Limiting Government Predation Through Anonymous Banking: A Theory with Evidence from China

By: Chong-En Bai, David D. Li, Yingyi Qian and Yijiang Wang

Limiting Government Predation Through Anonymous Banking:

A Theory with Evidence from China[1]

Chong-En Bai
Department of Economics
Boston College

David D. Li
Department of Economics
University of Michigan

Yingyi Qian
Department of Economics
Stanford University

and

Yijiang Wang
Carlson School of Management
University of Minnesota

July 31, 1999

Abstract

China's economic performance of the past two decades presents a puzzle for the economics of transition and development: Enormous private business incentives were unleashed that have fueled rapid economic growth despite the fact that China has had very weak "conventional institutions" (such as the rule of law and separation of powers) to constrain the government from arbitrary intrusion into economic activities. We argue that one mechanism that has limited the government's ability for predation and harassment is commitment through information decentralization, where the key institution is "anonymous banking," that is, a combination of the use of cash for transactions and the use of anonymous savings deposits. The government's incentive for such a mechanism comes from the increased quasi-fiscal revenues collected from the state banking system through "financial repression," a combination of controls on international capital flows with restrictions on domestic interest rates. The major features of China's economy concerning its fiscal decline, financial deepening, and the sectoral dual-track can be better understood using this analytical framework.

I. Introduction

In the past two decades, China's economy achieved an average annual growth rate of nearly 10 percent and, at the same time, accomplished unprecedented improvement in the living standard of its 1.2 billion population. During this period, China's growth has accounted for about two-thirds of all the growth in the world's low-income countries, and by 1998, China's GDP constituted more than one-half of the total GDP produced by all transition economies. Considering its enormous size, China's economic development and its transition to markets have global significance.

Surprisingly, China's economic performance occurred in an environment apparently lacking the "conventional institutions" of a modern market economy, such as the rule of law and separation of powers, to constrain the government from arbitrary intrusion into private economic activities. The absence of these institutions is usually thought to be a fundamental obstacle to economic growth in developing and transition economies. When the state is not constrained, it faces a fundamental commitment problem, that is, how to credibly commit not to prey on private gains or intrude on private economic activities despite the great temptation to do so. Lack of such commitment often results in discretionary marginal tax rates that are too high, which is detrimental to private incentives.[2] Moreover, the state itself also suffers from its lack of commitment: when the discretionary marginal tax rate is too high, the state is only able to grab little revenue because it is on the downward sloping part of the Laffer curve. China's remarkable performance in the past two decades presents a puzzle for economics of transition and development. One wonders: How were private business incentives unleashed without the conventional institutions to constrain the government from arbitrary intrusion into economic activities? And how did the government benefit from the improved private incentives so that it had the incentives for reforms?

This paper attempts to address the puzzle by examining the above two questions. First, we argue that information decentralization (through reducing the amount of information to the government about private economic activities) can be an effective device for limiting the government's predatory behavior and

---

[2] To be sure, no government, even a democracy under the rule of law, is completely free of influences from interest groups and its policies are also subject to change, raising the question of credible commitment. However, under a political system without these institutions and an economic system just emerging from central planning, the lack of constraints on the government and credible commitment is a far more serious problem.

for creating private incentives. The key institution for information decentralization in China has been "anonymous banking," that is, a combination of the government relaxing control over the use of cash for business transactions and allowing the use of anonymous savings deposits in state banks. Second, we argue that the government has the incentive for such information decentralization because it can also benefit from the improved private incentives by the increased implicit taxes (quasi-fiscal revenues) on financial assets, mainly state bank deposits, cash, and government bonds. This is made possible by "financial repression," which is a combination of controls on international capital flows and restrictions on domestic interest rates.

In our model, when bank deposits are anonymous, the government does not know the identity of depositors and thus is unable to target a particular person and confiscate his/her financial wealth. Although the government can still implicitly tax savings deposits with the state banks through regulation on the interest rate or inflation, this method of taxation is indiscriminate and thus in effect entails a flat tax rate. In particular, it taxes the poor and needy at the same rate as the rich. When the poor and needy are taxed too heavily, they cannot meet their minimum consumption needs and starvation may be the result. This is costly to the state because, for example, starvation may provoke revolt against it. The state's concern about starvation, together with the institutions of anonymous bank deposits, credibly limits its extent of taxation on private savings deposits. Hence, while the state has difficulty in taxing income directly because of the extensive use of cash for transactions, its implicit tax rate on savings deposits can also be moderate and thus financial repression will be mild. This in turn provides a degree of security for private income as well as the savings deposited in the state banks. Through information decentralization on transactions (i.e., transaction hiding) and on financial wealth (i.e., wealth hiding), the state is able to achieve credible commitment in the absence of the conventional institutions such as the rule law and separation of powers.

The combination of anonymous banking and a mild financial repression actually can achieve two goals at the same time. On the one hand, it credibly limits government predation by imposing upper bounds on explicit taxation on outputs and implicit taxation on bank deposits. This fosters private incentives. On the other hand, it also implies that the lower bound on the implicit taxation on bank deposits is greater than

2

zero so that the government can collect some revenues from the state banking system. This suits the government's own interest as well. Together, anonymous banking and a mild financial repression can limit government predation without reducing its revenue; that is, they benefit private agents while moving the state closer to the top of the Laffer curve.

The model is then extended to allow the coexistence of two sectors: a well-monitored sector and a less-monitored sector. We show that the well-monitored sector pays more taxes, receives more credit, and is more capital intensive, but has low incentives; and the less-monitored sector pays fewer taxes, receives less credit, and is more labor intensive, but has high incentives and saves more in state banks. Moreover, the coexistence of the two sectors can also improve private incentives and at the same time increase government revenue, compared to the case of a well-monitored sector alone.

We provide evidence to demonstrate that the major features of China's economy concerning the government's fiscal revenue decline, the financial deepening, and the sectoral dual-track fit the predictions of our model well. First, the government's fiscal revenue as a share of the GDP declined significantly, from 31 percent of the GDP in 1978 to 11 percent in 1996 in the budgetary category, and from 40 percent to 17 percent if all sources are included. Second, the government collected a considerable amount of quasi-fiscal revenue from the state banking system, which averaged at about 9 percent of the GDP (or more than one-half of the budgetary revenue) between 1986 and 1994. And third, evidence shows that the state sector (which is better monitored by the state) paid more taxes, received more credit, and employed more capital intensive technology, compared to the non-state sector (which is monitored less by the state).

The fundamental ideas of our paper are related to two types of literature. The first is credible commitment through an information structure from the literature of industrial organization. A principal, by giving up information and authority to agents, can credibly provide better incentives to agents in a dynamic setting and thus benefit from poorer information and weaker authority. This idea about the efficiency of information decentralization differs from that of Hayek (1945) on the use of local knowledge. In his view, information decentralization is efficient because information transmission to a central authority is costly. Here, the argument runs in a different direction: If information transmission is not costly, then it may be

3

better to make it more costly in order to achieve credible commitment. For example, limiting the formal authority of the principal credibly provides a subordinate with incentives to take the "initiative" when the latter gains more real authority through controlling more information (Aghion and Tirole, 1997). Reducing the information channels linking lower decision-makers to the top can be beneficial because it reduces wasteful influence activities (Milgrom and Roberts, 1992). In the theory of firm ownership, one benefit for non-integration is the credible reward from one firm to another when the former does not control cost information (Riordon, 1990; Cremer, 1995). Diffused information and authority is also the key to the theory of hard versus soft budget constraint by Dewatripont and Maskin (1995). We extend these ideas from the study of firms to the study of the relationship between the state and economic agents, going beyond the domain of industrial organization.

The second is from the literature of public finance and political economy on the limits on taxation and the size of government. In the presence of political failure to constrain the government, less efficient taxation can be socially beneficial. Becker (1983) studied a general model of political process focusing on pressure groups, recognizing that in all political systems--democracies or not--those making policies are always subject to influence from pressure groups of those affected by their policies. Becker and Mulligan (1998) further showed that in an interest group competition model inefficient taxation imposes higher costs on interest groups who pay taxes, which increases the benefit of fighting for fewer taxes, and thus limits the size of government and improves social welfare. Our paper is related to Becker (1983) and Becker and Mulligan (1998) in two aspects. First, the government in our mode is also subject to constraints of pressure groups, specifically the threat of revolt from the poor, although our model does not feature interest group competition as Becker's does. Second, we also show that, in the presence of government commitment problem, inefficient taxation can incredibly limit the government's ability to tax and thus be socially beneficial, although we focus on the role of information decentralization for this purpose, which makes it necessary for the government to forego more efficient taxation on income and adopt less efficient taxation through financial repression. Our paper is also related to Brennan and Buchanan (1980), who pointed out that tax competition among local governments can put a constraint on local tax rates. In

4

contrast to tax competition there, information decentralization here is a new mechanism to constrain the government.[3]

In the spirit of these two types of literature, our paper runs against two popular views concerning the role of information transparency and efficient taxation respectively. First, there is a widely held belief that the more transparent the information, the better for the function of markets. The claim is often heard that efficiency increases as information and transparency increase. But the literature on credible commitment shows a countervailing general principle: the less information, the better the commitment, and thus the higher the incentives. Our paper represents one application of this principle.

Second, there is also a belief that the more efficient the taxation system, the higher the social welfare. According to this belief, implicit taxation on savings through financial repression would be dominated by direct taxation on income. Furthermore, implicit taxation through financial repression is costly to economic growth because it impedes the development of the financial sector, which is critical for growth (McKinnon, 1973; Shaw, 1973; Roubini and Sala-i-Martin, 1992). Our analysis shows that, when political economy is considered, financial repression can be socially better than direct taxation on income. Specifically, with anonymous banking, indirect taxation through the banking system entails a flat tax, which reduces the state's discretion in taxation and thus credibly limits the tax rate.

In the context of China, the prevailing views on public finance reform often ignore the importance of political economy and the government's commitment problem. Indeed, many economists and China experts criticized China's fiscal reform in two areas: general government fiscal revenue decline and the use of costly quasi-fiscal revenue generated through the state banking system. But these criticisms may be misplaced for two reasons. First, they fail to consider the more important objective of the reform in

---

[3] There are two separate but related questions on government revenue generation. The first is the classical question of optimal taxation schemes for the given level of revenue to be generated. The second concerns how the aggregate level of revenue is determined, in particular, how it is affected by the chosen taxation scheme. This paper, like the one of Becker and Mulligan, addresses the second question. In particular, it focuses on how financial repression, as compared to discretionary taxation, can help the state commit to a (endogenous) low level of total taxation and thus be beneficial to the creation of private incentives. We believe that this question is more important than the first one for transition and developing economies. In a companion paper (Bai, Li, Qian, and Wang, 1999), we address the first question, comparing taxation with financial repression from the perspective of allocative distortions and efficiency, for the given (exogenous) level of government revenue to be generated.

5

creating private incentives, for which reducing the government's taxation ability is an essential step. Second, they also fail to recognize that precisely because generating quasi-fiscal revenue is more costly, it works better to limit the state's predation.

The rest of the paper is organized as follows. Section II documents the problem of state predation and its lack of credible commitment, both before and during reform. Section III describes the institutional arrangement of anonymous banking and financial repression. Section IV sets up the model to show that the state's predatory behavior can be limited and its credible commitment achieved through information decentralization. Section V extends the model to two sectors and probes the features of sectoral dual-track. Section VI provides evidence to show that the major features of China's economy during reform concerning fiscal decline, financial deepening, and the sectoral dual-track fits the predictions of the model well. Section VII concludes. Appendix A contains mathematical proofs of the propositions and Appendix B discusses the issue of multiple equilibria.

II. The Problems of State Predation and Lack of Commitment Before and During Reform

In this section, we present evidence to show the predatory behavior of the state in China both before and during reform. The evidence illustrates that before reform the state failed repeatedly to honor its promises to preserve private incentives and behaved in a predatorial manner towards private citizens. The evidence also demonstrates that in the reform era, the state still has the same predatory tendency, although its actual predatory ability has become more limited.

A. State Predation before Reform

An early example of the predatory behavior of the Chinese government is its handling of the capitalist firms that existed before the Chinese Communist Party took control of the country. In the eve of assuming national power, senior leaders of the Party fully realized that in order to meet the challenge of economic recovery from decades of war, it was in their own interest not to eliminate private businesses too soon. The Party then outlined an economic policy in a document called the "Common Principles"

(*gongtong gangling*), which explicitly states that the government is to protect the economic interests of the capitalists and their properties (Fang, 1984, p.2).

Despite the widely publicized promise to preserve existing capitalist firms, three years later in the early 1952, the government waged a massive campaign against these firms. The campaign was to fight against the "illegal activities" of the capitalist firms, alleging they made illegal profits from government military procurement during the Korean War. Of the 470,000 capitalist firms in the nine largest cities, 85 to 90 percent were accused of engaging in "illegal activities." Nationwide, the total fine on "criminal capitalists" amounted to 10 billion yuan, an amount equivalent to the total output of these firms in that year (Fang, 1984, p.69; Zhao 1988, p.129; *China Statistic Yearbook*, 1985, p.306). When the campaign ended in the summer of 1952, private businesses had shrunk dramatically. Nationwide, the share of private business dropped from 65.4 percent to 36.3 percent in the wholesale business and from 75.5 percent to 57.2 percent in the retail business (Zhao, 1998, p.131).

The harsh campaign resulted in an imminent economy-wide recession. Private businesses were running at half of their capacity. The government quickly felt the damage to its own interests and began to make new promises to preserve the private firms. It delayed collection of taxes and fines on capitalist firms, lowered interest rates, and promised high procurement prices to guarantee the profitability of private firms. Toward the end of 1952, the top leadership declared that the transition to socialism would take "a rather long period of time." It meant that the capitalist firms would not have their profits and assets expropriated for a long time. Later, Mao specified that this "rather long" period would be ten or fifteen years, or even longer. In 1954, this policy was written into China's first constitution (Fang, 1984, pp. 69-72, 85, 99, 125-6).

However, the constitutional commitment was broken once and for all in less than two years. In 1955 Mao urged that the transition to socialism be hastened, launching a campaign (the so-called "socialist high tide") to nationalize capitalist firms (Fang, 1984, pp. 154-58). By the end of 1956 nearly all capitalist firms in the nation were converted into firms "jointly managed" by the state and private owners, who were given an annual fee equivalent to five percent of the net asset value in exchange for their assets (Zhao,

1988, pp. 278-279). These capitalist owners were promised they would receive the fee indefinitely, but they actually received it for only 10 years until 1966 when the Cultural Revolution started (Fang, 1984, p. 417). Private firms did not reemerge in China until three decades later.

The second example of the state's predatory behavior concerns the government's handling of agricultural collectivization in the 1950s. Before assuming national power, the Party also realized that private incentives in agriculture must be preserved and forced collectivization like the one in the Soviet Union was not desirable. In 1951 the government issued a document promising peasants free choice between continuing private household production and forming collective farms (Fang, 1984, p. 56). However, within two years in 1952, the government reversed its policy and instructed that 80 to 90 percent of peasants must be organized into cooperatives within two to three years. This had a destructive effect on the rural economy, when the peasants rushed to cut down trees and kill animals to "eat up everything" before it was collectivized.

Concerned about the recession of the rural economy, the government retreated in 1953 and sought to re-issue promises to peasants, emphasizing that collectivization must be voluntary and that it would be enough to collectivize only 20 percent of all peasant households by the end of 1958 (Fang, 1984, pp. 65, 94, 106). In reality, however, and despite these repeated promises, 85 percent of peasant households were collectivized by 1956 (Fang, 1984, p.150, 166). In 1958, with the start of the Great Leap Forward, virtually all peasant households had joined the commune.

The third example of state predation is about rural households' private plots (*ziliudi*). Originally, the private plot was the land given to individual households as an incentive for them to join collectives. In 1955, the government promised that private plots could be at least 2 to 5 percent of the total arable land and could be used by the households to grow cash crops (Huang, 1992, p.258). Nevertheless, the promise was broken time and again. For example, in Gansu Province, all of the private plots were collectivized in the winter of 1958 (Huang, 1992, pp. 626-27, 636). During the Cultural Revolution (1966-76) private plots were reduced by one half to two thirds in many provinces and growing cash crops was also widely prohibited (Zhao 1989, p. 150).

B. State Predation in the Reform Era

The tendency of state predation has continued in the reform era. One persistent cause is ideological discrimination against private businesses amid power struggles and ideological debates within the government. The period of the Tiananmen Square incident best illustrates this problem. During 1989 and 1990 conservative leaders denounced the reformers for "openly advocating private ownership" (*People's Daily*, July 22, 1989) and accused them of promoting private ownership "under the guise of reform" (Wen, 1993, pp. 531-536). In the meantime, the conservatives attempted to launch a campaign against private businesses. As a result, the number of households with private industrial and commercial businesses dropped by 2.18 million, or 15 percent, compared to 1988. Total employment in these businesses dropped by over 3.6 million, or 15.7 percent (*People's Daily*, August 12, 1989).

Another form of state predation in the reform era is simply revenue grabbing, in contrast to the ideology-based political campaign described above. Governments of different levels tended to impose various kinds of taxes and fees in order to grab as much of the observable revenue from businesses in their jurisdiction as possible. A 1988 study of private firms in Liaoning Province found that taxes and surcharges alone would take away 63 percent of the observed enterprise profits. When the scores of different fees were also taken into account, the tax burden was even higher. Such a tax burden made it hard for firms to survive, unless they evaded taxes and fees by hiding their transactions and revenue (*China Economic Almanac*, 1989, p. 107). Ten years later a 1998 study of private firms in Anhui Province reported that gross profits for many products was about 10 percent of total revenue, whereas total taxes and fees added up to more than 10 percent. There were more than 50 types of fees imposed on a private business, and some types of these fees are prohibited by the government's own publicized regulations and rules. This study reached the conclusion, that "owners who do not want to close down their businesses had no choice but to evade taxes" by hiding revenue (*Jilin Daily*, May 30, 1998).

Government revenue grabbing from rural enterprises has also been widespread. From 1980 to 1988 tax revenue from rural enterprises grew at a rate of 32 percent per year, whereas the total reported revenue and profits grew at 26.7 and 10 percent, respectively. According to various surveys, the amounts

of taxes and fees paid by rural enterprises have been as high as over 80 percent of the total reported gross profit (*Township Enterprise Yearbook*, 1990, p. 274). Total taxes and fees paid to county or higher governments exceeded 50 percent, and those to township and village governments exceeded 27 percent of gross profits, respectively. A study of rural enterprises in Wujin County of Jiangsu Province found that in 1994, about 70 percent of the levied fees were not legal according to the government's own rules and regulations (*Township Enterprise Yearbook*, 1995, p. 349).

Peasants in the rural areas are major victims of excessive taxes and fees. Throughout the reform period the government made countless promises to reduce *kejuan zashui* (heavy fees and taxes) on peasants, but *kejuan zashui* continued to be widespread. In some places 61 different types of fees were charged (Ding et. al., 1995). Despite the fact that the central government had passed laws limiting taxes and fees on peasants to 5 percent of their annual income, local governments have continued to levy high fees on peasants. Many newspaper articles have complained that the peasants' burden "alarmingly high" and "unbearable."

III. Anonymous Banking and Financial Repression

In this section, we describe anonymous banking in China. Two institutions are most relevant: the relaxed control over the use of cash for business transactions, and the use of anonymous household bank deposits for savings in the state banks. In addition, we provide evidence on financial repression in China, which is achieved through a combination of controls on international capital flows and near state monopoly of the banking system.

A. Relaxing Cash Management

Tight control over the use of cash as a means of transaction is a key part of any central planning system, including China's. The main motivation of the government's tight control over cash is its desire to have good information about economic activities, which allows it to better control the economy and to

collect taxes and profits.[4] The main method of tight cash control is to allow very limited cash holding and require that payments be made through bank transfers. For the three decades from the 1950s to the 1970s, the government required that transactions of more than 30 yuan (or about US$20 at the time) in value must be made through state bank transfers. No institutions were allowed to keep more than 30 yuan of cash; all cash received exceeding that amount must be deposited in a designated state bank on the same day. The only exceptions were wage payments to state and cooperative employees and payments for agricultural procurement.

During the reform era, the government gradually, but over time, significantly, loosened its control over the use of cash. In the early and mid-1980s, it stopped rigorously enforcing the previous regulations on cash holding and using cash in transactions. In 1988 the State Council (the Chinese Cabinet) issued "Provisional Regulations on Cash Management," which later was supplemented by the Central Bank's document on "Implementation Details of Provisional Regulations on Cash Management." The new "Regulations" introduced a "convenience" principle stating that cash management must "help to gradually establish the new order of socialist market economy and better serve commercial circulation in the economy." The "Implementation Details" also instructed that "banks at all levels must solve all kinds of problems according to practical conditions" so that "normal and reasonable needs for cash of a unit can be satisfied" (*People's Daily*, September 13, 1988).

A combination of tacit recognition, lack of enforcement, official changes in policy, and simplified procedures for firms to draw large amounts of cash meant that, in the words of a commentator, "the central bank no longer has hard restrictions on commercial banks' cash management" (*Almanac of China's Finance and Banking*, 1997, p. 271). The result was a steady increase of cash in circulation in the

---

[4] As early as in 1950, the state issued a decree instructing that "cash management must be seen as the centerpiece of the centralized payment and accounting system in the economy." "All state-owned enterprises, government agencies, and cooperatives must deposit any cash above an allowable amount into the state bank." All transactions between economic organizations, such as firms and government agencies, must go through the state bank in order to "quickly reflect conditions and problems in production and commodity circulation so that economic accounting can be more effective." Referring to the experiences of Northeastern China where tight cash management had started earlier, the decree states that these measures of tight cash control can "clarify economic relationships and disputes among firms" and "guarantee that they pay their taxes and remit their profits to the government" (*Xinhua Yuebao*, 1950, vol. 6, pp. 1364-66).

economy. Nationwide, cash in circulation as a percentage of the GDP increased from less than 6 percent in 1978 to the peak of 17 percent in 1993 before it leveled off to about 13 percent in recent years (*Almanac of China's Finance and Banking*, 1996).

One reason for the preference of using cash for transactions is convenience because bank transfers could be slow. Another reason is the need to withhold economic information from the state, which is understood by business people as well as the government. When the 1988 "Regulations" was issued, a Central Bank spokesman commented that "substantially increased use of cash in all kinds of transactions provided those outlaws many opportunities. For example, they use cash to buy and sell materials in shortage, ..., take rebates, give and accept bribery, ..., and avoid and evade taxes." "Most of these illegal activities involve transactions mediated by cash" (*People's Daily*, September 13, 1988).

B. Allowing Anonymous Household Bank Deposits

As early as in 1956, to encourage private savings in state banks, the Chinese government formulated the "Four Principles" of "voluntary deposit, free withdrawal, interest bearing, and confidentiality." The confidentiality principle states that the bank has an obligation to "keep the secret for depositors." These principles were restated in the revised regulations of 1980 and 1992.[5]

The confidentiality principle limits the availability of information to a third party, but not to the state bank itself. To address this concern, the state allows individuals to open savings accounts without personal identification. It also allows individuals to freely choose their types of deposits, either "named," or "unnamed."[6] To make a "named" deposit, a seal of the depositor is required, but because a person can have as many seals as he wants, his real name is not necessarily revealed. To make an "unnamed" deposit, no

---

[5] Article 2 of the 1980 "Household Savings Deposits Regulation" of the People's Bank of China and Article 5 of the 1992 "Household Savings Deposits Regulation" (*Almanac of China's Finance and Banking*, 1986; 1993).

[6] Article 4 of "Savings Deposit Regulation" issued by People's Bank of China on December 30, 1956 (document no. 162) says: "Demand deposits should be named and the depositor should leave a seal of the name. Saving deposits with lottery prizes need not be named. Other types of deposits, whether named or not named, whether requiring a seal or not, should be chosen by the depositor" (*Practical Handbook of Household Savings Business*, p. 246). Article 30 of the 1992 regulation reconfirms these choices for individual depositors (*Almanac of China's Finance and Banking*, 1993).

name is required at all. The downside of an unnamed deposit, as compared to a named deposit, is that it cannot be recovered if the certificate of deposit is lost.

Although anonymous household bank deposits were adopted in the 1950s, their effect on the economy was very limited before the reform. This was so because household income was low and private activities were virtually banned. After the reform private business became legal and the state loosened its control over cash and oversight over transactions. Every individual, including the newly rich, can use anonymous bank deposits as a safe heaven to store his/her wealth. Many business firms also open bank accounts under false household names, illegally but quite safely, because of the difficulty in catching and prosecuting them.

Some influential Chinese scholars and deputies of the National People's Congress (the state legislative body) have repeatedly advocated abandoning anonymous bank deposits, arguing that they contribute to pervasive corruption, tax evasion, and money laundering, especially by the newly rich. They have proposed requiring real-name deposits, following the "common international practice" (*China Industrial and Commercial Times*, May 28, 1998; *Guangzhou Daily*, March 11, 1999; *Guangming Daily*, March 29, 1999). China's Central Bank seriously considered such proposals on several occasions, but is concerned with the possible adverse effects, and has decided not to adopt the proposal yet.

C. Financial Repression

Financial repression in China is achieved through a combination of controls on international capital flows and near state monopoly of the banking system.

Although China has liberalized current account convertibility, strict controls on capital accounts remains in effect. Government regulation formally prevents capital from flowing freely into or out of China. In particular, domestic residents are not allowed to buy foreign assets or take assets out of China. Foreign investors are only allowed to repatriate legitimate profits.

In the domestic banking sector, the state has maintained a near monopoly during the reform, and its share of outstanding loans has remained at around 90 percent in the 1990s (*Almanac of China's Finance*

and Banking, 1997, p. 465). By way of comparison, the state's share of industrial output in the total has shrunk from nearly 80 percent to below 30 percent in recent years. The state monopoly over the commercial banks not only makes enforcement of interest rate regulations quite effective, but also ensures that virtually all savings deposits are made with state banks.

IV. Commitment Through Information Decentralization

A. A Preview

Our basic assumption is that when the state is not constrained it cannot credibly commit to not preying on private citizens. State predatory behavior includes arbitrary taxation and harassment of private businesses. To articulate our main idea in a simple model, we focus on arbitrary taxation. We assume that the state cannot commit to any moderate marginal tax rate.

The basic ideas of the model are as follows. The high tax rate dampens private incentives. As a result, the tax base is small and tax revenue is also low. Therefore, the state has an interest to limit its ability to tax. But how? One way for it to do so is to limit its ability to monitor private transactions and savings, which can be accomplished by anonymous banking, that is, relaxing regulations on cash transactions and allowing anonymous bank savings deposits. When the state has poor information about economic transactions among private agents and therefore about individual revenue, its ability to levy revenue-based tax is very limited. Then, it needs to rely on quasi-fiscal revenue from financial repression, including implicit taxation on bank deposits and seigniorage. When the state cannot observe individual savings, as is the case with anonymous banking, its taxation on savings is indiscriminate. In particular, it taxes the poor and needy at the same rate as the rich and fortunate. When the poor and needy are taxed too heavily, they may starve. This is costly to the state, for example, starvation may provoke revolt against the state. This concern about starvation limits the state's taxation on private savings. When the state's ability to tax is limited and therefore tax rates are low, private incentives are high and so is the tax base, resulting in high revenue.

14

Four factors are important in the above augment. The first factor is private savings. To model private savings, we assume that each agent lives for two periods -- production in the first and retirement in the second. The second factor is heterogeneity among agents. We assume that agents have different minimum consumption needs and have uncertain income, and that the state does not have the information about individual agents' minimum consumption needs. The third factor is the state's concern about starvation. We assume that the state's objective function has two components -- its revenue and the cost of revolt to it -- and that the danger of revolt increases when more people fall farther below their minimum consumption needs.[7]

The fourth factor, financial repression, needs some elaboration. We assume that savings are held in the form of financial assets, such as cash, bank deposits, or government bonds. Furthermore, the state has monopoly over the issuing of these financial assets; banks are state owned and private bond issues are not allowed. Then, the state can (implicitly) tax these financial assets: cash holdings can be taxed through inflation; and bank deposits and bond holdings can be taxed by setting low real interest rates. When all financial assets are anonymous, savings can only be taxed at a flat rate. A particularly important aspect of anonymous financial assets is anonymous banking. In China, the lion's share of private savings is in the form of bank deposits.

B. The Basic Model

We consider a model with a continuum of agents, with the measure of the whole population to be normalized to 1. Each agent lives for two periods: production in the first and retirement in the second. The utility function of an agent is

$$u(c_1) + u(c_2 - n),$$

where n is the agent's minimum consumption need in the second period. There are two types of agents: $n = 0$ with probability $1 - \epsilon$ and $n = h > 0$ with probability ϵ where $\epsilon > 0$. An agent's type is his private information. When the agent's second period consumption is lower than n, he faces the danger of

---

[7] To fix ideas, we identify the costs of starvation to the state with the costs of revolt to it in our analysis.

starvation; he will starve with probability $P(c_2 - n)$. We assume that $P(0) = 0$ for $x \geq 0$, $P(x) = 1$ for all $x \leq -h$, and P is convex and decreasing for $x \in [-h, 0]$. Suppose the utility level at starvation is $-N$. Then, $u(x) = -NP(x)$ for $x \leq 0$. Furthermore, we assume that $u(x)$ is strictly increasing and concave for $x \geq -h$. However, u is not necessarily differentiable at $x = 0$. We will use $u'(0)$ to denote its right derivative, which is independent of N. The left derivative of the utility function is $-NP'(0)$.

The agents' production function is as follows. In period 1, before the agent learns his minimum consumption need, he exerts effort e, which is not observed by the state. There are two effort levels: $e = e_L$ or e_H such that the disutilities are $0 = d(e_L) < d(e_H)$. Let capital per agent be k, which is observable to all. Output per agent is a random variable $Z(e, k) = k + Y(e, k)$, where the random component is in the value-added part $Y(e, k)$. We assume that the mean of Y is $EY = y(e, k)$, where $y(., .)$ satisfies all standard assumptions about production functions. Furthermore, we assume that $Y(e_H, k) \geq \alpha h$, where $\alpha \geq 1$.

The agent's optimal choice of effort depends on the tax rates on income and savings; when the rates are high the agent will choose low effort and when the rates are low he will choose high effort. Given income Y, minimum consumption need n, and savings tax rate r, let $W(Y, n, r)$ be the maximum level of the agent's utility (when c_1 is chosen to maximize)

$$u(c_1) \ + \ u((1-r)(Y - c_1) - n).$$

Assumption 1: It is optimal for the agent to choose e_H when the income tax rate is 0 and the savings tax rate $r \leq 1 - 1/\alpha$; that is

$$E_{Y,n} W(Y(e_H), n, r) - E_{Y,n} W(Y(e_L), n, r) > d(e_H)$$

for $r \leq 1 - 1/\alpha$, where $E_{Y,n}$ represents the average over all possible values of Y and n. When there is no possibility of confusion, we will omit the subscripts of Y and n.

The state is assumed to care about its revenue and the costs imposed on it from revolt. We further assume that the chance of revolt increases with the proportion of agents facing starvation. In particular, the state's utility function is assumed to be

$$R - ME_{Y,n} P(c_2 - n),$$

where R is the state's revenue, c_2 is the second period consumption of an agent with income Y and minimum consumption need n, and M is the costs of revolt to the state per unit measure of agents facing starvation.

When savings are anonymous, taxation on savings can be very costly to the state because it taxes the poor and needy at the same rate as the rich and fortunate. The state especially needs to worry about those agents who are "the poorest and most needy" (i.e., agents with $Y = \alpha h$ and $n = h$). To articulate our point, we assume that there is a non-trivial proportion of these people in the population. Specifically,

<u>Assumption 2:</u> There is a non-trivial proportion of the agents whose income Y is at its lowest possible value αh; that is,

$$\Pr[Y(e_H, k) = \alpha h] \geq \delta > 0.$$

Furthermore, we need,

<u>Assumption 3:</u> $-\epsilon \delta MP'(0) \geq 1.$

In the above assumption, $\epsilon \delta$ is the proportion of agents who are the poorest and most needy, $-P'(0)$ is the marginal increase in the probability for such an agent to starve with respect to the tax, M is the cost to the state per unit measure of agents starving, their product is the marginal cost of the tax, and 1 is the marginal benefit of the tax. This assumption means that the state will have an interest to refrain from an indiscriminate tax if it pushes the poorest and most needy into the danger of starvation.

Finally, we make the following technical assumption:

<u>Assumption 4:</u> $-NP'(0) \geq \alpha u'(0).$

This assumption implies that the agents' disutility from starvation is so high that the poorest and most needy agents would save all their income for the second period consumption when the tax rate on savings is not too high. When these agents save more, taxation on savings will impose lower costs on the state because the likelihood of their starvation and revolt will be lower. Therefore, Assumption 4 makes it harder for the state to credibly commit to a low tax rate. We will show that even under this assumption, the state's ability to tax savings can still be limited.

C. The Benchmark Case: Information Centralization

Having laid out all the assumptions, we next consider the benchmark case of information centralization. In this case, the state forces all transactions be registered with or channeled through state banks and therefore observes each individual agent's output. The timing of the game is presented in Figure 1.

Figure 1. Timing of the Game under Information Centralization

	Period 1:		Period 2:
player:	the agents	the state	the state
action:	e; Y; and n	$T(Y)$ and c_1	c_2

In period 1, each agent first chooses his effort e, without knowing his type n. Then, a random output $Y(e, k)$ is realized. So is the type n, which is not observable to the state. Then, the state observes Y and collects tax T, leaving c_1 for the agent to consume in the first period. In period 2, the state gives c_2 for the agent to consume in the second period subject to its budget constraint $E(c_2) \leq E(T - c_1) + T_2$, where T_2 is the state's total revenue in the second period.

The argument to follow uses the extreme assumption that the state cannot commit to any promised

marginal tax rate that is less than 100 percent. This assumption is unnecessarily strong; our argument goes through even if, for reasons we don't model here, the state can commit to some tax rates less than 100 percent as long as these rates are sufficiently high.

The equilibrium of the benchmark case can be summarized as the one of the "*iron rice bowl*," which refers to the situation of 100 percent taxes, complete redistribution, and lowest private incentives. The mechanism driving this equilibrium is that once output Y is produced and observed by the state, it is optimal for the state to tax it away, regardless of any *ex ante* promises. Also, since effort is chosen before n is realized, the observation of Y does not reveal any information about n. Therefore, in period 2 the optimal policy is for the state to evenly redistribute part of its revenue to agents, striking a balance between maintaining high revenue and reducing the proportion of agents facing starvation. As a consequence, from an individual agent's point of view, the final consumption is completely independent of his output. Therefore, all agents make the lowest effort. To summarize the above discussion, we have:

Proposition 1 ("the iron rice bowl"): When Y is observable to the state, $T = Y$, $c_1 = 0$, $c_2 = F \leq$ h, and e = e_L for all agents. That is, the state taxes away all output; it provides the same level of consumption for all agents in period 2, and all agents exert a low effort.

D. The Main Case: Information Decentralization

In the main case, we assume that the state does not observe an individual agent's revenue, neither the level nor the time when it is realized. We also assume that agents only hold their savings as financial assets and these financial assets are anonymous. For simplicity, we only consider one form of financial asset: deposits in the state banks. The state cannot observe individual savings but can observe average savings in the state banks.

The main conclusion here will be that, under anonymous banking, there is a good equilibrium in which the state can commit to no taxation on output and low taxation on savings deposits and thus agents'

high incentives are created. Therefore, with information decentralization, the predatory behavior of the state is constrained. At the same time, through financial repression, the state can also get some revenue from the banking sector in the form of implicit taxation on bank deposits.

The timing of the events is as follows.

Figure 2. Timing of the Game under Information Decentralization

	Period 1:	Period 2:
player:	the agents	the state
action:	e; Y; n; c_1 and s_1	r and F; c_2

In period 1, agents simultaneously choose effort e first. Then n and Y are realized, and the agents consume c_1 and save $s_1 = Y - c_1$. About any individual agent, the state does not know the value of n, the value of Y, when Y is realized, nor when c_1 is consumed. In period 2, the state only observes average savings s, and chooses a tax rate r on savings and per agent subsidy F under its budget constraint $F \leq rs + T_2$, where $T_2 \geq 0$ is the state's revenue from other sources ($T_2 > 0$ is possible under a sectoral dual-track to be discussed in the next section). Finally, each agent consumes $c_2 = (1 - r)s_1 + F$. We will denote the agent's optimal savings by $s_1(Y, n)$ or $s_1(Y, n, r, F)$ according to the context.

Since the state does not know that the agent has the income until period 2, the only form of tax that is feasible is a tax on savings. Furthermore, because the state does not have information about individual savings, it can only tax savings according to a flat rate based on the observed average savings.

As a first step in characterizing the equilibrium, we study the state's decision after observing the average saving s. Given Assumptions 2 and 3, the state has the incentive to avoid any danger of the poorest and most needy agents starving (and thus revolt). If the poorest and most needy agents save all their income for the second period (i.e., $s_1 = \alpha h$), then to avoid the danger of starvation in the absence of

20

any subsidy, the tax rate r cannot be so high that $(1-r)\alpha h < h$; that is, r cannot be higher than $r_0 = 1 - 1/\alpha$, which satisfies $(1-r_0)\alpha h = h$.

Definition 1: $r_0 = 1 - 1/\alpha$.

The next question is whether it is better for the state to choose a higher tax rate together with some subsidy. The answer is no if the poorest and most needy save more than an average agent. In this case, any tax-cum-redistribution scheme constitutes a net tax on the poorest and most needy without yielding any net revenue to the state, which is undesirable for the state. To facilitate our discussion, we define a critical level of k as follows.

Definition 2: k^* is such that $Es_1(Y(e_H, k^*), n, r_0, 0) = \alpha h$.

We will focus on the case where $k < k^*$, that is, the average savings $Es_1(Y(e_H, k), n, r_0, 0) < \alpha h$.

So far, we have argued that if the poorest and most needy save αh for the second period, then it is optimal for the state to choose $r = r_0$ and $F = 0$. If we can further show that, anticipating $r = r_0$ and $F = 0$, these agents will indeed save αh, then we will complete our proof that $r = r_0$ and $F = 0$ form an equilibrium.

By Assumption 1, anticipating $r = r_0$ and $F = 0$, all agents will choose high effort e_H. Then, the poorest will have an income of αh. If they don't save all of their income, their second period consumption will be less than $(1-r_0)\alpha h = h$. If the disutility (i.e., N) of starvation is high enough, as is stated in Assumption 4, the poorest and most needy will save all their income, αh.

Proposition 2 ("anonymous banking"): Suppose that the state does not observe individual income or savings. Then $e = e_H$, $s_1 = s_1(Y, n, r_0, 0)$ and the state choosing $r = r_0$ and $F = 0$ when observing the average savings $Es_1(Y, n, r_0, 0)$ constitutes an equilibrium, provided $k < k^*$.

Propositions 1 and 2 show the important role of information decentralization in helping the state to credibly commit to low tax rates in the absence of conventional institutions to constrain the state. With information about an individual agent's income, the state is not credible in taxing income at a low rate; by way of comparison, without information about an individual agent's income or savings, the state can credibly tax savings only at a moderate rate. Furthermore, information decentralization also helps the state avoid the "soft budget constraint" problem in the following way. Suppose an individual agent chooses low effort, hoping to get subsidy from the state. With good information, the state will subsidize the agent when it finds the agent's income to be too low; in contrast, without the relevant information, the state will not subsidize him because it does not know the agent has shirked. The difference in the state commitment power regarding taxes and subsidies implies that private incentives are higher under information decentralization than under information centralization. Moreover, the state can also benefit from the high incentives under information decentralization. Specifically, the state's revenue is $r_0 E s_1(Y(e_H), n, r_0, 0)$ under information decentralization and is $EY(e_L) - h$ under information centralization. The state is better off in the former case than in the latter if the effect of effort on Y is sufficiently large.[8]

The condition of $k < k^*$, that is, the economy is not very developed, is important for the result of Proposition 2. $k < k^*$ means that the average savings of all the agents is less than the savings of the poorest and most needy. Under this condition, a tax-cum-redistribution scheme entails a net tax on the poorest and most needy without bringing the state any revenue, and therefore is undesirable. Whether or not the same or other mechanism also works for a richer economy ($k > k^*$) is an interesting issue and awaits further research.

It is well known that in a world of a benevolent government without any commitment problems, taxation on income is more efficient (less distortionary) than using a banking system to perform fiscal activities through financial repression. However, this principle may become invalid in real world situations

---

[8] In Appendix B we discuss the possibility of multiple equilibria. We show that under some mild assumptions, for $T_2 = 0$, other equilibrium, if exists, does not Pareto dominate the one given in Proposition 2. In particular, the state and agents with n = h and high Y are strictly worse off under this equilibrium than the one given in Proposition 2. Therefore, the equilibrium given in Proposition 2 is a more reasonable one. We also show that for sufficiently large T_2, the equilibrium given in Proposition 2 is actually unique.

once political economy consideration is incorporated. In developed economies with interest group politics, a less efficient taxation method may lead to higher social welfare than a more efficient taxation method because it reduces the size of government (Becker and Mulligan, 1998). We have shown above that in an economy without conventional institutions to constrain the state, implicit taxation through financial repression can be a lesser evil than direct taxation on income when the state's commitment is a problem.

One might argue that, in the absence of institutions, the state can still make a credible commitment and will not break its promise because of concerns about its reputation. In this argument, if the state breaks its promise, people will not believe in the state and they will not make investments in the future. Since the state is long-lived and has many units, reputation concern will effectively constrain it from pursuing short-run gains by breaking its promises.

In reality, however, reputation concern has not been a very effective deterrence of the state's predatory activities in China. There are many reasons for this. The first reason is that the ideology of the top leadership may shift. When orthodox communist ideology prevails, private property will be confiscated without regard for the consequences on private incentives. The second reason is that bureaucrats working on behalf of the state have a short time horizon and do not care about the possible negative reputation effect of their predatory behavior on other regions. Therefore, they tend to pursue short-term gains. For example, it is a widely known fact that in China bureaucrats of age 59 (just one year before retirement) are the most feared. The third reason is that private agents have limited means for punishing the state for breaking its promise without resorting to the extreme measure of revolving; given China's political system, they are not allowed to form any formal organizations and coordinate their actions to pressure the government; the most they can do is to stop production, or to rebel.

V. The Sectoral Dual-Track

In this section, we extend the basic model to include two sectors coexisting at the same time: a monitored sector (denoted by "s") and an unmonitored sector (denoted by "n"). Transactions in the monitored sector are required to go through real-name bank accounts and the state can verify the amount of

output produced. However, the state is unable to verify the amount of output produced by the unmonitored sector because transactions are made through the use of cash. Therefore, the monitored sector represents the case of information centralization and the unmonitored sector the case of information decentralization, respectively, in section IV.

At the beginning of the first period, the state allocates labor and credit to the two sectors. At the end of the first period, the state observes the output of the monitored sector and taxes the entire output away; the unmonitored sector pays back the credit from the state bank, consumes part of the output, and deposits the rest in the state bank as savings; thus the state is in control of the total output of the monitored sector and the savings of the unmonitored sector. Of the amount controlled by the state, it consumes some and allocates the rest to the two sectors manned by an additional generation of workers (agents), who, in contrast to the first-generation agents, are assumed to live for only one period. By the end of the second period, the government taxes the output of the second-generation monitored sector, gets back its credit to the second-generation unmonitored sector, pays pensions to two generations of workers in the monitored sector, and return the deposits (plus interests) to the retired workers in the unmonitored sector; the remainder of the state's revenue is its second period payoff.

The main results of this section will be that the under certain conditions the state benefits from the coexistence of the two sectors rather than one. In addition, the model predicts that the monitored sector pays more taxes, is more capital intensive, but induces lower incentives from workers and has lower marginal product of capital than the unmonitored sector.

We employ the following notations. We refer the beginning of period 1 as "date 0," the end of period 1 (or the beginning of period 2) as "date 1," and the end of period 2 as "date 2." We continue to normalize the total amount of labor to 1 in both periods and denote σ_0 and σ_1 as the shares of labor in the unmonitored sector in period 1 and period 2, respectively. k_0 is the total amount of capital (or credit) available at date 0, k_{s0} and k_{n0} are per capita capital in the monitored and unmonitored sectors at date 0, and k_{s1} and k_{n1} are those at date 1. Given k_t, σ_t, and k_{nt}, k_{st} is uniquely determined, for $t = 0, 1$. For

24

simplicity, we assume that the second period is the end period and that σ_1 and k_{n1} are exogenously given.[9]

The purpose of this assumption is to focus on the date 0 allocation of labor (σ_0) and credit (k_{n0}) between the two sectors, which correspond to the government's interim decisions during the reform.

In the monitored sector, agents always exert low effort e_L, as analyzed in the benchmark case in the basic model. In the unmonitored sector, it has been shown that, if $k_{nt} < k^*$, agents will exert high effort e_H. We will restrict ourselves to $k_{nt} < k^*$ for $t = 0, 1$.[10]

At date 1, the state's tax revenue is all from the monitored sector and, since effort is low in the sector, is given by $T_1 = y_{s1} = (1 - \sigma_0)y(e_L, k_{s0})$. The total savings in the state bank by agents in the unmonitored sector is $S_1 = \sigma_0 s(e_H, k_{n0})$ because effort is high in the unmonitored sector. We denote the state's consumption in period 1 by C_1. The consumption of the agents in the monitored sector is $c_{s1} = 0$, since the state has the incentive to limit the first period consumption of the workers in the monitored sector to the minimum level. Then, the state's budget constraint at date 1 is given by

$$C_1 + k_1 = T_1 + S_1 + k_0,$$

where k_1 is the total capital stock at date 1 for period 2 production. To simplify, we assume that $C_1 = C^*$. Then,

$$k_1 = T_1 + S_1 - C^* + k_0 = (1 - \sigma_0)y(e_L, k_{s0}) + \sigma_0 s(e_H, k_{n0}) - C^* + k_0.$$

In the second period, the state's tax revenue is $T_2 = (1 - \sigma_1)y(e_L, k_{s1})$. Each agent's consumption is $c_{s2} = h$ and $c_{n2} = (1 - r_0)s(e_H, k_{s1})$, in the two sectors, respectively, where $r_0 = 1 - 1/\alpha$ is the (implicit) tax

---

[9] We abstract away the issue of the savings of the second-generation workers in the unmonitored sector by assuming that they consume everything by the end of the second period.

[10] The case $k_{nt} > k^*$ is complicated. In this case, $r \le r_0$ and $e = e_H$ are no longer in equilibrium, because $r \le r_0$ implies an average savings higher than h, which in turn implies that the government will choose to confiscate all savings ($r = 1$) and redistribute h equally to all agents.

rate on bank deposits. The state's period 2 consumption C_2 is given by the following budget constraint:

$$C_2 + (1-\sigma_0)h + (1-\sigma_1)h + \sigma_0(1 - r_0) \, s(e_H, k_{s1}) = k_1 + (1 - \sigma_1)y(e_L, k_{s1}),$$

where $\sigma_0(1 - r_0)s(e_H, k_{n0}) + (1-\sigma_1)h$ is the total amount of after-tax savings returned to depositors and $(1 - \sigma_0)h$ is the total amount of pension paid to the two generations of workers in the monitored sector. The state's objective is to maximize C_2 by choosing k_{n0} and σ_0 for given σ_1 and k_{n1}. We can calculate C_2 as follows:

(1) $C_2 = (1 - \sigma_1)y(e_L, k_{s1}) + k_1 - \sigma_0(1 - r_0)s(e_H, k_{n0}) - (1 - \sigma_0)h - (1-\sigma_1)h.$

Define $1 - v_1$ to be the share of credit allocated to the monitored sector. Then $(1 - \sigma_1)k_{s1} = (1 - v_1)k_1$. With this, the two first order derivatives of (1) are:

(2) $\partial C_2/\partial k_{n0} = - \sigma_0(1 - r_0)s_k(e_H, k_{n0}) + [(1 - v_1)y_k(e_L, k_{s1}) + 1](dk_1/dk_{n0}),$

where

$dk_1/dk_{n0} = \sigma_0 s_k(e_H, k_{n0}) - \sigma_0 y_k(e_L, k_{s0});$

and

(3) $\partial c_2/\partial \sigma_0 = - (1 - r_0)s(e_H, k_{n0}) + h + [(1 - v_1)y_k(e_L, k_{s1})+1](dk_1/d\sigma_0)$

where

26

$$dk_1/d\sigma_0 = s(e_H, k_{n0}) - y(e_L, k_{s0}) + (k_{s0} - k_{n0})y_k(e_L, k_{s0}).$$

We first examine the conditions under which the state chooses to allow a unmonitored sector in period 1, i.e., $\sigma_0 > 0$. It turns out that there are two alternative conditions. The first of these requires that $s(e_H, k_0) > y(e_L, k_0)$ and $s(e_H, k_0) < h$, which are satisfied when e_H is sufficiently higher than e_L and k_0 is not very high. Under these conditions, the state can always improve upon the choice of $\sigma_0 = 0$, which implies that $k_{s0} = k_0$. In fact, the state can move a worker from the monitored sector to the unmonitored sector with the same amount of per capita capital, k_0. With this adjustment, k_1 will increase by $s(e_H, k_0) - y(e_L, k_0)$. One period later, the state's expenditure increase by $(1 - r_0)s(e_H, k_0) - h$, since $(1 - r_0)s(e_H, k_0)$ is to be paid back to a depositor and h to a retiree. Thus, if $s(e_H, k_0) > y(e_L, k_0)$ and $s(e_H, k_0) < h$, such an adjustment benefits the state.

Alternatively, when $y(e_L, k_0) < h$ and v_1 is large, the state also chooses to have a unmonitored sector. The reason goes as follows. If $\sigma_0 = 0$, $k_{s0} = k_0$ and then $y(e_L, k_{s0}) < h$; that is a worker in the monitored sector produces less than his retirement pension and therefore is a burden on state budget. By moving a worker into the unmonitored sector and allocating little capital to him, the state can avoid subsidizing the work in the amount of $h - y(e_L, k_{s0})$. Moreover, the state also increases the per capita credit available to the remaining workers in the monitored sector and therefore increases their per capita output. With v_1 being sufficiently large, this advantage of moving workers to the unmonitored sector dominates any possible cost of lowered k_1 because k_1 will mostly go to the unmonitored sector in the second period which pays little taxes. Therefore, under the alternative assumptions of $y(e_L, k_0) < h$ and v_1 being large, it is optimal for the state to have a unmonitored sector. Apparently, the second conditions are more likely to be satisfied when either e_L or k_0 is very low. The following proposition summarizes the discussions.

Proposition 3: Under either of the following conditions, the optimal $\sigma_0 > 0$:
(1) $s(e_H, k_0) > y(e_L, k_0)$ and $s(e_H, k_0) < h$; or
(2) $y(e_L, k_0) < h$ and v_1 is sufficiently large.

We can also characterize a condition under which it is optimal for the state to maintain a monitored sector, i.e., $\sigma_0 < 1$. A simple condition for this to hold is that v_1 is sufficiently large. The reason can be explained easily. Suppose initially, there is no monitored sector, i.e., $\sigma_0 = 1$. The state can establish such a sector with a small proportion of total labor but with per capita capital, k_{s0}, so high that per capita output in the monitored sector $y(e_L, k_{s0}) > h$. Such a monitored sector will be a net contributor to the state's budget in the second period. When v_1 is high enough, the above benefit of having the monitored sector dominates any possible costs as is argued in the last paragraph. Therefore, it is optimal for the state to have a monitored sector. The following proposition summarizes the discussion.

Proposition 4: When v_1 is sufficiently large, the optimal $\sigma_0 < 1$.

We next examine how the government optimally allocates credit at date 0 between the two sectors by assuming that the two sectors co-exist. Given $0 < \sigma_0 < 1$, the optimal k_{n0} is an interior solution if the marginal product of capital is sufficiently high when the level of capital is low. Therefore its first order condition is satisfied by setting equation (2) equal to zero. Then, in (2), the first term is negative and consequently $dk_1/dk_{n0} > 0$ or $s_k(e_H, k_{n0}) > y_k(e_L, k_{s0})$. But $s_k(e_H, k_{n0})$ equals the marginal propensity to save, a variable less or equal to 1, multiplied by $y_k(e_H, k_{n0})$. Therefore, $y_k(e_H, k_{n0}) > y_k(e_L, k_{s0})$. The implication is that credit rationing exists against the unmonitored sector. The reason is that, although credit allocated to the unmonitored sector increases k_1, it also increases the amount the state has to pay to each depositor in the second period. That is, the government cannot enjoy all of the marginal benefits of added credit to the unmonitored sector. On the other hand, to each worker in the monitored sector, the government's obligation is h, a fixed amount independent of k_{s0} (and k_{n0}). Therefore, the government does enjoy the full marginal benefit of added credit to the monitored sector. The following proposition is a summary of the discussion.

Proposition 5 (credit rationing): Under the sectoral dual-track, at the optimum, $y_k(e_H, k_{n0}) > y_k(e_L, k_{s0})$; that

is, credit is rationed against the unmonitored sector.

Finally, we examine the relative capital intensity of the two sectors. We will show that when v_1 is sufficiently large, the monitored sector has a higher capital intensity than the unmonitored sector. This conclusion is stronger than that in Proposition 5. The argument before Proposition 5 shows that the state only gets a portion of the marginal benefit of capital allocated to the unmonitored sector but gets the full marginal benefit of capital allocated to the monitored sector. As v_1 approaches 1, the state only cares about its revenue from the first period production, and for the unmonitored sector, the proportion of marginal product going to the state decreases to r_0 multiplied by the marginal propensity of saving, making it less and less attractive for the state to allocate capital to the unmonitored sector. Eventually, when v_1 is sufficiently large, per capita capital allocated to the unmonitored sector becomes lower than that allocated to the monitored sector, despite of high effort in the former sector. Thus, we have Proposition 6.

Proposition 6 (capital intensity): Under the sectoral dual-track, when v_1 is sufficiently large, at the optimum, $k_{s0} > k_0 > k_{n0}$.

VI. Evidence from China's Reform Experience

Our model presented in sections IV and V has three major predictions. First, under anonymous banking, the government should find it difficult to tax business. As a result, private incentives should rise, so does GDP, and the share of government tax revenue in GDP should decline. Second, under financial repression, the government should be able to collect some revenue, which we call quasi-fiscal revenue, from the banks in the forms of seigniorage and implicit taxes on deposits. Third, the government may find it desirable to allow the co-existence of two sectors: a well-monitored sector and a less-monitored sector, which exhibit the following features: the well-monitored sector pays more taxes, receives more credit, and is more capital intensive, but has lower incentives; and the less-monitored sector pays fewer taxes, receives

less credit, and is less capital intensive, but has higher incentives. Below we provide evidence from China's reform experience to support these predictions.

A. *The Decline of the Share of Government Fiscal Revenue in GDP*

Government fiscal revenue in China consists of three parts: budgetary revenue, extra-budgetary revenue, and off-budget revenue. In the following, we explain and calculate the magnitude of each of these revenue items.

It is an often cited fact that the Chinese government's budgetary revenue as a share of GDP declined dramatically during the past two decades (e.g., Wong, 1991). Column (4) of Table 1 shows that the consolidated government budgetary revenue as a share of the GDP declined from 31 percent in 1978 to 13 percent in 1993 and went down further in 1996 to 11 percent. After adjusting for non-standard accounting practices (for example, the Chinese budgetary data is net of subsidies to the losses of state-owned enterprises), the adjusted data can be about 1-2 percentage points higher.

[Insert Table 1 here]

Column (5) of Table 1 gives estimated figures of extra-budgetary funds. Under the definition prior to 1993, extra-budgetary funds consisted of two categories: tax surcharges and user fees, and SOEs' earnings retained by SOEs and their supervisory government agencies. About three-quarters of the extra-budgetary funds are in the second category, most of which are not really government revenues. Chinese economists estimated that about 30% of total extra-budgetary revenue was used for public expenditure before 1993 (Fan, 1996). Since 1993, the SOE retained earning portion of extra-budgetary funds has been excluded from the new definition of extra-budgetary revenue. To maintain consistency, we use 30 percent of extra-budgetary revenue as a share of GDP for the data before 1993 and include the entire extra-budgetary revenue after 1993.[11]

Column (6) of Table 1 presents the estimated off-budget revenue based on 30 percent of the local budgetary revenue. The "off-budget" revenue, also known as "self-raised funds," consists of user charges

---

[11] We made estimations for 1978-81 and 1995-96 due to the lack of relevant data.

or fees (such as land management fees and water and electricity fees) not included in extra-budgetary revenue, as well as retained profits and management fees from collective enterprises such as TVEs. Some survey studies indicate that at the township level in many localities, the size of the off-budget expenditure is as large as the budgetary expenditure, and in some townships in Guangdong province it is as high as 90% of total expenditure. On average, off-budget revenue could be around 30 percent of local budgetary revenue (Fan, 1996) and we use this ratio to calculate column (6) of Table 1.

Total government revenue combining revenues from all three sources also experienced a significant decline during the past two decades as shown in column (7) of table 1. It declined from about 40 percent of GDP in 1978 down to 25 percent in 1990 and down further to 17 percent in 1996. Again, after adjusting for non-standard accounting practices, the adjusted revenue can be 1-2 percentage points higher, but, still, total fiscal revenue was below 20 percent of GDP in 1996. However, the decline of government revenue as a share of the economy does not necessarily imply the decline in absolute terms. In fact, compared with that of 1978, total government revenue nearly doubled in 1996, despite the fact that the share of government revenue in GDP declined.

Economists usually attribute the decline of the share of government fiscal revenue in GDP to economic liberalization that relaxed the state monopoly over industry (Naughton, 1992). Under central planning, the government almost exclusively extracted its revenue from the state industry monopolies, made possible by setting artificially low planned prices for materials and resources and artificially high planned prices for final products. Economic reforms liberalized prices, allowed entry of non-state enterprises, and increased compensation to state workers and retained earnings to state enterprises. This is why government revenue declined.

The above argument is incomplete, because it does not explain why the government could not raise fiscal revenue from other sources such as non-state enterprises. Presumably, the government found it difficult to collect taxes from non-state enterprises. We have argued that information plays a critical role here. In section II, we presented evidence showing that the government remains predatory during reform. But, decentralized information serves to limit its actual ability to prey on citizens. Government officials

frequently complain that they were unable to collect taxes because they lacked information. Evidence

shows that there was considerable difficulty in collecting taxes from industrial enterprises because of the

lack of information. For example, in 1990, after a round of campaigns aimed at tax evasions of private

businesses, it was estimated that only 20 to 30 percent of nominal taxes were collected (Lu and Yang,

1992). The main reason for this was that "the non-state firms have poor accounting systems, therefore

governments have limited capacity taxing these enterprises" (An and Liang, 1996).

The decline of fiscal revenue as a share of the GDP has occurred not only in China. In Russia,

consolidated fiscal revenue (including off-budget funds) as a share of the GDP also declined drastically

during reform, from 46.1 percent in 1992 to 32.3 percent in 1996 (table 1 in Chapter III, Treisman, 1999).

The reported reasons are similar to those we have argued here: the Russian government was unable to

collect taxes because of informational problems. The difference is in the details: enterprises in China use

cash for transactions, and enterprises in Russia use barter. Another difference is that in Russia, the

absolute amount of government fiscal revenue declined because its GDP declined, but in China, only the

share, not the absolute amount, declined.

B. Government "Quasi-Fiscal" Revenue from the Financial System

We now turn to evidence showing that anonymous banking plus the state monopoly of the financial

system has been generating a considerable amount of revenue for the Chinese government during the reform

era. The revenue, which is not directly collected via taxation, is often referred to as "quasi-fiscal" revenue.

Government's quasi-fiscal revenue come from two sources. The first source is seigniorage, which is from

the increases in cash issued by the central bank, which can be both inflationary and non-inflationary.[12] The

second source is from (implicit) taxation on bank deposits through creating a gap between the regulated

deposit rate and the market interest rate.[13]

---

[12] Although our model captures the inflationary part of seigniorage revenue of the government, it does not
explicitly capture the non-inflationary part of seigniorage revenue from the increase in real money balance.

[13] Here we focus on the revenue (flow) of the government. The expenditure side of the government is a separate
issue, although the two sides are related. We note that if the government uses the deposits for non-productive

In China, cash in circulation and bank deposits have increased rapidly (table 2), a phenomenon often referred to as financial deepening. Financial deepening provides a "tax base" for government's quasi-fiscal revenue. Column (6) shows that cash in circulation increased from 5.9 percent of GDP in 1978 to the peak of 17 percent of GDP in 1993 before it leveled off a little more recently. Column (3) of table 2 shows that household bank deposit increased annually by over 30 percent for most years in the past two decades. Column (7) shows that total household bank deposits were less than 6 percent of the GDP in 1978. They increased to 22 percent in 1986, 42 percent in 1991, and further to 56 percent in 1996. Column (8) displays the M2 to GDP ratio, which increased from 50 percent in 1985 to 110 percent in 1996.

[Insert Table 2 here]

How large is the government's revenue from currency seigniorage in China?[14] Hofman (1998) estimated that between 1986 and 1994, inflation tax (on currency stock) was 1.2 percent of GDP (Column (1) of table 3) and real money expansion (i.e., increases in deflated cash in circulation) was 1.8 percent of GDP (Column (2) of table 3). These two combined averaged 3 percent of the GDP (Column (3) of table 3).

[Insert Table 3 here]

On the other hand, because of government monopoly of the banking system and capital control, the government was able to regulate the interest rate to the level below the market rate. We estimate the amount of resulting implicit taxes on deposits as follows. Assuming first zero as the opportunity cost of capital. According to Hofman (1998), the implied implicit taxation on deposits between 1986 and 1994 was 2.1 percent of the GDP on average (Column (4) of Table 3).[15] Now consider a more realistic case in

purposes beyond a point, state banks' non-performing debts will accumulate. We will discuss this issue in the concluding section.

[14] Because all commercial banks were state-owned in China during the time period of our study, we consider the central bank and state commercial banks as one bank and thus do not include reserve money seigniorage as part of the seigniorage.

[15] This 2.1 percent is perhaps overestimated a bit because it does not consider inflation compensation for household term deposits maturing in over three years and it also includes state enterprise deposits.

which the opportunity cost of capital is 10 percent rather than 0 percent. Between 1986 and 1994, the average household bank deposits to the GDP ratio was about 35 percent (column (7) of table 2). Then, on average, the additional implicit taxes on household bank deposits would be 3.5 percent of the GDP each year. This amount is then added to the average 2.1 percent of the GDP above. This gives the total implicit tax on bank deposits as close to 6 percent a year, which is about one-half of the budgetary revenue or about one-third of the total fiscal revenue in 1994.[16]

Combining the seigniorage revenue and implicit deposit taxes, between 1986 and 1994, the government's quasi-fiscal revenue averaged about 9 percent of the GDP every year. This means that, on average, the government's quasi-fiscal revenue was more than one-half of its budgetary revenue, or more than one-third of its total fiscal revenue from budgetary, extra-budgetary, and off-budgetary sources. Therefore, in the 1990s, the Chinese government's total revenue (fiscal and quasi-fiscal) was somewhere between 25 and 30 percent of GDP.

We now return to the comparison between China and Russia. Although both countries experienced similar sharp declines of the share of government's fiscal revenue in GDP, there was a big difference in their financial systems. The Russian economy suffered from the serious problem of inflation in the early 1990s, through which the Russian government collected some seigniorage revenue, but only in a limited amount and for a short time period. "Direct credit" from the Russian Central Bank was as high as 15.5 percent of GDP in 1992, but dropped sharply to 5 percent in 1993 and 1.9 percent in 1994 (table 1 in Chapter 3, Treisman, 1999). After the 1998 crisis, the market of ruble-denominated financial assets shrank drastically. In contrast, for the past twenty years, China experienced unprecedented financial deepening, which allowed the government to continuously collect a considerable amount of quasi-fiscal revenue.

---

[16] Giovannini and de Melo (1993) provided evidence indicating that in developing countries the government revenue from financial repression can be substantial, and for several countries it is of the same order of magnitude as seigniorage.

C. Features of the Sectoral Dual-Track

Our model predicts the existence and characteristics of two sectors in the economy: the well-monitored sector and the less-monitored sector. This is indeed a prominent feature of the Chinese economy during reform. In China, the well-monitored sector consists of mostly state-owned enterprises (SOEs) while the less-monitored sector consists of mostly non-state-owned enterprises. But the correspondence is not perfect: certain transactions of SOEs are not monitored by the government while some transactions of non-state enterprises are.

There is overwhelming anecdotal evidence showing that work efforts in the non-state sector (i.e., less-monitored sector) are higher than those in the non-state sector (i.e., well-monitored sector), which is consistent with a basic prediction of the model.[17] In the following, we provide evidence on other predictions of the model concerning the comparison between these two sectors.

Tax contribution. Table 4 displays government budgetary revenue from sources of different ownerships. It shows in Column (3) that budgetary revenue from the state sector declined from 87 percent of total revenue in 1978 to 71 percent in 1995. Even in the 1990s, the state sector remained the most important source of government budgetary revenue, despite the fact that state ownership in the entire economy has become a minority. For example, in 1996, the state sector produced less than 30 percent of the total industrial output of the nation (Column (4)). Although data is not readily available, we can estimate the state's share in GDP as of 1996. In terms of value added, the shares of the agriculture, industry, and service in the economy were about 20, 50, and 30 percent, respectively. Assuming that the state's shares in the three sectors are 0, 30, and 60 percent, respectively, the share of the state sector in the GDP would be roughly 1/3.[18] At more than 2/3, the state sector's contribution to government budgetary

---

[17] Like other models dealing with effort problem, effort is not observable or measurable, and thus direct evidence comparing effort in the state sector and the non-state sector is not available. While indirect evidence such as lower capital productivity in the state sector is consistent with our prediction that effort is lower in the state sector, it is also consistent with other explanations such as allocative inefficiency, i.e., too much capital, in the state sector. Isolating the effect of individual factors on productivity in the state sector is not easy and we do not have systematic data to address the issue here.

[18] The service sector includes industries like banking, wholesale and rail and air transportation and others in which state ownership dominates, as well as retail, restaurants in which private ownership dominates. The sector

revenue is disproportionately high, as our model predicts.[19]

[Insert Table 4 here]

Credit allocation. It is well known that SOEs have been favored in credit allocation, and non-state enterprises, especially private enterprises, have been discriminated against. Table 5 presents figures on non-agricultural loan allocations between the state and non-state sectors. The figures in Column (4) of Table 5 show that the share of loans extended to the state sector never fell below 85 percent of the total, despite the fact that the output produced by SOEs fell to less than 1/3 in industry and to about 1/3 in GDP in terms of value added. Clearly, the state sector received disproportionately high share of credit from the banking system.

[Insert Table 5 here]

Capital Intensity. Figures in Table 6 suggest that the state and the non-state sectors employed different technologies in terms of capital intensity. Comparing the figures in Columns (1) and (2), we can see that net capital stock per worker in the SOEs is four to seven times that of township-village enterprises (data missing for some years). Data of the original values of per worker capital stock in industry, contained in Columns (3) and (4) in table 6, give the same picture. We conclude that, on average, the state sector employed a much more capital-intensive technology than the non-state sector.

[Insert Table 6 here]

In summary, the evidence presented in tables 4 to 6 displays a pattern of systematic differences between the state and non-state sectors: On a proportional basis, the state sector pays more taxes, receives more credit, and is more capital intensive. The opposite are true for the non-state sector: It pays fewer taxes, receives less credit, and is less capital intensive. All of them are consistent with the predictions of our model derived in section VI.

---

also includes government institutions.

[19] Note that the government budgetary revenue figures are already net of planned subsidies to the losses of state enterprises.

VII. Conclusions

The starting point of our paper is what appeared to be the fundamental problem facing China at the outset of reform: The state as an entity was not constrained by the conventional institutions such as the rule of law and separation of powers so that it had difficulties to make any credible commitment to the creation of private incentives. The evidence presented in section II confirmed that such a lack of credible commitment was a characteristic of the Chinese government before the reform and remained a serious problem during the reform. We then explained theoretically in sections IV and V how reform can limit government predation and thus create private incentives through information decentralization by way of anonymous banking. At the same time, through a mild financial repression, the government is able to collect quasi-fiscal revenue from the state banking system. Both the institutions of anonymous banking and financial repression were documented in section III. Finally, we presented evidence in section VI on the major predictions of the model, including government fiscal revenue decline, financial deepening, and the features of the sectoral dual-track. In light of our theoretical analysis and empirical evidence, China's successful economic performance in the absence of the conventional institutions can be better understood.

Our work has several implications for the study of transition and development issues in general and China's reform in particular. First, the primary implication of our work is that in studying the role of institutions for economic development and transition, one needs to make a distinction between the "conventional" (or "best-practice") institutions and "transitional" institutions. Both China and Russia have had very weak conventional institutions for a modern market economy, but their performances have been quite different. Some transitional institutions, such as anonymous banking and financial repression analyzed here, have played important roles in China en route to the conventional institutions. These transitional institutions address the most central issues facing transition and developing countries and are more pertinent to their institutional environment. As a result, an evaluation of these institutions is considerably different from doing so for industrialized economies with the well established conventional institutions such as the rule of law. It is well understood that in those economies government taxation is less distortionary than financial repression, and information transparency is beneficial to an efficiently

functioning market. But transition economies usually do not have effective institutions right away to constrain the predatory state. We have shown that in this environment, information opaqueness can be useful for creating private incentives and financial repression can be less distortionary than conventional government taxation.

Second, we consider reducing state predation (including excessive taxation) and creating private incentives as of first order importance for economies just stepping out of central planning. Most public finance economists have largely ignored this incentive effect in criticizing the shrinking tax revenue in China and other transition economies. However, they ignored the fundamental difference between transition economies (developing economies in general) and industrialized economies in that the former not only had taxes that were too high to start with, but also had no institutions to limit the government's predatory behavior.

Third, focusing on the financial sector, our analysis highlights the critical role the banking sector can play in helping the state achieve credible commitment on the one hand, and generate quasi-fiscal revenue on the other. We consider a mild financial repression as having a positive effect on the economy of "bribing" the government to give up its taxation ability without reducing its total revenue. Therefore, financial repression can be better than taxation from both the government's and social points of view.

Fourth, our work points out the need for and the direction of further reforms in China. Although information decentralization serves as an effective commitment device when other institutional arrangements of constraining the state are not available, it is not ideal and should be viewed as transitional.[20] China needs to continue its reform to establish best-practice institutions. Our work suggests that fixing the financial system must include other more fundamental changes. First, liberalization of the

---

[20] There are both static and dynamic costs associated with it. Our model has already captured the static inefficiency, that is, the financial system is inefficient because it does not allow interest rates to be determined by the market and it allocates too much credit to the less efficient sector. The system can also be dynamically inefficient, but this is outside our model. For example, there may be intertemporal misallocation of resources to the extent that if the government borrowed too much from the private sector today, it would have to raise more taxes in the future and/or face a collapse of the financial system. However, shifting some burden of financing the cost of reform to the future generation may be desirable from the point of view of fairness. In this view, both the current and future generations should share the cost of reform, and thus borrowing to finance the cost of reform is preferred to taxation in the context of transition.

financial system depends on reforming the fiscal system. Our model shows how the tax system and the financial system are linked, and in particular, the rationale for lending to the inefficient state sector is because the state cannot tax non-state firms. Therefore, liberalizing the financial sector without a sound fiscal system in place would be a disaster. Second, our model also suggests a deeper need than reforming the fiscal system is to establish best-practice institutions such as the rule of law to constrain the state so that a more transparent tax system can be put in place. Without such institutions, private firms will end up paying too high a tax, and worse, a more transparent system will make private firms feel less secure. Both will undermine private incentives. If anonymous banking is to be abolished and information transparency to be introduced in the financial system, as China now plans for, supporting institutions, such as the rule of law, need to be put in place first to constrain the government.

A natural concern is whether the institutional arrangements of anonymous banking and financial repression analyzed in the paper are facing an imminent danger of collapse, which is a view that some economists studying China's financial system recently expressed. They foresee a coming financial crisis similar to, or even worse than, those experienced in Asia and Russia. We do not share this view, although we consider the Chinese financial system fragile and thus not sustainable in the long run without further reforms. We argue that this view ignored the basic difference between China and those economies. First, the banks in China are government-owned and thus their bad debts are simply government, not private, debts. Second, these bad debts are domestic, not foreign debts, and China has maintained capital control and restrictions on interest rates so that financing these debts is less costly from the government's point of view.

A more detailed look at China's overall financial picture is helpful to illustrate our point. By the end of 1998, explicit government debts were about 10 percent of GDP. According to Lardy (1998), bad debts in the state commercial banks were estimated at about 35% of GDP. Assuming that one half of these debts are not recoverable, then total government debts, including the bad debts in state commercial banks, would be less than 30% of GDP. This level of government debt compares favorably with the 70% in the U.S. and over 100% in Japan currently, or 60% as is required to join the European Monetary Union.

Considering the fact that the taxation ability of the Chinese government is lower (only about one-half of that in developed countries), the burden of servicing the government debts as a share of the government budgetary expenditure is still comparable to other countries and thus manageable at this point. In addition, as long as the state controls the international capital flow and has restrictions on domestic interest rates, the government still has the instruments of financial repression at its disposal. The real issue is not the stock problem emphasized by some economists, but rather, how fast the reform will proceed to stop new bad loans from appearing in the future. Therefore, if the government takes resolute actions now, it has the time to fix the financial system before it is too late.

Appendix A. Proofs of Propositions

Proof of Proposition 1: Since the state can observe all Y's, it can tax according to Y and determine the

agents' consumption levels c_1 and c_2. The state's objective function is

$$E(Y) - E(c_1) - E(c_2) - ME[P(c_2 - n)],$$

Then, it is optimal to choose $c_1 = 0$. Since $P(c_2 - n) = 0$ for $n = 0$, the objective function becomes

$$E(Y) - E(c_2) - \epsilon ME[P(c_2 - h)].$$

Because P is convex, the objective function is maximized when c_2 is the same for all agents with $n = h$.

Because the state cannot distinguish agents with $n = 0$ from those with $n = h$, c_2 should be the same for all

agents. The optimal $c_2 = F \le h$ because $P(c_2 - h) = 0$ for $c_2 > h$.

Anticipating that the state will set each agent's consumption independent of his output, it is optimal

for the agent to choose $e = e_L$ in period 1 regardless of other agents' choices. ∎

Two Lemmas are useful for the proof of Proposition 2.

Lemma 1: With anonymous banking, $F \ge \min\{h - (1-r)s_1(\alpha h, h), F'\}$, where $F' = rs + T_2$. That is,

whenever the budget constraint allows, the state should relieve the poorest and needy agents from

starvation.

Proof: The state chooses (r, F) to maximize

$$\pi = rs - F - \epsilon ME[P((1-r)s_1(Y, h) + F - h)]$$

subject to the budget constraint that $F \le F'$. For $F < h - (1-r)s_1(\alpha h, h)$, the consumption of the least

fortunate agents, $(1-r)s_1(\alpha h, h) + F < h$. The marginal cost of F is 1. The marginal benefit of F from

agents with $Y = h$ and $n = h$ is

$$-\epsilon \delta MP'((1-r)s_1(\alpha h, h) + F - h) > -\epsilon \delta MP'(0),$$

and the marginal benefit of F from agents with $Y > h$ and $n = h$ is non-negative. By Assumption 3, the

marginal benefit dominates the marginal cost when $F < h - (1-r)s_1(\alpha h, h)$. ∎

Lemma 2: Under Assumption 4, $s_1(\alpha h, h, r_0, 0) = \alpha h$.

Proof of Lemma 2: Denote the agent's utility function by

$$V(s_1) = u(Y-s_1) + u[(1-r_0)s_1-n].$$

The marginal utility is

$$V'(s_1) = -u'(Y-s_1) + (1-r_0)u'((1-r_0)s_1-n).$$

Furthermore, V is a concave function. When $Y = \alpha h$ and $n = h$,

$$V'(\alpha h) = -u'(0) - (1-r_0)NP'(0) \geq 0.$$

Therefore, $s_1(\alpha h, h, r_0, 0) = \alpha h$. ∎

Proof of Proposition 2: (i) Given the agents' strategies, all agents with $n = h$ save at least αh and their second period consumption is $(1-r)s_1 + F \geq h$ for $F \geq (1-\alpha+\alpha r)h$. Therefore, there is no need to choose F greater than $\max\{0, (1-\alpha+\alpha r)h\}$. By Lemma 1, the optimal F is

$$\min\{\max\{0, (1-\alpha+\alpha r)h\}, rs+T_2\}.$$

If $(1-\alpha+\alpha r)h \leq rs + T_2$, $F = \max\{0, (1-\alpha+\alpha r)h\}$ and the state's utility is

$$\pi = rs - F = rs - \max\{0, (1-\alpha+\alpha r)h\}.$$

When $r \leq r_0$, $F = 0$ and $\pi = rs$. When $r > r_0$, $F = (1 - \alpha + \alpha r)h$ and $\pi = r(s - \alpha h) + (\alpha-1)h$. Because $k < k^*$, $s < \alpha h$ and therefore π is maximized when $r = r_0$ and $F = 0$. If $(1-\alpha+\alpha r)h > rs + T_2$, $F = rs + T_2$, the state's revenue minus subsidy is non-positive, and some agents face positive probability of starvation. Then the state's payoff is strictly lower than that when $r = r_0$. Therefore, the optimal choices are $r = r_0$ and $F = 0$.

(ii) Given that other agents choose $s_1 = s_1(Y, n, r_0, 0)$ and $e = e_H$, the observed average savings is $s = E$ $s_1(Y, n, r_0, 0)$ regardless of the agent's own savings and $r = r_0$, $F = 0$. The state's choices of r and F for observed average savings $\neq s$ are irrelevant. Then the agent chooses s_1 to maximize

$$u(Y - s_1) + u((1-r_0)s_1 - n).$$

The solution is $s_1 = s_1(Y, n, r_0, 0)$. By Assumption 1, the optimal effort level is e_H.∎

Appendix B. Multiple Equilibria

In this appendix, we consider whether there is another equilibrium besides the one given in Proposition 2. For simplicity, we analyze the special case where $\alpha = 1$ and thus $r_0 = 0$. Denote an equilibrium by $\{e^*, s_1^*(Y, n), r^*, F^*\}$, where (r^*, F^*) is the state's action when an average savings of s^* is observed. Since there are many agents, agents do not consider the effect of their individual decision on the state's choice of r and F. Therefore, we have the following properties of equilibrium strategies of the agents.

<u>Lemma 3:</u> In any equilibrium, $s_1^*(Y, n) = s_1(Y, n, r^*, F^*)$. As a result, $s_1^*(Y, n)$ increases with Y and n, and $s_1^*(Y, h) \geq s_1^*(h, h)$ for all Y.

<u>Proof:</u> In an equilibrium, an agent's strategy is his optimal choice given the equilibrium strategies of other agents and the state. Given the equilibrium strategies of other agents, the average savings is s* and therefore the state will choose (r^*, F^*) regardless of the agent's own choice. Then, the agent should choose $s_1^*(Y, n) = s_1(Y, n, r^*, F^*)$.∎

An important determinant of the equilibrium is the subsidy chosen by the state, F, which depends on the state's budget constraint. We consider two cases below. In the first case, we assume $T_2 = 0$, where T_2 is the state's revenue in period 2 from other sources. In the second case, we assume that T_2 is so large that it is feasible for the state to choose r and F to avoid any starvation. We first develop two lemmas for our analysis (for any $T_2 \geq 0$).

43

<u>Lemma 4:</u> There exists no equilibrium in which $s^* > h$.

<u>Proof:</u> Suppose $s^* > h$. By Lemma 1, $F = \min\{h - (1-r)s_1(h, h), rs^* + T_2\}$.

We first show that the optimal r must satisfy $rs^* + T_2 \geq h - (1-r)s_1(h, h)$. The inequality holds for all r if $s_1 \geq h$. Consider $s_1 < h$. For r in the range $rs^* + T_2 < h - (1-r)s_1(h, h)$, $F = rs^* + T_2$ and the state's revenue is $-T_2$, which independent of the choice of r. Then, in this range of r, the state's only objective is to minimize the probability of starvation. The second period consumption of agents with $Y = h$ and $n = h$ is $c_2 = (1-r)s_1(h, h) + F = r(s^* - s_1(h, h)) + s_1(h, h) + T_2$, which increases with r. In the aforementioned range of r, $c_2 < h$ and therefore the state's utility is strictly increasing in r. As the range is an open interval bounded from above, the optimal r cannot be in the range.

Given $rs^* + T_2 \geq h - (1-r)s_1(h, h)$, $F = h - (1-r)s_1(h, h)$ and no one starves. Then the state's only objective is to maximize its revenue, which is given by

$$\pi = rs^* - F = r(s^* - s_1(h, h)) + s_1(h, h) - h.$$

Since $s^* > h \geq s_1(h, h)$, the optimal r is 1.

When $r^* = 1$, it is optimal for the agent to choose $s_1 = 0$ regardless of his Y or n, which contradicts with the hypothesis that $s^* > h$. Therefore, there exists no equilibrium in which $s^* > h$.■

The intuition of Lemma 4 is as follows. If $s^* > h$, it is possible for the state to choose r and F to avoid starvation and the state will do so. Then, with a unit increase in r, F increases by $s_1(h, h)$ but revenue increases by s^*. Therefore, it is optimal for the state to choose r as large as possible because $s^* > s_1(h, h)$; That is, $r^* = 1$. However, $r^* = 1$ is inconsistent with $s^* > h$. Therefore, $s^* > h$ cannot be satisfied by any equilibrium.

Since $s_1^*(Y, h) \geq s_1^*(h, h)$ for all Y, the level of $s_1^*(h, h)$ is crucial to the state's decision about (r, F). There are two possibilities about $s_1^*(h, h)$: either $s_1^*(h, h) = h$ or $s_1^*(h, h) < h$, because an agent with income $Y = h$ cannot save more than h. About the first case, we have,

<u>Lemma 5:</u> The only equilibrium that satisfies $s_1*(h, h) = h$ is the one given in Proposition 2.

<u>Proof:</u> By Lemma 2, the equilibrium found in Proposition 2 satisfies $s_1*(h, h) = h$. It remains to be shown that $r* = 0$ and $F* = 0$ in any equilibrium that satisfies $s_1*(h, h) = h$.

$s_1*(h, h) = h$ implies that $s_1*(Y, h) \geq h$ for all Y. Then there is no need to choose F greater than rh. By Lemma 1, the optimal F is

$$\text{Min}\{rh, rs* + T_2\}.$$

By Lemma 4, there are two possibility for $s*$: $s* = h$ or $s* < h$.

If $s* = h$, then $F = rh$ and the state's utility is

$$\pi = rs* - rh = r(s* - h),$$

which is 0 for all r. A positive r necessitates a tax-cum-redistribution scheme that does not increase the consumption of any agent with $n = h$ and could possibly reduce the consumption of some of these agents. If the state has any aversion to such a scheme, or such a scheme has any cost, the state will find it optimal to choose $r = 0$. Then, $F* = r*h = 0$.

If $s* < h$, part (i) in the proof of Proposition 2 has shown that $r* = 0$ and $F* = 0$.

In summary, we have shown that $r* = 0$ and $F* = 0$ in any equilibrium that satisfies $s_1*(h, h) = h$. ∎

<u>Proposition 7:</u> Suppose $T_2 = 0$. If an equilibrium exists besides the one given in Proposition 2, it satisfies $0 < r < 1$ and it does not Pareto dominate the equilibrium given in Proposition 2. In particular, the state and agents with $n = h$ and high Y are strictly worse off under this equilibrium than under the equilibrium given in Proposition 2.

<u>Proof:</u> By Lemmas 4 and 5, to determine whether there are equilibria other than the one given in Proposition 2, we only need to consider the case where $s* \leq h$ and $s_1*(h, h) < h$. In this case, $rs* \leq h - (1-r)s_1*(h, h)$ for all r. Then Lemma 1 implies $F = rs*$, the state's revenue is 0, and any $r > 0$ is associated with a tax-cum-redistribution scheme.

45

If $s^* \le s_1^*(h, h)$, the scheme does not increase the consumption of any agent with $n = h$ and could possibly reduce of consumption of some of these agents. The same argument as in the proof of Lemma 5 implies that the state's optimal choice is $r^* = 0$ and $F^* = 0$. Then $s_1^*(h, h) = h$, contradicting $s_1^*(h, h) < h$. Therefore, there does not exist any equilibrium satisfying $s^* \le s_1^*(h, h) < h$.

If $s^* > s_1^*(h, h)$, an equilibrium with $r^* > 0$ may or may not exist. If the equilibrium exists, $r^* < 1$, because otherwise $s^* = s_1^*(h, h) = 0$. The equilibrium entails a tax-cum-redistribution scheme that imposes a net tax on agents with $n = h$ and high Y (such that $s_1^*(Y, h) > s^*$). These agents are strictly worse off under this equilibrium than under the equilibrium given in Proposition 2, because in addition to paying a net tax, they also lose the opportunity for consumption smoothing. Welfare comparison for agents with $n = h$ and Y such that $s_1^*(Y, h) < s^*$ is ambiguous as these agents receive net subsidy but lose the opportunity for consumption smoothing. Note that these agents will face positive probability of starvation despite of the subsidy. Therefore, the state is strictly worse off under this equilibrium than under the equilibrium given in Proposition 2.∎

Proposition 8: For sufficiently large T_2, the equilibrium given in Proposition 2 is unique.

Proof: By Lemma 1, $F = \min\{h - (1-r)s_1^*(h, h), rs^* + T_2\}$. When $T_2 \ge h$, $F = h-(1-r)s_1^*(h, h)$ and no agent starves. Then, the state's utility is

$$\pi = rs^* - F = r(s^*-s_1^*(h, h)) + s_1^*(h, h) - h.$$

Consider three possibilities:

(i) $s^* > s_1^*(h, h)$. In this case, the optimal r is 1. Then $s_1^*(Y, n) = s_1(Y, n, 1, F^*) = 0$, which is inconsistent with $s^* > s_1^*(h, h)$. Therefore, there is no equilibrium satisfying $s^* > s_1^*(h, h)$.

(ii) $s^* < s_1^*(h, h)$. In this case, the optimal r is 0. Then $s_1^*(h, h) = s_1(h, h, 0, F^*)$ is the solution to

$$\max u(h-s_1) + u(s_1+F^*-h).$$

It is easy to show that $s_1^*(h, h) = h - F^*/2$. Then the equilibrium condition becomes $F^* = h - s_1^*(h, h) = F^*/2$, which implies $F^* = 0$. Hence, the equilibrium is the one given in Proposition 2.

(iii) $s^* = s_1^*(h, h)$. In this case, the state's revenue does not depend on r. Each positive r is associated with a tax-cum-redistribution scheme that does not increase the consumption of any agent with n = h and could possibly reduce the consumption of some of these agents. If the state has any aversion to such a scheme, or such a scheme has any cost, the state will find it optimal to choose r = 0. The analysis of case (ii) shows that $F^* = 0$. That is, the state's strategy here is the same as that given in Proposition 2. If k < k^*, the resulting equilibrium does not satisfy $s^* = s_1^*(h, h)$.∎

The conclusion of Proposition 8 seems counter-intuitive. First of all, it says that the equilibrium subsidy is zero even if the state has enough funds for high level of subsidy. Given the state's aversion of starvation of agents and its ability to afford high level of subsidy, it seems that all agents would save less than the efficient amount to force the state to subsidize later. However, such actions of the agents cannot be in equilibrium because, given other agents' strategies of saving less, an agent's desire to smooth consumption induces him to save more than other agents. The second seemingly counter-intuitive aspect is that the equilibrium is unique here when the state has abundant funds whereas it is not necessarily unique in Proposition 7 where the state faces a tighter budget constraint. By comparing the proofs of the two propositions, one can see that the difference about uniqueness depends on whether or not there exists an equilibrium satisfying $s^* > s_1^*(h, h)$. In Proposition 8, since the state has enough funds to avoid starvation, it chooses r to maximize revenue (or minimize net subsidy). As a result, $s^* > s_1^*(h, h)$ leads the state to choose r = 1. But the agents' choices anticipating $r^* = 1$ are inconsistent with $s^* > s_1^*(h, h)$. Therefore, there is no equilibrium satisfying $s^* > s_1^*(h, h)$. In Proposition 7, however, the state faces a tight budget constraint and cannot avoid starvation. It then chooses r to minimize the probability of starvation. Its optimal choice of r is less than 1, which may be consistent with $s^* > s_1^*(h, h)$. Therefore, there may be an equilibrium satisfying $s^* > s_1^*(h, h)$ in Proposition 7.

Table 1. Government Fiscal Revenue

	(1) Budgetary revenue (billion yuan)	(2) Extra-budgetary revenue (billion yuan)	(3) GDP (billion yuan)	(4) Budgetary revenue as share of GDP (%)	(5) Adjusted extra-budgetary revenue as share of GDP (%)	(6) Estimated off-budget revenue as share of GDP (%)	(7) Estimated total fiscal revenue as share of GDP (%)
1978	113.2		362.4	31.24	3.50	5.62	40.36
1979	114.6		403.8	28.38	3.50	5.11	36.99
1980	116.0		451.8	25.68	3.50	4.62	33.80
1981	117.6		486.2	24.19	3.50	4.35	32.04
1982	121.2	80.3	529.5	22.89	4.55	4.12	31.56
1983	136.7	96.8	593.4	23.04	4.89	4.15	32.08
1984	164.3	118.8	717.1	22.91	4.97	4.12	32.00
1985	200.5	153.0	896.4	22.37	5.12	4.03	31.52
1986	212.2	173.7	1020.2	20.80	5.11	3.74	29.65
1987	219.9	202.9	1196.2	18.38	5.09	3.31	26.78
1988	235.7	236.1	1492.8	15.79	4.74	2.84	23.37
1989	266.5	270.9	1690.9	15.76	4.81	2.84	23.41
1990	293.7	412.2	1854.8	15.83	6.67	2.85	25.35
1991	314.9	324.3	2161.7	14.57	4.50	2.62	21.69
1992	348.3	385.50	2663.8	13.08	4.34	2.35	19.77
1993	434.9	143.30	3463.4	12.56	4.14	2.26	18.96
1994	521.8	186.30	4662.2	11.19	4.00	2.01	17.20
1995	624.2		5847.8	10.67	4.00	1.92	16.59
1996	740.8		6859.4	10.80	4.00	1.94	16.74

Note: Column (1): Budgetary revenue data is net of subsidies to the losses of state-owned enterprises. Data after adjustment should give slightly higher figures.
Column (5): Adjusted extra-budgetary revenue is 30 percent of reported extra-budgetary revenue between 1978 and 1992 and 100 percent of reported extra-budgetary revenue afterwards.
Column (6): Off-budgetary revenue is estimated at 30 percent of local budgetary revenue.
Column (7): Equal to sum of Columns (4), (5) and (6).

Source: *Statistical Yearbook of China*, 1997, p. 25; p. 235; State Statistical Bureau, 1997.

Table 2. Financial Deepening

	(1) Cash in Circulation (billion yuan)	(2) Household Bank Deposit (billion yuan)	(3) Increase Over Previous Year (%)	(4) M2 (billion yuan)	(5) GDP (billion yuan)	(6) Cash in Circulation/GDP (%)	(7) Household Bank Deposit/GDP (%)	(8) M2/GDP (%)
1978		21.06			362.4	5.91	5.81	
1979		28.10	33.43		403.8		6.96	
1980		39.95	42.17		451.8		8.84	
1981		52.37	31.09		486.2		10.77	
1982		67.54	28.97		529.5		12.76	
1983		89.25	32.14		593.4		15.04	
1984		121.47	36.10		717.1		16.94	
1985	98.78	162.26	33.58	519.89	896.4	11.02	18.10	58.00
1986	121.84	223.76	37.90	672.09	1020.2	11.94	21.93	65.88
1987	145.45	307.33	37.35	833.09	1196.2	12.16	25.69	69.64
1988	213.40	380.15	23.69	1009.98	1492.8	14.30	25.47	67.66
1989	234.40	514.69	35.39	1194.96	1690.9	13.86	30.44	70.67
1990	264.44	703.42	36.67	1529.34	1854.8	14.26	37.92	82.45
1991	317.78	911.03	29.51	1934.99	2161.7	14.70	42.14	89.51
1992	433.60	1154.54	26.73	2540.22	2663.8	16.28	43.34	95.36
1993	586.47	1520.35	31.68	3487.98	3463.4	16.93	43.90	100.71
1994	728.86	2151.88	41.54	4692.35	4662.2	15.63	46.16	100.65
1995	788.53	2966.23	37.84	6075.05	5847.8	13.48	50.72	103.89
1996	880.20	3852.08	29.86	7609.49	6859.4	12.83	56.16	110.94

Note: Column (4): M2 is equal to sum of cash in circulation and all bank deposits.

Source: *Almanac of China's Finance and Banking*, various years.

Table 3. Currency Seigniorage and Implicit Taxation on Bank Deposits (percent of GDP)

	Currency Seigniorage			Implicit Tax on Bank Deposits
	(1) Inflation Tax	(2) Real Expansion	(3) Currency Seigniorage	(4) Implicit Tax on Bank Deposits
1986	0.7	1.5	2.2	1.33
1987	1.1	0.7	1.8	3.07
1988	0.9	3.9	4.8	1.12
1989	0.8	0.5	1.3	-0.09
1990	0.7	-0.7	-0.0	-1.11
1991	1.0	1.5	2.5	0.70
1992	1.7	3.0	4.7	5.61
1993	2.0	3.6	5.6	4.40
1994	1.9	3.3	5.2	4.43
Average 1986-94	1.2	1.8	3.0	2.10

Note: Column (3): Equal to sum of Columns (1) and (2).
          Column (4): A zero real interest rate is assumed as opportunity cost of capital. Inflation compensation for household term deposits maturing in over three years is not taken in to account.

Source: Hofman (1998), Tables 5 and 6.

Table 4. State vs. Non-State Sector: Government Budgetary Revenue

	(1) Budgetary revenue (billion yuan)	(2) Budgetary revenue from state ownership (billion yuan)	(3) Share of budgetary revenue from state ownership (%)	(4) Share of state industrial output (%)
1978	113.2	98.5	87.01	77.6
1979	114.6	100.2	87.43	78.5
1980	116.0	100.7	86.81	76.0
1981	117.6	101.7	86.48	74.8
1982	121.2	103.3	85.23	74.4
1983	136.7	114.7	83.91	73.4
1984	164.3	136.0	82.78	69.1
1985	200.5	155.6	77.61	64.9
1986	212.2	166.2	78.32	62.3
1987	219.9	162.1	73.72	59.7
1988	235.7	168.8	71.62	56.8
1989	266.5	187.7	70.43	56.1
1990	293.7	209.5	71.33	54.6
1991	314.9	224.6	71.32	56.2
1992	348.3	248.3	71.29	51.5
1993	434.9	311.6	71.65	47.0
1994	521.8	372.7	71.43	37.3
1995	624.2	444.1	71.15	32.6
1996	740.8			28.5

Note: Column (1): Government budgetary revenue is net of planned subsidies for the losses of state-owned enterprises.

Source: *China Statistical Yearbook*, 1997, p. 235, 237, 238; p. 413. *China Industrial Statistical Yearbook*, 1994, p. 27.

Table 5. State vs. Non-State Sector: Non-Agriculture Loan Allocations

	(1) Total loans (billion yuan)	(2) Agricultural loans (billion yuan)	(3) Total loans to the non-state sector (billion yuan)	(4) Share of non-agriculture loans to the state sector (%)	(6) Share of state industrial output (%)
1978	189.52				77.6
1979	208.71				78.5
1980	249.59				76.0
1981	295.66				74.8
1982	330.18				74.4
1983	375.36				73.4
1984	512.06				69.1
1985	627.19				64.9
1986	811.65	54.25	97.91	87.07	62.3
1987	976.63	71.14	125.83	86.10	59.7
1988	1142.50	82.12	152.29	85.64	56.8
1989	1346.95	95.95	170.42	86.38	56.1
1990	1654.13	118.56	205.85	86.59	54.6
1991	1981.05	146.43	246.19	86.58	56.2
1992	2403.81	198.76	305.02	86.17	51.5
1993	2957.59	239.73	383.70	85.88	47.0
1994	3645.80	236.25	347.48	89.81	37.3
1995	4462.77	301.64	387.96	90.68	32.6
1996	5379.94	385.44	451.83	90.95	28.5

Note: Column (4): Loans to the non-state include loans to urban collectives, individual industry and commerce, and rural enterprises.

Source: *Almanac of China's Finance and Banking*, 1993, p. 356; 1995, p. 483; 1997, p. 470.

Table 6. State vs. Non-State Sector: Capital Intensity in Industry

	Net capital stock per worker (thousand yuan)		Capital stock per worker (thousand yuan)	
	(1) SOEs	(2) TVEs	(3) SOEs	(4) TVEs
1978	6.74	0.81	9.56	1.03
1979	7.00	0.97	10.13	1.20
1980	7.10	1.07	10.39	1.31
1981	7.14		10.75	1.49
1982	7.52		11.38	1.63
1983	8.17		12.30	1.73
1984	8.46		13.10	1.78
1985	8.99		13.58	2.15
1986	9.93	2.00	14.85	2.50
1987	10.89	2.39	16.22	3.05
1988	12.16	2.95	17.92	3.79
1989	13.98	3.67	20.15	4.75
1990	15.37	4.25	22.43	5.61
1991	17.54		25.44	6.45
1992	19.74	5.85	28.81	7.84
1993	23.50		34.66	
1994	29.12		44.05	
1995	39.38		58.52	
1996	46.33		68.85	

Note: Columns (1) and (3): SOEs are state-owned enterprises.
         Columns (2) and (4): TVEs are township-village enterprises.

Source: *China Statistical Yearbook*, various years; *Township Enterprise Statistical Materials*, various years; *China Industrial Statistical Yearbook*, 1994.

References

Aghion, Philippe, and Tirole, Jean. "Formal and Real Authority in Organization." *Journal of Political Economy*. February 1997, *105*(1), pp. 1-29.

An, Tipeng; and Liang, Peng. *Caimao Jingji*, 1996, no.12, pp. 26–31.

Bai, Chong-En; Li, David D.; Qian, Yingyi; and Wang, Yijiang. "Taxation vs. Financial Repression." Mimeo, 1999.

Becker, Gary. "A Theory of Competition among Pressure Groups for Political Influence." *Quarterly Journal of Economics*, XCVIII(3), August 1983, pp.371-400.

Becker, Gary; and Mulligan, Casey. "Deadweight Costs and the Size of Government." NBER Working Paper 6789, November 1998.

Brennan, Geoffrey, and Buchanan, James. *The Power to Tax: Analytical Foundations of a Fiscal Constitution*. Cambridge: Cambridge University Press, 1980.

Cremer, Jacques. "Arms Length Relationship." *Quarterly Journal of Economics*, 1995.

Dewatripont, Mathias, and Maskin, Eric. "Credit and Efficiency in Centralized and Decentralized Economies." *Review of Economic Studies*, October 1995.

Ding, Guoxiang, Yan; Qingzeng, Yang; Xun (eds.). *A Bibliographical Record of Events in China's Rural Reform (Zhongguo Nongchun Gaige Jishi)*, Shanxi Economic Publishing House, 1995.

Fan, Gang. "New Norms in Public Revenue and Expenditure," in Shuguang Zhang (ed.), *Case Studies in China's Institutional Change*. Shanghai People's Publishing House, 1996.

Fang, Weizhong (ed.). *Zhonghua Remin Gongheguo Jinji Dashi Ji (A Bibliography of Major Economic Events of the People's Republic of China.)*. China Social Science Publishing House, 1984.

Giovannini, Alberto; and de Melo, Martha. "Government Revenue from Financial Repression." *American Economic Review*, September 1993, *83*(4), pp. 953-963.

von Hayek, Friedrich A. "The Use of Knowledge in Society." *American Economic Review*, 1945.

Hofman, Bert. "Fiscal Decline and Quasi-Fiscal Response: China's Fiscal Policy and System 1978-1994," in Olivier Bouin, Fabrizio Coricelli, and Francoise Lemoine (eds.), *Different Paths to a Market Economy: China and European Economies in Transition*. OECD, Paris and London, 1998.

Huang, Daoxia. *The Report of the Communist Party Committee of Gansu Province on Its Implementation of the Central Committee's Urgent Letter on Agriculture Policy*, 1992.

Lardy, Nicholas. *China's Unfinished Economic Revolution*, Brookings Institution, 1998.

Lu, Xianxiang and Yang, Yuyian. *Caomao Jinji*, 1992, no.8, pp. 44-49.

McKinnon, Ronald. *Money and Capital in Economic Development*. Brookings Institution, Washington DC, 1973.

McKinnon, Ronald. *The Order of Economic Liberalization: Financial Control in the Transition to a Market Economy*, Baltimore and London: The Johns Hopkins University Press, 2nd edition, 1993.

Milgrom, Paul; and Roberts, John. *Economics, Organization, and Management*. Prentice Hall, 1992.

Naughton, Barry. "Implications of the State Monopoly over Industry and Its Relaxation." *Modern China*. January 1992, *18*(1), pp. 14-41.

Practical Handbook of Household Savings Business. Comprehensive Planning Department of the People's Bank of China. Beijing: China Public Finance and Economics Publishing House, 1992.

Riordan, Michael. "What is Vertical Integration?" in M. Aoki, B. Gustafsson, and O. Williamson (eds.), *The Firm As a Nexus of Treaties*. Sage Publication, 1990.

Roubini, Nouriel; and Xavier Sala-i-Martin. "Financial Repression and Economic Growth." *Journal of Development Economics*. 39, pp.5-30, 1992.

Shaw, Edward S. *Financial Deepening in Economic Development*. Oxford University Press, New York, NY, 1973.

State Statistical Bureau. *China Regional Economy: A Profile of 17 Years of Reform and Opening-Up*, Beijing: China Statistical Press, 1997.

Treisman, Daniel. *After the Deluge: Regional Crises and Political Consolidation in Russia*. Ann Arbor, MI: University of Michigan Press, 1999.

Wen, Yu. *Leftist Perils in China (Zhongguo Zuohuo)*. Chaohua Publishing House, Beijing, China, 1993.

Wong, Christine W.P. "Central-Local Relations in an Era of Fiscal Decline: The Paradox of Fiscal Decentralization in Post-Mao China." *China Quarterly*. December 1991.

Xie, Ping, et al. *Zhongguo de Jinrong Shenhua yu Jinrong Gaige* (*Financial Deepening and Financial Reform in China*). Tianjin: Tianjin People's Press, 1992.