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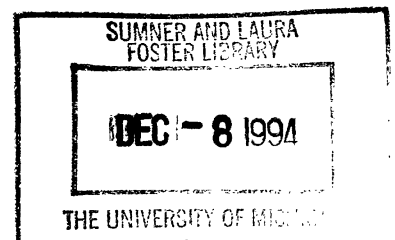
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**Corruption and Reform**

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## Corruption and Reform

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### Abstract

We question the received wisdom on the role of corruption in economic development and economic reform. We do so by treating corruption as a by-product of bureaucratic institutions. We distinguish the roles played by corruption pre-reform and during reform. We show that a one-time corruption is a catalyst for reform by providing incentives for the bureaucrats in power to accede to reform and to dissolve the class of bureaucrats. Thus, a one-time surge of corruption can be a prelude to a permanently reduced level of corruption in the future.

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### 1. Introduction

In this paper, we question the received wisdom on the role of corruption in a reforming economy. We define corruption broadly as a situation where government bureaucrats obtain personal benefits in exchange for the exercise of their power<sup>2</sup>. Corruption is generally regarded as an obstacle to economic development and a major cause of the inefficiency of command economies. But as we note below, countries reforming their economies to encourage a greater degree of capitalism often experience a surge in the level of corruption. This is widely interpreted as a signal that reform is being blocked or distorted by the power of entrenched bureaucrats. We argue that this analysis may be flawed. Instead, a one-time rise in corruption is an essential catalyst to reform, which in turn permanently eliminates or reduces the level of corruption and the power of the bureaucrats. Thus, a normative implication of our analyses is that corruption can be desirable if it is accompanied by a market-oriented institutional change, such as the post-socialist transition.

Our argument is simple. Corruption results from the power that bureaucrats enjoy. Bureaucratic power, in turn, is a product of bureaucratic institutions, in which generations of bureaucrats succeed one another. The aim of reform is to eliminate such institutions and to break the chain of succession of bureaucrats in order to let the market mechanism prevail. Thus, by definition, reform is not Pareto improving. Faced with a reform, bureaucrats will fight in various ways to block or delay institutional change, unless they can benefit personally from such change. The role of a one-time surge in corruption is to overcome the opposition of bureaucrats to their loss of power. In effect, this pits generations of bureaucrats against one another. Bureaucrats who are currently in power are thus given an incentive to encourage reform and rein in their would-be successors, who oppose the change because it will

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<sup>2</sup>Our definition of corruption is more inclusive than the traditional ones which imply that corruption is bureaucrats' spontaneous actions amounting to breaching public trust and therefore is illicit. Here, we are not concerned with legal and moral issues of corruption.

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<sup>1</sup>We would like to thank Robert Barsky, Roger Gordon, and Kenneth Lieberthal for their comments. All errors are ours.

curtail or eliminate the perquisites of the office they expect to hold. Once the reform is successful and bureaucratic institutions are eliminated, corruption is permanently reduced and ceases to be an obstacle to development.

Our analysis of the role of corruption in reform is rooted in observations of large-scale social changes in many countries, including formerly socialist countries such as China, Eastern Europe, and the former Soviet Union. In general, Huntington (1968) observes that political modernization, such as a transition from an autocratic to a more democratic government, is usually accompanied by increases in corruption. In reforming or transitional economies, corruption is widespread and takes on a great variety of forms, ranging from directly taking money, to obtaining free shares in a privatized firm, to taking important positions in newly formed business ventures. In the next section, we shall present case studies of rampant corruption in several transitional countries.

Our analysis is directly related to the current process of reform in these countries. Our message is that one cannot make a blanket statement about corruption. Corruption must be judged with an eye to its role in promoting desirable institutional change. "Good corruption" induces institutional change and should be allowed to flourish so that reform can be successful. Of course, excessive levels of corruption may cause social dissatisfaction and result in severe political repercussions. Thus, even reform-inducing corruption should be controlled within moderate levels and executed in a politically safe way.

Contrary to our view, the received wisdom on corruption is generally negative. The reason is that previous analyses have focused on steady-state and permanent corruption. By contrast, we study the implications of one-time corruption that is connected to institutional change, and show that it can be beneficial even in a setting where steady-state corruption is harmful.

Gould and Amaro-Reyes (1983), United Nations (1989), and Klitgaard (1991) represent the dominant view that corruption impedes economic development./footnote

Huntington (1968) represents a minority position, that corruption is a by-product of modernization. We, by contrast, argue that corruption is more closely related to institutional change. Leff (1964) also dissents from the majority position and argues that moderate corruption can improve efficiency. Shleifer and Vishny (1993) best articulate this position in their systematic and sophisticated analysis of the organization of corruption. They argue that even well-organized corruption is more distortionary than taxation, while disorganized corruption can virtually eliminate economic development.

Based on these analyses of the steady state, many have transferred their opposition of corruption to the context of reform. Many Chinese experts list corruption as a potential pitfall of the Chinese economic reform. In the Russian context, Shleifer (1994) argues that corruption can be dangerous since it is self-generating due to the hunger of bureaucrats for ever more power. Other observers of economic reform are puzzled by the paradoxical combination of improvement in economic efficiency and increases in corruption (*The Economist*, 1994).

In order to examine the relationship between corruption and institutional change, we utilize a framework in which corruption arises naturally as a by-product of economic institutions. Before reform, the economy is in a "bureaucratic steady state" in which power is transferred between generations of bureaucrats and corruption is endemic. Reform or institutional change aims to end this bureaucratic steady state. But paradoxically, ending corruption in the long run may require that we increase it in the short run, in order to persuade current bureaucrats to surrender their power. Thus, contrary to the previous literature, which assumes that the economy is in the bureaucratic steady state, our analysis implies that corruption per se is not necessarily an obstacle to reform. Our analysis is positive, but it carries the normative implication that reform should be designed to tolerate – and even encourage – moderate levels of corruption.

In the next section, we present two case studies of corruption during reform and

argue that the evidence is consistent with our interpretation that bureaucrats need to be bribed in order to accede to reform. Then in section 3, we model corruption, both in a steady state where bureaucrats have power and during the process of a reform designed to eliminate that power. The analysis based on the model forms the core of the paper's argument. In section 4, we extend the basic model along several dimensions. Section 5 concludes the paper.

## 2. Case Studies of Corruption and Reform

We study two cases of corruption in the reform process in two countries that are reforming in very different ways, Russia and China.

### A. The Russian Privatization

The extremely successful Russian privatization is a good illustration of our theory of the role of corruption. Unlike privatization in many other transitional economies, the Russian privatization takes a very rapid pace. In less than a year and a half since the inception of the program, over 20% of the industrial labor has been employed by the new private sector.<sup>3</sup>

We would argue that the pace and success of the Russian privatization program are directly due to its proper design, which includes large-scale and systematic bribery of the incumbent bureaucrats in order to enlist their support for reform. In Russia, as in our model, the bureaucrats – especially managers – are potential losers of privatization. In the pre-privatization system, they enjoy enormous control rights. After privatization, not only are their control rights constrained and contested by shareholders, their very position is often jeopardized due to takeover threats. However, given that they possess important information on the current operation of the firm, privatization cannot be implemented effectively without their cooperation (Shaffer

<sup>3</sup>See Boycko, Shleifer and Vishny (1993)

and Fan, 1994). To win the support of the management class, the Russian program offers large shares in the new enterprises, which are essentially bribes to the existing management (see Boycko, Shleifer and Vishny, 1993). Not only does this mollify their resistance to reform, it actively enlists their aid since the value of the bribe increases with the success of reform.

As our theory predicts, in the Russian privatization, the incumbent bureaucrats, or the managers of the formerly state-owned enterprises, benefit the most from the privatization procedure. The young or future bureaucrats get no special deal. Taking advantage of their superior position in the firm, the managers actually have obtained an average of 17% of the shares of the enterprises. Indeed, as Shleifer and Vishny (1993) concluded, “the Russian managers are emerging from privatization with quite substantial ownership of cash flows.”<sup>4</sup>

The fast-paced Russian privatization program also successfully avoids the commitment problem. Once the incumbent bureaucrats (the managers) become large shareholders of their firm, they have strong incentives to fight against any potential restoration of the old system, which the younger generation of bureaucrats may prefer. Thus, as our model predicts, a properly-designed reform process pits groups of bureaucrats against one another, buying their support and vitiating their resistance.

### B. The Dual Track Pricing System in the Chinese Economic Reform

The Chinese economic reform, which appears to be drastically different from the Russian one, is in essence no different from the perspective of our theory. For the purpose of illustration, take for example the most peculiar early step of the Chinese economic reform, the dual-track pricing system. We argue that the design of the dual track pricing system provides incumbent bureaucrats with large amount one-time economic rents (bribes from corruption) in exchange for surrendering their rights to

<sup>4</sup>Page 35.

set price and allocate productive materials in the future.

The dual-track system worked as its name suggests. Under the system, the planning agency negotiated a contract with each of the firms under its control. According to the contract, each firm was to deliver a certain amount of output (the output quota) at the planned price, and at the same time was entitled to a certain amount of input (the input quota) at the planned price. Beyond the quota, firms could buy and sell in the free market. The dual-track system formally came into being at the beginning of 1985 (see Diao, 1987). The price difference between the “tracks” reached the highest point in 1988, chiefly due to inflationary pressure. By 1992, the two “tracks” had been merged to the “market track” for all but a few basic inputs.

The dual-track pricing system simultaneously served two purposes. On one hand, it provided a convenient means for the incumbent bureaucrats to extract greater rents from their vested power. On the other hand, with the ultimate goal of greatly reducing central planning and price control, the dual-track system gradually phased out the institutions of economic planning. This juxtaposition was not coincidental: the first was a prerequisite for bureaucrats to acquiesce to the second.

In the dual-track system, the price difference between the two tracks provided enormous opportunities for bureaucrats to arbitrage for profit. Thus, their control rights were simply translated into economic rents. In fact, around 1987, on average about 50% of the firm’s profit consisted of economic rents associated with quotas (Li, 1994). However, with the introduction of the market track, the control domain of the planning bureaucrats was reduced. Given the general trend of moving towards the market mechanism, the dual-track system essentially presented the last opportunity for the bureaucrats in the planning agencies to benefit from their control rights. This is why an outright price liberalization – which cannot leave any benefits for the bureaucrats – was rejected in China as a reform strategy around 1984. At the same time, privatizing the firms by giving bureaucrats shares was utterly impossible in China due to political and ideological reasons.

The evolution of the Chinese reform illustrates an important lesson that emerges from our model. The lesson is that top leaders must be committed to reform for it to be carried out. Without such commitment, corruption by itself will not be enough to eventually phase out bureaucratic power over the economy, both because of oppositions from the bureaucrats who have not benefited from the corruption scheme and due to popular discontent with excessive corruption. In 1989, corruption associated with the dual track system had gone out of control, forming the economic basis for the political turmoil in Tiananmen Square. After Tiananmen Square, conservative factions tried to reverse the course of reform. Eventually, in 1992, Deng Xiaoping himself had to intervene before price reform could be concluded and other reforms enacted.

### 3. The Model

We model the bureaucratic institution as a bureau that has the authority to issue business licenses. A license is necessary in order to establish or operate any business. There is no economic justification for the existence of such a bureau. It exists for an ideological and political reason: the desire of the government and bureaucrats to exert control over private business. Reform consists of abolishing the licensing bureau and setting entrepreneurs free to start and operate their private business.

#### A. Entrepreneurs and Bureaucrats

We concentrate on two classes of agents in the economy: entrepreneurs (E) and bureaucrats (B). Both live for two periods and neither internalizes the utility of his successors or descendants. For simplicity, we initially assume that there is always one bureaucrat for each entrepreneur. The utility (payoff) for both entrepreneurs and bureaucrats is the undiscounted sum of their first and second period incomes.

The model focuses on the life cycle of a representative entrepreneur (E) and the two relevant generations of bureaucrats (B's). There are two periods with two negotiating moments. At time 0, the entrepreneur has to obtain a production license from the

licensing office in order to establish a private business. With the production license approved, she decides how much to invest in a production process. At time 1 she has to renew her production license from the new bureaucrat who has assumed control of the office.

Let the investment by the entrepreneur at time 0 be  $k$ , which is irreversible and sunk. Let  $\pi(k)$  be the per period income. The normal assumptions apply to  $\pi(k)$ . That is

$$\pi'(0) = +\infty;$$

$$\pi'(k) > 0;$$

$$\pi''(k) < 0.$$

Two generations of bureaucrats work in the licensing bureau at the same time. This is due to the hierarchical nature of the bureaucratic organization, as Kornai (1992) and Williamson (1975) have argued. Young bureaucrats have little power because they are in training for senior positions and because promotion is mainly based on seniority. Importantly, only the old generation of bureaucrats has the power to issue licenses. Corresponding to the two production periods of the entrepreneur, two consecutive generations of bureaucrats are in power. At time 0, the old generation of bureaucrat (represented by  $B1$ ) is in charge while the young generation (represented by  $B2$ ) works in the same office but does not have any decision rights. At time 1, the old generation retires and the young generation takes control.

When issuing the production license, the bureaucrat in power takes a bribe from the entrepreneur. The size of the bribe is determined by bargaining between the bureaucrat and the entrepreneur. We model the outcome by a simple Nash bargaining game and assume that the entrepreneur's bargaining power is  $\alpha$ .

#### **B. Commitment of The Top Leadership and their Cooperation with the Bureaucrat**

In all reforms, a change in the top leadership is always the first move and the

top leader's (T) commitment to reform is a critical condition for the reform to be successful. In the Russian or Eastern European case, the transition is headed by a reforming government which was popularly elected after a political revolution. Commitment to reform is the basis of the political platform which enables the government to be elected. In the Chinese case, the reform started in 1978 with a change in the top leadership when Deng Xiaoping took over the national power from Hua Guofeng, Mao Zetong's hand-picked and conservative successor.

To catch the importance of the top leadership's commitment, our model makes two assumptions about the top leader (T). First, before the reform, T is fully committed to the cause of the maintaining of the bureaucratic institution. Specifically in our model, T guards against any tendency of the bureaucrat's effort in closing the licensing office and committed to re-open it if it does happen. In this case, despite that the old (incumbent) bureaucrat  $B1$  knows that he can strike a deal with the entrepreneur  $E$  by grabbing a large bribe and closing the office, the new bureaucrat  $B2$  will report and resort to the power of the top to reopen the office. In reality, this corresponds to Mao's idea of constant revolution to fight against the potential of the coming back of the capitalism.<sup>5</sup>

The second assumption of the top is that during the reform, they are fully committed to the cause of changing the bureaucratic institution. As an extreme and simplifying assumption, this implies in the model that once the licensing office is closed, even though the young bureaucrat ( $B2$ ) has interests in reopening it, the entrepreneur will inform and resort to the top leader T to keep such attempts of  $B2$  futile.

Implicit in these two assumptions is another one that the cooperation between

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<sup>5</sup>Mao's fundamental thought in this regard can be summarized by his famous quotation: "Socialism is a long historical period, during which there exist classes, class conflicts, and class struggle and persistently there are dangers of the restoration of capitalism, ... Therefore, we always have to pay attention to class struggle every year, every month, and every day." — Selected Works of Mao Zetong, People's Press, Beijing, China.

the top and the bureaucrat under him is crucial in fulfilling his commitment. That is, before reform, the top needs the cooperation of the young bureaucrat (e.g. to inform the top) to guard against the attempts of closing the office.<sup>6</sup> During the reform, the top needs the cooperation of the old bureaucrat in closing the office, since a non-cooperative incumbent bureaucrat can easily increase the cost of the transition by abusing his last-minute power. A typical example is decapitalization or making “sweet deals with foreign investors” by incumbent managers as witnessed in many transitional economies.

Therefore, a necessary, but not sufficient, condition for reform is the top leader’s commitment to reform. Such a commitment combined with a one-time surge in corruption constitutes a sufficient condition for reform.

### C. The Bureaucratic Steady State

In a bureaucratic steady state, the institution of the licensing office is maintained over time. The simple game outlined above is repeated for many generations of bureaucrats.

The bargaining outcome at time 1 determines the amount of bribery as a fee for renewing the license. If the license is renewed,  $\pi(k)$  will be the total income; otherwise income is 0. With the Nash assumption, the young bureaucrat (*B2*) can demand  $(1 - \alpha)\pi(k)$  for the license. In other words, the entrepreneur will get  $\alpha\pi(k)$  as her share of the income. At time 0, when the license is first issued, both the entrepreneur and the old bureaucrat (*B1*) anticipate the time 1 bargaining. If a license is issued at time 0, the total income that can be shared by both *B1* and *E* is:

$$\pi(k) - k + \alpha\pi(k)$$

since  $(1 - \alpha)\pi(k)$  will be expropriated by *B2*. By the Nash bargaining rule, *E* gets

$$\alpha[2\pi(k) - k] - (1 - \alpha)\pi(k). \quad (3.1)$$

<sup>6</sup>In this view, there is no coincidence that Mao always found that his best followers were the young “Red Guards”.

Therefore, *E*’s optimal investment level is given by the first order condition:

$$(1 + \alpha)\pi'(k) = 1. \quad (3.2)$$

Let  $k_{ss}$  be the steady state investment level that satisfies the first order condition. Our assumptions on  $\pi$  ensure that the second order conditions are satisfied and that

$$(1 + \alpha)\pi(k_{ss}) - k_{ss} > 0$$

which guarantees that there will be a positive amount of investment in the steady state.

On the other hand, the total social benefit of the investment is

$$2\pi(k) - k$$

which implies that the socially optimal level of  $k$  is such that

$$2\pi'(k) = 1. \quad (3.3)$$

Let  $k^*$  be the socially efficient level of investment implied by this equation. Again, the assumptions on  $\pi$  tell us that

$$2\pi(k^*) - k^* > 0.$$

It is then easy to prove the following proposition:

**Proposition 1** *In a bureaucratic steady state, the entrepreneur does not invest up to the level of social efficiency. In other words,  $k_{ss} < k^*$ .*

We can interpret this result in a number of ways. From the perspective of property rights, bureaucrats possess the right to stop production, and so can share in the income from production. Generally, however, the Coase Theorem (Coase, 1960) tells us that reassigning control rights does not impede efficiency. Indeed, this is true of the control right of the old bureaucrat, who can negotiate with the entrepreneur



before investment and production are determined. In our overlapping generations framework, the source of the inefficiency is the inability of the young bureaucrat to also participate in the negotiations before the project starts.

From a public finance perspective, the bribe paid to  $B1$  is a pure profits tax, which is not distortionary. The bribe demanded by  $B2$ , on the other hand, is like a sales tax, which reduces investment.

From an institutional perspective, the source of the inefficiency is the old bureaucrat's inability to commit his successor to "tax" only profits and not income. Although we have discussed  $B1$  and  $B2$  as if they are distinct individuals (and we believe the distinction is important for our analysis of reform), this analysis suggests a reinterpretation in the spirit of Grossman and Hart (1986). That is, we can regard  $B1$  and  $B2$  as the same individual at two different points in time, where the source of the inefficiency is the bureaucrat's inability to precommit to a second period bribe of given size. In this interpretation, our problem is closely related to the problem of capital taxation in the time consistency literature (e.g. Fischer, 1980).

#### D. The Reform

With the advent of reform, there is pressure from the top leadership as well as from the general public to close the licensing office permanently. However, the bureaucrat in power can easily delay or block the process, since in reality his cooperation is needed to implement reform. Thus, the reform program must provide incentives to ensure that the office is closed. As usual, bureaucrats take bribes for their actions and the bureaucrat in power is the beneficiary.

We formalize the notion that bureaucratic cooperation is necessary for reform by giving bureaucrats in power the right to decide whether to close their offices permanently. The key player in the reform is thus the old bureaucrat, who is in power at time 0 and decides whether to close his office. The potential loser is the young bureaucrat whose career ends prematurely if the office is closed, losing him

the income he had expected from bribes in the next period. Anticipating this, the young bureaucrat will himself try to bribe the old bureaucrat not to close the office. The maximum bribe is the potential license fee that the young bureaucrat can collect should the office stay open, that is

$$W_2 = (1 - \alpha)\pi(k_{ss}).$$

On the other hand, the entrepreneur wishes to see the office closed immediately. As our analysis of Proposition 1 shows, if the office is closed investment rises to the socially efficient level  $k^*$ . With the young bureaucrat gone, the total profit being divided between the old bureaucrat and the entrepreneur is

$$2\pi(k^*) - k^*$$

which is also the most that the entrepreneur can offer to the old bureaucrat. Clearly,

$$2\pi(k^*) - k^* > W_2 = (1 - \alpha)\pi(k_{ss})$$

since

$$2\pi(k^*) - k^* - (1 - \alpha)\pi(k_{ss}) = 2\pi(k_{ss}) - k_{ss} - (1 - \alpha)\pi(k_{ss}) = (1 + \alpha)\pi(k_{ss}) - k_{ss} > 0.$$

Intuitively,  $2\pi(k^*) - k^*$  is the socially optimal level of profits, which is larger than the pre-reform profit  $2\pi(k_{ss}) - k_{ss}$ , which in turn is larger than the bribe paid to the young bureaucrat,  $W_2$ .

The outcome of the political struggle is unambiguously a success for reform. That is, the office is closed at time 0 and the young bureaucrat is sacrificed. In essence, reform allows the entrepreneur and the old bureaucrat to cooperate, eliminate the young bureaucrat as a claimant to the income, and divide the bigger post-reform profit among fewer parties. The old bureaucrat's bargaining position is determined by his income if he blocks reform: his usual one-period bribe, which he can get should reform fail, plus  $W_2$ , which the young bureaucrat offers for keeping the office open.

Therefore, according to the Nash bargaining solution, the payoff to the old bureaucrat is

$$\begin{aligned}
& (1 - \alpha)[(2\pi(k^*) - k^*) - (2\pi(k_{ss}) - k_{ss})] + (1 - \alpha)[\pi(k_{ss}) + \alpha\pi(k_{ss}) - k_{ss}] + (1 - \alpha)\pi(k_{ss}) \\
&= (1 - \alpha)[(2\pi(k^*) - k^*) - (2\pi(k_{ss}) - k_{ss})] + (1 - \alpha)[2\pi(k_{ss}) + \alpha\pi(k_{ss}) - k_{ss}] \\
&= (1 - \alpha)[(2\pi(k^*) - k^*) + \alpha\pi(k_{ss})]. \tag{3.4}
\end{aligned}$$

Therefore, the payoff to the entrepreneur becomes

$$\begin{aligned}
& (2\pi(k^*) - k^*) - (1 - \alpha)[(2\pi(k^*) - k^*) + \alpha\pi(k_{ss})] \\
&= \alpha[(2\pi(k^*) - k^*) - (1 - \alpha)\pi(k_{ss})]. \tag{3.5}
\end{aligned}$$

The intuition behind (3.5) is that the entrepreneur must share with the old bureaucrat the increase in the higher income due to higher investment. Notice the symmetry between equations (3.5) and (3.1). Comparing (3.5) to (3.1), we see that the entrepreneur is unambiguously better off: she receives some of the benefits from the increase in production. The old bureaucrat is also better off, both for the same reason (the pie is larger) and because he receives the bribe that would have gone to the young bureaucrat in the next period if reform had not taken place (thus getting a larger share of the pie). To summarize, then, we have:

**Proposition 2** *With the advent of reform, the licensing office will be closed permanently by the old bureaucrat and the entrepreneur's investment is socially optimal.*

Two implications of this outcome are worth discussing. The first is that reform does not make everybody better off. The loser is the young generation of bureaucrats. Thus reform is efficient only in a utilitarian sense. The second implication is that the immediate effect of the reform is a surge in the level of corruption, from  $(1 - \alpha)[\pi(k_{ss}) + \alpha\pi(k_{ss}) - k_{ss}]$  to  $(1 - \alpha)[(2\pi(k^*) - k^*) + \alpha\pi(k_{ss})]$ . So institutional change, which amounts to the removal of barriers to investment, leads to higher than usual levels of corruption. As we noted above, however, this high level of bribery is a signal that reform is proceeding, not an indication that it is being blocked.

**Corollary 1** *During the reform process the level of bribery is higher than in the bureaucratic steady state.*

At this point we should warn against taking the idea of “bribes from the young bureaucrats” too literally. While there may indeed be some of that, we also use the idea as a metaphor for a host of issues. Bureaucrats who accede to reform must surrender their power (which gives them the enjoyable private benefits of control as argued by Hart, 1992), must act against the interests of their class, and must go against the habits of a lifetime. The higher level of corruption is necessary to overcome these inertial obstacles, as well as the active opposition of the next generation of bureaucrats.

Interestingly, however, as we claimed in the introduction, the higher level of corruption is necessary to facilitate reform and is not itself a source of inefficiency. In the steady state there is a one-to-one correspondence between the degree of corruption, as given by bureaucrats' bargaining power,  $1 - \alpha$ , and the degree of inefficiency (compare equations 3.2 and 3.3). But reform succeeds in eliminating the licensing office, and with it the next generation of bureaucrats who would have been the source of the inefficiency. With reform, bribes are pure transfers from entrepreneurs to the last generation of bureaucrats. As the Coase theorem shows, such transfers do not cause inefficiency.

So far we have made a positive analysis of corruption during reform. However, our analysis also suggests a prescription for designing institutional change. The literature on reform argues that a major problem is establishing property rights for entrepreneurs free of bureaucratic controls (Shleifer, 1994), since bureaucrats naturally resist this effort to eliminate their power and income. We suggest that it is not necessary to immediately transfer all control rights to entrepreneurs, since some current bureaucratic control does not necessarily lead to inefficiency. (Note, however, that entrepreneurs have strong incentives to press for full control immediately and to misrepresent the efficiency effects of bureaucratic control, since property rights

retained by bureaucrats reduce entrepreneurs' incomes.) In fact, our analysis shows that there is a natural conflict of interests between generations of bureaucrats, since they essentially get pieces of the same pie. Reform can be designed in a way to exploit this conflict and enlist some of the bureaucrats on the side of institutional change. Thus, rather than turning all the entrenched interests against reform, the change can be designed in such a way that bureaucrats dissipate their strength in fighting one another. Although this may entail a temporary surge in corruption, which carries political costs, our analysis shows that this strategy need not imply efficiency losses.

### 3. Further Discussions

#### A. Secrecy and Liquidity Constraints

Secrecy is a distinguishing feature of corruption. Corruption has to be secretive, due to its illegal and politically sensitive nature. The parties involved thus need to invest a lot of their energy in maintaining secrecy (or at least "plausible deniability"). Therefore, as Shleifer and Vishny (1993) argue, in the bureaucratic steady state secrecy makes corruption more distortionary than taxation. We agree with their analysis of the pre-reform situation.

However, we argue that the opposite can be true in the context of reform: that is, secrecy can actually facilitate reform. The reason is simple. We have argued that the young bureaucrats and entrepreneurs engage in a bidding war to bribe the old bureaucrats to reform. In our exposition above, we implicitly assumed that neither young is liquidity constrained. Consequently, both can bribe up to their reservation values: this assumption, plus the fact that reform is efficient, guarantees that entrepreneurs can pay more and therefore reform takes place.

The conclusion is no longer as clear if there are liquidity constraints. The simplest type of liquidity constraint is that the young may not borrow at all. Liquidity constraints of this type imply that even if reform is unambiguously desirable it may

not take place: the young bureaucrats may outbid the young entrepreneurs if they have more resources in the first period.

Now, however, suppose we introduce a loan market, and allow both the young to borrow against their future income. Entrepreneurs have legitimate investments that guarantee them second-period income. Therefore, they can obtain a loan against their expected future income pending the closing of the office, which is a publicly observed event. However, young bureaucrats cannot borrow against future income from corruption, which takes place secretly. Then it is clear that secrecy facilitates reform. This differential access to the loan market gives entrepreneurs an edge in bribing the old bureaucrats into reforming in the first period. Also, it means that the old bureaucrats' bargaining position is weakened when dealing with the young entrepreneurs — since the young bureaucrats may not be able to bribe up to their reservation values, the old bureaucrats cannot credibly extort as much in bribes as they could before. Therefore, the combination of these two considerations implies that in a world with liquidity constraints, secrecy actually favors reform.

Hence the fact that corruption takes place in secret, which is distortionary in the pre-reform bureaucratic steady state, is actually a help to reform. Of course, there may be institutions that allow bureaucrats to borrow some against part of their expected future bribes.<sup>7</sup> But the extreme assumption illustrates the basic thrust of this section: the fact that income from corruption is secret means that bureaucrats are more liquidity constrained before they receive this income than are those whose

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<sup>7</sup>The Indian marriage market provides one mechanism: the dowry paid to the groom increases dramatically if he is able to enter the bureaucracy. Anxious fathers of prospective brides reportedly bribe examiners for the results of the Indian Administrative Service exams before they are made public, so a future IAS officer may first learn of his good fortune when his prospective father-in-law appears on his doorstep.

income is legitimate.

### B. Decentralized Corruption

Corruption can be either centralized or decentralized. In general, as Shleifer and Vishny (1993) have argued, decentralized corruption is the more distortionary of the two. The reason is simple. With decentralized corruption, the approval of a number of bureaucrats is needed to undertake a project, and each bureaucrat may attempt to extract more than his share of the surplus from the project. In such a situation, of course, the project cannot be executed.

In the context of reform, it is not immediately clear that decentralized corruption presents the greater problem. Suppose there are  $N$  bureaucrats who need to be bribed to close their offices in the first period in order to induce the socially efficient level of investment  $k^*$ . Then there is clearly a bargaining issue over how the  $N$  bureaucrats are to divide their "extra" bribe (the amount that the entrepreneur will pay above the customary bribe to each bureaucrat). Formalize the bargaining as follows: suppose each of the  $N$  bureaucrats simultaneously claims a share,  $s_n$ , of the surplus. If  $\sum_n s_n > 1$ , there is no surplus to divide, and they each get zero (extra bribes). In a Nash equilibrium, this situation cannot arise. All Nash equilibria have the property that the project is executed, and any distribution of  $s_n$  such that  $\sum_n s_n \leq 1$  can be an equilibrium.<sup>8</sup>

But the intuition that many bureaucrats may fail to coordinate is an appealing one, and further analysis reveals that decentralized corruption can indeed be more difficult for reform. For analyzing an unprecedented situation like major institutional change, the solution concept of Nash equilibrium that we have hitherto used may itself be problematic. The distinguishing feature of Nash equilibrium is that the equilibrium actions of all players are common knowledge. That is, each player plays

<sup>8</sup>Of course, an important assumption here is perfect information. Once some of the bureaucrats are unsure of the size of the potential surplus, then they may ask for too large a bribe in the aggregate, causing the project to be delayed or even cancelled.

a best response to the known actions of all the other players. Thus, Nash equilibrium presupposes a high degree of strategic certainty. This assumption is justified by an appeal to stability — if a game were played many times, the only strategies that players would use over and over are the Nash equilibrium strategies. So Nash equilibrium is likely to be a reasonable solution concept to analyze a situation that has been observed many times and where agents have had a chance to learn each other's strategies — for example, the bureaucratic steady state.

We believe, however, that an unprecedented situation like economic reform is characterized by a high degree of strategic uncertainty, which makes Nash equilibrium an unsuitable solution concept for analyzing some aspects of bargaining during reform. One way to formalize the idea of strategic uncertainty is to use the concept of rationalizability (in the sense of Pearce, 1984). Rationalizability allows players to be uncertain about the actions of their competitors — rather than knowing the strategies used by their opponents, players only know that others will play "rationalizable" strategies, which are best responses to strategies that they in turn could rationally expect others to play. In the case of an one-shot, unprecedented situation like major institutional reform, rationalizability allows us to formalize the notion of strategic uncertainty. Thus, for this application, rationalizability may be a more appropriate solution concept than Nash equilibrium. It is easy to see that there are rationalizable equilibria where we can indeed have situations where the average bureaucrat claims more than his share of the bribe.<sup>9</sup>

Overall, the conclusion here is consistent with Shleifer and Vishny (1993) that is, "decentralized bureaucracy" — in the sense of needing to satisfy many bureaucrats at a point in time — is an obstacle to reform.

However, this is not the only possible interpretation of what it means to have a

<sup>9</sup>In a two-player game, one player could reasonably ask for half the bribe, assuming that the two were going to split it 50-50. But the other player might claim two thirds, on the assumption that they were going to split two thirds-one third. The two together ask for more than all of the bribe.

decentralized bureaucracy. We return to this issue at the end of this section.

### C. The Free Rider Problem Among Entrepreneurs

In dealing with decentralized corruption, we investigated a situation where there was more than one bureaucrat per entrepreneur. Here we examine the opposite case, where there is more than one entrepreneur per bureaucrat. Not surprisingly, the analytics of the situation are quite similar. Here there is a potential free rider problem among the entrepreneurs — entrepreneurs rely on each other to bribe the bureaucrats.

Suppose there are  $N$  entrepreneurs who need to bribe a single “old” bureaucrat into closing his office. As in our model above, they collectively have pay the bureaucrat an extra bribe to induce him to accede to reform. Clearly this situation is one where all of the entrepreneurs will want to see reform in place, but each wants to pay as little of the extra bribe as possible. Again, assume a bargaining situation, now between the entrepreneurs, like the one we discussed above. Therefore we have the same results: there is no Nash equilibrium where the bribe is not paid and reform does not take place, but there are many such rationalizable equilibria. Again, we conclude that the intuition is correct: in a situation where many entrepreneurs benefit from closing a single licensing office, it is more likely that the office will not be closed because of the free rider problem.

However, we would naturally expect the free rider problem among entrepreneurs to be much more severe than the “decentralized bureaucracy” problem of the previous section. The reason is that the identities of the bureaucrats are known, to the public and to each other. After all, they have been part of the old government agencies for many years. Furthermore, bureaucrats are likely to be a relatively small group, with mechanisms that allow them to resolve some of the coordination and bargaining issues we discussed. But entrepreneurs are not necessarily known to each other. Indeed, many would-be entrepreneurs in a reformed economy are not engaged in business

in the pre-reform steady state (because taxes and bribes are too high, or because their abilities are less suited to a bureaucratic environment). Furthermore, unlike the bureaucrats, entrepreneurs probably do not have access to good communications and are almost certainly less able to keep unruly members in line.

The analyses of this section and the previous one, therefore, lead us to conclude that reform is more likely where powerful, centralized groups — for example high-level bureaucrats and strong unions or industry trade associations — can bargain with one another. These large groups are more likely to internalize the externalities present in bribery and reform.

### D. Reform and the Big Push

In this section we turn our attention to the production and marketing aspects of the model. So far we have assumed that the level of profit from a single project depends only on reform in the local bureaucracy, but does not depend on the overall level of reform in the country. In other words, we have ignored the interactions among investment projects. In reality, these interactions are probably important. We make this point in a simple extension of our main model.

Suppose we extend the model to have a continuum of industries, indexed by  $i$ . Profits in industry  $i$  are given by

$$\pi = \pi(k_i, R) \tag{4.1}$$

where  $R$  is the fraction of industries that have reformed. We assume  $\pi_1 > 0, \pi_2 > 0, \pi_{11} < 0, \pi_{22} < 0$ , and, crucially,  $\pi_{12} > 0$ . A number of realistic features can lead to a situation where profits depend on the extent of reform. Since production in a modern economy often relies on specialized inputs of intermediate goods and services of skilled workers, production in a reformed industry may be more difficult unless there is also reform in upstream input-producing industries and in the national labor market. Unless there is widespread reform, a single reformed industry might have difficulty in selling its goods to other sectors or exporting them abroad, since

these trades will still require permission and licenses. Another source of the positive externality is learning to adapt to the new market environment. More reform means more examples to follow, saving learning costs. Most simply, given that reform raises the overall level of investment, income, and aggregate demand, there are likely to be pecuniary externalities that lead to higher profits from a higher volume of sales in a reformed economy.

Our analysis of reform concluded that the extra payoff to the old bureaucrats and the increased income of the entrepreneur depend positively on the profit  $\pi$ . Thus, if profits depend on the overall level of reform as in equation (4.1) and there are “strategic complementarities” in reform (since  $\pi_{12} > 0$ ), there is clearly an issue of coordination between industries. There is an incentive on the bureaucrat and entrepreneur in each industry to wait for other industries to reform. In the extreme case we might have multiple equilibria, where each industry will bribe in order to be reformed only if enough other industries do so as well.<sup>10</sup> But even when the coordination problem is not so severe, the size of the bribe that each industry is willing to pay will depend positively on whether the rest of the country is being reformed. Thus, the likelihood of reform (which depends on each industry being able and willing to outbid the anti-reform interests), may depend crucially on whether industrialists can solve the coordination problem as well as the free-rider problem.

### E. Decentralization Redux

In this section we return to the issue of decentralization, and argue there are types of decentralization that can help reform.

#### Decentralization Across Space

China and the former Soviet Union are the two regions of the world whose reform is being followed with the keenest interest. But although both were socialist economies,

<sup>10</sup>For analysis of games with strategic complementarities, see Cooper and John, 1988. Our analysis is similar to Murphy, Shleifer and Vishny (1989).

they differed significantly in their organization of production. Central planning in the former Soviet Union was much more complete than in China (Sachs and Woo, 1994.). At the same time, China was much more decentralized economically. Qian and Xu (1993) argue that, due to Mao, Chinese provincial economies became self-sufficient and self-contained sub-economies. On the other hand, the Soviet Union tried to exploit economies of scale and, for ideological reasons, scattered production around the republics. Therefore, in China, a relatively small group of bureaucrats and entrepreneurs can coordinate on a local reform and reap many of the benefits, whether or not there is economy-wide reform. On the other hand, in the former Soviet Union, reform has to take place in coordinated fashion across many regions, and in some cases republics, for reform to be successful. Therefore there is a larger problem of coordination in the former Soviet Union, the more centralized state. In this sense, decentralization benefits reform.

#### Decentralization Over Time

So far we have investigated the issue of decentralization at a point in time, and asked whether decentralization helps reform. But we can also think of centralization as referring to the coordination of decisions over time. Suppose we define a centralized bureaucracy, in this sense, as one where bureaucrats can bind their successors, i.e. put into place policies that last longer than their tenure in office. In our model, this implies that bureaucrats can, to some extent, commit their offices to “tax” (levy bribes) only on second-period profits rather than on second-period income. So the second-period bribe becomes:

$$w_2 = \alpha(\pi(k) - \frac{1}{2}\beta k) \quad 0 < \beta < 1 \quad (4.2)$$

where  $\beta$  is a measure of the degree of centralization. Notice that the investment  $k$  is for two periods and  $\frac{1}{2}k$  is the prorated cost of the investment. When  $\beta = 1$ , the second period bribe is like a profit tax, which is not distortionary. A  $\beta$  closer to 1 means that bureaucrats can control their successors, leading to both higher investment and higher

bribes in the bureaucratic steady state. Our model of the steady state thus confirms Shleifer Vishny (1993) intuition, for the situation where the failure of coordination takes place over time: decentralized corruption reduces income and welfare for all.

However, this interpretation of decentralization also demonstrates our basic point: institutional features that are harmful in the steady state may aid reform. In this case, note that the most decentralized economies (the ones with lowest  $\beta$ 's) have the most to gain from reform. But it is precisely in these economies that reform is easiest, for three reasons. First, the fact that there are large income gains from reform mean that there is more pressure for reform from the private sector (in terms of our model, entrepreneurs can afford to pay larger bribes). Second, the fact that the existing situation is grossly inefficient implies that it has less support, even within the bureaucracy (in terms of our model, the young bureaucrats are unwilling to pay large bribes to block reform). Third, the fact that there is less connection across generations of bureaucrats probably means that bureaucrats now in power have less vested in their office, and thus less of an interest in blocking reform. Thus they probably need less persuasion (smaller bribes) to close their offices and let reform take its course.

We do not mean to suggest that efficient bureaucracy is a substitute for reform, although this is true in our model in the limit as  $\beta$  tends to 1. Shleifer (1994) notes a number of reasons why bureaucracies, especially ones where corruption is rampant, are likely to be highly inefficient. Nevertheless, we do believe that there is something to the idea that there is broader support for reform in countries where the pre-reform situation is intolerable. For example, compare the pre- and post-reform experiences of Poland and Hungary. Hungary started the reform process with a number of advantages that many expected would make it the leader in successful reform in Eastern Europe. But reform and economic success in Hungary have trailed what Poland has achieved, despite the fact that Poland started with fewer capitalist economic institutions. (For a detailed exposition, see Kornai, 1994) Arguably, the

situation in Poland was sufficiently bad that the government felt it had the political backing to engage in more thorough-going reform than was the case in Hungary, leading Poland to leapfrog its more "advanced" neighbor.

We have argued that there are different forms of decentralization, some of which are helpful to reform and others of which are inimical. If these different kinds of decentralization are found together, it is not possible to say a priori whether decentralization favors or hinders reform.

## 5. Conclusion

We analyze corruption in the context of institutional changes such as the post-socialist reform. Our conclusion is generally the opposite of the widely received view on corruption. We argue that a one-time surge in the level of corruption is needed to induce the incumbent bureaucrats to give up their control rights. Our analyses can explain a set of observations of transitional economies that have puzzled many commentators, in particular, how rampant corruption can co-exist with rapid economic growth.

Our conclusion stems from our new approach to corruption. First, we treat corruption as a by-product of the bureaucratic institutions; so changes in such institutions have consequences for corruption. Second, we regard the bureaucratic institution as a succession of generations of bureaucrats. Thus, bureaucrats are not a uniform class. Our analysis emphasizes that reform does not affect different generations of bureaucrats in the same way.

The implication of our conclusion should be treated with care. Although corruption during reform is unavoidable and necessary, it is not harmless and therefore should not be left unbridled. Excessive corruption in overt forms can be politically dangerous and should be controlled. But, within limits, corruption can be the friend

of a well-designed program of reform.

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