

WPS1743

POLICY RESEARCH WORKING PAPER

1743

How China's Government and State Enterprises Partitioned Property and Control Rights

Lixin Colin Xu

In moving toward a more market-oriented system, how did China's government and state enterprises partition control rights, incentives, and financial arrangements?



Summary findings

In 1980, China's government owned and controlled its state enterprises, which were managed (inefficiently) by bureaucrats. During the 1980s, the government experimented with decentralizing state enterprises to boost productivity. By decade's end, China's state enterprises had become more market-oriented, and the structure of enterprise property rights had changed dramatically.

Xu examines how China's government and state enterprises partitioned property rights — how the government and enterprises decided about incentives, financial arrangements, and control rights.

Xu assumes that the government is risk-neutral and the enterprise manager is risk-averse; that the government's goal is to increase revenue (or profitability), to retain control of the firms, and to reduce the inequality of income across firms (by bailing out firms in financial trouble and collective heavier taxes on high-performing firms). The enterprise manager and employees, on the other hand, have an informational advantage over the

government that allows them to earn a rent; that advantage leads to suboptimal efforts.

Among Xu's findings:

- The ways the government and enterprises partitioned property rights were consistent with the prediction of the principal-agent model based on the above assumption.
- Many of the changes in property rights reflected the government's attempt to cope with managerial informational advantage.
- The government, in striving for equality, rewards inefficient firms while penalizing efficient ones (the so-called ratchet effect). Efficient firms are unwilling to reveal their true efficiency. They pretend to be inefficient by slacking, so they can get more transfers. So, there are inherent conflicts between two of the government's goals: profitability and equality. And the government's desire to control state enterprises prevents many of them from becoming decentralized and improving their productivity.

This paper — a product of the Finance and Private Sector Development Division, Policy Research Department — is part of a larger effort in the department to understand state-owned enterprise reforms and government behavior. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Paulina Sintim-Aboagye, room N9-030, telephone 202-473-7644, fax 202-522-1155, Internet address psintimaboagye@worldbank.org. March 1997. (30 pages)

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How China's Government and State Enterprises Partitioned Property and Control Rights

*Lixin Colin Xu*¹

1 I am grateful to Bob Cull, Joe Hotz, D. Gale Johnson, Sherwin Rosen, and a referee for suggestions. Thanks also go to seminar participants of the University of Chicago and the World Bank for comments. Financial support from the Prince Foundation, the Asian Dissertation-Writing Fellowship, and the University of Chicago is gratefully acknowledged.

I. Introduction

Property rights of state owned enterprises (SOEs) display large cross-sectional and time series variations. A case in point is Chinese SOEs in the 1980s. As will be shown later, Chinese SOE managers faced firm-specific profit retention rates, had different production decision rights and discretion in employee wage determination, and financed investments from different sources---some relied more on government funds, some on bank loans, and the others on their own retained profits. What determines how the involved parties partition property rights? What are the behavior patterns of the government and SOEs in this process? These questions are the central concerns of this paper. A positive study of the political economy of property rights will help us better understand SOEs' behavior, including the objectives and constraints of the government; it may, therefore, enable us to offer better prescriptions for reform of SOEs. As yet, these questions have not been addressed systematically, and this research attempts to fill that void.

The theoretical approach used here highlights the asymmetry of information between the government and managers to examine how the principal (the government) and agents (managers) partition control rights and incentives. To curb the information advantage of SOEs, the government designed incentives and control rights based on the firms' characteristics---such as the risks they faced, their sizes, capital intensities, and past performance. For instance, for firms facing a "noisier" environment, the government often designed lower profit sharing and retained more centralized production decisions to mitigate risk; for firms with higher capital intensity, the government's goal of maintaining the value of equipment was likely to be in conflict with the employees' short-run bonus motives when profitability-based pay was imposed. Thus monitoring was more likely to be used than pay sensitivity in inducing internal labor incentives in capital-intensive firms.

The empirical implementation and tests were carried out using *A Survey of State Enterprises: 1980-1989*, a panel data set consists of 769 firms over 1980-1989. Firms in

this data set display variations of property rights both in cross section and time series reflecting the differential timing of many decentralized reforms. The rich variation in property rights and the size of the data set allow us to examine in detail the determinants of property rights such as management turnover, profit retention rates, production decisions, financing arrangements, and wage control rights.

We find that the property rights configurations were in general consistent with the implications of a principal-agent model in which the government had at least three goals: profitability (or tax revenue), control over firms, and inter-firm equality -- through bailing out firms in financial troubles, and collecting heavier taxes on well-performing firms. The property rights structure also reflected government attempts to deal with the information problem relying on the rationality of SOEs: it designed high-powered incentives -- that is, higher firm-level pay sensitivity -- for efficient firms, which accepted this type of contract because they expected high revenue associated with their high productivity, and it used low-powered incentives and more centralized control for inefficient firms, which chose this type of contract in anticipation of low productivity.

II. The Data and the Decentralized Reforms

This research uses *A Survey of State Enterprises: 1980--1989*, a retrospective survey conducted by the Chinese Academy of Social Science in 1991.² The data set is a balanced one: no firms were dropped out during the 10 years. The survey questionnaires were sent out to 800 state enterprises. Valid responses of 769 firms, located in 21 cities in four provinces of China (Sichuan, Jiangsu, Jilin, and Shanxi), were returned. This data set was not designed to be a random sample of the state enterprises: large firms were over-

²This data set has been used by many other authors, including Groves et al., "Autonomy and Incentives in Chinese State Enterprises," *Quarterly Journal of Economics*, 109(1) (1994); "China's evolving managerial labor market," in *Journal of Political Economy*, 103(4) (1995).

represented, making up more than 70% of the sample; the median firm had 931 employees.

The data set consists of two parts. Part one, filled out by accountants of the firm surveyed, contains quantitative tables with details of the firm's production inputs, outputs, internal incentives, wages, and profits. Part two, answered by the manager of the firm, includes information about the firm's industry affiliation, governance status, when the firm was granted the discretion to plan output and what product to produce, when the firm adopted the Management Responsibility System, and whether the manager had the discretion to determine wage setting.

Change in Property Rights Structure of State Enterprises in the 1980s

At the beginning of the 1980s, both ownership and control of Chinese SOEs belonged to the state: the government collected all profits, and allocated the entire investment fund, wage, and collective welfare expenditures (such as firm-specific housing and medical facility). The managers did not have autonomy over production decisions and employee compensation. State enterprises were largely managed by bureaucrats. Without a link between rewards and performance, the managers and employees did not have incentives to work hard.

During the 1980s, the government experimented with decentralizing state enterprises to boost productivity. By the end of the decade the property rights structure of SOEs had changed dramatically, becoming much more market-oriented.³ Meanwhile the

³For more thorough coverage of industrial reforms and the rural reforms of China, see D. Gale Johnson, *The People's Republic of China: 1978-1990*, San Francisco: ICF Press, 1990; Gene Tidrick and Chen Ji Yuan, *China's Industrial Reforms*, New York: Oxford University Press, 1987; Dwight Perkins, "Completing China's Moves to the Market, *Economic Perspectives*, 8 (1994), 23-46; and Jefferson and Rawski, "Enterprise Reform in Chinese Industry," *Economic Perspectives*, 8 (1994), 47-70.

labor productivity of the firms in the data set increased at 2.6% annually.⁴ The individual reforms are described below; their trend is displayed in table 1.

1. Increasing profit retention rates. SOEs faced two retention rates: the base retention rate for the profit below or at the base amount, and a marginal retention rate for profit above it.⁵ The average base retention rate increased from 17% in 1980 to 39% in 1989, most of this increase occurring before 1986. The average marginal retention rates, lower than the average base retention rates, increased more smoothly: from 11% in 1980, to 17% in 1984, and 27% in 1989. The variation across firms and over time was

Table 1. Trends of the Decentralized Reforms in the 1980s

	80	81	82	83	84	85	86	87	88	89
Average base retention rate	.17	.19	.22	.30	.34	.37	.39	.38	.39	.39
Average marginal retention rate	.11	.12	.11	.14	.17	.17	.19	.23	.26	.27
% firms with production autonomy	.07	.08	.10	.14	.25	.35	.40	.53	.64	.67
Average mandatory-plan share	Not Available				.64	.62	.60	.58	.57	.57
% firms with wage discretion	.01	.01	.01	.02	.05	.09	.12	.20	.32	.35
% firms under MRS	.00	.00	.00	.01	.02	.04	.08	.42	.83	.88
Average firm-level pay sensitivity for firms under MRS	Too Few Observations				.51	.39	.41	.46	.43	.42
% investment financed by government funds	.27	.26	.24	.21	.20	.17	.14	.13	.12	.10
% investment financed by bank loans	.17	.18	.20	.22	.25	.33	.32	.34	.33	.28
% investment financed by profit retention	.08	.08	.09	.12	.12	.12	.12	.12	.15	.15
% firms with management turnover	.09	.01	.06	.10	.16	.14	.07	.15	.10	.09

Source: *A Survey of State Enterprises: 1980-89*.

⁴ It may be useful to know that there were two complementary conditions that allowed SOE reforms to work. First, SOEs became increasingly active in both the input and product markets. Between 1980 and 1989, the share of material inputs purchased through the market rose from 32% to 59%, and the share of output sold on the market rose up from 49% to 60%. Second, the SOE sector faced increasing competition from the non-state sector: in 1980, collective and other non-state-owned industries accounted for 21% of gross value of industrial output; by 1991 this figure had risen to 47%.

⁵ According to *MRS in practice*, the determination of base profit was largely exogenous--usually some weighted average of past profits, or simply one-period lagged profit. See Research Group for the Chinese Firm System Reform, System Reform Committee, *Management Responsibility System in Practice*, Beijing, China: The Economic Management Press, 1988.

substantial. A firm could use retained profit to invest, improve collective welfare, or pay employee bonuses. However, the manager's freedom in using retained profit was limited by many constraints such as a bonus cap, a very high progressive tax rate, or increasing dependency on self-financing for capital investment, for which the government was previously fully responsible. In the rest of the paper, the base retention rate is viewed as a transfer mechanism, and the marginal rate as an incentive device for the firm.

2. Autonomy of production decisions. At the beginning of the 1980s the government controlled most of the production plans for SOEs. Throughout the decade it gradually granted some firms more autonomy on production decisions, mainly in six areas: value and physical quantity of output, and choices of product, technology, production scheduling, and exports.⁶ In our data set the share of SOEs with production autonomy increased from 7% in 1980 to 25% in 1984, 53% in 1987, and 67% in 1989. Another indicator of production autonomy is the share of output under the government's mandatory plan (mandatory plan share hereafter):⁷ a low value implies a high level of production autonomy for the firm. The average share dropped from 64% in 1984 to 57% in 1989.

3. More managerial discretion to determine employees' wages. Traditionally the government set an employee's wage by an almost deterministic function of personal observables such as age, education, location, and tenure, leaving managers with no leverage to induce employee efforts. Worse yet, managers could not fire employees.⁸ To

⁶These types of production decisions were delegated around the same time, with the exception of production scheduling, which came earlier, and exports autonomy, which came later.

⁷A state enterprise's output fell under three categories: mandatory plan by the government, which is set up by the government and must be fulfilled, directive plan that was suggested by the government, and own plan which was under the discretion of the manager.

⁸Part of the reason was that the "fallback position" for the fired employees implied great hardship: it was very difficult to find jobs outside the incumbent firm due to a rigid labor market; in addition, since the social security and welfare function was carried out by the state enterprises rather than the market or the state, the dismissed employees would lose much of their firm-specific investments such as housing, tenure wage, pension plan if they left the incumbent firms.

improve internal labor incentives, the government granted managerial wage discretion (called the *firm-specific wage scheme*) for managers to base employees' wages on their observed productivity, controlling only either the firm's aggregate wages or their growth rate. That managerial discretion, presumably, could be manifested in determining employee wages based on his output (pay sensitivity) and on his effort and skills (monitoring); yet, in a team production setup, managers could not tell each employee's productivity. Individual-level pay sensitivity is thus precluded from being a component of that discretion. In the rest of the paper, therefore, managerial wage discretion is justifiably viewed as managers' heightened right to monitor as an incentive device for employees.⁹ The share of firms with managerial wage discretion increased in the latter 1980s: it was only 0.5% in 1980, 5% in 1984, then jumped to 20% in 1987, and 35% in 1989.

4. Making a firm more self-financing. A SOE could finance its investment through government funds, bank loans, and profit retention. Traditionally the government funds were the major source. Over the decade the share of finance attributable to bank loans and profit retention increased: the figure for by bank loans was 14% in 1980, 22% in 1984, 32% in 1987, and 27% in 1989; for profit retention the figure was 13% in 1980, 15% in 1984, 15% in 1987, and 17% in 1989. In the rest of the paper, direct government finance is regarded as a redistributive mechanism: since its funds are more heavily subsidized than other sources, greater reliance on government funds indicates larger transfer to SOEs.

5. *Management (or Contract) Responsibility System (MRS)* and firm wage elasticity.¹⁰ The counterpart to the Household Responsibility System of the Chinese

⁹ In this paper, monitoring refers to that performed by managers on employees. We do not discuss the monitoring the government conducted on the firms, for we do not have a good measure of government monitoring on firms. While production autonomy may sound like lessened government monitoring on firms, it is not clear that was the case.

¹⁰ All information about MRS is from *MRS in Practice*.

agricultural reform,¹¹ MRS was, perhaps, intended to be the most dramatic reform for SOEs. MRS is a performance contract signed between the government and a SOE, usually for a duration of 3-5 years. Under the contract, the manager was granted some discretion to make decisions within the firm, and was supposed to fulfill specified targets.¹² Typically a MRS contract specified the distribution of value added between the state and the firm, performance requirements such as the minimum annual expenditure on capital maintenance, the number of new products to be developed, the volume of output to be delivered to the state and its price, the dependence of CEO compensation on the performance of the firm, and the way the total wage bill was linked to the firm's profit level-- that is, an *ex ante* wage elasticity with respect to profit. Bear in mind that this firm level pay sensitivity existed *only* when the firm was under the MRS. Given the complexity of contract provisions, MRS often resembled an imposed state plan. It was not clear, therefore, that it gave the manager more independence. In the rest of the paper MRS is interpreted as the government's attempt to use performance contracts with incentive components (as measured by firm-level wage elasticity) to govern SOEs. Most firms did not adopt MRS until 1987. Almost none had a MRS contract in 1980, only 2% of the sample in 1984, but 42% in 1987, and 88% in 1989.

6. Increasing management turnover. Over the decade, an increasing number of firms experienced management turnover, especially from 1983-85 and 1987-1989. The figure was 9% and 6% of firms in 1980 and 1982, and then jumped to 16% and 14% in

¹¹Justin Yifu Lin, "Rural Reforms and Agricultural Growth in China," *American Economic Review*, 82 (1992), 34-51; McMillan et al. (1989), "The Impact of China's Economic Reform on Agricultural Productivity Growth." *Journal of Political Economy*, 97 (1989), 781-807. Both authors attributed the adoption of the Household Responsibility System as the major source of the unprecedented increase of farming productivity in China in the first half of the 1980s.

¹²Usually, the MRS contract for a firm was signed by the industrial bureau, which was a branch of government in charge of industrial SOEs, and by some representatives of the firm, including the manager--the winner for the contract. The winner was determined by a committee representing the government, and sometimes also the employees of the firm.

1984 and 1985; it dropped to 7% in 1986, then increased to 15% in 1987, and dropped again to 10% and 9% in 1988 and 1989.

III Hypotheses about the Determinants of Decentralization

Using a principal-agent (PA) approach, this section discusses what determines the way the government and SOEs decide internal and managerial incentives, financing arrangements, and control rights over production decisions. Consider this PA relationship: the government as the principal is risk-neutral, and the manager of a SOE as the agent is risk averse. For some reforms, I shall also consider a PA relationship between the manager as the principal and his employees as his agents. The government is postulated to have three goals: increase revenue (or profitability), retain control of SOEs which represent high control amenity -- that is, utility from directly controlling the firms - - to the government, and reduce the inequality of income across firms. Managers and employees have an informational advantage over the government that allows them to earn a rent, and that advantage, as a result, causes sub-optimal effort and investment levels. To reduce the informational asymmetry, the government can design managerial and employee incentives, control rights and performance contracts to align the objectives of the SOEs with those of the government.¹³ The manager, of course, may opt for the more centralized status quo if the firm is better off than under the considered reform.

Incentives, Control and Risks

In designing incentives the government would like to differentiate between firms in terms of the risks they face, and strike a balance between incentives and insurance.¹⁴ In

¹³ See Laffont and Tirole (1993), chapter 1, *A Theory of Incentives in Procurement and Regulation*, the MIT Press: Cambridge, Massachusetts.

¹⁴For surveys on principal-agent models, see David Sappington, "Incentives in Principal-Agent Relationships," *Journal of Economic Perspectives*, 5(2), 1991, p. 45-66; Bengt Holmstrom and Jean Tirole, "The Theory of the Firm," in Schmalensee R., and R. Willig eds., *Handbook of Industrial Organization*, Amsterdam: North-Holland, 1989.

particular, other things equal, firm facing relatively greater risks should be given more insurance, corresponding to lower-powered incentives (in our context, lower marginal profit retention rates). Since in these risky firms the government cannot rely on sufficient incentives, it instead will rely to a larger extent on controlling the operation of the firm directly. Thus we expect more risky firms to have less production autonomy. Further, a firm facing higher risks would be less likely to choose MRS as that option would expose them to a larger extent to risks. In other words, the relative gains from the risk-free nature of the centralized status quo may often be larger for these firms. Thus we conjecture that firms facing more risks will lean less toward adopting MRS. Let us call the above the *insurance-incentive-tradeoff hypothesis*. A brief summary of all the hypotheses will appear in table 5 at the beginning of section V, and in another form in table 2 at the end of this section.

MRS, Pay Sensitivity and Efficiency Level

In designing MRS contracts (including the pay sensitivity), the government has to balance two conflicting goals: effective incentives and extracting rents enjoyed by SOEs.¹⁵ Because of managers' information advantage the government cannot distinguish efficient from inefficient firms. To induce firms to reveal their own types, the government can offer a menu of MRS which differ in incentive intensity and insurance coverage. Incentive intensity is reflected in firm-level pay sensitivity (to profits).¹⁶ To illustrate, assume the manager's utility function increases with monetary rewards (which are equal to a lump sum transfer plus shared profit), and decreases with effort level. The government offers two types of MRS contract: the high-sharing type with a high firm-level pay sensitivity (high-powered incentives), and a low amount of fixed transfer (low insurance), and the good-insurance type with a low pay sensitivity, and a high amount of

¹⁵ Laffont and Tirole (1993). See note 13.

¹⁶ Ibid.

transfer. Consider the subset of firms for whom both types of contract represent higher utility levels than that under the centralized mode. The inefficient firms will prefer the good-insurance type: the managers know that they will not obtain a large profit, therefore their utility is maximized under the contract with a high transfer, low pay sensitivity, and low efforts. In contrast, the efficient firms will prefer the contract with high pay sensitivity: they know that they will be able to reach a large profit level, thus the utility level associated with the high wage amount, the low transfer and corresponding high efforts will be larger than under the alternative contract. Of course, there would still be firms that opt for no participation in MRS: for extremely inefficient firms, even the good-insurance MRS contract would expose them to some risks, whereas the centralized status quo offers more insurance.

The above separating equilibrium improves efficiency in comparison to offering the same contract to every firm. I shall illustrate by showing that 3 cases of pooling equilibrium do not work as well as the separating equilibrium. Case 1: offer a large transfer and large pay sensitivity to both types of firms. They will all accept gladly. But this incentive scheme will leave the SOEs with too much rent, an undesirable outcome since the state's budget constraint is tight and public funds are generated through distortionary taxes. Case 2: offer a large transfer and a low pay sensitivity to both types. All inefficient firms will accept the contract. Some efficient firms will stay at the centralized mode; others will accept the contract. As a result, efficient firms yield lower efforts than if they had high pay sensitivity and a low transfer. In this case, slacking on the part of efficient firms prevents the maximization of the social welfare (the government's plus the firms' utilities). Finally case 3: offer a low transfer and high pay sensitivity. Then the efficient firms will participate but the inefficient will not. As a result, the inefficient type will yield a lower effort level than if it participates in the high-insurance contract type. Again, social welfare is likely to be lower than that in the separating equilibrium. While the choice of MRS contract may successfully cope with

hidden information problems, it cannot overcome the moral hazard problem: whereas the efficient firms will work hard due to the high-incentives contract, the inefficient firms, due to the low incentives for the good-insurance contract, will not work as hard as when the government has perfect information.

The above analysis offer testable implications for MRS status and its associated incentive components, namely pay sensitivity. The theory implies that efficient firms will choose MRS with a high pay sensitivity, while inefficient ones will choose either a low pay sensitivity or not to adopt MRS. We call this the *self-selection hypothesis*.

Internal Labor Incentives, Firm Size and Capital Intensity

When the government decides if the manager should be granted the rights to control a firm's internal incentives, it will take into account the information structure underlying a firm's size and its capital intensity. Due to the inseparability of team members' productivity, employees enjoy a certain amount of discretion that may run counter to the objectives of the government.¹⁷ To align the incentives of the employees with its goals, the government can choose two types of incentives: allow managers to monitor (rewards based on input) or use pay sensitivity (rewards based on output).

The government would dictate that, employees in more capital-intensive SOEs be more closely monitored (i.e., depend more on managerial wage discretion) and less motivated by pay sensitivity so that the danger of equipment abuse in the presence of pay sensitivity would be mitigated. Pay sensitivity based on current profitability can be especially harmful. That is, a firm's current profit can simply be boosted by under-investing and over-utilizing machines which may reduce future capital stock (or its growth), therefore, hurting the long run objective of the government. Monitoring employees in capital-intensive firms are more attuned to the longer term goals of the

¹⁷ Alchian, A. and Demsetz, H. "Production, Information Costs, and Economic Organization." *The American Economic Review*, Vol. 62, No. 5 (December 1972).

government, the abuse of capital is more likely to be prevented. In this way, the rewards for workers in capital-intensive firms should be less based on short-term outcome measures such as profitability (i.e. should exhibit less pay sensitivity).

The government may also prefer that larger firms have stronger internal labor incentives in order to compensate for the loss of control associated with a burgeoning workforce. When a firm's size increases, employees enjoy a larger extent of discretion. So a firm with a larger size needs stronger internal labor incentives to induce desirable employee actions, both in the form of pay sensitivity and managerial wage discretion. These hypotheses relating pay sensitivity and managerial wage discretion to firm size and capital-intensity are called the *Alchian-Demsetz hypotheses*.

Management Change and Firm Characteristics

Managerial slacking can be curbed by taking advantage of their career concern.¹⁸ The government can threaten the manager with losing his job and reputation if he is judged to have done a poor job. The government infers his effort by observing the firm's performance: if it turns out to be poor, he is more likely to have shirked, and thus will be more likely to be replaced. Management turnover incentives, however, should be more carefully used when a firm faces intrinsically higher variability of profits. For these firms, it is harder for the government to discern whether poor performance is due to technology or demand shocks or due to managerial slacking. As a result, the government should be more reluctant to replace the managers whose firms face higher uncertainty. Finally, the government's profitability (or revenue) goals dictate that larger firms will find their managers replaced more readily, for the economic benefits of replacing a bad manager increase monotonically with the size of the firm. These hypotheses are referred to as the *management-discipline hypothesis*.

¹⁸ Sherwin Rosen, "Contracts and The Market for Executives," in Lars Werin and Hans Wijkander, eds., *Contract Economics*, Oxford, UK.: Basil Blackwell, 1992.

Centralized Control, Firm Size, and Capital Intensity

In giving different controls to SOEs, the government sacrifices differential benefits in terms of control amenity.¹⁹ Implementation of different reforms, moreover, incurs different governance costs. These considerations will partially determine how the incentive structure and control rights are related to a firm's size and capital intensity.

In deciding on MRS status, the government sees more control amenity in more capital-intensive firms, because it cares for capital maintenance and accumulation besides profitability. When capital-intensive firms become more independent, the government has to worry more about their tendency to abuse equipment or not accumulate capital in single-minded pursuit of short run profits. The analysis of Holmstrom and Milgrom (1991)²⁰ is relevant to our discussion: when the principal pursues multiple goals (for example, profit and capital accumulation in our case), a stronger reward (MRS with pay sensitivity in our context) for one objective (profit in this case) might lead the firm to sacrifice others. The principal, therefore, may opt for low-powered incentives (no MRS or MRS with lower pay sensitivity). One might naturally assume that, by the same line of reasoning, more capital-intensive firms would also be less likely to have production autonomy. This is not, however, true. First, the granting of production autonomy was not associated with strong incentives for one objectives versus the other(s), while MRS is

¹⁹ See Demsetz and Lehn (1985), in H. Demsetz (1988), *Ownership, Control and the Firm*, New York: Basil Blackwell.

²⁰ See Bengt Holmstrom and Paul Milgrom, "Multitask Principal-Agent Analyses: Incentive Contracts, Asset Ownership, and Job Design," *Journal of Law, Economics, and Organization* 7(1991): 24-52.

clearly associated with pay sensitivity. Second, as will be discussed later, production autonomy (but not MRS) and capital intensity are complementary in raising productivity.

A larger firm represents better control amenity to the government. It has more employment at stake; and it produces a more strategically important product (such as steel and energy). As a result, the government tends to maintain control over production of larger firms. In these firms we expect the government to rely on a more centralized control mode, as indicated by less production autonomy to the firm, higher mandatory-plan share, lower-powered profit-sharing regimes (low profit retention rates), and larger shares of investment financed by government funds. We call the hypotheses in this and last paragraph the *control-amenity hypothesis*.

To the extent that MRS may also have an autonomy component, the control amenity hypothesis imply that large firms (which have higher control amenity) are less likely to have MRS. An important caveat, however, is that it is not clear how much more autonomy a firm had after the adoption of MRS. The main feature of MRS was not production autonomy; rather, MRS represents the government's attempt to use a performance contract with an incentive component to govern firms. The government could, after all, substitute targets of the MRS contract for direct control, and, therefore, maintain its grip on the firm. Indeed, production autonomy reform largely preceded MRS reform: in 1986, 40% of firms had production autonomy whereas only 8% of firms had MRS. By 1989, while 88% of firms had MRS, only 67% of firms had production autonomy. In addition, whereas from 1986-1989 the share of firms under MRS rose from 8% to 88%, the mandatory-plan share dropped only minimally, from 60% to 57%.

There is another reason why larger firms may be less likely to have MRS (as predicted by the control-amenity hypothesis), and they are more likely to obtain production autonomy (opposite to what is predicted by that hypothesis); it is because larger firms are associated with lower governance costs. It is surely easier to directly manage a large firm with 100 employees than to manage 100 firms of one employee.²¹ Given the extent of information costs, the government can economize by first pushing MRS in larger firms because their agreements entails lower relative negotiation costs and enforcement costs---after all the government has to audit the accounting books to evaluate the firm, go through the management selection process, then sign the contract regardless of a firm's size. Notice that larger firms do not necessarily adopt MRS more readily, for control-amenity hypothesis suggest the opposite. Similarly, lower per capita governance costs for larger firms also imply that these firms are more likely to be governed by the government itself, and thus are less likely to enjoy production autonomy. We call this *governance-costs hypothesis*.

SOE Property Rights and the Government's Revenue and Equality Motives

The revenue (or profitability) motive of the government dictates that more capital-intensive firms should be more likely to implement the reforms that raise total factor productivity. Just imagine a production function: $y = Ak^\alpha L^\beta TFP^\delta$, where y is per capita value added, A a constant, k capital intensity, L the number of employees, and TFP total factor productivity. Since TFP increased with marginal profit retention rates, production autonomy, managerial wage discretion, firm-level pay sensitivity, and decreases with the

²¹ I am indebted to a referee for this point.

mandatory-plan share, apparently k and these reforms are complements in raising a firm's value added ($\frac{\partial^2 y}{\partial k \partial TFP} > 0$).²² Thus, when pursuing revenue, *ceteris paribus*, the government is likely to allow more capital-intensive firms a higher marginal retention rate, larger firm-level pay sensitivity, a lower mandatory-plan share, higher likelihood of production autonomy, and of managerial wage discretion. This is called the *TFP-capital-complementarity hypothesis*.

As postulated earlier, besides revenue and control, the government also wants to reduce income inequality across firms. This objective adds further shape to the configuration of property rights. First, the government can selectively allocate investment in favor of poor firms by giving them increased access to government funds, which are offered free of charge or at preferential rate. Second, the government may permit poorer firms to have higher base profit retention rates, which represents a lump sum transfer. Note that marginal retention rate will not be used: it has incentive therefore real allocative effects, a consequence not intended by redistributive purpose.

Finally, the government may grant more production autonomy to bail out firms in trouble, knowing that firms with production autonomy tend to achieve better productivity.²³ While some may find it odd that the government would redistribute through giving poor firms productivity-enhancing policies, it needs not be, at least for the Chinese government, which has granted many cities special policies in attracting foreign

²² In addition, it was found that, when we did not allow differential effects of new management by governance (i.e., by central, provincial, prefecture, and country governments), TFP did not increase with the presence of new management. See L. Colin Xu, "The Effects and Determinants of Decentralized Reforms," Ph.D. thesis, the University of Chicago, 1996.

²³ Xu (1996) found that firms with production autonomy have significantly higher productivity levels and growth rates.

capital, and given many poor regions tax exemptions and more independence in governance. Since production autonomy increases productivity for all types of firms, it is demanded by all firms; since the government enjoys control, the government is more likely to give up control to firms where its cost is lower: relative to giving production autonomy to rich firms, giving it to poor firms at least increase the government's utility by reducing income inequality and is therefore more likely. We call these hypotheses raised here the *equality-motive hypotheses*.

Why doesn't the government transfer cash directly to firms to avoid distortion? It may be that it faces substantial cost in breaking its own budget constraint; moreover, direct cash transfers are more visible and therefore entail higher political costs than the afore-mentioned methods. Additionally, some might ask, why not just decentralize production and give financial independence to poorly-performing firms? After all, these firms are most in need of restructuring. The answer is that these firms are not willing to participate in some cases. Production autonomy will make firms better off, thus poor firms will accept production autonomy. In contrast, participating in MRS and having high-powered incentives, as discussed earlier, are associated with lower lump sum transfer, leaving poor firms worse off, so they will not participate. What is more, MRS in particular and performance contracts in general were not associated with substantial productivity gains.²⁴ Therefore, it does not appear to be an effective redistributive mechanism. Similarly, because financial independence for poor SOEs is not as comfortable and risk-free as under the centralized status quo, it is often not embraced; moreover, financial independence entails hard budget constraints, which were not feasible given that the government did not want to bankrupt firms. In short, when some decentralized reforms threaten their status quo, poor firms may not participate.

²⁴ In *Bureaucrats in Business* (the World Bank, 1995, Oxford University Press: New York), it is found that the use of performance contracts on SOEs had minimal gains. Xu (1996) (see xxi) finds MRS to have also negligible gains (except its pay sensitivity components, which was associated with significant productivity gains).

Table 2 summarizes the hypotheses about the determinants of the reforms.

Table 2. Summary of the relationship between reforms and Several Key Variables

<i>Reforms:</i>	<i>Determinants of Reforms:</i>			
	<i>Efficiency level</i>	<i>Risks</i>	<i>Number of employees</i>	<i>Capital intensity</i>
<i>Base retention rate</i>	-: equality motive	?	-: control-amenity	?
<i>Marginal retention rate</i>	?	-: insurance-incentive tradeoff	-: control-amenity	+: TFP-capital-complementarity
<i>Probability: Production autonomy</i>	-: equality motive	-: insurance-incentive-tradeoff	-: control-amenity -: governance- costs	+: TFP-capital-complementarity
<i>Mandatory plan share</i>	+: equality motive	+: insurance-incentive-tradeoff	+: control-amenity +: governance-costs	-: TFP-capital-complementarity
<i>Probability: MRS</i>	+: self-selection	-: insurance-incentive tradeoff	-: control-amenity +: governance-costs	-: control-amenity
<i>Firm-level pay sensitivity</i>	+: self-selection	?	+: Alchian-Demsetz	-: control-amenity -: Alchian-Demsetz +: TFP-capital-complementarity
<i>Managerial wage discretion</i>	?	?	+: Alchian-Demsetz	+: TFP-capital-complementarity +: Alchian-Demsetz
<i>The change of management</i>	-: management-discipline	-: management discipline	+: management discipline	?
<i>% of investment from gov't funds</i>	-: equality-motive	?	+: Control-amenity	?

Note. +, -, and ? imply a positive, a negative, and an ambiguous relationship.

IV. Empirical Strategy and Findings

This section presents empirical results of the determinants of property rights and tests the hypotheses proposed in the last section. Alternative estimation strategies will be used depending on whether the dependent variable is discrete or continuous. For binomial reform variables---the managerial wage discretion, MRS, and autonomy --a binomial

Probit model is estimated,²⁵ and the samples consist of those years when the considered reform was not adopted or had just been adopted.²⁶ For continuous variables -- base and marginal retention rate, financing variables, and the mandatory-plan share ---we estimate OLS, fixed effects, and random effects models, using all observations for which the dependent variables are not missing. Specification tests will be used to examine these alternative models.²⁷ For each specification, only the best results are reported based on statistical criteria. In examining firm wage elasticity, since it was a constant for all the years following the adoption of MRS, and not observed or non-existent for firms without a MRS contract, our sample consists of all MRS-participating firms in the year when MRS was adopted.

Based on the considerations of the last section, the included explanatory variables are as follows.

1. *Profitability of the firm last year ($\ln y_{t-1}$):* a proxy for the efficiency level of the firm. One might question whether last year's profitability adequately captures the price and subsidy differences. We will therefore use a function of subsidies to predict property rights, including subsidy variables such as financing arrangements and base retention rates. As will be pointed out later, we shall control industry, governance and year dummies, which should filter out industry-, governance-, and year-specific price and subsidy differences. In addition, because SOEs became increasingly active in the market by selling part of their products and buying part of their inputs from the market, the plan

²⁵The underlying assumptions of binomial Probit model are as follows. Let the outcome, y , be either 0 or 1. let y^* be an index function such that y is 1 if $y^* \geq 0$, and 0 if $y^* < 0$. Assume $y^* = X\beta + \varepsilon$, where X is the determinants of outcome y , and β the associated parameters, and ε the disturbance term. Then $probability(y = 1) = probability(X\beta + \varepsilon > 0) = \Phi(X\beta)$.

²⁶In this sample, once you had one of the three afore-mentioned reform dummies, you had it till the end of our sample period. Therefore, only years before a reform or the year reform was adopted are relevant sample when we examine the determinants of that reform.

²⁷We use F-test to choose between OLS and fixed effects model, Hausman's test between random effects and fixed effects model, and Breusch-Pagen Lagrangian multiplier test between OLS and random effects model.

price difference embodied in the profitability measure became less and less important. Profitability in the prior year, therefore, became an increasingly reliable measure of a firm's efficiency. Moreover, for continuous variables, which include subsidy variables (financing variables and base retention rate), we shall experiment with fixed effects models which are likely to filter out firm-specific subsidies and price differences. Taken together, these steps should ensure that last year's profitability is a reasonable proxy for efficiency.

2. *Riskiness of the environment*:²⁸ represented by the coefficient of variation for profitability ($\ln y_i$) -- its standard deviation over its mean -- computed by industry \times year cells (thus it has both cross-sectional and time series variations). In the calculation there are ten industries, and ten years (1980-89), so a firm could receive one of 100 risk indicators.

3. *Production structure of the firm*: the capital-labor ratio ($\ln k$), and the employment of a firm ($\ln L$). Capital is measured by the total net fixed capital stock divided by the number of employees. It is deflated by firm-specific price index, constructed from the data set.²⁹

4. Governance dummies.³⁰ Firms with alternative governance status had a different tendency to decentralize, as each governance status represented both distinct amenity of control to the government and different executive procedures to implement reforms. Moreover, the governance status of a firm was closely related to the subsidy level it received from the government: in general, the higher the authority of the firm's governing agency, the higher the subsidy level.

²⁸Demsetz and Lehn (1985) considered the *noisiness of environment* as a factor that determines the diffuseness of corporate ownership. I follow their tradition.

²⁹I have also experimented with a province-specific consumer price index, and the empirical results remained similar.

³⁰From the data set, we know that the higher authority of the governing body, the more controlled (lower) the output price, and the more subsidized the inputs.

5. Industry, province, and year dummies. Industry dummies control for systematic differences in control amenity to the government across industries. Provincial dummies control for province-specific differences in implementing the central government's policies. Year dummies capture macro shocks over time: the increasing intensity of competition from village and township firms, and collective firms; policy changes; and trends of decentralized reforms.

The empirical results are displayed in table 3 (panel A for discrete, and panel B for continuous dependent variables).

MRS (panel A) and Firm Pay Elasticity (panel B)

The results show that firms with higher productivity adopted MRS more readily. Further, better-performing firms tended to have higher firm wage elasticity, representative of high-powered incentives. These observations support self-selection hypotheses.³¹

The MRS Probit results also suggest that firms in industries with more volatile profits appeared to be more reluctant to adopt MRS. This is consistent with insurance-incentive-tradeoff hypothesis. In addition, larger firms were more likely to adopt MRS.

³¹ Some may question whether the positive correlation between MRS and efficiency level is merely a manifestation of reverse causality: low profitability is caused by tighter control (as indicated by no MRS contract) and a lower plan price for strategically important products. However, the profit measure I use is lagged one period, and, should be viewed, therefore, as predetermined. As a result, the causality is more likely to be from lower productivity to tighter control. Moreover, Xu (1996) finds that, relative to firms that had not eventually adopted MRS, those that did enjoyed significantly higher productivity even *before* the adoption of MRS, a piece of evidence against reverse causality.

Table 3. The Determinants of Property Rights Structure of Chinese SOEs
Panel A. Discrete Dependent Variables

	<i>Dependent Variable:</i>							
	<i>Change of management</i>		<i>Adopting MRS</i>		<i>Delegating autonomy</i>		<i>Delegating managerial wage discretion</i>	
	<i>Probit estimates</i>	<i>Change in prob. when X_i change by one standard deviation</i>	<i>Probit Estimates</i>	<i>Change in prob. when X_i change by one standard deviation</i>	<i>Probit Estimates</i>	<i>Change in prob. when X_i change by one standard deviation</i>	<i>Probit Estimates</i>	<i>Change in prob. when X_i change by one standard deviation</i>
Number of Observation	3463		3825		4234		5418	
Log likelihood	-1338.02		-939.32		-1186.41		-823.16	
Prob. (the event happens this year)		.145		.107		.090		.040
ln(value added per capita at the previous year)	-.057 (.037)	-.016	.093* (.048)	.019	-.067* (.040)	-.009	-.004 (.049)	-.0002
Variation coefficient of avg. value added in the industry at year t	-6.091** (2.694)	-.030	-7.623** (3.848)	-.032	-6.201** (2.931)	-.017	2.554 (3.262)	.003
ln(capital-labor ratio)	.045 (.045)	.009	-.089* (.053)	-.015	.080 (.048)	.009	.029 (.055)	.001
ln(number of employees)	.067* (.034)	.018	.184*** (.042)	.042	-.044 (.036)	-.007	.139*** (.042)	.007

Panel B. Continuous Dependent Variables

	<i>Dependent Variable:</i>						
	<i>Firm Pay Elasticity</i>	<i>Base retention rate of profit</i>	<i>Marginal retention rate of profit</i>	<i>Mandatory-plan share</i>	<i>% investment financed by gov't fund</i>	<i>% investment financed by bank loans</i>	<i>% investment financed by retained profits</i>
Model	OLS	Fixed effects	Random effects	Fixed effects	Random effects	Random effects	random effects
Number of observations	617	3848	2397	2715	4034	4154	3197
R-Square	.124	.109	.080	.040	.091	.113	.053
ln(value added per capita at the previous year)	.086*** (.019)	-.014** (.007)	.005 (.007)	.014* (.007)	-.017** (.007)	.024*** (.008)	.022*** (.006)
Variation coefficient of avg. value added in the industry at year <i>t</i>	1.380 (1.843)	-.049 (.249)	-.600** (.279)	-.032 (.296)	-.178 (.279)	-.194 (.316)	-.034 (.209)
ln(capital-labor ratio)	-.035* (.021)	.010 (.009)	.014 (.010)	-.017* (.010)	.011 (.009)	.034*** (.010)	-.022** (.007)
ln(number of employees)	.030* (.015)	-.074*** (.025)	-.013 (.015)	.090*** (.028)	.020* (.011)	.010 (.012)	-.015 (.010)

Note. In random effects regression and Probit estimations, other included variables are 9 industry dummies, 9 year dummies, four governance dummies, and three province dummies. In fixed effects regressions, other included variables are 9 year dummies. Estimates with *** are significant at 1% level, with ** at 5%, and with * at 10%.

As discussed earlier, on the one hand, to the extent MRS might have an autonomy component, MRS should be less likely for large firms because they offered more control amenity to the government; on the other hand, their lower governance costs made large firms more likely to have MRS. The finding that larger firms were more likely to be under MRS indicates that the governance costs consideration was, perhaps, more important than control amenity consideration in determining firms' participation in MRS.

Finally, more capital-intensive firms were less likely to adopt MRS. This supports the control amenity hypothesis, which maintains that the government will be more reluctant to grant a firm independence if it represents a higher control amenity. As discussed earlier, when granting MRS to firms, the government has to be concerned more about relatively capital-intensive firms: there is greater potential efficiency loss associated with the abuse of capital that is spawned by the explicit pay sensitivity in MRS. Indeed, the firm pay elasticity regression suggests that more capital-intensive firms had lower pay sensitivity. Since (from table 2) pay sensitivity should decrease with capital intensity by Alchian-Demsetz and control-amenity hypotheses, and increase by TFP-capital-complementarity hypothesis, the result implies that the considerations associated with the first two hypotheses were more important than that with the third. In addition, larger firms tended to have higher pay sensitivity. This finding is consistent with the Alchian-Demsetz hypotheses.

The Managerial Wage Discretion (panel A)

The delegation of managerial wage discretion is not affected by past performance and the volatility of profits in the firm's industry. Meanwhile it increases with capital intensity (statistically insignificant) and the size of employment. These observations are broadly consistent with the Alchian-Demsetz hypotheses and the TFP-capital-complementarity hypothesis: larger and more capital-intensive firms need more discretion to monitor.

The Change of Management

I tried two specifications for the determinants of management change. In table 2 performance was measured by the level of value added in the previous year; in table 3, it was measured by the difference of value added between last year and the year before. Besides fitting the data better, the latter variable is economically more meaningful as well: the difference can filter out firm-specific advantage in price and market power.

The findings from both specifications largely draw the same conclusions. Larger employment entailed higher likelihood of management turnover. So it appears that the government was aware of the increasing benefits of management change in larger firms. In addition, higher volatility of profits in the industry of the firm was associated with less chance of management change. So the government was more cautious to point fingers at managers when there was more uncertainty involved with a firm's profitability. Finally, poorer performance gave rise to higher management turnover. The result is stronger when we used the change of profits rather than the level as the performance measure. So the government indeed based management change on profitability. These findings support the management-discipline hypothesis.

Table 4. The Determinants of management turnover: another specification

<i>Model</i>	dependent variable: changing management	
	<i>Probit Estimates</i>	<i>Change in prob. when X_i change by one standard deviation</i>
Number of observations	2813	
Log likelihood.	-1271.33	
Probability that the event happens this year		.145
Change of average value added from (t-2) to (t-1)	-.107* (.060)	-.018
Variation coefficient of avg. value added in the industry at year t	-5.727* (2.972)	-.035
$\ln k_{t-1} - \ln k_{t-2}$.008 (.102)	.001
$\ln(\text{number of employees})$.062* (.035)	.021

Note. Other included variables are the same as in Probit model of table 2. Estimates with * are significant at 10% level.

Profit Retention Rates (panel B)

Profit retention rates seem to play multiple roles. First, the base profit retention rate acted as a transfer mechanism: the base retention rate was negatively related to the firm's past performance, while the marginal retention rate was not affected by this measure. It appears the government used base retention rate as a transfer mechanism to narrow the gap of income between rich and poor firms.³² This observation is consistent with the equality-motive hypothesis. Second, profit retention rates acted as insurance. SOEs in industries with higher volatility of profits faced lower marginal retention rates. This is consistent with insurance-incentive-tradeoff hypothesis. That is, firms facing higher risks should have lower-powered incentives. Third, profit retention rates acted as complementary incentive arrangements to centralized control. Larger SOEs were granted lower profit retention rates (insignificant for the marginal rate, and significant for the base rate). This finding should be looked at jointly with an observation made later, namely, the government tended to maintain more direct control and give lower-powered incentives to larger firms. The finding is also consistent with control-amenity hypothesis, which holds that, because larger firms signal better control amenity, they are more likely to be centrally controlled.

Production Decision Rights

This category includes production autonomy (panel A) and the mandatory-plan share (panel B). By both measures, SOEs with worse performance in the previous year were found more likely to have production autonomy. As a result, efficient firms were implicitly penalized while inefficient ones rewarded. This is consistent with the equality-

³² Since the base profit is a fixed amount, the number (base profit \times base retention rate) is just a lump sum transfer.

motive hypothesis. In addition, SOEs in industries of higher volatility were less likely to have production autonomy. This renders support for our insurance-incentive-tradeoff hypothesis. Finally, larger SOEs seemed to be less likely to have production autonomy. This is consistent with the control-amenity hypothesis: the government is less likely to give up control to larger firms because of their high control amenity.

More capital-intensive firms were found to have better chance of production autonomy (insignificant) and lower mandatory-plan share (significant). This is consistent with the TFP-capital-complementarity hypothesis: an efficiency-minded government will grant autonomy to more capital-intensive firms because TFP and capital-intensity are complementary in raising productivity.

Financing Arrangements (Panel B)

The results show that, first, SOEs with better past performance relied more on bank loans and their profit retention for investment, and less on government funds. Thus the government appeared to use investment financing to reduce income inequality across firms. This piece of evidence supports the equality-motive hypothesis. It also indicates the presence of “ratchet effects:” the government, in striving for equality, rewarded inefficient firms while penalized efficient ones. Second, capital-intensive firms depended more on bank loans and less on their own retained profits, probably reflecting both their greater need for capital, and the banks’ role in allocating investment funds. Finally, larger firms relied more heavily on the government for investment. This is consistent with the control-amenity hypothesis: because larger firms present better control amenity, they tended to receive more centralized control as reflected in the traditional financing arrangement.

V. Concluding Remarks

We have examined how Chinese SOEs and government partitioned property rights. Table 5 summarizes this paper by listing the hypotheses and specific empirical findings, which were generally consistent. The predictions were generated from the following framework: with three goals in mind (revenue or profitability, control and inter-firm equality), the risk-neutral government designs incentives, control rights and financing arrangements to cope with the information advantage of firms. Many pieces of evidence lend credence to the framework: when granting capital-intensive SOEs managerial wage discretion and low pay sensitivity, the government appeared to reduce the harm associated with employees' discretion in pursuing short-run rewards; when using profitability as a criterion to judge managers, it appeared to align managerial incentives with its efficiency goal; when granting high-powered incentives for better-performing firms and low-powered incentives for poorly-performing ones, it appeared to use contract to reveal the types of firms, and thus achieve a tradeoff of incentives and extracting rent; when it was more willing to implement MRS in larger firms, again at the heart is the information problem -- it incurs higher monitoring costs to supervise 100 firms of one employee than to supervise a firm with 100 employees.

The findings of this paper offer some insights about the sources of inefficiency of SOEs. One source is the dynamic inefficiency uncovered in this paper: the "ratchet effects," represented by giving better firms lower base retention rates and less subsidized investment funds, make efficient firms unwilling to reveal their true efficiency level; instead, they pretend to be inefficient by slacking so that they can get more transfers. So there are inherent conflicts between two of the government's goals: the revenue objectives and the equality goals. Another source of inefficiency is the control motive of the government, which prevents many SOEs from becoming decentralized and therefore improving their productivity. The final source is, perhaps, the most difficult to tackle: the information problem embedded in the government-enterprises relationship. To the extent that the government can design mechanisms to reduce managers' informational

Table 5. Matching Hypotheses and Evidence

<i>Hypothesis</i>	<i>Evidence</i>
<p><i>Insurance-incentives-tradeoff:</i> firms facing more risks will be given lower-powered incentives; the government will manage their operations more directly.</p>	<p>Firms in industries with more profit volatility had lower marginal profit retention rates, more centralized production control, and were less likely to adopt MRS.</p>
<p><i>Self-selection:</i> Efficient firms will choose MRS with strong incentives, while inefficient ones will self-select into either MRS with weak incentives or no MRS.</p>	<p>Firms with better past performances adopted MRS more often, and had higher firm-level pay sensitivity.</p>
<p><i>Alchian-Demsetz Hypothesis</i> (about internal labor incentives): to prevent employees from pursuing short-run bonus too aggressively by abusing equipment, in more capital-intensive firms the manager should depend more on monitoring (managerial wage discretion) and less on pay sensitivity to motivates employees. Moreover, when a firm is larger, stronger internal labor incentives are called for.</p>	<p>The firm-level pay sensitivity increased with firm size, and decreased with capital intensity. The tendency to grant managerial wage discretion to a firm increased with both its capital intensity and size.</p>
<p><i>Management-Discipline:</i> To motivate managers, their careers will be made dependent on their performance. The discipline is more beneficial in bigger firms because the productivity gains are multiplied by the size of the firm. However, when the noisiness of environment is large, management turnover is unlikely to function well as a discipline device.</p>	<p>Managers were more likely to be replaced when recent productivity change was smaller, or when firm size was larger, or when the industries they were in had lower volatility of profits</p>
<p><i>Governance Costs:</i> in governing firms the government will try to reduce governance costs, which implies that larger firms will be more likely to have MRS and less so to have production decision rights.</p>	<p>Larger firms were more likely to have MRS, and less so to have production autonomy, and had larger mandatory-plan share.</p>
<p><i>Control-Amenity:</i> the government will control firms whose control amenity is higher. Better control amenity lies in larger firms, or in more capital-intensive firms in the presence of explicit pay sensitivity to profit .</p>	<p>Larger firms were under a more centralized control mode: lower profit retention rates, less production autonomy, and more investment from government funds. They were not, however, less likely to have MRS, as predicted by control amenity hypothesis. This indicates that in determining MRS for larger firms, governance costs were the dominant consideration. More capital-intensive firms were less likely to be under MRS.</p>
<p><i>TFP-Capital-Complementarity:</i> Complementary to capital intensity in raising productivity are production autonomy, marginal retention rate, firm-level pay sensitivity, and managerial wage discretion. In pursuing efficiency, the government will allow more capital-intensive firms to have higher marginal retention rates, higher firm-level pay sensitivity, and higher likelihood of production autonomy and managerial wage discretion.</p>	<p>More capital-intensive firms had better chance of enjoying production autonomy and managerial wage discretion, had a higher marginal retention rate and a lower mandatory-plan share. These firms, however, were not more likely to have higher firm-level pay sensitivity (as predicted by this hypothesis); so the control-amenity and Alchian-Demsetz hypotheses dominated this hypothesis in determining firm-level pay sensitivity.</p>
<p><i>Equality-Motive:</i> The government has an intention to reduce inequality among firms.</p>	<p>Firms with worse performance were allowed higher base profit retention rate, higher share of investment from government funds and lower share from self-financing, and more likely to have production autonomy.</p>

advantage, the SOE reforms can improve productivity. Additional evidence in support of this claim comes from Groves et al (1995),³³ who find that firms whose management replacements were filled by bidding procedure experienced higher efficiency gains than firms that used other procedures which did not reveal as much information about firms. However, agency problems, especially the information advantage of SOEs, coupled with objectives of the government that deviate from profits, may severely limit the mileage one can expect from incentive- and contract-based partial reforms.

³³See note 2.

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