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## Property Rights Arrangements and Industrial Productivity in China

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# Property Rights Arrangements and Industrial Productivity in China

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## ABSTRACT

This paper summarizes some important results from an on-going research on behavior and performance of Chinese industrial enterprises. The theoretical and empirical results strongly support ownership reforms toward private property system. The paper also suggests that the gradual change of institutions in Chinese industrial enterprises has facilitated evolution toward a more rational enterprise system in spite of various distortion associated with the gradual change.

Since 1978, the Chinese Government has transferred some important dimensions of property rights from the State to managers and workers. It has allowed the state enterprises to retain a portion of profits for bonuses, for welfare benefits, such as housing, and for industrial investment. As a result, productivity has increased significantly.

This productivity enhancement has been under-estimated in the literature because the non-industrial activities such as the provision of housing, training, and medical care in Chinese firms have not been taken account of properly. This study shows that it is important to include non-industrial activities in the productivity analysis because public ownership of Chinese firms and high monitoring costs have allowed Chinese managers and workers to divert industrial resources to non-industrial uses.

Estimations from Chinese firm-level industrial samples indicate that if fringe benefits are not accounted for, the state-owned enterprises would produce about 60% less industrial output than the collective enterprises. After including fringe benefits as outputs, the productivity gap decreases, but is still substantial at about a 30% level.

Also, the collective enterprises have sustained a high rate of productivity growth throughout the reform period while the state enterprises only increased productivity growth in the initial period of reforms.

## I. Introduction

About forty years ago, the Chinese Communist Party, under the leadership of Chairman Mao Ze-dong, took over China and started a thirty years experiment of socialist economic development. The Chinese government transformed private farming into collective farming and private firms into state and collective enterprises. A command or planned economy was born and recorded impressive industrial growth during the three-decade-long experiment.

However, questions about the effectiveness of the Chinese socialist economic development were raised during the 1970s by the government and scholars. It is now clear that some of the high growth rates during that period had been artificially inflated by the authorities as a propaganda for the "superior" socialism. The rest of the growth had been achieved largely through massive investment in fixed capital at the cost of current consumption and efficiency. During the thirty years of socialist development, Chinese people suffered not only repression of political struggles but also stagnation of living standards.

In 1978, two years after the death of Mao Ze-Dong, the Chinese government started to reform the socialist economy. Although the government did not intend to transform the socialist economic system into a capitalist market economy, the economic reforms during the last decade effectively opened the door to decentralization, commercialization, privatization, as well as democratization. The reforms have been particularly successful in the agricultural sector, where a version of private farming has been introduced.

In the industrial sector, the reforms have been advanced primarily through the Contract Responsibility System, which has two key institutional elements. The first is profit-sharing between the government and the enterprises and the second is managerial autonomy, which allows enterprise managers to make decisions about production, investment, sales, and compensation.<sup>1</sup> The Contract Responsibility System effectively transferred some dimensions of property rights from the government to the managers and workers in Chinese state and collective firms. It is suggested by many scholars that the Contract Responsibility System has provided incentives to Chinese managers and workers and improved their productivity. However, little research has been done to provide rigorous models and systematic evidence about the link from the new institutional system to the changes in incentives and productivity.

The still on-going research reported in this paper provides not only a theoretical model of the Contract Responsibility System but also uses the model to guide an empirical study on the performance of the Chinese state and collective enterprises. The theoretical model focuses on the ownership aspect of the Contract Responsibility System and explores closely the link between ownership structure and some unique features of the enterprise behavior in China. In particular, the model examines how the ownership structure affects the incentives to pursue fringe benefits and how the expansion of fringe benefits affects productivity.<sup>2</sup> Using firm and city-level data, the empirical work examines the differences between the state and collective enterprises in institutional structure, use of fringe benefits, and productivity.

## II. A Property Rights Perspective

When examining the ownership structure of Chinese enterprises, the first step is to determine who the owners are. Officially, the state enterprises are owned by all the people in China. In practice, none of them has the ownership rights. Hence, the formal owners are usually identified as the central or local governments. However, the managers and workers in the Chinese state enterprises derive substantial fringe benefits from their control over economic resources in the enterprises. So, it is useful to regard the managers and workers as implicit owners.

The next step is to find out how and what the owners own. In a Western corporation, the owners own machines, buildings, land, and the returns originated from these factors by holding shares of the corporation's stock. The stockholders not only claim residual profits but also control the corporation through buying and selling shares freely in the market as well as voting on important corporate decisions. But, in the Chinese enterprises, ownership of production factors is not clearly delineated because of the underdeveloped laws and regulations regarding the ownership aspect of economic organizations. Instead, the Chinese government creates many regulations and policies on how resources in the enterprises should be used. Hence, in the Chinese system, it is necessary to distinguish between ownership as a claim on residual profits and ownership as a claim on control of the enterprises.<sup>3</sup> In this study, ownership structure refers to arrangements of residual claims such as profits. Control is discussed as various forms of managerial autonomy and the restrictions on the autonomy.

*Index of Ownership Structure: A weighted average of the current and expected future rates of profit remittance to the government is used as an index of ownership structure (or an index of government ownership*

concentration).<sup>4</sup>

Ideally, a definition of ownership structure should relate to real or financial assets instead of the profits streams. However, in the Chinese enterprises, property rights to those assets are not well delineated and capital markets for them are virtually not existed. Hence, it is less useful to speak of asset ownership than of profit ownership. Since the level of profit remittance often correlates with the original investment by the government, the indexing of ownership structure based on profit remittance should correlate somewhat with an index based on asset ownership.

The above definition of ownership structure (based on profit claims) also closely relate to the Chinese legal and administrative classification of ownership into the state-owned, urban collectives, and rural township and village collectives. The rate of profit remittance is usually higher in the state enterprises than in the urban or rural collectives. Within the collectives, the large urban collective enterprises have much higher profit remittance rates than the small rural collectives. Although there are many institutional differences and similarities among the state-owned and the urban and rural collectives, these difference and similarities may be summarized partly by the long-run expected profit remittance rate.<sup>5</sup>

As made clear in the dynamic model of this study (see chapter 4 of Xiao (June 1991)), the index of ownership structure in each period depends not only on the current rate of profit remittance but also on the expected future rates. The expected future rates of profit remittance are incorporated into the indexing of ownership structure because it is natural to consider the ownership structure in the state and collective enterprises as a stable institutional parameter which, on the one hand, does not change much in response to the fluctuation of the rate of profit remittance from year to year, but, on the other hand, is sensitive to a permanent change of the policies regarding profit remittance. The long-run expected rates of profit remittance for the state and collective enterprises have decreased significantly during the reform period.

The property rights in post-Mao Chinese industrial enterprises have appeared mainly in four distinctive forms:

*Stylized Fact 1: The profit-sharing arrangements, set up between the government and the enterprises, explicitly define the formal and contractual ownership structure of the enterprises.*

The right to profits is the most important form of property rights over the Chinese enterprises. This right is widely recognized by the central and local governments, enterprises, as well as the scholars. The negotiation of profit-sharing schemes for each period is usually intensive and significant changes to the schemes are difficult to arrange.

*Stylized Fact 2: Fringe benefits are informally controlled and "owned" by managers and workers.*

Unlike fringe benefits in the Western countries, which are part of a competitively determined package of employee compensation, the fringe benefits in Chinese enterprises are more like welfare benefits. The amount and even the kind of the fringe benefits are unspecified and may vary among enterprises. That is, they are not determined by explicit agreements but, instead, are a "consensual" sharing of enterprise resources. These fringe benefits can not be written into a contract and can not be un-bundled and traded with other benefits because of the government ownership of non-industrial fixed capital, which is used to provide fringe benefits services. Moreover, some of the fringe benefits, such as residential housing, involve large amount of fixed capital investment, and become an important channel for employees to accumulate quasi-private property, since it is practically impossible for enterprises to take back apartments that have been distributed to their employees, although the apartments are officially state property.

The fringe benefits in this study represent in-kind benefits such as the provision of medical care and residential housing. However, they may also be interpreted as including other elements in Chinese enterprises such as increased security and reduced work load. The implicitly recognized claim to fringe benefits is largely ignored by scholars in China and abroad. This study not only brings the Chinese fringe benefits to attention but also reveals the importance of incorporating them into the formal analysis of Chinese enterprise behavior.

*Stylized Fact 3: Price-controls, wage-ceilings, production-quotas, and other administrative regulations specifically define the restrictions on the managerial autonomy of the enterprises.*

Although these administrative regulations may create some distortions and inefficiency, their role in Chinese industrial activities are declining. At the margin, more and more inputs and outputs are allocated according to market prices. Some of the regulations exist for reasons relating to income distribution across industries. Also, these regulations often involve very specific products, such as steel, coal and electricity, and are implemented more effectively than the regulations on fringe benefits provision. For simplicity, the theoretical model of this study does not model these types of government regulations. But, some relevant restrictions, such as

wage-control, are incorporated into the model as assumptions.<sup>6</sup>

*Stylized Fact 4: While the central and local governments still influence enterprises through arrangements of loans, subsidies and appointments, a significant part of control over resources in the enterprises has been implicitly and non-contractually delegated to the managers.*

This study focuses on managerial autonomy. Control by the government is an important subject for research and has received major attention from economists and political scientists in China and abroad. However, as the Chinese economy becomes more decentralized, and as economic resources are controlled to a greater extent by enterprise managers, it becomes important to study the behavior of managers under the new institutional system. Since Chinese managers usually devote a significant part of their effort to non-industrial activities, such as allocating and maintaining residential apartments, supervising food services and clinics, and even resolving domestic disputes of their employees, this study includes non-industrial activities of the managers in the formal analysis of Chinese industrial enterprises.

The dynamic model formalizes the new structure of property rights described above. Several important theoretical results are derived:

*Theoretical Result 1: The Contract Responsibility System, which consists mainly of profit-sharing between the government and the enterprises, managerial autonomy, and the provision of in-kind fringe benefits, is more efficient than the pre-reform planning institution, but less efficient than the private property institution.*

Under the Contract Responsibility System, the managers and workers receive full marginal return from fringe benefits production but only a fraction of marginal return from industrial production. Since it is costly for the government to monitor effort, regulate fringe benefits and distinguish industrial and non-industrial investment, the new system create incentives for Chinese workers to divert effort and capital away from industrial to fringe benefits production. The workers, behaving rationally, equate private returns on the margin, but this leaves social marginal returns from production of industrial profits unequal. In equilibrium, the degree of distortion depends directly on the terms of present and future rates of profit remittance to the government.

*Theoretical Result 2: Under the Contract Responsibility System, the ownership structure, as defined by the current and expected future rates of profit remittance to the government, determines the degree of distortion to resource allocation in Chinese publicly owned enterprises. Greater government claims lead to reduced use of resources in industrial production and inefficiency.*

Hence, the state enterprises should be less productive industrially than the collective enterprises. The reform should improve efficiency of Chinese enterprises since it reduces profit remittance.

The above result holds regardless how much the enterprises pursue non-industrial activities. The amount of fringe benefits are endogenously determined by the ownership structure. The managers and workers would not use all resources for current fringe services since the future wages and fringe benefits depend on future industrial profits. They have incentives to maintain future industrial productivity as long as the profit-sharing or the ownership structure is largely stable. The ownership structure is the driving force for the degree of efficiency as well as for the extent of fringe benefits expansion. The fringe benefits expansion only reflects one of the consequences of the high government ownership concentration.

*Theoretical Result 3: Under the Contract Responsibility System, the ownership structure determines the extent of fringe benefits expansion.*

Hence, the state enterprises should have more fringe benefits than the collective enterprises. Reforms toward private ownership should lead to the curtailment fringe benefits in Chinese enterprises.

It should be emphasized that the use of fringe benefits as a form of compensation to employees does not itself cause inefficiency. On the contrary, when wages are tightly controlled by the government, it is efficient for the enterprises to pay more productive workers above the official wages through in-kind fringe benefits.

However, because both high fringe benefits and low efficiency are associated with the state enterprises, it is easy to mistake the expansion of fringe benefits as the source of low efficiency. The fringe benefits, as a component of the incentive-enhancing Contract Responsibility System, may contribute to productivity.

Nevertheless, as a component of the second-best Contract Responsibility System, the fringe benefits may also associate with inefficiency in Chinese enterprises. It is the ownership structure that determines the net effects of fringe benefits on overall efficiency.

Because it is difficult to measure the value of in-kind fringe benefits, the productivity increase associated with fringe goods production may not be recorded in Chinese enterprises.

*Theoretical Result 4: The productivity of the Chinese state enterprises may be underestimated if the fringe benefits produced in the enterprises are not included as an output.*

In the literature on Chinese industrial productivity, the fringe benefits are regarded as welfare benefits and excluded from the productivity estimation. However, the fringe benefits are closely related to productivity estimation in at least two different ways. First, higher fringe benefits may be associated with higher productivity because the fringe benefit provision makes it possible to pay Chinese workers real wages exceeding the official wages. Second, the fringe benefits provision may create incentives and conditions for Chinese managers and workers to divert industrial resources for non-industrial investment.

For example, the maintenance of residential apartments and factory buildings uses essentially the same materials and labor services. Under managerial autonomy, it is difficult for the government to know how many industrial resources are used for improving old apartments or even building new ones. Because some costs of producing fringe benefits are counted as costs of industrial production, the conventionally measured industrial productivity of Chinese enterprises will be lower than it should be.<sup>7</sup>

In this research, a property rights approach is used to study Chinese enterprises. The emphasis is on how the right to benefit and the right to control are matched in the Contract Responsibility System. It is clear from the analysis that the right to fringe benefits together with the managerial autonomy has provided incentives for Chinese managers and workers to use enterprise resources more efficiently. Nevertheless, the right to profits is still separated from the control over the enterprise resources. This separation will limit incentives for hard work, innovation, risk-taking etc. Moreover, the separation hinders the development of capital market by increasing transaction costs. Limited capital and labor markets further restrict the match of skill and task. Hence, further reforms of the Contract Responsibility System are necessary to improve efficiency.

### III. Behavior and Performance

Using firm and city-level data during 1980-1987 and econometric techniques, the study examines empirically the behavior and performance of Chinese state and collective enterprises. The evidence shows forcefully that the post-Mao Chinese industrial reforms have successfully stimulated individual incentives and started a promising process of evolution toward a private market economy. This section summarizes the major findings and their implications.<sup>8</sup>

*Empirical Finding 1: Economic reforms in the 1980s have increased productivity growth of both the state and collective enterprises. But, the growth rate of productivity in the collective enterprises is much higher than that in the state enterprises.*

During 1980-1985, the estimated annual total factor productivity growth from the firm sample of this study is 3.9% for the state enterprises and 8.8% for the collective enterprises. The productivity improvement is also reflected in the increase of output elasticity of capital in both state and collective enterprises during the reform period.

However, according to the city-level data of 1985-1987, the state sector has a stagnant productivity growth in the later period of the decade-long reforms. The collective sector have maintained high productivity growth of 4.4% per year during 1985-1987. These findings confirm the prediction of the Theoretical Result 2 discussed in the last section. Contrary to many evaluations of the Chinese industrial reforms, the results here basically indicate some success for the Contract Responsibility System.

*Empirical Finding 2: Although the productivity gap between the state and collective enterprises decreases when the non-industrial activities are taken into account properly, the decreased gap is still significant. The state enterprises are less efficient than the collective enterprises in using labor and capital.*

The estimated gaps of total factor productivity between the two sectors after controlling for economies of scale are 23.7% in 1985 and 34.8% in 1987 according to the city-level data. From the firm sample, the measured gap of total factor productivity between the state and collective enterprises is about 60% during 1980-85, if fringe benefits are ignored. However, the gap decreases to about 30% if the fringe benefits services are counted as output. The evidence shows clearly the effects of ownership structure on productivity.

*Empirical Finding 3: The state enterprises have much higher fringe benefits than the collective enterprises. The level of fringe benefits is positively correlated with the level of government investment in the Chinese enterprises.*

According to the firm sample, during 1980-1985, controlling for industrial capital and other variables, the fringe benefits capital has grown about 30% for the state enterprises and about 80% for the collective enterprises. The more rapid growth of fringe benefits capital in collective enterprises does not change the basic pattern of fringe benefits capital stock. In the firm sample, controlling for industrial capital and other variables, the state enterprises have about 100% more fringe benefits capital than the collective enterprises in 1980. This gap narrows

to about 50% in 1985. It is found that fringe benefits capital is positively correlated with industrial capital. So, the capital-intensive firms have also significantly higher levels of fringe benefits capital for their workers in addition to higher wages than the labor-intensive firms. One explanation for the pattern is that Chinese managers and workers are able to divert more industrial capital for non-industrial uses when they control more government property. Hence, the managers and workers in large state enterprises have captured some of the monopoly rents which would have gone to the government in the pre-reform system.

*Empirical Finding 4: Across industries, productivity is converging, but wages and fringe benefits are diverging during the reform period.*

This evidence shows the tradeoff between productivity and equity. However, it is important to realize that although some of the income differences may be caused by productivity gaps, a transfer of monopoly rents from the government to the managers and workers of the privileged large state enterprises may also cause income inequality across enterprises without significant productivity improvement.

#### IV. Future Reforms

A trend of decentralization has characterized Chinese economic reforms since 1978. However, the central government seldom initiated the decentralization. More often, the farmers, enterprises or local governments first demanded "policies", which gave them some autonomy, and the central government then yielded to them. After ten years of reforms, the central government now controls less economic resources and has become weaker financially. On the other hand, private business, rural enterprises, and urban collective enterprises have grown rapidly competing with the state enterprises.

As a result of the decentralization, transactions among the state, the local governments, the state enterprises, collective enterprises, private and foreign business have increased significantly. In this process, the Contract Responsibility System is crucial in reducing the transaction costs. It reduces control and ownership by the government largely to negotiation and collection of profits. As is shown in this study, the Contract Responsibility System is flexible enough to accommodate enterprises of different ownership concentration. Hence, it may provide a basic institutional framework for Chinese state enterprises to operate during the transition period toward a private property economy. Since the government has limited resources in protecting the state enterprises, the private firms and rural and collective enterprises may continue to grow rapidly. The trend towards a market-oriented economy generated by the industrial reforms is likely to continue in the future.

The future of Chinese industrial development looks promising. But some problems associated with the Contract Responsibility System may hinder future economic reforms of the state enterprises.<sup>9</sup> Although the non-state sector has been growing very rapidly since 1978, the state sector still produces about half of the total gross industrial output. Most of the fiscal revenues of the government still come from the state enterprises. However, the state enterprises have failed to provide enough revenue for the government because of low industrial productivity. Moreover, even the profit-losing state enterprises have not given up effort to continue the expansion of fringe benefits projects. Hence, the government is anxious to propose new policies to improve productivity and increase profits of the state enterprises. This section briefly analyzes a few reform options and their relation to ownership reforms.

##### *Reform Policy 1: Tightening Control by the Government and Stopping Expansion of the Fringe Benefits.*

This policy reflects the wish of the current government but has been proved difficult to implement. Moreover, interest groups such as managers and workers in large state-owned enterprises may lobby for protection of their monopoly positions which give them resources to expand fringe benefits. The current leadership of Chinese government could not carry through the re-centralizing attempts and is now supporting the Contract Responsibility System which has been the core of liberal reform measures.

##### *Reform Policy 2: Increasing Investment from and Profit Remittance to the Government.*

The government is now actively pumping money into profit-losing large state enterprises hoping to increase its financial resources. But, according to this study, the managers and workers in the large state enterprises will benefit from these subsidies. It is doubtful whether industrial productivity and profits will increase.<sup>10</sup>

##### *Reform Policy 3: Privatizing Housing and Eliminating Fringe Benefits Provision.*

The Chinese government realizes the problem of fringe benefits expansion. One proposed reform is to privatize enterprise-owned housing. However, privatizing housing will only transform the current quasi-ownership of the apartments by the workers into formal private ownership. It will facilitate efficient use of the housing resources, but may not reduce the incentives for enterprises to build more residential housing. Perhaps, the

incentives to expand housing projects may be greater with housing privatization than without if the workers are required to pay little to obtain title of private ownership to the apartment. As long as the enterprises are owned by the government, privatization of the enterprise-owned residential apartments may solve few problems of inefficiency and probably facilitate de-capitalization of state-owned property.

It is suggested that housing privatization may facilitate labor mobility and improve productivity. This theoretically beneficial result is difficult to achieve because of the predicted slow and incomplete process of housing privatization. Unlike the East European countries and the former USSR republics, China has plenty unskilled and skilled labor. The mobility of unskilled labor is not restricted by the provision of fringe benefits as is demonstrated by significant increase of temporary workers from rural areas in the urban enterprises. Fringe benefits also have not prevented many skilled workers from taking positions in other profitable enterprises, which include state-owned firms in the coastal region, rural township and village enterprises, and even private business. Developing private housing markets is more important and useful than privatizing the enterprises-owned residential housing while maintaining state ownership of the enterprises.<sup>11</sup>

*Reform Policy 4: Adopting the Stock-Share System without Private Shares.*

Experiments of a stock-share system for the state enterprises have received supports from scholars, managers and even the government. Basically, two kinds of shares are proposed: one for the government; the other for the employees. Sometimes a third type of shares for the enterprises is also suggested. In most of the experiments, the shares are non-tradable. It is enough to point out that this kind of the stock-share system is essentially a profit-sharing system that differs little from the Contract Responsibility System. In particular, the incentives to pursue fringe benefits are still strong for the managers and workers because of the lack of effective monitoring under government ownership.

*Reform Policy 5: Adopting the Stock-Share System with Private Shares.*

A stock-share system itself does not produce efficiency. Nevertheless, it may provide a good institutional framework for organizing ownership structure since the shares may be issued to outside private owners as well as the government and employees. Once private shares are introduced, significant changes in the ownership and control of the stock-share company may happen. If the block of private shares can dominate the government shares, the private owners will be able to monitor the management of the company. Since the outside private owners have different interest from the managers and workers, they will propose effective measures to bring wages and fringe benefits into limits set by market competition. The industrial productivity of the stock-share company may increase because the company may take advantage of the private ownership and control.

The government, as a share holder, may also benefit from the effective control of enterprises by outside private owners even if it plays a passive role in the company. Like millions of small individual shareholders in Western countries, the government may be a free-rider to a certain extent when claiming the dividend, which is brought about by effective monitoring by private owners.

It should be pointed out that the system of mixed ownership by private owners and the government requires that the shares can be traded and the profits from trading can be paid and become the property of shareholders, in order to facilitate resolution of conflicts among them. As the shares are exchanged in the market, the ownership structure may change over time. If the company performs well, private shares many increase. If the private shareholders lack confidence in the company's future, they will sell their shares and buy those of other companies.

*Reform Policy 6: Privatization.*

The Chinese government has sold or rented many small state enterprises in the service sector to individuals or groups of employees. The government is quite successful in privatizing small and less important business. However, private business in China has been restricted mainly to rural areas and to the service sector in the cities. Large private manufacturing firms are virtually absent in China. Hence, the first step in privatization is to promote private firms by establishing laws and regulations protecting private property and free contracting.

Private firms not only have high productivity but are also a potential source of tax revenues other than the state enterprises.<sup>12</sup> The Chinese government is used to the concept that the government has invested in the state enterprises and so it should share some of the profits as fiscal revenues. As the government invests less in industry, it seems necessary for the government to tap new sources of tax revenues. It is true that there is difficulty in collecting taxes from small private business. But, that is also true for other countries. If the property rights of large private firms or corporations are effectively protected by the Chinese government, they may be more than happy to pay the taxes and still get enough profits for themselves.

However, at present, government regulations do not intend to protect the growth of private enterprises

and in many cases discriminate against them. The future uncertainty of government policy toward private business severely restricted the type and the size of private firms. Since it is only efficient for government to monitor business accounts and tax files of large firms, the financial benefits of promoting private business for the government will come later when large private and semi-private firms have earned significant profits.

In common with the results of many other scholars, the theoretical and empirical results of this study strongly support privatization. Privatization improves productivity. The lower the productivity of the state enterprises the more the privatization will bring revenue to the government. Also, according to this study, the larger the potential future returns of the projects undertaken by the state enterprises, the more the privatization will contribute to efficiency. This later point may be easily ignored by the government. The Chinese government always reserve those projects important for the economy to the state enterprises. But, the inefficient state enterprises often fail to do the important job right. For example, the transportation and communication sectors, too important to be left over to the private sector from the perspective of the government, probably show the poorest performance.

While supporting privatization, this study has not examined the process of privatization. The objective of privatization may be achieved through many different ways. The speedy approach to privatization in Eastern Europe and Russia reflects urgent political and economic demand there. The early unsuccessful results of privatization in those countries do not contradict with the basic argument that private property system delivers better performance. The problem is with the transition. It is difficult to maintain political and economic stability during a transitional period. As a result, it becomes difficult to form short and long term expectations about how much one can get from one's productive efforts. On the other hand, quick rent-seeking may be very fruitful for various groups. This is particularly true for the state sector in East Europe and Russia. Recent dramatic output decline there reflects partly consequences of an extremely weak property rights system. One of the most important characteristics about private property system is its stability about control rights and claim rights relating to the use of private property and the close association of control and claim. This feature has not yet established in East Europe and Russia. On the other hand, similar feature has been developing in China, especially in the rural township and village enterprises and less significantly in the state-owned enterprises. In the next phase of reform, it may be useful to privatize some state-owned enterprises while maintaining current Contract Responsibility System for others. It seems that the current Contract Responsibility System has indeed provided an imperfect but flexible institutions for transition. But, ultimately, the well-tested stock-share system of the market economies should be introduced to take full advantage of private property mechanism.

## V. Conclusion

Since 1978 the Chinese government has transferred some important dimensions of property rights from the State to managers and workers. It has allowed the state enterprises to retain a portion of profits for bonuses, welfare benefits such as housing, and industrial investment. As a result, industrial productivity has increased significantly.

This productivity enhancement has been under-estimated in the literature because the non-industrial activities such as the provision of housing, training, and medical care in Chinese firms have not been taken account of properly. The study shows that it is important to include non-industrial activities in the productivity analysis because public ownership of Chinese firms and high monitoring costs have allowed Chinese managers and workers to divert industrial resources to non-industrial uses.

Because of the excessive expansion of fringe benefits, managers and workers in some large state enterprises have captured monopoly rents which would have gone to the State under the pre-reform system of property rights. While the change in the structure of property rights has generated a different pattern of income distribution, the present profit contract system is clearly more efficient than the pre-reform one.

Nevertheless, the study also shows that as long as the state ownership of the fixed capital remains, the incomplete set of property rights given to the managers and workers may distort resource allocation. The extent of the distortion will correlate with the ownership structure. The theory predicts that the state enterprises will be less efficient than the collective enterprises even after considering fringe benefits production.

Estimations from Chinese city and firm-level industrial panel samples confirm the prediction. If fringe benefits are not accounted for, the state-owned enterprises would produce about 60% less industrial output than the collective enterprises. After including fringe benefits as outputs, the productivity gap decreases, but is still substantial at about a 30% level.

Also, the collective enterprises have sustained a high rate of productivity growth throughout the reform

period while the state enterprises only increased productivity growth in the initial period of reforms.

Hence, the theoretical and empirical results of this study strongly support ownership reforms such as privatization and an introduction of a stock-sharing system with private tradable shares for the state enterprises.

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#### ENDNOTES

1. Compared with managers in private firms, Chinese managers still face important restrictions when exercising their managerial autonomy. For example, they can not hire or fire workers freely. They are not usually allowed to divest the capital stock.
2. Chapter 4 of Xiao (June 1991) presents a detailed dynamic model of Chinese industrial enterprises.
3. Chapter 3 of Xiao (June 1991) reviews property rights literature and contains a more detailed discussion about the interaction of residual claim and residual control rights in economic organization.
4. The weight is derived from the dynamic model and is related to workers' preference, future marginal return of capital etc. (see equation (10) in chapter 4 of Xiao (June 1991)).
5. It is well known that some large urban collectives are subjected to similar constraints and behave similarly as the state-owned enterprises of the same size. These enterprises probably have similar long-run expected rate of profit remittance despite of their different legal and administrative ownership title. Hence, the index of ownership structure proposed here may be a more useful indicator of the actual ownership situation.
6. Without government control on wages and bonuses, the enterprises may pay excessive cash incomes and little fringe benefits to their workers.
7. The miscalculation of productivity can be illustrated through a simple example. Suppose a state enterprise is dis-integrated into two firms only for accounting purpose. One industrial firm keeps the industrial labor, capital and materials and produces \$700 value added of industrial products. The other service firm retains the non-industrial labor, capital and materials and provides \$300 value added of fringe benefits services. Assume that the two firms are run together the same way as the integrated state enterprise except keeping one additional accounting book for each firm. Hence, the value added of the integrated state enterprise should be equal to the value added of the industrial firm (\$700) plus that of the service firm (\$300), e.g. \$1000, if the accounting is done correctly.  
 However, in reality, only the value added of the industrial products (\$700) is recorded in the "integrated" state enterprises because the fringe benefits services (\$300) are produced and consumed directly within the enterprises. Hence, the value added for the "integrated" state enterprise is \$700 according to the conventional measure of the statistics, much lower than the theoretically correct number of \$1000.  
 Total Factor Productivity is an index obtained from dividing value added by a weighted average of all inputs. Since all the inputs in the state enterprises are recorded when they are brought into the enterprises whether

they are used to produce industrial products or fringe benefits services, an underestimated number of value added will lead to an underestimated index of total factor productivity.

8. In the following discussion on empirical findings, the evidences from city-level data are documented in chapter 5 of Xiao (June 1991) and Xiao (Spring 1991). The city-level industrial data are from the *Statistical Yearbook of Chinese Cities* (1986 & 1988) and covers all industrial enterprises in the state and urban collective sectors across 324 Chinese cities. While the estimated gaps in productivity level may reflect ownership effects as well as differences in industry composition (and other unidentified cross-section differences) between the state and collective sectors, the estimated gaps in growth of productivity probably relate more to ownership differences since it takes time to change industry composition.

The evidences from firm-level data are documented in chapter 6 of Xiao (June 1991). The firm-level data are from the internal edition of 1985 Industrial Survey and cover 1764 large and medium-sized state and collective enterprises. The sample size is reduced to 958 (903 state owned and 55 collectives) by excluding industries that do not have any collective enterprises in the sample. The resulting sample has 14 industries (electronic products, food products, textiles, wearing apparel, coking, industrial chemicals, chemical fibre, rubber products, plastic products, cement and glass, machinery I, machinery II, transport equipment, and electrical machine). The estimated productivity growth and levels are controlled for industry, price, labor skill, equipment vintage, energy use, export-orientation etc. Hence, the estimation from the firm-level data yields more reliable results. However, because of the small sample size for the collective enterprises, part of the huge productivity gaps (15% or 30%) between the state and collective enterprises may reflect bias from small sample size.

9. Here, I concentrate on micro-economic problems of reforms. As market activities expand, it is more and more difficult for Chinese government to manage macro-economic stability. However, some of the macro-problems, such as inflation and investment hunger, have roots in the micro-structure of enterprise organization.

10. The logic behind this analysis is simple. If the enterprises produce \$100 profits, it may pay the managers and workers wages and bonuses \$30. The government will get \$70 as taxes and profit remittance. If the enterprise use the industrial resources to provide \$100 value housing services, the managers and workers will consume all of them. The incentive to provide housing services will increase as the rate of profit remittance rises following the increase of government investment. Now, instead of \$30, the enterprise may only pay \$20 out of every \$100 profits to their managers and workers. But the workers may still consume \$100 housing services if they manage to produce the services instead of industrial profits.

11. During April 1989, a group of Chinese economists and I visited a private firm in Wenzhou, Zhejiang. The managers told us that he provided food and housing accommodation to several dozens of his employees from other counties. As pointed out in the theoretical section of this paper, the provision of fringe benefits itself implies nothing about efficiency or inefficiency. The problem of fringe benefits expansion or short-sighted behavior originates from state ownership of enterprise capital.

12. As shown by the study, there are significant economies of scale for the state enterprises. The economies of scale are currently unavailable to private firms because of their limited size. Large private firms should be able to reap both the economies of scale and the efficiency of private ownership.