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## *Corruption and Reform*

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# Corruption and Reform<sup>1</sup>

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## Abstract

Countries making the transition to a market economy often experience an increase in corruption along with an increase in growth. This observation is puzzling in the context of current models, which emphasize the destructive nature of corruption. We present a model of corruption and reform which shows that under some circumstances a particular gradualist reform strategy is optimal. This strategy consists of temporarily relaxing control of corruption in order to provide a windfall to existing bureaucrats, thereby gaining their support for a reform effort that will ultimately reduce the distortions stemming from bureaucratic power. Thus, a one-time surge of corruption can be a prelude to a permanently reduced level of corruption in the future, which provides the incentive for high current growth. We illustrate our point with examples from the recent Chinese reform.

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## 1. Introduction

In this paper, we present a new view of 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. Corruption is widely regarded as a major cause of government inefficiency. We agree with this view. However, 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 increase in corruption is widely interpreted as a signal that reform is being blocked or distorted by the power of entrenched bureaucrats. Our paper suggests that this view is not always justified. Instead, our analysis indicates that a one-time rise in corruption speeds the process of reform, which in turn permanently reduces the level of corruption and the power of the bureaucrats. Thus our analysis has a normative implication: corruption can be desirable if it is accompanied by market-oriented institutional change, such as the post-socialist transition. This may be true even if corruption is destructive both before and after reform.

Our argument is simple. Corruption results from the power that bureaucrats enjoy. Bureaucratic power, in turn, is a product of institutions that allow generations of unsupervised bureaucrats to succeed one another, controlling productive activities for their own benefit without necessarily providing useful inputs to production. The aim of reform is to identify and eliminate the inessential parts of the bureaucracy, breaking the chain of succession of bureaucrats in these offices. 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. This bureaucratic opposition is a major obstacle to a top leadership that is newly committed to reform, since much of the actual implementation of reform must be accomplished by mid-level career bureaucrats who are effectively asked to destroy their own livelihood. We argue that in this context a one-time increase in corruption can serve as a "golden handshake," giving bureaucrats a financial stake in the success of reform and moderating their opposition to losing power. Once the reform is successful and the unproductive bureaucratic institutions are eliminated,

corruption is permanently reduced and is less of 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, especially China. In reforming 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. Below we document several instances where corruption rises while reform is taking place.

This observation is a puzzle, since the dominant view is that corruption is harmful and impedes economic development.<sup>2</sup> Shleifer and Vishny (1993) argue that even well-organized corruption is more distortionary than taxation, while disorganized corruption can virtually eliminate economic development. Analyses of corruption during reform have generally taken this perspective, arguing that since corruption impedes development in the steady state, it must also impede the transition to a market economy. 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. Other observers of economic reform are puzzled by the paradoxical combination of improvement in economic efficiency and increases in corruption (e.g. *The Economist*, 1994).<sup>3</sup> Our model can explain why corruption might increase – even as a fraction of total output – in a reforming economy experiencing high growth.

The message of our paper is that steady-state analyses of corruption do not by themselves provide a basis for analyzing the causes and effects of corruption during transitions.

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<sup>2</sup>Gould and Amaro-Reyes (1983), United Nations (1989), and Klitgaard (1991) represent this view. In light of this view, a large literature studies how best to control corruption. For example, see Rose-Ackerman (1975).

<sup>3</sup>On the other hand, a minority view holds that corruption promotes useful growth by “greasing the wheels” of the bureaucracy. Leff (1964) thus argues that moderate corruption can improve efficiency. Others counter that corruption decreases efficiency since bureaucrats have incentives to slow down in order to ask for more bribes. In an equilibrium queuing model, Lui (1985) shows that the last view does not hold. All of these analyses are set in steady-state institutions. Ours are concerned with institutional changes, such as those in a reform.

We show that the welfare effects of transitory corruption can be quite different from those of steady-state corruption, if the transitory corruption is a necessary part of a reform package that implements permanent, desirable institutional change. We argue that governments do (and should) use this sort of “good corruption” to increase the likelihood of successful reform. 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.

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. We assume that, before reform, the top leadership is ideologically committed to bureaucratic control over the economy. We define “reform” as a time when the top leadership permanently abandons this ideological stance and switches to promoting economic efficiency. However, some bureaucratic offices do provide useful services, so the top leadership would prefer not to simply close all offices indiscriminately. But the top leadership needs cooperation from bureaucrats in order to reform. While there are many reasons why cooperation is needed, our model focuses on one in particular: informational imperfections. In our model, the leadership is unable to observe directly the productivity of offices and discern which offices should be closed.

Thus, the leadership must enlist the cooperation of the bureaucrats themselves. We show that a one-time increase in corruption can provide the appropriate incentives for bureaucrats to reveal the necessary information. Thus our model predicts that, in a wide variety of cases, corruption will rise subsequent to a reform before falling to its new, lower, steady-state value. On the other hand, output will often rise immediately, as entrepreneurs anticipate the future removal of distortions. Thus we might temporarily observe the puzzling juxtaposition of high growth combined with high corruption, even though corruption is generally inimical to growth. Our analysis is positive, but it carries the normative implication that reform should be designed to tolerate – and even encourage – moderate levels

of corruption.

We have modeled the need for bureaucratic cooperation in a specific way, but we believe the point is more general. Reform is a difficult and politically dangerous process. Even if it is socially desirable, it usually attacks the perquisites of an entrenched elite, who generally oppose the process. Given the limited political capital of any set of reform-minded leaders, who must spend some of that capital undertaking essential reforms like privatizing industry and eliminating popular subsidies, it may be optimal for the leadership to co-opt the opposing interests by "buying them off." This temporary rise in distortions can actually improve welfare by raising the probability that reform will be successfully implemented. However, we emphasize that for transitional corruption to be welfare-improving it must be implemented as part of a controlled plan by a top leadership that expects to remain in power to reduce corruption in the future. Corruption that results from a total breakdown of law and order is not welfare-improving; it is a sign that the state has lost much of the power it needs to implement reform successfully.

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 sections 3 and 4, we model corruption, both in a steady state where bureaucrats have power and during the process of a reform designed to reduce that power. The analysis based on the model forms the core of the paper's argument. In section 5, we discuss the results and extend the basic model along several dimensions. Section 6 concludes the paper.

## **2. Two Cases of Corruption during Economic Reform**

Before presenting our formal analysis of reform and corruption, we examine two case studies of corruption during reform. Both cases are from China, where the reform has lasted for over fifteen years, often accompanied by increases in corruption.

Corruption has gone up hand-in-hand with China's economic reform. Meanwhile, anti-corruption campaigns have always been visible, but apart from the rhetoric, which is con-

stant, actual attempts to reduce corruption are often modest and their intensity varies greatly with the reform cycle. A repeated pattern is that when the reformist top leadership is able to push for faster reforms, the anti-corruption campaign takes secondary importance; when reform slows down, much tougher anti-corruption policies are pursued.<sup>4</sup> This short-term negative correlation between corruption and reform is exactly what our model would predict.

In general, during the reform process, out-going bureaucrats in China have benefited handsomely from reform via the increased level of corruption. Reform gives corrupt bureaucrats two main sources of income. The first is from sponsoring new businesses, and the second is from restructuring existing state agencies – in particular, the state-owned enterprises. In both cases, the scope of bureaucratic institutions is eventually reduced and replaced by the market mechanism. In many cases, the outgoing bureaucrats become businessmen.

The first case of corruption we analyze is government officials' direct "sponsoring" of new businesses. This has been responsible for the rapid entry of new firms in China. The second case of corruption is the so-called "stock craze" induced by initial public offerings of shares of state enterprises from 1991 to 1993. Many government officials benefited greatly during the stock craze.

### *2.1. Government "Sponsored" Entry of New Businesses*

Rapid entry of non-state-owned businesses is arguably the most successful aspect of China's economic reform. These new businesses enter the so-called non-state sector, which accounted for less than 20 percent of GDP at the start of the reform. With an average

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<sup>4</sup>An outstanding example is the dispute within the Communist Party in the summer of 1988. The reform-minded party secretary Zhao Zhiyan tried to push a bold plan for further reform, the so-called "New Order for the Socialist Commodity Economy", as a response to surging corruption. The conservative premier Li Peng advocated a retrenchment plan against reform and insisted on the importance of a full-fledged anti-corruption campaign. Zhao lost the confrontation. The Tienanmen incident and the two-year rectification program followed. For details, see Gong (1994).

annual growth rate of over 20 percent, the non-state sector now accounts for more than 50 percent of GDP.

Almost all newly-established firms in the non-state sector are “sponsored” by government officials, especially local officials. Even private firms (other than very small family businesses) usually have government “sponsors” when first set up.<sup>5</sup> The reason is simple. The entrepreneur needs constant help from the “sponsor” to obtain the right to use land, to secure low interest loans, and to evade excessively high formal taxes. In the case of potential contract disputes with other firms, support from the “sponsor” becomes even more important.<sup>6</sup>

Corruption surges with the “sponsorship” of new businesses. Formally, there is a “sponsorship” fee, which is typically 10% of the profit. Revenue from this fee is a main source of the “extra-budgetary” income for officials’ own use. In addition, officials can collect various ad hoc taxes and fees, use the new businesses as expense accounts, and force these firms to hire their relatives. These perquisites have made Chinese bureaucrats very happy to set up new enterprises.<sup>7</sup>

The most important and often-neglected aspect of the phenomenon of government officials “sponsoring” new businesses is that the bureaucratic institutions themselves are subsequently changed. A widely observed pattern among these new businesses is that as they grow larger, they seek independence from the “sponsoring government” by registering as an independent business group. The former government officials retire from government and become major managers of the company. In this way, the officials’ long-term stake in the businesses is secured. Also, as the officials retire, the control span of the government is reduced, since the spun-off company is now more independent of the government and operates according to market principles.<sup>8</sup>

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<sup>5</sup>In Chinese, the words for the “sponsor” is *gua kao tan wei* (the connecting and relating agency).

<sup>6</sup>See Li (forthcoming) for a detailed analysis of these sometimes called “ambiguously owned” firms.

<sup>7</sup>For a detailed case study on the incentives of local government officials, see Lin, He, and Du (1992).

<sup>8</sup>The best illustration of this is the recent development in rural China under the name of “clarifying property rights of rural enterprises.” As a result, many local officials become solely business owners and



In this case, corruption provides incentives for bureaucrats to support, and even to initiate reform. In fact, those bureaucrats who obstructed the most worthwhile investments before reform have the most incentive to “sponsor” new businesses, since they can expect to retire from the government and become managers of the most profitable new firms. This example illustrates our contention that an increase in corruption can smooth the path of institutional change. This change then reduces the long-run level of corruption, while bringing needed economic reform.

### *2.2. Initial Public Offering of State Enterprise Stocks*

A highly visible wave of corruption was observed in China between 1991 to 1993, when the so-called “stock craze” swept the country. The level of corruption was high because the bureaucrats in charge of approving initial stock issuing of state enterprises were offered shares at their book value. Because the total amount of stock issued was quite small in relation to the demand, these shares often traded at ten times their book value. As a result, “(T)here have been scores of millionaires made among officials controlling the application of a potential stock market” (Chen (1994) ).

From the top reformers’ point of view, the stock craze played an important role in jump-starting the reform process after the Tienanmen incident. At that time, the reformers faced a dilemma. They wished to partially privatize some firms, in order to improve corporate governance. But they were concerned that a large stock offering would divert a large amount of household saving away from buying the government bonds that had to be floated to finance the budget deficit. Thus, they decided to limit the amount of stock that would be offered. This implied that only the “most suitable” enterprises would be privatized. The problem was that only the lower-level bureaucrats knew which enterprises would be most suitable for privatization, but they stood to lose if they lost control of their most efficient firms. The leadership used corruption to solve this problem, offering low-priced shares to create the proper incentives.

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managers. See Cui (1993) for interesting cases.

The procedure of the stock offering was initiated by the bureaucrats controlling the firm. These bureaucrats made proposals to higher level bureaucrats. All parties involved were offered “initial shares” at par value. Therefore, these officials had clear incentives to choose the firms with the biggest upward potential in the secondary market. In other words, the corrupt bureaucrats had strong incentives to privatize those firms which would benefit the most from privatization. In addition, bureaucrats losing control of the privatized firms were also compensated. This way, the forces that would have opposed reform were turned into its enthusiastic supporters. Again, a temporary surge of corruption was used as a means of improving long-term economic efficiency.

### 3. Corruption and Economic Development in Steady State

In this section, we build a simple model to analyze the role of corruption in economic development in steady state, i.e., either before the reform takes place or after it is completed.

#### 3.1. Three Classes of Agents

There are three classes of agents in the economy. The first class is the top leadership, denoted by  $T$ . Before reform,  $T$  monitors the bureaucratic offices by setting anti-corruption policies.

The second class of agents comprises overlapping generations of bureaucrats. A large number of bureaucrats (of measure 1) are born at the beginning of each period. Each lives for two periods. Let  $B_t$  indicate the bureaucrat who is *born* at the beginning of period  $t$ . With probability  $\beta$ ,  $B_t$  is assigned to a high productivity office  $H$ , which we define later. Otherwise,  $B_t$  is assigned to a low productivity office  $L$ . Thus,  $\beta$  is the fraction of “good” offices. Let  $B_t^H$  and  $B_t^L$  be the representative bureaucrat in each office, respectively. In period  $t$ ,  $B_t^i$  ( $i = H$ , or  $L$ ) is an “apprentice” young career bureaucrat and does not have any power. At the end of period  $t$ ,  $B_t^i$  graduates from the “apprenticeship” and assumes power in period  $t + 1$ .

Entrepreneurs comprise the third class of agents. For each office, which may be inter-

preted as a geographic area or industry, a large number of entrepreneurs (of measure 1) are born at the beginning of each period. Entrepreneurs also live for two periods. Let  $E_t^H$  and  $E_t^L$  be the entrepreneur born at the beginning of period  $t$  in each of the office, respectively.  $E_t^i$  makes an investment  $k$  at the beginning of period  $t$ . Let the investment be  $k$ . Then, investment pays off stochastically at the end of period  $t$  and then again at the end of period  $t + 1$ .

For simplicity, we assume that neither bureaucrats nor entrepreneurs discount future utilities.

### 3.2. *Entrepreneurs' Investment*

An entrepreneur born at the beginning of time  $t$  and in the control domain of an office of type  $i$ ,  $E_t^i$ , invests  $k_i$  at the beginning of time  $t$ . Subsequently, at the end of period  $t$  and again period  $t + 1$ ,  $E_t^i$  gets two random draws of gross profit. The random draw is simple: with probability  $\mu(k_i)$ , the gross profit is a constant  $R$ ; otherwise it is 0. The two random draws at the end of period  $t$  and  $t+1$  are independent of each other. This assumption reflects the intrinsic uncertainty associated with business investment. As standard assumptions, we will maintain

**Assumption 1:**  $\mu(0) = 0$ ,  $\mu'(0) = \infty$ ,  $\mu'(k) > 0$ , and  $\mu''(k) < 0$ .

It turns out that the most interesting case when discussing the effect of corruption is when the return function  $\mu$  is highly concave, i.e., having rather rapidly decreasing returns to investment. Consequently, we will maintain the following assumptions:

**Assumption 2:**  $-\frac{\mu'(k)}{\mu''(k)}$  is a decreasing function of  $k$ .

Even if the return to investment turns out to be  $R$  (i.e., the business is ex-post profitable),  $E_t^i$  still cannot directly benefit from her investment. In order to do so, she has to obtain “bureaucratic services” from the office in her area. This compulsory bureaucratic service is the source of corruption. The social value of the bureaucratic service may be positive or negative, depending on the office type.<sup>9</sup> In particular, the productivity  $v$  of the

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<sup>9</sup>By “compulsory bureaucratic services” we mean those rather standard and routine bureaucratic activities that can be easily verified, so that bureaucrats’ incentives and effort are relatively unimportant.

“bureaucratic service” depends on the type of the office ( $i = H$  or  $L$ ). If the gross profit is  $R$ , then after the service, the net profit becomes  $v_i R$ . We assume that the entrepreneur knows the type of the office before making her investment.

### 3.3. Corruption and Anti-Corruption Policies

The first type of corruption we analyze takes the form of payoffs from entrepreneurs to bureaucrats. Since the bureaucratic service is compulsory, the bureaucrat can earn a rent from it, by extorting a bribe from  $E_t^i$ . Let the bribe taken in period  $t$  be  $b_t$ . For simplicity, we will assume that the bureaucrat can make a take-it-or-leave-it offer in negotiating the amount of the bribe.

To control corruption,  $T$  implements an anti-corruption policy. We model a very simple version of such a policy. With probability  $q$ ,  $T$  investigates whether the bureaucrat has taken a bribe. If he is found to have taken a bribe  $b$ , the bureaucrat will have to pay a fine of  $F(b)$ . For simplicity, assume that the fine function is  $F(b) = b^2$ . At the end of period, the fine is rebated in a lump-sum fashion to the entire population.<sup>10</sup> Under such an anti-corruption policy,  $b$  is chosen to maximize  $b - qb^2$ , so the optimal bribe the bureaucrat demands is  $b = \frac{1}{2q}$ .

Throughout our analysis, we shall assume that anti-corruption policies are a binding constraint on the amount of the bribe. The implicit assumption is that the total net profit is bigger than the bribe so that it is worthwhile for the entrepreneur to bribe the bureaucrat.

In general, it is costly to implement an anti-corruption policy  $q$ ,  $F(\cdot)$ , since resources have to be allocated to prosecutors, judges, press coverage, etc. For our purpose, we shall assume that these costs imply an upper limit on  $q$ , which we denote  $q_0$ . For technical convenience, we shall focus on changes in  $q$  without discussing changes in  $F(\cdot)$ .

To summarize the discussion about  $q$ , we have

**Assumption 3:**  $0 < q < q_0$  and for all  $q$ ,  $Rv_i > \frac{1}{2q}$ , where  $i = H$  and  $L$ .

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<sup>10</sup>We assume that the fine is evenly distributed among all agents, so that there are no incentive consequences. We can allow the fine to be paid back to the investing entrepreneur without any qualitative changes in the following analysis.

We shall also maintain an assumption that despite corruption, the existence of the high-productivity office is valuable for the entrepreneur, while the low productive office is not. In other words, the  $H$  office should be kept open while the  $L$  office should be closed. In our model, this translates into the following assumption:

**Assumption 4:**  $Rv_H - \frac{1}{2q} > R$  and  $v_L < 1$ .

### 3.4. *Internal Corruption within Bureaucratic Establishments*

Our model allows for another kind of corruption, which we shall call *internal corruption*. Before a young bureaucrat  $B_t^i$  inherits power from an old bureaucrat  $B_{t-1}^i$ , the young must pay a “tribute” to the old. Nepotism is a classical example of internal corruption. Internal corruption arises because a senior bureaucrat has the monopoly power to choose his successor and aspiring junior officials have to compete for the position.<sup>11</sup>

Avoiding the details of modeling internal corruption, we simply assume that the “tribute” from the junior to the senior bureaucrat is a constant ( $\alpha$ ) proportion of the junior official’s expected future bribe. The “tribute” is a perk enjoyed by the senior official. Since it is unlikely that there are well-functioning capital markets to finance junior bureaucrats’ pursuit for future power,  $\alpha$  is likely to be much less than 1.

### 3.5. *The Role of Corruption in Economic Development*

We can now analyze the role of corruption in economic growth, assuming that there is no institutional change. Our conclusion is consistent with the conventional wisdom on corruption, which is that corruption reduces income and welfare. The intuition is that bribes to bureaucrats siphon off returns to entrepreneurs, who then have less incentive to invest.

From our previous analysis,  $E_t^i$  has to bribe  $B_{t-1}^i$  in period  $t$  and  $B_t^i$  in period  $t + 1$ . Both bribes are of the same amount:

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<sup>11</sup>In our model, for simplicity, we assume away competition among junior bureaucrats. In general, such competition can be important.

$$b = \frac{1}{2q}. \quad (1)$$

Consequently,  $B_i^i$  expects to get a payoff of  $b - qb^2 = \frac{1}{4q}$  with probability  $\mu$ . With probability  $1 - \mu$ ,  $B_i$  gets 0. Thus, the expected per-period bribe to a bureaucrat from an entrepreneur is:

$$b = \frac{\mu}{4q}.$$

Meanwhile, the expected per-period loss of  $E_i^i$  due to bribery is

$$\mu b = \frac{\mu}{2q}.$$

How much will  $E_i^i$  invest?  $E_i^i$  will maximize her expected return, which is

$$2\mu(k)(Rv_i - b) - k,$$

since she does not discount the second period payoff.

The first order condition for  $k$  becomes:<sup>12</sup>

$$2\mu'(k)(Rv_i - \frac{1}{2q}) = 1. \quad (2)$$

From now on, we shall use  $k_H$  and  $k_L$  to indicate the investment in the  $v_H$  and  $v_L$  offices. These amounts are defined by equation (2).

Notice that given the existence of the bureaucratic office, the expected social welfare from investment  $k$  is

$$2\mu Rv_i - k$$

which requires that the first best investment level satisfy

$$2\mu'(k)Rv_i = 1. \quad (3)$$

Comparing equations (2) and (3), we conclude:

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<sup>12</sup>The second order condition is guaranteed by our convexity assumption on  $\mu$ .

**Proposition 1** *Given the existence of bureaucratic offices, a tighter anti-corruption policy creates higher investment, higher output, and higher social welfare.*

Can anti-corruption policies be Pareto improving, so that both bureaucrats and entrepreneurs prefer tighter anti-corruption policies? In the world the answer is likely to be no, since otherwise popular political demand should have already produced stricter policies. In our model, however, the answer may be yes. The intuition is that an increase in  $q$  may increase  $k$  so much that the higher success rate  $\mu$  leads to more frequent bribes, which more than compensates for the lower amount of each bribe. It turns out that this situation does not arise when  $q$  is not too low. Assumption 5 rules out this unlikely case. We shall maintain this assumption for the remainder of the paper.

**Assumption 5:**  $q \geq \frac{\mu'^3}{-\mu\mu''}$ , for  $k > 0$ .

**Lemma 1** *Under Assumptions 1 to 5, an increase in  $q$  makes the entrepreneur better off, but the bureaucrat worse off, i.e.  $(\frac{\mu}{4q})'_q < 0$ .*

#### 4. Corruption and Reform

In essence, reform is a process of reducing the role of the bureaucracy. We identify two types of reforms: *sweeping reforms* and *selective reforms*. In a sweeping reform, the reformist top leadership  $T$  orders that all bureaucratic offices be closed at the start of reform. In a selective reform, the reform closes only the unproductive offices ( $L$ ) and keeps open the offices that can provide value-adding services to entrepreneurs.

In order to implement a selective reform,  $T$  must know the type of each office. However, we assume that the reformist  $T$  cannot distinguish between the two types of offices.  $T$  only knows that  $\beta$  proportion of offices are productive and the rest are unproductive.<sup>13</sup> Theoretically,  $T$  could survey  $E_i$  for  $v_i$ . However, having very limited administrative capacity,

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<sup>13</sup>This informational asymmetry is our way of formalizing why  $T$  needs bureaucratic cooperation during reform. See section 5.1. for other reasons why this might be true.

$T$  would have to rely on the bureaucrats' own answers, and they will generally not wish to respond honestly.

How can one implement a selective reform? In general,  $T$  can utilize two instruments. First, it can pay a transfer  $m$  to bureaucrats who report that their offices are of type  $L$  and close such offices immediately. Second, it can reduce  $q$  for one period and close the offices that report that they have low productivity.<sup>14</sup> We analyze both approaches in the following sections.

#### 4.1. *Buying Out Bureaucrats*

The first strategy to implement a selective reform is to buy out bureaucrats. In such a strategy,  $T$  compensates bureaucrats who report  $v_L$ , and then closes the identified offices immediately. If the compensation  $m$  is high enough, bureaucrats in offices of type  $L$  have incentives to report  $v_L$ . If  $m$  is not too high, those in offices of type  $H$  will not report  $v_L$ , and their offices will remain open. We show that there exists a range of feasible  $m$ .

From the perspective of a bureaucrat in a low-productivity office, if he reports  $v_L$ , he gets  $m$ , since the office is closed immediately. If he reports  $v_H$ , he gets  $2[\frac{\mu(k_L)}{4q_0}] + \alpha 2[\frac{\mu(k_L)}{4q_0}] = (1 + \alpha)\frac{\mu(k_L)}{2q_0}$ , since he expects to get bribes from both the old (invested in period  $t_{0-1}$ ) and the new (invested in period  $t_0$ ) investment projects, and also expects to get tribute which is proportional to future bribes going to the young bureaucrats. Thus, the buy-out payment has to be

$$m \geq (1 + \alpha)\frac{\mu(k_L)}{2q_0}.$$

To ensure truthful revelation by those in the high-productivity offices, on the other hand, the buy-out payment should not be too high, since otherwise they will pretend that their office is of type  $L$ :

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<sup>14</sup>Our model is similar to models of the ratchet effect such as Laffont and Tirole (1988). Unlike the ratchet-effect models, our model may reach separating equilibria in cases where  $T$  chooses the co-opting strategy. The reason is that in our model, the principal  $T$  has a longer horizon than the agents, i.e. the bureaucrats.



$$m \leq (1 + \alpha) \frac{\mu(k_H)}{2q_0}.$$

Clearly both conditions can be satisfied simultaneously, since  $k_H > k_L$ .

In fact, such a buy-out plan reaches the first-best outcome of reform: a fully informed social planner (who know the type of each office) cannot do better. The simple intuition is that  $B$ 's are risk-neutral and the buy-out plan just lets  $B$ 's make the closing decisions for their offices. They become the owners of the "reform process" and they are the only parties with private information. We thus have

**Lemma 2** *If it is feasible, the buy-out strategy is a first-best arrangement of reform. The payment  $m$  to bureaucrats in the closing office must satisfy  $(1 + \alpha) \frac{\mu(k_L)}{2q_0} \leq m \leq (1 + \alpha) \frac{\mu(k_H)}{2q_0}$ .*

Desirable as it is, the buy-out strategy is often infeasible. The simple reason is that  $T$  is likely to have tight budget constraints during the reform period. Theoretically,  $T$  can borrow against future tax raises in order to finance the buy-out strategy. Realistically, issuing a very large amount of government debt is not feasible at a time when the government typically lacks credibility in financial markets.<sup>15</sup>

#### 4.2. Co-opting Bureaucrats via Higher Corruption

When buy-out plans are infeasible, the only other option to implement a selective reform is a co-opting strategy, which is a gradualist strategy. Using the co-opting strategy,  $T$  has to commit to a low  $q^*$  for one period. Then  $T$  requests bureaucrats' support for the reform. This support takes the form of reporting the type of office. Offices reporting  $v_L$  are closed after a period.

We first analyze the incentive of  $B_{t_0-1}^L$ , the incumbent bureaucrat in the low-productivity office. How much can  $B_{t_0-1}^L$  expect to obtain after reporting that the office is of type  $H$ ?

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<sup>15</sup>Even if  $T$  can borrow, without lump-sum taxes  $T$  may well find raising taxes in the future an unattractive option. The reason is that these taxes will fall partly on productive investors served by the  $v_H$  offices. As we show below, the co-opting strategy is equivalent to taxing the low-productivity investors. The first tax may be more costly than the second.

In this case, the office will remain open and conduct business as usual. Let the investment level be  $k_L^O$ , after the entrepreneur observes the dishonest report. (“O” stands for the office being open after the reform.)  $k_L^O$  will satisfy the following first order condition:

$$\mu'(k_L^O)(2Rv_L - \frac{1}{2q^*} - \frac{1}{2q_0}) = 1.$$

Correspondingly, in period  $t_0$ ,  $B_{t_0-1}^L$  expects to obtain a bribe of

$$\frac{\mu(k_L)}{4q^*} + \frac{\mu(k_L^O)}{4q^*}, \quad (4)$$

since there are two projects in position during the reform,  $k_L$  and  $k_L^O$ . In addition,  $B_{t_0-1}^L$  can obtain “tribute” from  $B_{t_0}^L$  in the amount of

$$\alpha\left(\frac{\mu(k_L^O)}{4q_0} + \frac{\mu(k_L)}{4q_0}\right).$$

In summary, the total expected payoff to  $B_{t_0-1}^L$  conditional on reporting that his office is of type  $H$  is

$$\frac{\mu(k_L)}{4q^*} + \frac{\mu(k_L^O)}{4q^*} + \alpha\left(\frac{\mu(k_L^O)}{4q_0} + \frac{\mu(k_L)}{4q_0}\right). \quad (5)$$

On the other hand, if  $B_{t_0-1}^L$  reports honestly that his office is of type  $L$ , then at the beginning of period  $t_0 + 1$ , the office will be closed. Observing the honest report and expecting the subsequent closing of the office,  $E_{t_0}^L$  will invest  $k_L^C$  (the superscript  $C$  indicates the closing of the office) satisfying the first order condition

$$\mu'(k_L^C)[(Rv_L + R - \frac{1}{2q^*})] = 1, \quad (6)$$

since in period  $t_0 + 1$ , there will be no bureaucrats to demand a bribe from  $E_{t_0}^L$ . Comparing equation (2) and (6) and noticing Assumption 4, one can see that  $E_{t_0}^L$  invests more after observing an honest report by  $B_{t_0-1}^L$ . The intuition is that in this case, the low-productivity office will be closed, and in the next period there will be neither value-decreasing bureaucratic services  $v_L$  nor corrupt  $B_{t_0}^L$  to reduce the payoff that  $E_t$  can expect.

For  $B_{t_0-1}^L$ , an honest report has two effects: higher investment by  $E_{t_0}^L$ ; and losing tribute from the young bureaucrat. The total payoff to  $B_{t_0-1}^L$  after reporting honestly becomes:

$$\frac{\mu(k_L^C)}{4q^*} + \frac{\mu(k_L)}{4q^*}, \quad (7)$$

where the second term comes from pre-reform investment by  $E_{t_0-1}^L$ .

Similarly, we can analyze the incentive of  $B_{t_0-1}^H$ . Under Assumption 4, we know that closing the good office will result in a decrease in investment by the entrepreneur  $E_{t_0}^H$ . Such a reduction in investment will not benefit  $B_{t_0-1}^H$ . In addition, closing the office means that the bureaucrat  $B_{t_0}^H$  will stop paying tribute to  $B_{t_0-1}^H$ . These two effects are in the same direction and both prevent  $B_{t_0-1}^H$  from reporting dishonestly. Thus, the high-type official will always report honestly that the office is of high productivity, and it will be kept open.

Therefore, the key to the success of a selective reform is for  $T$  to persuade the incumbent officer in the low-productivity office,  $B_{t_0-1}^L$ , to cooperate by reporting honestly that his office should be closed. A sufficient condition for the success of a gradual reform can be obtained by comparing expressions (5) and (7).

**Proposition 2** *A necessary and sufficient condition for the success of a co-opting reform strategy is*

$$\frac{\mu(k_L^C) - \mu(k_L^O)}{q^*} \geq \alpha \frac{\mu(k_L) + \mu(k_L^O)}{q_0},$$

where  $k_L^C$  and  $k_L^O$  are the investment levels corresponding, respectively, to expectations that the office will be closed or remain open.

We can obtain several comparative static results from Proposition 2. Consider a decrease in  $q^*$ . The first effect is that  $k_L^C$  is lower; the second effect is that  $k_L^O$  is also lower. These effects pull in opposite directions and the net effect is ambiguous. However, with the lower  $q^*$ , the bureaucrat can benefit even more from the difference between  $k_L^C$  and  $k_L^O$ . Overall, we show that this third factor is more important.

Similarly, consider an increase in  $q_0$ , the steady state anti-corruption policy.  $k_L^O$  is higher, since fewer bribes have to be paid in  $t_0 + 1$ , and this creates a stronger incentive for the type- $L$  bureaucrats to keep their offices open. At the same time, Lemma 1 shows that future bureaucrats receive lower income. This translates into lower tribute paid to the incumbent bureaucrats. Under certain conditions, the second effect is more important.

The effect of a lower  $\alpha$  is obvious. It reduces the importance of lost tributes in the decision of the incumbent bureaucrats. This makes the co-opting strategy more successful.

To summarize:

**Corollary 1** *Ceteris Paribus, a lower  $q^*$  or a lower  $\alpha$  makes the co-opting strategy of reform more likely to succeed. Furthermore, when  $\alpha$  is large, specifically, when  $\frac{4\alpha}{1^* + \frac{3\alpha}{q_0}} \geq \frac{(\mu_L^{O'})^3}{-\mu_L^O \mu_L^{O''}}$ , then a higher  $q_0$  makes the co-opting strategy more likely to succeed.*

We can also study the consequence of a successful co-opting strategy. If a reform based on the co-opting strategy is successful, then the bureaucrat in the type- $L$  office expects to get more bribes. However, compared with the pre-reform situation, the investment level in the  $L$  office will increase, since entrepreneurs expect that their offices will be closed. Furthermore, after the success of the reform, the investment level will increase again due to the final elimination of the  $L$  office. Meanwhile, the investment level in the  $H$  office will fall during the reform due to the looser control on corruption.

**Proposition 3** *During a successful co-opting strategy of reform, the level of corruption in the type- $L$  offices (as measured by total expected bribes) goes up. The level of investment in the outgoing office also goes up. Meanwhile, investment in the remaining offices goes down during the reform period.*

Given this characteristic of the co-opting reform, one can expect that depending on the relative frequency of the two types of offices, total output (or investment, or social welfare) during the reform period (i.e., in the interim period before the reform is successful) can be either higher or lower than that in the pre-reform period.

**Corollary 2** *There exist a constant  $\beta^*$ , such that if  $\beta < \beta^*$ , then the total output of the economy during a co-opting reform is higher than that before the reform; otherwise, total output during a co-opting reform is lower than that before the reform.*

#### 4.3. A Comparison of Reform Strategies

We assume that the reformist  $T$  wishes to maximize discounted social welfare. Let  $\delta$  be  $T$ 's discount rate. Roughly speaking,  $\delta$  is positively related to the probability that  $T$  will

remain in power. When  $T$  is constantly challenged by other anti-reform parties, or when the election cycle is short,  $\delta$  is likely to be small. If  $T$  controls a stable, authoritarian regime,  $\delta$  may be close to 1. Thus, the chosen reform strategy maximizes the present value of social welfare, given the available reform options. In the following comparison, we continue to assume that the buy-out strategy is not available and the co-opting strategy is the only way to implement a selective reform.

We first look at a case that we call “sweeping reform.” At the start of a sweeping reform, at time  $t_0$ , all offices are closed. Therefore, starting from the beginning of period  $t_0$ , entrepreneurs cease to get services from their regional offices. They also stop paying bribes to bureaucrats. Furthermore, given that there are no bureaucratic offices, all entrepreneurs make the same level of investment. Let the common investment level be  $k_S$  (the subscript  $S$  stands for sweeping reform), which is given by the following first order condition

$$2R\mu'(k_S) = 1. \quad (8)$$

We calculate the social welfare associated with a sweeping reform starting at period  $t_0$ . First, notice that at the start of period  $t_0$ , there is a remaining project in each of the offices with investment levels of  $k_H$  and  $k_L$ , respectively, which were made in period  $t_0 - 1$  before the reform. These projects will neither get bureaucratic services nor generate bribes in time  $t_0$ . Together, they generate a social welfare of  $\beta\mu(k_H)R + (1 - \beta)\mu(k_L)R$ , since their investments are sunk in period  $t_0$ .

In addition, starting from period  $t_0$ , each period will on average generate one project (with probability  $\beta$  in the area of the obsolete  $H$  office; with probability  $1 - \beta$  in the area of the obsolete  $L$  office) with the following total payoff to the investing entrepreneur:  $2R\mu(k_S) - k_S$ , since each investment  $k_S$  will last two periods with equal return of  $R$  with probability  $\mu(k_S)$ . Thus, the total social product in a sweeping reform becomes:

$$W^S = \beta\mu(k_H)R + (1 - \beta)\mu(k_L)R + \frac{1}{1 - \delta}[2R\mu(k_S) - k_S]. \quad (9)$$

Notice that although entrepreneurs do not discount their future welfare, the reformist  $T$  discounts the utilities of future generations of entrepreneurs.

We now analyze the case of co-opting reform. When such a reform is successful, there are three kinds of projects. The first group comprises those left from the pre-reform period  $t_0 - 1$ . They generate a combined amount of social welfare of  $\beta\mu(k_H)Rv_H + (1 - \beta)\mu(k_L)Rv_L$ . The second group of projects consists of those made during the reform in period  $t_0$ . Their associated investment levels are  $k_L^C$  and  $k_H^O$ , respectively. They generate a net present social welfare of  $\beta[2\mu(k_H^O)Rv_H - k_H^O] + (1 - \beta)[\mu(k_L^C)(v_L + 1) - k_L^C]$ . The third group of projects comprises investments made after the reform, starting from period  $t_0 + 1$ . These investment levels are  $k_S$  in the obsolete  $v_L$  office and  $k_H$  in the productive office, respectively. Their total net present product thus is  $\frac{\delta}{1 - \delta}[\beta[2\mu(k_H)Rv_H - k_H] + (1 - \beta)2\mu(k_S)R - k_S]$ . Overall, the total net present social product from a successful co-opting strategy becomes

$$W^C = \beta\mu(k_H)Rv_H + (1 - \beta)\mu(k_L)Rv_L + \beta[2\mu(k_H^O)Rv_H - k_H^O] + (1 - \beta)[\mu(k_L^C)R(v_L + 1) - k_L^C] + \frac{\delta}{1 - \delta}[\beta[2\mu(k_H)Rv_H - k_H] + (1 - \beta)[2\mu(k_S)R - k_S]]. \quad (10)$$

Comparing equations (9) and (10), we get the following conclusions.

**Proposition 4** *When  $\beta$  or  $v_H$  is high enough, the the co-opting strategy is always chosen over a sweeping reform, regardless of  $\delta$ .*

Clearly, if there are many good offices or they provide very useful services, then a sweeping reform would destroy a valuable resource. This is clearly a bad strategy compared with the alternative of a selective reform that closes only the bad offices.

**Proposition 5** *Ceteris Paribus, when any of  $\delta$ ,  $v_H$ ,  $v_L$ , and  $\beta$  is higher, the co-opting strategy is more likely to be chosen over a sweeping reform.*

A higher  $\delta$  means that long-run payoffs are more important. Therefore, closing good offices forever in a sweeping reform looks less attractive. Meanwhile with a higher  $\delta$ , the short-run cost of increasing corruption during the reform is moderate. When either  $v_H$  or  $v_L$  is higher, the bureaucratic offices are less inefficient, so a reform that closes them all is less likely to be efficient. We have discussed the effect of a higher  $\beta$  above.

Next, we can study the effect of the steady-state anti-corruption policy,  $q_0$ . When  $q_0$  is higher, there are several effects on the comparison of reform strategies. The first is that wiping out the good office in the long run is more costly, since the good office is more valuable if there is a lower level of corruption. The second is that immediately closing the bad office in a sweeping reform is more beneficial. Since the investment made in period  $t_0 - 1$ ,  $k_{t_0-1}$ , is higher if there are lower bribes, allowing the  $B_L$  to continue “serving” is more costly now. On the other hand, of course, eliminating  $B_H$ ’s service right away in period  $t_0$  is also more costly. In summary, we can identify two sets of conditions: when there are many more good offices than bad ones, then the second effect is less important than the third; when the reformer is patient, then the first effect predominates over the second effect. In both cases,  $T$  is more likely to use a co-opting reform strategy.

**Proposition 6** *There exist  $\underline{\delta}$ ,  $\underline{\beta}$ ,  $\underline{v}_L$ , and  $\underline{v}_H$  such that if  $\delta > \underline{\delta}$  or  $\beta > \underline{\beta}$  or  $v_L > \underline{v}_L$  or  $v_H > \underline{v}_H$ , then a higher  $q_0$  makes it more likely that the co-opting strategy will be chosen.*

Overall, our message is that a co-opting strategy of reform aiming at closing selective offices is likely to be appealing when high-level reformers have a longer time horizon, when the underlying bureaucratic system is on average more productive, and when the steady-state level of corruption is lower. In other words, the co-opting strategy is likely to be adopted by a reformer with a long horizon to replace a relatively efficient bureaucratic system with one that is more efficient, more market-oriented, and less corrupt.

## 5. Extensions and Discussion

### 5.1. The Need for Bureaucratic Cooperation during the Reform

In our formal model, a key assumption is the information asymmetry between the reformist  $T$  and the incumbent bureaucrats  $E_{t_0-1}$ . This asymmetry makes the cooperation of bureaucrats important. In fact, our formal analysis can be extended to a much wider range of circumstances. What is essential to our theory is the premise that the cooperation of lower-level bureaucrats is very important if one is to implement significant institutional

change.

There are two broad categories of reasons why bureaucratic cooperation is needed. The obvious one is that bureaucratic skills are often indispensable for institutional changes. Many reform measures have to be implemented by lower-level bureaucrats. Take the issue of mass privatization. All detailed operations, from checking book values of state enterprises and issuing vouchers to organizing auctions of shares, have to be performed by the bureaucrats. Aside from incentive issues, the incumbent industrial bureau officials are the least costly human resources for these tasks. In general, such bureaucratic capital (see Huang and Li, 1996) is a resource that can be utilized efficiently by the reformers.

The second reason for the importance of bureaucratic cooperation during the reform is based on the top reformers limited political capital. The top reformer must amass a critical amount of political support for the reform. Incumbent bureaucrats, through their familiarity with politics, are potentially formidable foes of reform who need to be placated.

### *5.2. Political Cost of the Co-opting Strategy*

Our formal analysis omits any discussion of the political cost of co-opting bureaucrats through corruption. Our theory focuses on the economic costs of co-opting, i.e., decreased incentives for entrepreneurs to invest. However, there are also significant political costs. In a co-opting strategy, bureaucrats getting “golden handshakes” seem like a vestige of the past, and a counterexample to what reforming politicians usually preach. The presence of such examples can create public cynicism and dissatisfaction with the reform process. For instance, in China, corruption was a leading cause of the Tienanmen incident. In other formerly socialist economies, corruption was often regarded as a “second-generation” problem of transition.<sup>16</sup>

It seems that the marginal political cost of corruption increases very fast with the level of corruption. Mild levels of corruption can be easily tolerated by the general public so long as the economy grows fast. Extremely high levels of corruption even in rapidly

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<sup>16</sup>See Transition, June, 1995.



growing economies can lead to extreme political responses, from voting out the government to military *coup d'état*. This leads us to believe that our theory is more relevant to cases where corruption levels are low before the reform and a mild increase of corruption is enough to provide the incentives for bureaucrats to comply with the reform.

## 6. Conclusion

We analyze corruption in the context of institutional changes such as the post-socialist reform. Our conclusion is generally different from 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 analysis can explain a set of observations of transitional economies that have puzzled many commentators – in particular, how increasing corruption can co-exist with an apparently successful reform that has given rise to rapid economic growth.

Our conclusion stems from our new approach to corruption. First, we treat corruption as a by-product of bureaucratic institutions; therefore 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. In that case, a temporarily high level of corruption can be useful for “buying-off” bureaucrats currently in power, even if later generations of bureaucrats suffer as a consequence. These features of our approach lead to our key distinction: corruption during reform may be qualitatively different from corruption in the steady state. Even if steady-state corruption always impedes growth, as it does in our model, a short-lived burst of corruption can increase the likelihood that reform will succeed, and thus increase welfare.

This implication of our conclusion should be treated with care. Although corruption during reform is often unavoidable, 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.

## Appendix

### A.1. Proof Lemma 1

$$\left(\frac{\mu}{q}\right)' = \frac{\mu' k'_q}{q} - \frac{\mu}{q^2}. \quad (a1)$$

From the first order condition (2), we get

$$k'_q = -\frac{\mu'}{q(2qRv_L - 1)\mu''} = -\frac{\mu'^2}{q^2\mu''}. \quad (a2)$$

Plugging (a2) into (a1), we have

$$\left(\frac{\mu}{q}\right)' = -\frac{1}{q^3} \left[ \frac{\mu'^3}{\mu''} + \mu q \right] \leq 0.$$

The last inequality is from Assumption 5.

### A.2. Proof of Corollary 1

Define

$$D = \frac{\mu(k_L^C) - \mu(k_L^O)}{q^*} - \alpha \frac{\mu(k_L) + \mu(k_L^O)}{q_0}.$$

Clearly,  $\frac{\partial D}{\partial \alpha} < 0$ . Therefore, a lower  $\alpha$  makes the co-opting strategy more likely.

For an increase in  $q^*$ , we know that  $\mu(k_L^O)$  will be higher, since  $k_L^O$  will be higher.  $k_L$  is independent of  $q^*$ . Therefore, the second term in  $D$  will be higher. As for the effect of an increase in  $q^*$  on the first term, we have

$$\left[ \frac{\mu(k_L^C) - \mu(k_L^O)}{q^*} \right]_{q^*} = -\frac{\mu(k_L^C) - \mu(k_L^O)}{q^{*2}} + \frac{1}{2(q^*)^3} \left[ -\frac{(\mu_L^C)'}{\mu_L''} - \mu_L^C q^* + \frac{(\mu_L^O)'}{\mu_L''} + \mu_L^O q^* \right] < 0.$$

The last inequality is by assumption 2.

Finally, we can study the effect of a change in  $q_0$  on  $D$ . The only terms affected by  $q_0$  are  $-\frac{\mu(k_L^O)}{q^*} - \alpha \frac{\mu(k_L) + \mu(K_L^O)}{q_0}$ .  $k_L$  increases with an increase in  $q_0$  by Proposition 1. At the same time, the second term decreases with an increase in  $q_0$  by Lemma 1. Similiar to A.1., we have

$$\frac{\partial D}{\partial q_0} = \frac{(\mu_L^{O'})^3}{2q_0^2 q^* \mu_L^{C''}} + \alpha \left[ \frac{(\mu_L')^3}{(q_0)^3 \mu_L''} + \frac{\mu_L}{q_0^2} + \frac{(\mu_L^{O''})^3}{2(q_0)^3 \mu_L^{O''}} + \frac{\mu_L^O}{q_0^2} \right].$$

Notice that both  $\mu(\cdot)$  and  $\frac{\mu'^3}{\mu''}$  are increasing functions of  $k$  by assumptions. Therefore, we have

$$\frac{\partial D}{\partial q_0} \geq \left( \frac{1}{2} \frac{q_0}{q^*} + \frac{3}{2} \alpha \right) \frac{(\mu_L^{O'})^3}{(q_0)^3 \mu_L^{O''}} + 2\alpha \frac{\mu_L^O}{q_0^2}.$$

which gives the condition in Corollary 1.

### A.3. Proof of Propositions 4 to 6

Define

$$\begin{aligned} \Delta W &\equiv W^C - W^S \\ &= \beta \mu(k_H) R(v_H - 1) + (1 - \beta) \mu(k_L) R(v_L - 1) \\ &+ \beta [ [2\mu(k_H^O) R v_H - k_H^O] - [2\mu(k_S) R - k_S] ] + (1 - \beta) [ [\mu(k_L^O) R(v_L + 1) - k_L^C] - [2\mu(k_S) R - k_S] ] \\ &+ \frac{\delta}{1 - \delta} \beta [ [2\mu(k_H) R v_H - k_H] - [2\mu(k_S) R - k_S] ]. \end{aligned}$$

Furthermore, define

$$A \equiv \beta \mu(k_H) R(v_H - 1) + (1 - \beta) \mu(k_L) R(v_L - 1),$$

$$B \equiv \beta [ [2\mu(k_H) R v_H - k_H] - [2\mu(k_S) R - k_S] ] + (1 - \beta) [ [\mu(k_L^O) R(v_L + 1) - k_L^C] - [2\mu(k_S) R - k_S] ],$$

and

$$C \equiv \frac{\delta}{1 - \delta} \beta [ [2\mu(k_H) R v_H - k_H] - [2\mu(k_S) R - k_S] ].$$

Notice that when  $\beta$  is close to 1, all terms  $A$ ,  $B$ , and  $C$  are positive. In fact, all terms are increasing in  $\beta$ , since the coefficients on the  $\beta$  terms are all positive, while those on the  $1 - \beta$  terms are negative. The same can be said of  $v_H$  (except that  $v_H$  is unbounded from above). Thus, Proposition 4 is proved.

As for Proposition 5, the effect of a higher  $\delta$  on  $\Delta W$  is clearly positive. Both  $v_L$  and  $v_H$  enter positively in all  $A$ ,  $B$ , and  $C$  terms. Thus, Proposition 5 is readily proved.

Finally, for Proposition 6, notice that the effect of an increase in  $q_0$  increases both  $B$  and  $C$ , following the logic of Proposition 1. Moreover,  $\frac{\partial C}{\partial q_0}$  is unbounded upward when  $\delta$  goes to 1. Thus the condition on  $\delta$  is proved. The key to prove the rest of Proposition 6 is to study  $\frac{\partial A}{\partial q_0}$ :

$$\frac{\partial A}{\partial q_0} = \beta \mu'(k_H) k'_H R(v_H - 1) + (1 - \beta) \mu'(k_L) k'_L R(v_L - 1).$$

Notice that all terms are positive except for  $1 - v_L$  in the above expression, which is positive, when  $v_H$  is very large or when  $v_L$  is close to 1 or when  $\beta$  is near 1.

## References

- Boycko, M., A. Shleifer, and R. Vishny: "Privatizing Russia", *Brookings Paper on Economic Activities*, pp139-192, 1993.
- Chen, A.: "Chinese Industrial Structure in Transition: The Emergence of Stock-Offering Firms," *Comparative Economic Studies*, 36, 4:1-20. Winter, 1994.
- Cui, Ronfa, "The Experiment of the TVE Property Rights Reform in Taizhou Prefecture" ("Taizhou Diqu Xiangzheng Qiye Chanquan Gaige De Shiyan"). Mimeo., System Reform Commission of Taizhou Prefecture, Zhejiang Province, 1994.
- Challenges and Choices", M.E. Sharpe, Inc., New York, 1987. *Modernization*", Nov. 18, 1993.
- Gong, Ting: "*The Politics of Corruption in Contemporary China: An Analysis of Policy Outcomes*," Praeger:London, UK. 1994.
- Gould, D. and J. Amaro-Reyes: "The Effects of Corruption on Administrative Performance", *World Bank Staff Paper No. 580*, 1983.
- Grossman, S. and O. Hart: "Costs and Benefits of Ownership: A Theory of Vertical and

- Lateral Integration.” *Quarterly Journal of Economics*, , v.94, 1986.
- Hua, S., X. Zhang, and X. Luo: “Rethinking the Past Ten Year’s Reform” (in Chinese), *Economic Research*, 1988:11, 1988.
- Huang, Yasheng and David D. Li: “Bureaucratic Capital Utilizing Reforms versus Bureaucratic Capital Destroying Reforms,” mimeo, University of Michigan, 1996.
- Hungtington, S.: “*Political Order in Changing Societies*”, Yale University Press, 1968.
- Kornai, J.: “The Socialist System”, Princeton University Press, 1992.
- Laffont, J.-J., and J. Tirole: “The Dynamics of Incentive Contracts.” *Econometrica*, 56.1153–1176, 1988.
- Leff, N.: “Economic Development Through Bureaucratic Corruption”, *American Behavioral Scientist*, pp8-14, 1964.
- Li, D.: “A Theory of Ambiguous Property Rights in Transition Economies — the Case of Chinese Non-State Sector,” *Journal of Comparative Economics*, forthcoming.
- Lui, F.(1985): “An Equilibrium Queuing Model of Bribery,” *Journal of Political Economy*, v.93:4, pp760–781, August 1985.  
mimeo, University of Michigan, 1994.
- Lin, Qingsong, and He, Jiacheng, and Du, Haiyan, “Rural Industrial Enterprises and the Role of Local Governments: A Chinese Case Study.” In Jones, Derek, and Svejnar, Jan, Eds., *Advances in the Economic Analysis of Participatory and Labor-Managed Firms*, (Volume 4), pp.243—271. Greenwich, CT: JAI Press, 1992.
- Rose-Ackerman, Susan: “The Economics of Corruption,” *Journal of Public Economics*, v.4 n.1:187–203, 1975.
- Shleifer, A. and R. Vishny: “Corruption”, *The Quarterly Journal of Economics*, v.136,

1993.

Sachs, J. and W. Woo: "Structural Factors in the Economic Reforms of China, Eastern Europe and the Former Soviet Union", *Economic Policy*, Spring, 1994.

*The Economist*: "Something Smelly in Vietnam's Doi Moi," June 4, 1994.

United Nations: "*Corruption in Government*", New York, United Nations, 1989.

Science Publisher, Beijing, 1992.

The World Bank: "World Bank Discussion on Second-Generation Transition Issues," *Transition*, v.6, n.5-6, May-June 1995. pp.1-6.