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Decentralization and the Macroeconomic Consequences of Commitment to State-Owned Firms

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Decentralization and the Macroeconomic Consequences of Commitment to State-Owned Firms

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1 Introduction

The mass privatization of state-owned enterprises (SOEs) has been a central component of the strategy to reform the FSEs in Eastern Europe. In a handful of countries, e.g. Poland, Czech Republic, and Russia, large-scale privatization was carried out almost immediately. Those countries that chose a more gradualist approach, e.g. Hungary and Bulgaria, started to privatize and to downsize the SOEs within a few years. China, on the other hand, took a very different tack in dealing with the SOEs. Privatization was never considered a serious option, and employment in SOEs has been maintained as a share of total non-agricultural employment. Instead, SOE reforms centering on market liberalization, expanded enterprise autonomy, and improved managerial incentives were carried out.[1] These and other decentralizing economic reforms allowed and encouraged the entry of non-state enterprises and produced an average real GNP growth rate of nearly 9% over the last 15 years. In light of this impressive aggregate performance, some suggest that the Chinese approach to industrial reform provides important lessons for other transition economies. According to Jefferson and Rawski (1994): "If China's recent accomplishments carry distinctive implications for policy design, it is industry, where reform has side-stepped privatization and other standard remedies, that is the most likely source of lessons." (See also McMillan and Naughton, 1992.)

All is not well with the reform of SOEs in China. Although output of these enterprises has grown, their performance has deteriorated significantly relative to the non-state enterprises, and between 1978 and 1995 their share of industrial output declined sharply from 78% in 1978 to only 34% in 1995. The number of loss-making SOEs has also increased dramatically over the years. According to Chinese estimates, in 1995 loss-making SOEs accounted for nearly half of all SOEs, and total losses in SOEs now exceed profits. The deteriorating performance of the SOEs has spilled-over to the financial sector, with one estimate putting the percentage of non-performing loans among the state-owned banks at 40%[2]. The problem in the state sector has also been linked with the recurring macro-economic

[1] For a recent account of the reforms in the state sector in China, see Naughton (1994) and the references therein.

[2] Broadman (1995), citing *Economic Information Daily*, December 1994.

problems[3]. Since 1978, China's growth rate has been volatile, with inflation exhibiting strong pro-cyclical behavior. These cumulative difficulties appear to underlie a major shift in government policy towards SOEs announced in December of 1995.

The potential effects of SOEs on growth and macro stability are well-documented (World Bank, 1995). Because of their lower efficiency and tendency to crowd out other sorts of investment, SOEs can adversely impact growth. Financing of SOE deficits by domestic credit or government deficits can also undermine macro stability. But in the context of an economy growing at nearly nine percent per annum, and with much of that growth outside the state sector, the reasons for these difficulties are less clear. By reducing the relative size of the state sector, the rapid rise of the non-state sector should reduce the required transfers to the state sector measured as a percentage of GNP. In a rapidly growing economy, the tax base should be expanding as well. Furthermore, since decentralization is a main factor behind the rapid growth, we expect that it would be easier for the government to finance the transfers to the state sector as the economy becomes more decentralized. Why, then, in an economy that has been successfully decentralized in so many dimensions has supporting the SOEs become an increasingly difficult problem?[4]

In this paper we tackle this question, but with an eye to the more general issue of the macro-economic consequences of the interaction of economic decentralization and government commitment to the state sector. Several issues are central to our analysis. First, what is the nature of the government's commitment to the state-sector, and how does this affect enterprise behavior and productivity? Second, in light of these effects, what are the macro-economic implications of this commitment? Third, what impact does continued economic decentralization have on these macro-economic consequences? Does decentralization make it easier to support and eventually to grow out of the state sector, or are there hidden difficulties? If the latter, how should the speed of decentralization be coordinated with enterprise restructuring and a reduction of the government's commitment in order to ensure macro stability? And finally, how does the initial size of the state-sector influence the

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[3]See, for example, Brandt and Zhu (1997), Deng (1994), Fan and Woo (1993), Naughton (1992) and Yusuf (1994).

[4]In contrast, in discussing the macro-economic problems caused by the inefficient state-owned enterprises, Yusuf (1994) suggests that "the scale of the problem is diminishing".

magnitude of the effects of government commitment to the state-sector on the economy?

In this paper, we present a dynamic general equilibrium model to address these questions. In Section 2 we analyze the effect of government commitment to the state sector on enterprise budget constraints and productivity. Following Shleifer and Vishny (1994), politicians value state-controlled firms for their political support, which commits them to bailing out failing state firms through the use of transfers. We link the required transfers to the relative size of the state sector, and the level of productivity and investment in the non-state sector. In Section 3, we analyze the dynamic macro–economic implications of this commitment. We highlight its long–run consequences for growth and inflation, and the growing need for government control of the resource flow to the non-state sector. In Section 4, we examine the macro-economic effects of decentralization in both the financial sector and the real sector. We show that the decentralization actually exacerbates the inflation problem and makes commitment to the state sector more costly. Finally, in Section 5, we look at the implications of our analysis for the timing of the restructuring of the state sector, and the pace of decentralization in both the real and financial sector.

In recent years, several authors have studied two-sector models of transition.[5] Our focus is different from theirs in several respects. First, these models assume that the state sector's budget constraint has been effectively hardened, we do not. Recent experience of the transition economies suggests that even if a government starts to privatize SOEs at the very beginning of transition, hardening of these enterprises' budget constraints takes much longer. Thus, it remains important to analyze the impact of soft budget constraints on economic transition. Second, we formally model the decentralization process, while in these other models the level of decentralization is taken as given. Since the transition to a fully decentralized market economy is itself a slow process, it is critical to understand how the speed of decentralization may affect the overall transition process. Finally, we distinguish real from financial decentralization and analyze the effect of their interaction on the government's ability to support the state sector.

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[5]See, for example, Aghion and Blanchard (1994), Atkeson and Kehoe (1993a,b), Blanchard (1996), Dewatripoint and Roland (1992, 1996), and Murphy, Shleifer and Vishny (1992).

2 A Model of Two Sectors

In this section, we use a model that is very similar to those used by Dewatripoint and Maskin (1995) and Qian (1994) and embed it into a dynamic search model to study how the government's commitment to the state sector results in the soft budget constraint for the state firms and the productivity differential between the two sectors.

Consider an economy with two sectors: the state sector and the non–state sector. There is only one good which can be either consumed or invested. Investment is done by the firms in both sectors. All agents are assumed to be risk–neutral. Time is discrete and is indexed by $t = 0, 1, 2, ...$

2.1 The Firms and Technology

The firms in both sectors are endowed with the same technology. For simplicity, we assume that each firm has only one employee who we call a manager. Managers' economic activities include picking and possibly searching for investment projects. There are two types of investment projects: Good projects and bad projects.

(I) Good Project: Investing i units of the good in one period yields $A_g i$ units of output in the next period. In addition, the manager of the project enjoys an private employment benefit Bi.

(II) Bad Project: Investing i units of the good yields no output. Without further investment, the firm will have to be closed, in which case the manager will become unemployed and lose her employment benefit. But with additional i units of investment (refinancing) the project can be completed and yields $A_b i$ units of output and a private benefit Bi for the manager.

Firms do not have capital and they rely on bank loans for investment financing. Let $R < A_g$ be the gross real interest rate on investment loans charged by the banks. When a project is good, the bank that finances the project receives a per unit return R and the firm (or the manager) retains the residual profit, $A_g - R$. When a project is bad, the firm defaults on its debt. If the bank refinances the project, all of the output of the project will go towards debt repayment to the bank.

Thus, a manager's per unit return from a good project is

$$\pi_g = A_g - R + B,$$

and a manager's per unit return from a bad project is

$$\pi_b = \begin{cases} B; & \text{if the project is refinanced} \\ 0; & \text{if the project is not refinanced} \end{cases}$$

In each period $t \geq 0$, the probability of finding a good project depends on managers' search effort. If a manager does not search but picks a project randomly, the probability of getting a good project in the next period is Q_l. If the manager searches at the disutility cost of $a > 0$ (per unit of investment, measured in the output unit), the probability of getting a good project is:

$$Q_t = Q_h^{\delta} Q_{t-1}^{1-\delta} \tag{1}$$

where $\delta \in (0,1)$, $Q_h > Q_l$, and Q_{t-1} is the probability of finding a good project for a manager who searched in period $t-1$. The search technology assumes that search by managers in one period has a positive spillover effect in the next period, but only those who search benefit from this effect. Let $Q_0 = Q_l$. Then, we have that

Lemma 1 *for any* $t \geq 1$, $Q_l < Q_t < Q_{t+1} < Q_h$ *and* $\lim_{t\to\infty} Q_t = Q_h$.

In other words, the return to search, represented by Q_t, rises over time and converges to Q_h.[6]

The *ex ante* expected return for a manager in period t is

$$\pi_t^e = \begin{cases} Q_l \pi_g + (1 - Q_l)\pi_b; & \text{if does not search} \\ Q_t \pi_g + (1 - Q_t)\pi_b - a; & \text{if searches} \end{cases} \tag{2}$$

Since the managers are risk-neutral, their objective is to maximize the expected return. From (2), a manager will search in period t if and only if $(Q_t - Q_l)(\pi_g - \pi_b) \geq a$.

Assumption 1 $(Q_h - Q_l)(A_g - R) < a < (Q_h^{\delta} Q_l^{1-\delta} - Q_l)(A_g - R + B)$

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[6] Since we assume that the benefit of search is reflected in a higher probability of finding a good project, the return to search is always bounded. If search improves both the probability of finding a good project and the quality of projects, the return to search can be unbounded.

Assumption 1 states that a manager's search effort depends on the possibility of project refinancing. She will search if she expects no refinancing when her project turns out to be bad, and will not search if she expects that a bad project will be refinanced. In the latter case, we say that the manager has a *soft budget constraint.*

2.2 The Political Role of the State Firms and The Soft Budget Constraint

Following Shleifer and Vishny (1994), we view state firms as a means for the government to obtain political benefits. The government builds up its *political capital* in the state firms by continually providing the managers in these firms with employment and above market wages. In return, it receives their political support. The political capital that the government has accumulated in a state firm will be lost, however, if the firm is closed.[7] This implies that the political cost of closing a state firm is much higher than that of closing a non–state firm. Because of this difference in the political cost of closing firms in the two sectors, the government is more likely to bail out a state firm than a non–state firm.

Banks are controlled by the government and, therefore, their financing decisions reflect the government's political objectives. Specifically, the banks' decision on whether to refinance a bad investment project will be based on the total return from refinancing, including the potential political cost of closing firms. Let μi, for some $\mu > 0$, be the political cost of closing a state firm that had invested i in a bad project. Then, the per unit return of refinancing a bad project in the state sector is $\mu + A_b - 1$ while that in the non–state sector is $A_b - 1$. The larger the political cost μ is, the higher the return of refinancing a bad project in the state sector, and the less likely that the banks will let the state firms with bad investment projects be closed.

The next assumption says that the political cost is high enough so that it is always optimal for the banks to refinance bad projects in the state sector, but it is not optimal for the banks to refinance bad projects in the non–state sector.

Assumption 2 $A_b < 1 \leq \mu + A_b$

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[7] When a state firm is closed, the manager of the firm will be unemployed and lose all the benefits of being in the state sector. As a result, the manager's political support to the government will be reduced.

Thus, the managers in the state sector have a soft budget constraint while the managers in the non–state sector have a hard budget constraint. From the discussion in the last section, we know that the managers in the state sector will never search and the managers in the non–state sector will always search.

Proposition 1 *Under Assumptions 1 and 2, (i) the managers of the state firms will never search and their probability of getting a good project is always Q_l; and (ii) the managers of the non–state firms will always search and their probability of getting a good project in period t is $Q_t (> Q_l$, for $t \geq 1)$, which rises over time.*

Part (i) of Proposition 1 implies that the productivity in the state sector remains constant over time. This is not critical to our analysis. What is important is the implication that the productivity level in the state sector is lower than that in the non–state sector because of the soft budget constraint of the state firms, and that the productivity gap between the two sectors widens over time.

2.3 The Size of the State Sector and Transfers

The government is committed to maintaining a certain level of employment in the state sector. By making lump–sum transfers to the managers in the state firms, the government also ensures that the value of being a manager in the state sector is higher than the value of being a manager in the non–state sector. The difference in the two values represents the rent that is enjoyed by the managers in the state sector. The magnitude of this rent is a function of the political benefits that they can provide to the government. The larger the political benefits, the higher the rent. Because we do not explicitly model the political process that gives rise to the political benefits provided by the state firms to the government, we can not endogenize the size of the rent. Instead, we simply assume that the government equalizes the average monetary income in the state and the non–state sectors. Thus, the rent enjoyed by the state firm managers is simply the job security and the associated private employment benefits.[8]

[8]This most likely underestimates the rent since in most countries the employees in the state sector enjoy both job security and a premium in monetary wages over the non–state sector.

There is a continuum of managers who are identical *ex ante*. For simplicity, we normalize the number of the managers in the non–state and the state sector to one and α respectively. In this way, α can be interpreted as the relative size of the state sector.

Let I_t^s and I_t^n be the investment (not including refinancing) made in period t by the two sectors, respectively. (How investment in the two sectors is determined will be discussed in the next section.) Then, the investment per firm in the state and the non–state sector is $i_t^s = I_t^s/\alpha$ and $i_t^n = I_t^n$, respectively. Thus, the average income in period $t+1$ for a manager in the state sector is

$$w_t^s = Q_l(A_g - R)i_t^s,$$

and the average income for a manager in the non–state sector (not including the private employment benefits) is

$$w_t^n = Q_t(A_g - R)i_t^n.$$

The size of the lump–sum transfers to the state sector that is needed to equalize the average income between the two sectors in period $t+1$, is

$$Z_{t+1} = (Q_t I_t^n \alpha - Q_l I_t^s)(A_g - R). \tag{3}$$

The output in period $t+1$, on the other hand, is

$$Y_{t+1} = Q_t A_g I_t^n + [Q_l A_g + (1 - Q_l)A_b]I_t^s \tag{4}$$

Let $\lambda_t = I_t^n/I_t^s$ be the ratio of investment in the non–state sector to that in the state sector. Then, the amount of transfers to the state sector as a percentage of output is

$$z_{t+1} = \frac{\alpha Q_t \lambda_t - Q_l}{A_g Q_t \lambda_t + [Q_l A_g + (1 - Q_l)A_b]}(A_g - R), \tag{5}$$

which is an increasing function of α, λ_t and Q_t. That is, the amount of transfers to the state sector increases in the relative size of the state sector the government wishes to maintain, the share of investment in the non–state sector, and the productivity in the non–state sector. The latter two variables have a positive effect on the required transfers because their increase leads to a larger output gap between the state and the non–state sectors.

2.4 Equilibrium

To complete the model, we now describe how investment in the two sectors is determined and financed, and how the transfers to the state sector are financed. Investment is financed by bank loans. Initially we consider the case when the credit allocation by the banks is directly controlled by the government. In section 4 we will consider the case when the banks have control over the credit allocation but subject to some constraints imposed by the government.

Let M_t be the supply of reserve money in period t, and p_t the price level. Then, the total loans that can be generated by the banks is $l_t = (\gamma - 1)M_t$, where γ is the money multiplier. These loans will be used to finance the investment in the non-state sector I_t^n, the investment in the state sector, I_t^s, and to refinance bad projects in the state sector, $(1 - Q_l)I_t^s$. Thus, we have

$$(\gamma - 1)M_t/p_t = I_t^n + (2 - Q_l)I_t^s = (\lambda_t + 2 - Q_l)I_t^s.$$

The transfers to the state sector are financed directly by the government (or the central bank) through money creation, thus

$$M_{t+1} - M_t = p_{t+1}Z_{t+1}. \tag{6}$$

The households in this economy hold money because they face a cash–in–advance constraint: $p_tC_t \leq M_t$, where C_t is the consumption of the representative household. We consider only the case when the cash–in–advance constraint always binds.[9] Thus,

$$p_tC_t = M_t. \tag{7}$$

Finally, the economy's resource constraint is $Y_t = I_t + C_t$, which combined with (7) implies that

$$Y_{t+1} - I_{t+1} = \frac{M_{t+1}}{p_{t+1}}. \tag{8}$$

Equations (3)–(8) are the equilibrium conditions of this model economy.

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[9]Under the assumption that the household is risk–neutral, the cash–in–advance constraint is always binding if $p_{t+1}/p_t > \beta$, where β is the time discount rate.

3 Dynamic Implications of the Commitment to the State Sector

It is widely recognized that a state sector adversely affects growth because of its inefficiency and inflation because the deficits it generates are often financed by the government through money creation. In this section, we analyze the dynamic impact of the government's commitment to the state sector.

Solving for the inflation rate and the output growth rate from equations (3)–(8), we have

$$\frac{p_{t+1}}{p_t} = \frac{\gamma(\gamma-1)^{-1}(\lambda_t + 2 - Q_l)}{[\gamma^{-1}A_g - \alpha(A_g - R)]Q_t\lambda_t + \gamma^{-1}[Q_l A_g + (1-Q_l)A_b] + Q_l(A_g - R)} \tag{9}$$

and

$$\frac{Y_{t+1}}{Y_t} = \frac{\gamma - 1}{\gamma}\frac{A_g Q_t \lambda_t + [Q_l A_g + (1-Q_l)A_b]}{\lambda_t + 2 - Q_l}. \tag{10}$$

Proposition 2 *(i) The output growth rate is increasing in Q_t, and it is increasing in λ_t if and only if*

$$Q_t A_g > [Q_l A_g + (1-Q_l)A_b](2-Q_l)^{-1}. \tag{11}$$

(ii) The inflation rate is an increasing function of α. In addition, it is increasing in both λ_t and Q_t if and only if

$$\alpha > A_g(A_g - R)^{-1}\gamma^{-1}. \tag{12}$$

Part (i) of Proposition 2 is trivial. The economy will grow faster if the productivity in the non–state sector is higher. Furthermore, if the average return to investment in the non–state sector ($Q_t A_g$) is greater than the average return to investment in the state sector ($[Q_l A_g + (1-Q_l)A_b](2-Q_l)^{-1}$)[10], the economy will also grow faster as a larger share of total investment is allocated to the non–state sector.

Part (ii) of Proposition 2 says that if the size of the state sector is large, the inflation rate is also increasing in Q_t and λ_t, or the non–state sector's productivity and share of investment, respectively. When Q_t and λ_t increase, the economy grows faster and the demand for money increases as well. Higher money demand implies that a higher level of seiniorage revenues can be collected at any given inflation rate. Thus, if the transfers to

[10]This is true if, e.g., $Q_t A_g > 1$.

the state sector remain fixed, then the inflation rate should fall as Q_t and λ_t increase and the economy grows faster. However, the (pre–transfer) income gap between the state and the non–state sector also widens with increases in Q_t and λ_t. Consequently, the amount of the transfers to the state sector must increase in order to maintain the size of the sector at a constant level α. When α is large, the increase in the required transfers is larger than the increase in the money demand. A higher inflation rate is needed, therefore, to finance the transfers. It is clear from the discussion that even though the output growth rate is positively correlated to the inflation rate, the source of the inflation problem is not growth but the transfers to the state sector.

There is an upper limit on the amount of transfers that can be financed with money creation or inflation. If Q_t and λ_t continue to rise, the required transfers will exceed this limit and the government will not be able to effect enough transfers to the state sector to maintain its size at α. To keep its commitment to the state sector, the government must control the ratio of investment between the two sectors, λ_t, below some threshold level. As the productivity in the non–state sector improves, i.e. Q_t increases, the income gap between the two sectors widens and the required transfers increase at any given level of λ_t. As a result, to prevent the transfers from exceeding the upper limit, the government must impose tighter controls on the investment in the non–state sector. Thus, we have

Proposition 3 *For any α that satisfies condition (12), there exists a finite threshold level, $\lambda^*(\alpha, Q_t)$, such that an equilibrium exists if and only if $\lambda_t < \lambda^*(\alpha, Q_t)$, with inflation accelerating into hyperinflation as λ_t approaches the threshold from below. Furthermore, the threshold level, $\lambda^*(\alpha, Q_t)$, is a decreasing function of Q_t.*

Proposition 3 highlights the long–run consequences of the government's commitment to a large state sector. It implies that the more productive the non–state sector is, the tighter the government's controls on the resource flow into the non–state sector must be in order to avoid hyperinflation. It follows that the welfare cost of maintaining the commitment to the state sector increases over time, as the productivity in the non–state sector improves.

Somewhat surprisingly, however, the progressively tighter control on investment in the non–state sector does not necessarily imply that the economy's growth rate will decline. In fact, if the government has direct control over investment allocation, it can keep the

rate of inflation constant by continually reducing the relative amount of investment in the non–state sector without causing the growth rate to decline.

Proposition 4 *Assume that α satisfies condition (12). For any constant $\tau > 0$, there exists a function $\theta(\tau, \alpha, Q_t)$, which is decreasing in Q_t, such that if $\lambda_t = \theta(\tau, \alpha, Q_t)$ for all $t > 0$, then the equilibrium inflation rate is at the constant level τ in every period and the output growth rate is increasing over time.*

The main reason behind Proposition 4 is that the government can control investment allocation directly without affecting productivity in either the state or the non–state sector. Therefore, the decline in the share of investment in the non–state sector is offset by the continued increase in productivity in the non–state sector and in net the economy's growth rate continues to increases.

Given the widening productivity gap between the state and the non–state sector, however, the incentive for agents such as the banks is to direct more, not less investment to the non–state sector. This makes the need to reduce continually the relative amount of investment in the non–state sector incompatible with the banks' incentives. This incentive incompatibility suggests that it would be very difficult if not impossible for the government to have complete control over the investment allocation in a decentralized environment.

In the next section, we study the impact of decentralization on the banks' incentive to direct investment to the non–state sector and on the government's ability to control investment allocation.

4 Decentralization and the Commitment

Two aspects of decentralization are studied in this section: Decentralization in the real sector and financial decentralization. The former leads to a higher productivity growth rate in the non–state sector, while the latter makes it easier for the profit seeking banks to allocate more credits to the more productive non–state sector.

4.1 Decentralization in the Real Sector

The degree of decentralization in the real sector can be captured by the parameter δ, which determines the return to search in the non–state sector. The idea behind this is that when markets are highly regulated, it is difficult for managers to find good projects even when they search. Thus, a lower degree of decentralization is reflected in a lower value of δ.

From equation (1), we have

$$Q_t/Q_{t-1} = [Q_h/Q_{t-1}]^{\delta}.$$

Since $Q_h/Q_{t-1} > 1$ (Lemma 1), the equation above implies that the growth rate of Q_t increases with δ. Thus, a higher degree of decentralization will lead to faster productivity growth in the non–state sector.

4.2 Decentralization in the Financial Sector

An important form of financial decentralization is for the control on credit allocation to be delegated at least partially from the government to the banks. We study what this implies about the government's ability to control the investment allocation between the state and the non–state sector.

In period t, a bank's *ex ante* expected profit per unit of investment from financing a project in the non–state sector is $\nu_t^n = Q_t R - 1$, and the expected profit from financing a project in the state sector is $\nu^s = Q_l R + (1 - Q_l)A_b - (2 - Q_l) < \nu_t^n$. Thus, a bank would lend exclusively to projects in the non–state sector if it is allowed to allocate its loans freely. This implies that $\lambda_t = \infty$, and from Proposition 3, the government would not be able to maintain its commitment to the state sector. In other words, a fully decentralized financial sector is incompatible with the government's commitment to the state sector.

Now consider the case when the government allows some limited financial decentralization. Specifically, the banks are allowed to allocate credits to the non–state sector up to a limit. A bank that make loans to non–state projects beyond the limit would incur a cost. Let I_t^s and I_t^n be the amount of investment in the state and the non–state sector, respectively, that are financed by the representative bank. The cost of financing investment

in the non–state sector is

$$d^{-1}\left(I_t^n/I_t^s - \overline{\lambda}_t\right)^2 I_t^s \tag{13}$$

where d is a cost parameter and $\overline{\lambda}_t$ is the limit set by the government on the ratio of investment between the two sectors. Here the parameter d can be interpreted as a measure of the degree of financial decentralization. The larger the value of d is, the less costly for the bank to lend to the non–state sector projects and, thereby, the more decentralized is the financial sector. Let l_t be the total amount of funds that are available to the representative bank at the beginning of period t. Then, the bank's problem is to allocate the funds to finance investment in the two sectors to maximize the expected profits net of the cost in (13). That is

$$\max_{I_t^s, I_t^n}\left\{v_t^n I_t^n + v^s I_t^s - d^{-1}\left(I_t^n/I_t^s - \overline{\lambda}_t\right)^2 I_t^s\right\}$$

subject to the constraint that

$$I_t^s(2 - Q_l) + I_t^n \leq l_t.$$

Let $R_t^n = v_t^n$ and $R^s = v^s/(2-Q_l)$ be the bank's expected return of lending to the non–state sector and the state sector, respectively. Then, we have

Proposition 5 *The optimal investment ratio chosen by the representative bank in period t, $\lambda_t = I_t^n/I_t^s$, is always strictly higher than $\overline{\lambda}_t$, the limit set by the government. In addition, λ_t is bounded from below by a lower bound $\lambda_b(d, R_t^n - R^s)$, which is an increasing function of both the decentralization parameter d and the return differential $R_t^n - R^s$.*

Proposition 5 shows that with a decentralized financial sector, the government's control over the allocation of credits and, therefore, investment between the state and the non–state sector is limited. Because of the higher expected return in the non–state sector, the banks always have an incentive to lend more to the sector than the government set limit, despite the costs they incur in the process. The more decentralized is the financial sector and the larger the return differential between the state and the non–state sector, the stronger is the banks' incentive to lend to the non–state sector.

4.3 The Cost of Commitment under Decentralization

In Section 3 we argue that if the government can directly control the allocation of investment between the two sectors without adversely affecting productivity growth in these sectors, then it is feasible to maintain a commitment to a large state sector and a stable inflation rate without reducing the economy's growth rate. When the government can not directly control the allocation of investment because of financial decentralization, however, maintaining a commitment to the state sector is much more costly.

From Proposition 3, we know that the government has to control the ratio of investment between the two sectors, λ_t, well below a threshold level $\lambda_t^*(\alpha, Q_t)$ to avoid hyperinflation. The closer λ_t is to the threshold level, the higher the inflation rate will be. But from Proposition 5, the maximum distance between the threshold and the actual λ_t is

$$h_t = \lambda_t^*(\alpha, Q_t) - \lambda_b(d, R_t^n - R^s) \equiv h(\alpha, d, Q_t), \tag{14}$$

which is a decreasing function of d and Q_t as well as α. That is, the economy is more likely to experience macro–instability the more decentralized is the financial sector and the higher is the productivity in the non–state sector. A higher productivity in the non–state sector increases the return differential between the two sectors and gives the banks a stronger incentive to lend to the non–state sector. A higher degree of financial decentralization, on the other hand, makes the lending to the non–state sector less costly. Both result in a lower level of investment in the state–sector relative to the non–state sector. This in turn implies that government must rely more on money creation to maintain its support to the state sector, thereby increasing the inflation rate.

The productivity in the non–state sector itself is a function of the degree of decentralization in the real sector. Thus, the more decentralized is the real sector, the faster productivity will grow and the more severe the inflation problem will be. If the government wants to maintain its commitment to the state sector (constant α) and achieve macro–stability at the same time, it has to impose restrictions on the degree of decentralization in the real sector in order to prevent Q_t from rising too fast. In particular, if the government wants to keep inflation below some threshold, it must force δ to zero so that productivity growth in

the non–state sector is eliminated. By doing so, however, it reduces the economy's long–run growth rate. In summary, we have

Proposition 6 *Under (partial) financial decentralization, maintaining the commitment to a large state sector and macro–stability at the same time implies that the government must impose progressively tighter constraints on and eventually eliminate the productivity growth in the non-state sector. Consequently, it also implies that the economy's long–run growth rate will be lower..*

Proposition 4 in Section 3 suggests that when the government has complete control over investment allocation, it can maintain its commitment to the state sector while having a stable inflation rate and an increasing growth rate. Proposition 6 shows that it is much more difficult and costly for the government to maintain its commitment to the state sector when the financial sector is (partially) decentralized. It would be mistaken, however, to conclude from this that decentralization in the real sector and centralization in the financial sector is a way for the government to avoid the macro difficulties in maintaining its commitment to the state sector. While we do not model specifically the impact of financial decentralization on growth, there are many reasons to believe that financial decentralization helps to improve productivity and growth by improving resource allocation. These benefits would be lost, however, if the financial sector is (re)centralized. In another paper,[11] we discuss extensively, in the context of China, the costs of recentralization in terms of efficiency growth.

5 The Speed of Restructuring and Decentralization

In the preceding sections, we took the relative size of the state sector to be fixed. As we pointed out in introduction, many FSEs have begun to downsize the state sector seriously. After fifteen years of not doing so, even the Chinese government is now seriously considering downsizing and/or restructuring of the state sector. In this section we analyze the implication of the speed of restructuring on decentralization.

Let α_t be the relative size of the state sector in period t. Restructuring means that α_t declines over time. As we argued in the previous section, maintaining macro–stability

[11] Brandt and Zhu (1997).

requires the government to keep the distance function h_t above some level that is greater than zero. That is,

$$h(\alpha_t, d, Q_t) \geq h^*, \tag{15}$$

for some positive constant h^*. Since the function h is increasing in Q_t and d, constraint (15) implies that, for a given path of α_t, d cannot be too high and Q_t can not increase too fast (or δ cannot be too high). The slower α_t declines, the lower values of d and δ can be allowed. That is, the degree of decentralization can not be too far ahead of the pace of restructuring. Otherwise the economy will experience serious inflation problem.

6 Conclusion

Without modeling the political equilibrium that supports it, in this paper we analyze the macro- implications of government commitment to the state sector. This commitment can arise for a variety of reasons, but in this paper we focus on the political benefits of ongoing support for the sector. We show that maintaining employment in state sector as constant share of total employment actually requires a growing percentage of the economy' s resources. This increase is a product of a widening productivity differential between the two sectors that is itself a consequence of the soft-budget constraints that arise because of the government's commitment.

As long as these transfers are financed (all or in part) by money creation, inflation will be a problem. There is a natural tension here between commitment and macro-stability. Moreover, concerns of escalating inflation will require the government to control the resource flow to the non-state sector: The more productive the non-state sector, the tighter these controls must be. Clearly, the welfare costs of maintaining the commitment to the state sector increase over time as the productivity in the non-state sector improves.

Decentralization, real or financial, only exacerbates these problems by increasing the productivity and returns to investment in the non-state sector . In this respect, decentralization should not by itself be seen as a panacea for dealing with the state sector. The Chinese experience is testimony to this, and over the period 1980-1994 we observe both a widening gap in productivity between the state and non-state sector, and a growing transfer

of resources measured as a percentage of GNP (Brandt and Zhu, 1997). The ability and cost of maintaining a commitment to the state sector and macro-stability depends crucially on the government's ability to control investment. If financial decentralization reduces the effectiveness of control, decentralization in the real sector must be slowed, or the difficulty of maintaining macro- stability will worsen.

Finally, once restructuring becomes politically feasible, there is a need to coordinate the speed of restructuring and the pace of decentralization. Decentralization well ahead of the pace of restructuring will only intensify inflationary pressure, and thus run the risk of macro-instability.

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