 and the firm's social insurance payments in 2001: $\text{pay2001}_1 = 1$, if the firm paid the prescribed social insurance in 2001 and $\text{pay2001}_2 = 1$, if the firm paid more than the prescribed social insurance in 2001. The reference

category is that the firm paid less than the prescribed social insurance in 2001. If the re-audited firms constitute a random sample, none of the firm characteristics in the 2001 sample should have a statistically significant effect on the probability of being re-audited. The picture that emerges in column 1 of Table 10 is that firms which are re-audited are not a random sample of all firms that were audited in 2001. In particular, the probability of being re-audited is significantly lower for firms that paid more than or equal to the prescribed social insurance payment in 2001. The marginal estimates show that relative to firms that contributed less than the prescribed amount in 2001, the probability of re-audit is lower by 13.8 percentage points for firms that paid the prescribed amount of social insurance and is lower by 10.5 percentage points for firms that paid more than the prescribed amount of social insurance. Other results that are worth noting: relative to SOEs, the probability of being re-audited is significantly lower for COEs and relative to firms in the manufacturing sector, the probability of being re-audited is significantly lower for firms in the banking, wholesale and retail and social services sector.

 Insert Table 10

The second and third columns of Table 10 examine whether firms from the 2001 sample, which were re-audited in 2002 differ from those 2001 firms which were not re-audited. In column 2 we present the estimation results from a probit model where the dependent variable is set equal to one if the firm paid greater than or equal to the prescribed amount in 2001 and is zero otherwise. In column 3 on the other hand, we present the results from an ordered probit model where the choices are: the firm paid less than the prescribed amount in 2001; it paid the prescribed amount in 2001; or it paid greater than the

prescribed amount in 2001. The explanatory variables in each case are industry and ownership dummy variables and number of employees for 2001. In addition, we include a dummy variable (AUDIT2001) which is set equal to one if the firm was re-audited in 2002 and is zero otherwise and interact AUDIT2001 with each of the explanatory variables. We compute a χ^2 test for the joint significance of AUDIT2001 and the interaction terms to test whether there are significant differences between the re-audited and non re-audited sample of firms. This is essentially a test of whether the coefficients of the set of explanatory variables and the constant differ for those firms that are re-audited versus those that are not re-audited. The joint χ^2 tests (with 17 degrees of freedom) show that the re-audited and non re-audited firms do differ in their initial behaviour. Of course it is worth noting that this statistical significance is pretty much driven by the statistical significance of the AUDIT2001 dummy because none of the difference estimates (the interaction terms) are statistically significant. But it is clear just by looking at the coefficient estimate of AUDIT2001 that these firms were indeed the poor performers in 2001: for example, the marginal effects, corresponding to the probit estimates presented in column 2, show that a firm that was re-audited in 2002 was nearly 12 percent more likely to have paid less than the prescribed amount of social insurance.

Does Re-auditing of Firms Make a Difference to Compliance Behavior?

While the results presented in the previous section show that re-auditing was not random and that the BOLSS used re-auditing as some form of “punishment” for poor performance in terms of social insurance contributions in 2001, the question that arises is: did this have any effect on the compliance behaviour of firms? Our second hypothesis is

that if the firm is re-audited, it will be more likely to comply with its social insurance obligations in order to be returned from the high into the low category.

In order to assess whether assignment of a firm to the aggressive category impacted upon future compliance with social insurance obligations, we undertook a paired samples t-test of underpayment percentages using firms who underpaid in 2001 which were re-audited in 2002. A significant difference was present in the mean degree of underpayment from 2001 to 2002 (t (df=642) = -6.25, $p < .001$). In 2001, firms which were later re-audited that underpaid social insurance did so, on average, by approximately 10.47 per cent, whereas in 2002, mean underpayment by these same firms dropped, on average, to approximately 6.62 per cent. Hence, while assignment to the aggressive category did not, on average, result in either future exact compliance or future over-compliance, it did significantly lessen the degree of future under-compliance.

We then undertook a 3 (firm size) x 4 (ownership form) x 4 (industry) between-subjects repeated measures analysis of variance to determine the location of significant mean group differences in degrees of underpayment from 2001 to 2002. These analysis yielded a significant within-subjects effect of payment year ($F^1_{484} = 12.44$, $p < .001$ (sphericity assumed) and significant between-subjects effects of firm size ($F^2_{482} = 4.02$, $p < .05$), ownership form ($F^3_{484} = 10.04$, $p < .001$) and industry ($F^3_{484} = 8.14$, $p < .001$).

Supporting our paired-samples t-test, a Least Significant Difference (LSD) pairwise comparison showed a significant difference of 3.90 ($p < .001$) in the estimated marginal

means of payment year, with underpayment significantly improving in 2002. The results are presented in Tables 11-13. Bonferonni post-hoc comparisons of observed means showed significance group mean differences between small firms and large firms ($p < .01$) such that small firms underpaid significantly more than did large firms. Significant group differences were also observed between SOEs and privately-owned firms ($p < .01$), such that privately-owned firms underpaid significantly more than did SOEs, and between SOEs and FIEs ($p < .001$), such that FIEs underpaid significantly more than did SOEs. Finally, significant group differences were observed between the real estate and wholesale/retail industries ($p < .001$), such that firms in the real estate industry significantly underpaid more than those in the wholesale/retail industry; between the real estate and manufacturing industries ($p < .01$), such that firms in the real estate industry significantly underpaid more than those in the manufacturing industry; and between the wholesale/retail and social service industries ($p < .01$), such that firms in the social services industry underpaid significantly more than did those in wholesale/retail

 Insert Tables 11-13

Do Re-audited Firms Perform Better than Firms First Audited in 2002?

Finally, to add strength to our argument that it is in fact assignment to the aggressive category that accounts for temporal changes in degrees of under-compliance, we examined the compliance behavior of firms first audited in 2002 with those firms which were re-audited. We began by computing an independent t-test between those firms re-audited in 2002 as a result of being found in non-compliance and those audited for the first time in 2002. We expected that if re-auditing, and its associated surveillance, were

sufficiently inconvenient to prompt improvement in social insurance payment that re-audited firms would pay significantly better in 2002 than would newly audited firms. Our results confirmed this expectation, with re-audited firms paying approximately 8.15 per cent below the prescribed payment as opposed to newly audited firms paying 13.54 per cent below the prescribed payment ($t(df=397.69) = -6.26, p < .001$).

 Insert Table 14

To further compare the behaviour of firms first audited in 2002 with those firms which were re-audited, we applied the five models (probit over compliance, Tobit over compliance, probit violation, Tobit violation and ordered probit) to the 2002 sample. The results are reported in Table 14. The explanatory variables are dummy variables for industry and ownership type, number of employees in 2002 and AUDIT2001, which is the dummy variable indicating whether the firm was re-audited. We will discuss the ordered probit and probit and Tobit estimates for over compliance, because in a sense they are the most interesting. The estimates presented in columns 1 to 3 of Table 14 show that (i) COEs were statistically more likely to comply relative to SOEs (which differs from 2001) and also paid more in terms of the percentage of their wage bill, while FIEs were statistically still less likely to comply with social insurance obligations relative to SOEs and also paid less in terms of the percentage of their wage bill; (ii) firms in construction and real estate were still statistically less likely to comply relative to manufacturing and also paid less. In addition, firms in social services and scientific research were also statistically less likely to pay social insurance than firms in manufacturing and also paid less as a percentage of their wage bill; (iii) firm size has no

effect on compliance. Interestingly, while being re-audited does not have a significant effect on the probability of over compliance, firms that are re-audited pay more social insurance as a percentage of their wage bill: AUDIT2001 is positive and statistically significant in the Tobit regression. This implies that those re-audited firms which over-comply, do so by a large amount, supporting the hypothesis that re-audited firms use over compliance as a signalling device to the regulator to be returned to the low category.

One might argue that we can only find an effect of re-auditing if the firm was paying less than the prescribed amount in 2001. To investigate this point, it is necessary to separate the re-audited firms which complied and those which did not comply in 2001. To do this, we re-estimated the Tobit model for over compliance, but we added an interaction term $AUDIT2001 * PAY2001$ where $PAY2001$ is a dummy variable set equal to one if the firm paid greater than or equal to the prescribed amount in 2001. Doing this, the difference estimate (the coefficient on the interaction terms $AUDIT2001 * PAY2001$) was negative, though not statistically significant. $AUDIT2001$ continued to remain positive and statistically significant.

6. Conclusion

Before proceeding to a formal discussion of the results, let us briefly summarize the main results that relate auditing and compliance behaviour. First, re-auditing does not appear to be random: the regression results show that firms that were in violation in terms of their social insurance contributions in 2001 were statistically more likely to be re-audited in 2002. It is as if the firm is found to be in violation in 2001 it is moved into a separate (violation) category and the probability of being re-audited in 2002 is higher if the firm is

in that category. Second, firms which were reaudited continued to underpay in 2002 but the degree of underpayment is significantly reduced. Third, when we compare the behaviour of firms first audited in 2002 with those which are re-audited in 2002, we find that the group of re-audited firms significantly increase the amount of over compliance though the probability of over-complying is not significantly different.

How do we explain the compliance behaviour of these firms? While violation rates are quite high, it is really surprising that 20 – 30 per cent of firms do actually comply or even over-comply, even though the frequency of surveillance (monitoring) is quite low, and even when violations are discovered, fines and other penalties are not large. This kind of firm behaviour cannot be explained in a static model. However, one can apply the Harrington (1988) dynamic model to explain the behaviour of firms and the BOLSS (the regulatory agency). What we have here is a dynamic repeated game model in which the firm and the regulatory agency can react to previous actions of each other. Suppose the regulatory agency classifies firms into two groups, one of which faces more severe enforcement compared to the other. Each firm can move from one group to the other based on its performance. One could argue that the BOLSS is using the audit results from 2001 to initially classify firms into the bad or the good group. The fact that poor performers in 2001 are more likely to be re-audited in 2002 tends to support this argument. Firms that performed poorly in 2001 (and are hence in the “bad” group) over comply in 2002 possibly to provide a signal to the BOLSS about their intentions and their desire to comply with the regulations in the future. It remains to be seen (from future surveys) how the BOLSS reacts to this kind of compliance behaviour by these firms.

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Table 1
Descriptive statistics for sample firms by industry

Industry	Firms in Sample	% of firms in sample	Paid less than prescribed amount		Paid the prescribed amount		Paid more than prescribed amount	
2001								
Electricity/Gas/Water	27	1.21	21	77.78	1	3.70	5	18.52
Real Estate	161	7.21	125	77.64	10	6.21	26	16.15
Construction	89	3.98	67	75.28	7	7.87	15	16.85
Transportation, Logistics, Post and Telecommunications	129	5.77	90	69.77	12	9.30	27	20.93
Education, Arts and Broadcasting	13	0.58	9	69.23			4	30.77
Banking	80	3.58	61	76.25	2	2.50	17	21.25
Scientific Research	63	2.82	46	73.02	4	6.35	13	20.63
Wholesale and Retail	416	18.62	284	68.27	19	4.57	113	27.16
Social Services	243	10.88	175	72.02	12	4.94	56	23.05
Manufacturing	992	44.40	715	72.08	61	6.15	216	21.77
Geology	2	0.09	1	50.00	1	50.00		
Agriculture	9	0.40	7	77.78	0	-	2	22.22
TOTAL	2234	100.00	1609	(72.02)	130	(5.82)	495	(22.16)
2002								
Electricity/Gas/Water	58	1.11	51	87.93			7	12.07
Real Estate	391	7.50	340	86.96	8	2.05	43	11.00
Construction	202	3.88	169	83.66	4	1.98	29	14.36
Transportation, Logistics, Post and Telecommunications	367	7.04	289	78.75	10	2.72	68	18.53
Education, Arts and Broadcasting	42	0.81	35	83.33	1	2.38	6	14.29
Banking	68	1.30	53	77.94			15	22.06
Scientific Research	113	2.17	99	87.61	1	0.88	13	11.50
Wholesale and Retail	1,033	19.82	828	80.15	24	2.32	181	17.52
Social Services	564	10.82	481	85.28	9	1.60	74	13.12
Manufacturing	2,324	44.59	1,878	80.81	40	1.72	405	17.43
Geology	20	0.38	16	80.00			4	20.00

Agriculture	20	0.38	16	80.00		4	20.00
TOTAL	5212	100	4262	(81.77)	99	(1.90)	851
t-test of difference across the two time periods							
Electricity/Gas/Water			-1.211		1.474		0.795
Real Estate			-2.731***		2.504**		1.663*
Construction			-1.683*		2.425**		0.548
Transportation, Logistics, Post and Telecommunications			-2.066**		3.121***		0.596
Education, Arts and Broadcasting			-1.111		-0.561		1.347
Banking			-0.244		1.313		-1.119
Scientific Research			-2.437**		2.092**		1.637
Wholesale and Retail			-4.845***		2.277**		4.129***
Social Services			-4.433***		2.736***		3.518***
Manufacturing			-5.576***		6.794***		2.938***
Geology			-0.965		3.237***		-0.699
Agriculture			-0.137		.		0.137

Note: Figures in parenthesis are percentages.

Table 2
Descriptive statistics for sample firms by ownership

Ownership	Firms in sample	% of firms in sample	Paid less than prescribed amount		Paid prescribed amount		Paid more than prescribed amount	
2001								
SOEs	979	43.82	662	67.62	36	3.68	281	28.70
COEs	316	14.15	215	68.04	13	4.11	88	27.85
Shareholding	64	2.86	52	81.25	1	1.56	11	17.19
Private	174	7.79	108	62.07	51	29.31	15	8.62
Firms from HK/Macau/Taiwan	93	4.16	76	81.72	6	6.45	11	11.83
Firms from Europe/US	139	6.22	105	75.54	6	4.32	28	20.14
Other FIE	469	21.00	391	83.37	17	3.62	61	13.01
TOTAL	2234	100.00	1609	(72.02)	130	(5.82)	495	(22.16)
2002								
SOEs	2,025	38.85	1,599	78.96	48	2.37	378	18.67
COEs	769	14.75	579	75.29	18	2.34	172	22.37
Shareholding	155	2.97	129	83.23			26	16.77
Private	516	9.90	430	83.33	6	1.16	80	15.50
Firms from HK/Macau/Taiwan	301	5.78	266	88.37	4	1.33	31	10.30
Firms from Europe/US	425	8.15	359	84.47	10	2.35	55	12.94
Other FIE	1,021	19.59	900	88.15	12	1.18	109	10.68
TOTAL	5212	100	4262	(81.77)	99	(1.90)	851	(16.33)
t-test of Difference Across Years								
SOEs			-6.754***		2.036**		6.230***	
COEs			-2.451**		1.593		1.922*	
Shareholding			-0.351		1.560		0.074	
Private			-5.853***		11.663***		-2.279**	
Firms from HK/Macau/Taiwan			-1.656*		2.745***		0.418	
Firms from Europe/US			-2.393**		1.210		2.081**	
Other FIE			-2.519**		3.179***		1.314	

Note: Figures in parenthesis are percentages.

Significance: *** = 1%; ** = 5%; * = 10%

Table 3**Ownership and Industry type of Re-audited firms (n = 643)**

OWNERSHIP	Number	Percentage
SOEs	274	42.61
COEs	64	9.95
Shareholding	19	2.95
Private	45	7.00
Firms from HK/Macau/Taiwan	32	4.98
Firms from Europe/US	38	5.91
Other FIE	171	26.59
INDUSTRY		
Electricity/Gas/Water	7	1.09
Real Estate	55	8.55
Construction	32	4.98
Transportation, Logistics, Post and Telecommunications	38	5.91
Education, Arts and Broadcasting	4	0.62
Banking	9	1.40
Scientific Research	18	2.80
Wholesale and Retail	99	15.40
Social Services	52	8.09
Manufacturing	167	36.30

Table 4

Compliance Behavior of Re-audited firms

		2001			
		Underpaid	Paid right amount	Overpaid	TOTAL
2002	Underpaid	435	13	70	518
	Paid right amount	22	0	2	24
	Overpaid	76	1	24	101
	TOTAL	533	14	96	643

Table 5
Employer Social Insurance Payment Behaviour, 2001

	1	2	3	4	5
	Ordered Probit	Probit: Over Compliance	Tobit: Over Compliance	Probit: Violation	Tobit: Violation
COEs	-0.057 (0.086)	-0.066 (0.088)	5.708 (21.126)	0.051 (0.086)	-4.954*** (1.379)
Shareholding firms	-0.466** (0.190)	-0.437** (0.190)	-88.356* (47.719)	0.468** (0.187)	-12.884*** (2.641)
Hong Kong, Macau and Taiwanese firms	-0.541*** (0.154)	-0.650*** (0.176)	-91.790** (40.918)	0.491*** (0.159)	-9.879*** (2.232)
European and US firms	-0.305** (0.126)	-0.321** (0.131)	-57.365* (32.042)	0.294** (0.127)	-7.048*** (1.916)
Other FIEs	-0.590*** (0.086)	-0.608*** (0.091)	-95.877*** (21.421)	0.576*** (0.087)	-11.686*** (1.226)
Private firms	-0.131 (0.086)	-0.820*** (0.145)	6.723 (26.423)	-0.150 (0.107)	-1.754 (1.756)
Electricity, Gas, Water	-0.348 (0.276)	-0.288 (0.300)	-111.978 (75.774)	0.363 (0.273)	-4.535 (4.059)
Real Estate	-0.316*** (0.119)	-0.349*** (0.133)	-68.275** (31.049)	0.306** (0.122)	-7.113*** (1.777)
Transportation, Logistics Post, Telecommunications	-0.048 (0.120)	-0.094 (0.136)	-21.359 (31.514)	0.022 (0.126)	-2.678 (1.968)
Education, Arts and Broadcasting	0.003 (0.377)	0.085 (0.363)	-11.124 (89.989)	0.055 (0.362)	-13.292** (5.750)
Banking	-0.275 (0.172)	-0.143 (0.179)	-35.393 (39.549)	0.346** (0.171)	-19.534*** (2.426)
Scientific Research	-0.168 (0.174)	-0.200 (0.190)	-35.948 (44.617)	0.153 (0.178)	-2.710 (2.716)
Wholesale and Retail	-0.025 (0.081)	0.026 (0.085)	-12.180 (19.985)	0.061 (0.082)	0.671 (1.297)
Social Services	-0.086 (0.099)	-0.016 (0.105)	-0.963 (23.760)	0.126 (0.101)	-4.110*** (1.520)
Construction	-0.288* (0.147)	-0.328* (0.171)	-106.239** (42.327)	0.267* (0.152)	-2.917 (2.320)
Number of Employees	-0.183** (0.088)	-0.220** (0.106)	-42.692* (23.011)	0.173** (0.087)	1.818 (1.116)
Constant		-0.442*** (0.069)	-167.061*** (16.632)	0.315*** (0.065)	-0.561 (1.000)
τ_1	0.293*** (0.064)				
τ_2	0.482*** (0.065)				
μ			246.709*** (7.904)		19.836*** (0.367)

Robust standard errors in parentheses for the probit and ordered probit regressions
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 6
Means and Standard Deviations for Underpayment in 2001 by
Firm Size, Ownership Form and Industry

Firm size	Ownership form	Industry	Mean	SD
Small	SOE	Real estate	-16.66	13.42
		Wholesale/retail	-6.09	10.06
		Social services	-19.09	6.00
		Manufacturing	-5.57	6.17
		Total	-9.67	10.82
	COE	Real estate	-50.00	70.71
		Wholesale/retail	-19.68	4.07
		Social services	-15.33	6.12
		Manufacturing	-12.29	11.77
		Total	-17.42	20.91
	PRI	Wholesale/retail	-2.92	4.14
		Social services	-20.15	26.11
		Manufacturing	-15.97	19.55
		Total	-14.36	18.27
	FIE	Real estate	-10.83	12.44
		Wholesale/retail	-6.45	8.35
		Social services	-5.17	5.21
		Manufacturing	-14.73	13.51
		Total	-13.20	12.98
	Total	Real estate	-17.74	21.75
Wholesale/retail		-7.16	9.84	
Social services		-14.78	9.90	
Manufacturing		-12.44	12.93	
Total		-12.41	13.90	
Medium	SOE	Real estate	-8.64	10.44
		Wholesale/retail	-4.05	8.62
		Social services	-4.45	3.79
		Manufacturing	-4.23	7.78
		Total	-5.22	8.57
	COE	Real estate	-16.97	16.81
		Wholesale/retail	-11.83	14.28
		Social services	-5.40	3.23
		Manufacturing	-8.90	13.28
		Total	-10.33	12.80
	PRI	Wholesale/retail	-11.55	19.44
		Social services	-7.92	12.58
		Manufacturing	-6.93	7.16
		Total	-8.61	11.85
	FIE	Real estate	-13.31	8.79
		Wholesale/retail	-13.97	1.85
		Social services	-22.26	17.34
		Manufacturing	-10.54	17.21
		Total	-10.54	17.21

		Total	-11.58	16.51
	Total	Real estate	-10.31	10.46
		Wholesale/retail	-6.35	10.54
		Social services	-10.35	12.73
		Manufacturing	-8.42	14.49
		Total	-8.46	13.09
Large	SOE	Wholesale/retail	-1.91	2.71
		Social services	-12.31	15.36
		Manufacturing	-4.03	8.44
		Total	-4.71	9.32
	COE	Wholesale/retail	-4.37	5.62
		Manufacturing	-6.62	2.02
		Total	-5.22	4.53
	PRI	Wholesale/retail	-5.82	9.06
		Social services	-34.84	19.98
		Manufacturing	-7.54	8.73
		Total	-11.95	15.10
	FIE	Real estate	-28.48	8.43
		Wholesale/retail	-11.03	9.34
		Social services	-10.95	8.74
		Manufacturing	-13.28	16.64
		Total	-13.26	15.70
	Total	Real estate	-28.48	8.42
		Wholesale/retail	-4.68	6.43
		Social services	-16.45	16.80
		Manufacturing	-8.01	12.90
		Total	-8.55	13.01
Total	SOE	Real estate	-12.40	12.42
		Wholesale/retail	-4.63	8.75
		Social services	-12.63	11.36
		Manufacturing	-4.41	7.79
		Total	-6.50	9.81
	COE	Real estate	-33.48	46.09
		Wholesale/retail	-10.69	10.52
		Social services	-13.68	6.81
		Manufacturing	-10.25	11.59
		Total	-12.78	16.80
	PRI	Wholesale/retail	-7.09	11.83
		Social services	-21.07	20.30
		Manufacturing	-10.23	13.19
		Total	-11.77	15.09
	FIE	Real estate	-13.14	11.22
		Wholesale/retail	-9.33	7.82
		Social services	-12.21	12.57
		Manufacturing	-12.88	15.75
		Total	-12.67	14.93
	Total	Real estate	-14.32	17.24
		Wholesale/retail	-6.28	9.39

Social services	-14.03	13.08
Manufacturing	-9.58	13.52
Total	-9.92	13.47

Table 7
Significant Differences in (Observed) Mean Underpayment as
a Function of Ownership Form

(I) Ownership form	(J) Ownership form	(I-J) Mean Difference ^a
SOE	COE	6.278**
	PRI	5.268
	FIE	6.171***
COE	SOE	-6.278**
	PRI	-1.010
	FIE	-0.1073
PRI	SOE	-5.268
	COE	1.010
	FIE	.903
FIE	SOE	-6.170***
	COE	.107
	PRI	-.903

a: Bonferroni multiple comparisons based on observed means

Note: Mean difference is ** significant at 5%; *** significant at 1%

Table 8
Significant Differences in (Observed) Mean Underpayment
as a Function of Industry

(I) Industry	(J) Industry	(I-J) Mean Difference ^a
Real Estate	Wholesale/retail	-8.038**
	Social services	-1.292
	Manufacturing	-4.733
Wholesale/retail	Real estate	8.038**
	Social services	7.745**
	Manufacturing	3.304
Social services	Real estate	0.292
	Wholesale/retail	-7.745**
	Manufacturing	-4.441
Manufacturing	Real estate	4.733
	Wholesale/retail	-3.304
	Social services	4.441

a: Bonferroni multiple comparisons based on observed means

Note: Mean difference is significant at (*) $p < .05$, (**) $p < .01$, (***) $p < .001$.

Table 9
Significant Differences in (Observed) Mean Underpayment as a Function of Firm Size

(I) Firm size	(J) Firm size	(I-J) Mean Difference ^a
Small	Medium	-3.949*
	Large	-3.860*
Medium	Small	3.949*
	Large	.089
Large	Small	3.860*
	Medium	-0.089

a: Bonferroni multiple comparisons based on observed means

Note: Mean difference is significant at (*) $p < .05$, (**) $p < .01$, (***) $p < .001$.

Table 10
Is There Systematic Selection of Firms for Re-auditing?

	Probability of Re-Audit	Are Re-Audited Firms Different (Probit)	Are Re-Audited Firms Different (Ordered Probit)
COEs (2001)	-0.266*** (0.094)	-0.067 (0.097)	-0.062 (0.097)
Shareholding firms (2001)	0.039 (0.174)	-0.530** (0.220)	-0.533** (0.222)
Hong Kong, Macau and Taiwanese firms (2001)	0.110 (0.144)	-0.547*** (0.192)	-0.606*** (0.182)
European and US firms (2001)	-0.096 (0.127)	-0.343** (0.148)	-0.351** (0.146)
Other FIEs (2001)	0.118 (0.079)	-0.605*** (0.105)	-0.617*** (0.103)
Private firms (2001)	0.047 (0.118)	0.159 (0.123)	-0.152 (0.097)
Electricity, Gas and Water (2001)	-0.200 (0.270)	-0.361 (0.312)	-0.280 (0.327)
Real Estate (2001)	0.044 (0.112)	-0.226 (0.143)	-0.225 (0.139)
Transportation, Logistics, Post and Telecommunications (2001)	-0.051 (0.126)	0.006 (0.148)	-0.022 (0.139)
Education, Arts and Broadcasting (2001)	-0.008 (0.380)	-0.075 (0.429)	-0.008 (0.446)
Banking (2001)	-0.769*** (0.195)	-0.387** (0.184)	-0.293 (0.186)
Scientific Research (2001)	-0.090 (0.174)	-0.068 (0.206)	-0.093 (0.198)
Wholesale and Retail (2001)	-0.208** (0.084)	-0.057 (0.095)	-0.014 (0.092)
Social Services (2001)	-0.304*** (0.102)	-0.119 (0.112)	-0.079 (0.110)
Construction (2001)	0.159 (0.146)	-0.262 (0.184)	-0.277 (0.178)
Number of Employees (2001)	0.068 (0.070)	-0.205** (0.092)	-0.219** (0.091)
pay2001_1	-0.475*** (0.139)		
pay2001_2	-0.333*** (0.073)		
Constant	-0.390*** (0.067)	-0.214*** (0.074)	
τ_1			0.201*** (0.073)
τ_2			0.392*** (0.073)
χ^2 test for Re-audit		33.88***	32.02**

Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 11
Mean Underpayment by Firm Size

Firm size	Mean
Small	-12.13
Medium	-10.16
Large	-9.39

Table 12
Mean Underpayment by Ownership Form

Ownership form	Mean
SOE	-6.99
COE	-10.53
PRI	-13.54
FIE	-11.17

Table 13
Mean Underpayment by Industry

Industry	Mean
Real estate	-14.201
Wholesale/retail	-7.23
Social services	-12.00
Manufacturing	-8.79

Table 14: Do Re-audited Firms Exhibit Different Compliance Behavior to Firms First Audited in 2002?

	1	2	3	4	5
	Ordered Probit	Probit: Overcompliance	Tobit: Overcompliance	Probit: Violation	Tobit: Violation
COEs (2002)	0.108* (0.059)	0.114* (0.061)	19.195*** (7.404)	-0.105* (0.059)	-2.720*** (0.933)
Shareholding firms (2002)	-0.090 (0.127)	-0.031 (0.126)	16.191 (14.643)	0.115 (0.125)	-9.686*** (1.800)
Hong Kong, Macau and Taiwanese firms (2002)	-0.411*** (0.102)	-0.401*** (0.105)	-39.440*** (13.168)	0.415*** (0.102)	-5.888*** (1.338)
European and US firms (2002)	-0.288*** (0.082)	-0.307*** (0.086)	-27.078** (10.638)	0.273*** (0.083)	-8.497*** (1.178)
Other FIEs (2002)	-0.428*** (0.063)	-0.411*** (0.065)	-37.520*** (8.136)	0.434*** (0.063)	-7.022*** (0.867)
Private Enterprises (2002)	-0.154** (0.073)	-0.126* (0.075)	-8.838 (9.269)	0.166** (0.073)	-4.967*** (1.068)
Geology (2002)	-0.087 (0.323)	-0.043 (0.319)	-9.194 (39.526)	0.107 (0.319)	-4.041 (4.840)
Electricity, Gas and Water (2002)	-0.411* (0.221)	-0.355 (0.219)	-41.533 (27.775)	0.431** (0.218)	-2.722 (2.877)
Real Estate (2002)	-0.324*** (0.088)	-0.350*** (0.093)	-35.977*** (11.449)	0.315*** (0.089)	-7.735*** (1.188)
Transportation, Logistics, Post And Telecommunications (2002)	-0.011 (0.080)	-0.029 (0.083)	-9.323 (10.293)	0.000 (0.080)	-3.223*** (1.230)
Education, Arts and Broadcasting (2002)	-0.238 (0.230)	-0.260 (0.243)	-36.292 (31.190)	0.229 (0.233)	-1.764 (3.375)
Banking (2002)	0.024 (0.179)	0.070 (0.177)	-4.625 (21.594)	0.000 (0.176)	-11.747*** (2.695)
Scientific Research (2002)	-0.420*** (0.156)	-0.408*** (0.158)	-3.822 (18.351)	0.425*** (0.156)	-6.132*** (2.081)
Agriculture (2002)	-0.074 (0.333)	-0.025 (0.329)	-0.295 (38.138)	0.096 (0.329)	-0.713 (4.858)
Wholesale and Retail (2002)	-0.091 (0.057)	-0.105* (0.059)	-13.709* (7.088)	0.085 (0.057)	-1.747** (0.846)
Social Services (2002)	-0.262*** (0.073)	-0.267*** (0.076)	-27.134*** (9.317)	0.259*** (0.074)	-8.052*** (1.027)
Construction (2002)	-0.240** (0.111)	-0.250** (0.115)	-21.069 (14.393)	0.235** (0.111)	-2.630 (1.607)
Number of Employees (2002)	0.032 (0.033)	0.031 (0.034)	0.367 (4.636)	-0.033 (0.034)	1.571*** (0.556)
AUDIT2001	-0.039 (0.062)	-0.054 (0.065)	138.452*** (13.091)	0.029 (0.063)	0.384 (0.964)
Constant		-0.777*** (0.047)	-112.315*** (6.509)	0.702*** (0.046)	-2.875*** (0.700)
τ_1	0.702*** (0.046)				
τ_2	0.777*** (0.046)				
μ			120.586*** (3.122)		20.854*** (0.231)

Robust standard errors in parentheses for the probit and ordered probit regressions;

* significant at 10%; ** significant at 5%; *** significant at 1%

ENDNOTES

¹ The data for 2003 and 2004 have not yet been made available. Hence we are restricted to using data from the first two survey years (2001 and 2002) only.

² The renminbi (RMB) is the Chinese currency. In June 2005 US\$1= 8 RMB.

³ Note that we have not altered the industry groupings in the data provided to us by the BOLSS, for example, by grouping some industries and not others. The break-up of industries in Table 1 reflects how the BOLSS classifies industries in Shanghai and is consistent with the official classification adopted by the State Statistical Bureau of China.

⁴ These are the categories in the BOLSS data set. The BOLSS data set did not allow us to distinguish between firms from Europe or the United States, nor did it separate out other Asian countries.