There appears to be significant diversity in the incidence of bureaucratic corruption across countries at different stages of economic development and under different political and economic regimes. Little theoretical or empirical analysis has been offered, however, on the link between corruption, government, and growth. The paper attempts to fill the void through equilibrium models of endogenous growth. “Balanced growth” is derived as a balancing act between accumulating human capital, which engenders growth, and accumulating political capital, which mainly assures bureaucratic power. The analysis focuses on the interplay between investment in these two types of capital and its implications for long-term growth under alternative political regimes. Some propositions are tested and confirmed empirically.

Work on this paper was originally inspired by a question from Gary Becker in a conference on the economic contest between communism and capitalism held by the Institute for the Study of Free Enterprise Systems (ISFES) of the State University of New York at Buffalo in June 1991. In a dinner talk, Becker noted that time-series data generally showed that while per capita income levels in former Soviet bloc countries lagged behind those of developed Western economies, the respective growth rates over a number of decades were similar. This would seem contrary to many economists’ intuition that free-market systems would outperform command economies. He sought an explanation that does not question the data. Ehrlich is also indebted to Zheng Yuan for dedicated research assistance and to Sergei Morozov and Jinyoung Kim for helpful comments and suggestions. We are responsible for the shortcomings.
I. Introduction

Evidence of bureaucratic corruption exists in all societies, at all stages of economic development, and under different political and economic regimes. There appears to be considerable diversity in its incidence, however, as indicated by some international corruption measures. This diversity and its association with economic growth and development are the focus of this paper.

Recent studies (e.g., Mauro 1995) indicate that countries mired in poverty are inundated by corruption (Zaire, Indonesia, and Haiti are notorious examples), whereas rich countries (Switzerland, Canada, and the United States) are less susceptible. There has been little theoretical or empirical analysis, however, on the link between corruption and long-term growth and development. How corruption and growth vary with the type of political regime is even less clear. No corruption measures are available for the command economies of former communist countries. While the reported real per capita levels of gross domestic product in these economies lagged behind those of Western democracies in the post–World War II era, however, their long-term rates of economic growth were even higher.¹

It is easy to dismiss especially this seemingly puzzling evidence by questioning the GDP measures in command economies, or the corruption measures in general. Could the apparent facts also be rationalized by some theoretical considerations? Is the relationship between corruption and growth causal, or is it the result of third factors, including government intervention in the economy? Furthermore, can a theory of the link between corruption and growth provide some insights into the growth experience of different political regimes? This paper explores these issues by applying a model of endogenous corruption and growth.²

¹ The overall growth rate of real per capita GDP (RGDPC) in the sample of 152 countries used in the regression analysis of Sec. III/F was 1.9 percent between 1962 and 1992, with a mean RGDPC value of $4,654 in 1980. By contrast, the estimated rate of growth of RGDPC in the 11 former communist countries included in that set was 3.7 percent over the same period, with a mean RGDPC value of $3,797 in 1980. The corresponding growth rates of RGDPC in the European subset of 20 countries and the eight former communist countries within it were 3.1 percent and 3.7 percent, respectively, and the mean values of RGDPC in 1980 in these two groups were $8,178 and $4,727, respectively.

² The basic model was first presented in a joint seminar of ISFES and the Institute for Policy Analysis of the University of Toronto held in Buffalo in May 1992 and in the session on economic growth and development in the 1992 American Economic Association meetings in Anaheim (Ehrlich and Lui 1992). The models by Murphy, Shleifer, and Vishny (1991, 1993) and Shleifer and Vishny (1993) pursue similar approaches toward the relationship between corruption and the economy, but the models are static in nature. They do not systematically model the relationship between corruption, government, and the economy’s growth path.
The point of departure is that any government intervention in the economy assigns some resource allocation responsibilities to a bureaucratic structure. Since the shadow prices generated thereby typically deviate from free-market prices, an incentive arises to close the gap by various side payments, or bribes. Exercising the opportunity to obtain such rents is what is here meant by corruption.

Bureaucratic corruption is thus an inevitable aspect of government intervention in the economy, whatever its raison d'être and regardless of the net social benefits it may confer. As an illegal activity, it could be modified through law enforcement, but conventional enforcement tends to be costly and ineffective against “victimless” crimes (Ehrlich 1996). Moreover, as members of the political establishment, bureaucrats have inroads to, and may even be part of, the law enforcement apparatus.

Corrupt behavior by itself need not impose a net social cost since it involves transfer payments from bribe payers to bureaucrats. Moreover, bribes can ameliorate the deadweight cost of government intervention by directing scarce resources toward higher bidders (Leff 1964; Lui 1985). However, since bureaucratic power holds the promise of economic rents through corruption, individuals have an incentive to compete over the privilege of becoming bureaucrats. Existing literature has referred to such activity as “rent seeking” (e.g., Krueger 1974). It is here called investment in political capital. Such investment consumes economic resources that could otherwise be used for production or investment in human capital. This is the source of the social loss from corruption in this analysis.

As in the recent literature on endogenous growth, investment in human capital is identified as the economy’s engine of growth. “Balanced growth” thus involves a balancing act between the accumulation of human capital, which engenders growth, and political capital, which mainly assures bureaucratic power and thus has little, if any, beneficial effects on productive capacity. The analysis focuses

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3 The possibility that bureaucrats will auction off government services, or even their own services, in an open market is disregarded since this would make government transactions indistinguishable from those of the free market.

4 Along similar lines, Murphy et al. (1991, 1993) argue that rent seeking distorts the allocation of talents away from entrepreneurship and innovation and may therefore reduce economic growth. But they do not offer an explicit model of the relationship between corruption and long-term growth in an endogenous growth context.

5 Some investment in social connections (an aspect of the Chinese guang-xi) may also be socially productive, to the extent that it cuts down on information and transaction costs caused by incomplete markets. What is modeled as socially unproductive here is investment designed to capture private distributional gains from bureaucratic power when that power replaces an explicit market-pricing mechanism.
on the interplay between investment in these two types of capital and its consequences for growth under different political regimes.

Two complementary models of endogenous growth are outlined. In model 1, agents are homogeneous, and the model offers a general equilibrium solution for the allocation of resources to investment in bureaucratic and productive pursuits, including work. In model 2, heterogeneous agents form separate groups of bureaucrats and workers as a consequence of different initial endowments and commensurate investment strategies. This model provides additional insights concerning the covariation of corruption and growth under alternative bureaucratic structures.

II. Homogeneous Agents Case

A. Assumptions

The economy consists of homogeneous agents: each is both a worker and a bureaucrat. Growth is endogenous to the economy, and the engine of growth is human capital. To make the analysis tractable, government plays a neutral role in the economy, its size is exogenously determined, and there is no effective law enforcement against bribes. Human capital is the sole productive asset. Agents thus choose to invest in human capital or socially unproductive bureaucratic power (or both), the rent on which is proportional to the extent of government intervention in the economy.

The opportunity set consists of four production technologies. Human capital is generated by

$$H_{t+1} = A(\overline{H} + H_t)h_t$$

(1)

where $H_t$ denotes human capital at period $t$, $\overline{H}$ an endowed “raw” labor capacity, $h_t$ the fraction of time invested in creating future human capital, and $A$ a technological parameter. This is essentially the investment technology employed in Lucas (1988), Becker, Murphy, and Tamura (1990), and Ehrlich and Lui (1991). Symmetrically, political capital is generated by

$$Q_{t+1} = B(\overline{Q} + Q_t)q_t$$

(2)

where $Q_t$ denotes the stock of political capital at time $t$ and $q_t$ the fraction of time invested generating it. Raw labor is also introduced in equation (2) to permit a possible accumulation of political capital even if its initial stock were zero. Since its role seems marginal relative to that of initial, or inherited, political capital, however, $\lambda$ is henceforth set equal to zero. The consumption good is produced by
The reward from bribe taking, like crime, is also a function of bureaucrats’ honesty and effective law enforcement. The parameter θ represents not just government size but also the probability that bureaucratic power will actually be exploited, which, in turn, reflects the moral impediments against graft and the prospect of punishment. Recognizing the role law enforcement may play to suppress corruption would not, however, affect the model’s major propositions.
age political capital \( \{Q^*_t\}, t = 1, \ldots, \infty \). While this variable is exogenous to individuals, however, it becomes endogenous at the macro level after the equilibrium condition \( Q_t = Q^*_t \) is imposed.

### B. Investment Choices

The necessary optimality conditions for \( h \) and \( q \) are a pair of second-order simultaneous difference equations.\(^7\) To economize on space, they are presented below after the equilibrium condition \( Q_t = Q^*_t \) is imposed:

\[
\left( \frac{c_{t+1}}{c_t} \right)^\sigma \geq \beta A(1 - q_{t+1}) \equiv \beta R_h
\]

(6)

and

\[
\left( \frac{c_{t+1}}{c_t} \right)^\sigma = \beta(\theta M_t + N_t) \equiv \beta R_q,
\]

(7)

where

\[
\frac{c_{t+1}}{c_t} = \frac{(\overline{H} + H_{t+1})(1 - h_{t+1} - q_{t+1})}{(\overline{H} + H_t)(1 - h_t - q_t)},
\]

\[
M_t = \frac{(\overline{H} + H_{t+1})(1 - h_{t+1} - q_{t+1})}{q(\overline{H} + H_t)},
\]

\[
N_t = \frac{(\overline{H} + H_{t+1})q_{t+1}Q_{t+1}}{(\overline{H} + H_t)q(\overline{H} + Q_{t+1})}.
\]

For investments in both forms of capital to coexist, the agent’s marginal rate of substitution in consumption must be equal to the discounted rate of return (\( \beta R \)) on each. There is also the possibility of zero investment in human, but not in political, capital. Indeed, by equation (7), as long as there is positive government intervention (\( \theta > 0 \)), if investment in political capital approached zero, the rate of return on this investment would approach an infinitely high value. Some investment in \( Q \) by any agents would then be optimal to take advantage of potential rents flowing from the necessarily positive production by others. A corollary to this proposition can also be

\(^7\)The transversality conditions for an optimal accumulation of both human and political capital can be shown to require that \( \lim_{t \to \infty} \beta(c_t)^{-\alpha} H_t = 0 \). Under a persistent growth equilibrium, this condition can be shown to be fulfilled if \( \beta(1 + g^*)^{1-\alpha} < 1 \), where \( g^* \) denotes the steady-state growth rate of consumption as \( t \to \infty \). These conditions assure the boundedness of the objective function as well.
easily proved, namely, that if there is no government intervention, optimal $q$ would be zero. *Accumulation of some political capital, hence corruption, is thus shown to be an inevitable aspect of government intervention in the economy.*

Although optimal a priori, investment in political capital yields zero equilibrium net return from bribes to all agents because of their homogeneity. This reflects a kind of market failure. All agents would be better off not to invest in $Q$, but no one can afford doing so. If $j$ eschews any investment, $\ln(Q_j/Q^o)$ would become infinitely negative: $j$ would wind up at the bottom of the net income distribution. Unless all agents cooperate to enforce a zero investment policy, each would continue to overinvest in political capital, to the detriment of human capital accumulation.

C. Multiple Equilibria, or Stages of Development

There is no unique dynamic solution to this system. The interaction between political and human capital accumulation produces multiple equilibria. A given set of basic parameters—$A$, $B$, $H$, $\beta$, $\sigma$, and $\theta$—that can support a stable, self-sustaining “growth equilibrium” may also support two other stagnant steady states: a stable “poverty trap” and an unstable “development equilibrium,” depending on the initial values of human and political capital. Above some critical values of $H$ and $h$, relative to $Q$ and $q$, investment in human capital becomes subject to increasing returns as $q$ is simultaneously falling. The opposite occurs if the relative magnitudes of $H$ and $h$ fall below this threshold level. This trade-off between investment in political and human capital creates a potential for economic instability in countries that are at a critical takeoff phase: a shock in the system could lead to either takeoff toward growth or regression toward poverty. These three admissible steady states represent, roughly, three stages of economic development.

*Low-level stagnant equilibrium, or poverty trap.*—There is no investment in human capital, only in political capital: $h = 0$ and $q_t = q_{t+1} = q_i$. Earning capacity is at its minimal level $H_i = H$. In this case we have explicit solutions for $q_t = \beta \theta / (1 - \beta + \beta \theta) < 1$ (since $\beta < 1$), and $e_i = Y_i = H_i(1 - q_i)$. Equilibrium is stable. An increase in government size increases optimal investment in $Q$, causing personal income and consumption to fall, or $dq_t/d\theta > 0$ and $dc_t/d\theta < 0$.

*Stagnant “development” equilibrium.*—The solutions for the control and state variables here are $h_t = h_{t+1} = h_d = 1 - [(\beta A - 1) / \beta A] [(1 - \beta + \beta \theta) / \theta] < 1$ and $q_t = q_{t+1} = q_d = 1 - (1/\beta A) < 1$, provided that $\beta A > 1$; and $H_d = H \alpha h_d/(1 - \alpha h_d)$ = constant. The agent invests in both $Q$ and $H$, but investment in the latter, $h_d$, is insufficient to
effect a takeoff to growth. This equilibrium is found to be unstable; that is, when we start from the equilibrium values of $h$, $q$, $H$, and $Q$, a shock moving $H$ and $h$ upward would raise the rate of return to investment in human, relative to political, capital, thus initiating a takeoff. But the opposite would happen if the shock lowers the initial human capital level.

Persistent "growth" equilibrium.—Investment in human capital is sufficient to generate self-sustaining growth. Specifically, as $t \to \infty$, we have $h_t \to h_s = \text{constant}$; $q \to q_s = \text{constant}$; and $(\bar{H} + H_{t+1})/(\bar{H} + H_t) \to A h_t = 1 + g$, where $g > 0$ is the asymptotic value of the growth rate of income and consumption. Simulation analyses for parameter values consistent with a stable growth equilibrium show that increases in government size lower investment in human capital while increasing investment in political capital, hence corruption; or $dh/\partial \theta < 0$ for all values of $\sigma < 1$, and $dq/\partial \theta > 0$ unless $\sigma = 0$. Moreover, the increase in $q$ exceeds the reduction in $h$, so that working time falls, or $d(1 - h - q)/\partial \theta < 0$. An increase in government size is thus seen to lower both the short-run level and long-run rate of growth of per capita income. Also, any exogenous increase in investment in political capital would necessarily lower the rate of accumulation of human capital and economic growth, since, by equation (6), $(1 + g)^s = \beta A (1 - q_s)$, and thus $dg/dq_s < 0$. By contrast, a decrease in time preference for consumption (an increase in $\beta$) will increase both corruption and growth.

D. Corruption and Stages of Development

Comparison of the three alternative equilibria, or stages of development, produces a monotonic, but opposite, ranking of the level of income and the degree of corruption across the three. With the stagnant, development, and growth equilibria labeled as $s$, $d$, and $g$, respectively, the analysis predicts a negative association between the steady-state levels of investment in political capital (hence corruption) and human capital (hence per capita income), or

$$q_s > q_d > q_g \quad \text{whereas} \quad h_s > h_d > h_g,$$

More specifically, as $t \to \infty$, the implicit solutions for $h_s$ and $q_s$ in a steady state of growth are given by $(Ah)^s - \beta A (1 - q) = 0$ and $A^{e-1} \beta^s H^s + \theta h - \beta 0 h = 0$, respectively. There is generally no explicit solution for $h$ and $q$ (hence the recourse to simulations), except in the special case in which $\sigma = 1$. In that case, $h = \beta/(1 + \beta 0) < 1$, $q = 0 h = 0 h/(1 + \beta 0) < 1$, and working time is given by $1 - h - q = (1 - \beta)/(1 + \beta 0) < 1$, as $\beta < 1$. Clearly then, an increase in $\theta$ lowers $h$ but raises $q$ by a greater amount, so that working time is necessarily lower. By eq. (6), a growth equilibrium may exist; i.e., $A h_t = 1 + g > 1$ only if $\beta A$ and therefore $A$ are sufficiently larger than one.
The incidence of corruption and its deadweight costs are expected to be highest in less developed countries and lowest in countries enjoying persistent per capita income growth, and this result holds for any values of the model’s basic parameters.\(^9\)

E. The Role of Government Intervention and Initial Conditions

As shown in subsection C, an exogenous increase in government intervention in the economy (\(\theta \)) will unambiguously lower both the short-run level and long-run rate of growth of per capita income and consumption if the economy is in a growth equilibrium. Or it will lower just the level of the two if the economy is in a stagnant equilibrium. Moreover, a large enough increase in \(\theta \) can cause a transition from persistent growth to an unstable stagnant equilibrium or a poverty trap. This result stems, in part, from the assumed neutral role of government as a productive agent, which ignores the salutary effects of such public goods as the rule of law and public security. It would remain valid, however, even if some degree of government intervention were conducive to growth, as in Sarro’s.\(^9\) In that case, the proposition would relate to an exogenous increase in government size above such a critical level.

A related implication concerns the role of initial conditions. Given a set of parameters that can in principle support growth, whether the economy converges in practice to one of the two stable steady states is shown to depend on the initial levels of investment in, and the stock of, human capital: \(h(0)\) and \(H(0)\). If the initial human capital stock and investment flow fall short of (or exceed) their “development equilibrium” thresholds, an exogenous parametric shock could nudge the economy toward a stagnant (or growth) equilibrium, depending on the direction of the shock.

It follows that a given level of government intervention will be more harmful to persistent growth prospects in human capital–poor

\(^9\) Proof. By eq. (1), \(Ah = H_{t-1}/(\bar{H} + H)\). Therefore, in state \(s\), \(h = 0\); in state \(d\), \(Ah_d = H_{t-1}/(\bar{H} + H) < 1\); and in state \(g\), \(Ah_g = H_{t-1}/H > 1\). It follows that \(h_t = 0\), \(h_l < 1/A\), and \(h_g > 1/A\), or \(h_l > h_g > h\). Also, from eq. (6), \((\sigma_{s+1}/\sigma)^s \geq \beta_A(1 - q)\). Rewriting eq. (6) for the three states, in state \(s\) we obtain \(1 = (\sigma_{s+1}/\sigma)^s > \beta_A(1 - q_s)\); in state \(d\), \(1 = (\sigma_{s+1}/\sigma)^s = \beta_A(1 - q_d)\); and in state \(g\), \(1 < (\sigma_{s+1}/\sigma)^s = \beta_A(1 - q_g)\). Since \(\beta_A(1 - q_d) > \beta_A(1 - q_g) > \beta_A(1 - q_s)\), it follows that \(q_d > q_g > q_s\). Because of the negative correlation between \(h\) and \(g\) across the alternative stages of development, the ranking of working time, \(1 - h - q\), across these stages is generally ambiguous. However, if \(\sigma = 1\), the closed-form solutions for \(h\) and \(q\) indicate that working time in the developed countries under the stable growth equilibrium, \((1 - \beta)/(1 + \beta)\), is necessarily lower than working time under the stable poverty trap, \((1 - \beta)/(1 - \beta + \beta)\), as is indeed the case empirically.
countries than in human capital–rich ones. The former can afford fewer “errors” in government policies. This implication seems contrary to conventional theories of development, which typically recommend more involvement of government in less developed countries.

III. Heterogeneous Agents Case: Workers and Bureaucrats

Missing from the homogeneous agents case are two possible types of specialization among agents. Bureaucrats (B) and workers (W) are typically separate groups. Also, each may invest exclusively in either human or political capital rather than necessarily in both. The heterogeneous agents model accounts for both types of specialization, as well as for the distributive effects of corruption across groups.

Added assumptions.—Each group of agents is homogeneous internally. They differ only in their initial endowments of political capital: \( Q_b(0) > Q_w(0) \). The advantage of B over W may originate from endowed differences in such attributes as ethnicity, language, religion, or ideological cohesion. Whatever its source, the gap between \( Q_b(0) \) and \( Q_w(0) \), and the exogenously determined group size of W relative to B, \( \alpha = N_w / N_b \) must be sufficiently large to eliminate the possibility of “jumps” from W to B or vice versa. A key assumption concerns the structure under which bureaucrats operate: “competitive” or “monopolistic.” The first is a case of decentralized bureaucracy, where bureaucrats compete over relative personal power. The second involves a centralized bureaucracy in which bureaucrats’ choices are controlled by a central authority. By contrast, workers are assumed to behave as strictly independent agents.

A. The Competitive Case

The opportunity set underlying production in the economy remains formally the same as in Section II, except that equations (1), (2), (3), and (5) are now specified separately for W and B by labeling the corresponding control and state variables by the subscripts \( w \) and \( b \). The major substantive change modifies the net income (con-

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10 While the underlying sources of heterogeneity may be contested over time, the analysis implies that they are likely to exert long-term influence as long as there are no changes in group-specific basic parameters because of the initial endowments’ impact on agents’ optimal investment strategies. Jumps from B to W are prevented by the equilibrium condition that B’s net income is at least as high as W’s. In turn, this requires \( \alpha \) to be sufficiently high, as indicated in subsection B below.
sumption) distribution functions to account for the distributional effects of corruption across groups:

\[ c_w(t) = (1 - \gamma(1 - \bar{Q}(t)))Y_w(t) \]  

(9)

for workers and

\[ c_b(t) = \left\{ 1 + \ln \left[ \frac{Q_b(t)}{Q^w_b(t)} \right] \right\} Y_b(t) + \alpha\gamma(1 - \bar{Q}(t))Y_w(t) \]  

(10)

for bureaucrats, where \( \bar{Q} = \frac{Q_w(t)}{Q_b(t)} \) denotes the ratio of workers’ to bureaucrats’ political capital, and \( \gamma \) denotes the portion of the economy under government influence, which is conducive to extracting rents (the analogue of \( \theta \) in Sec. II). In this model, \( B \) winds up with positive net bribes, paid by \( W \), and the the bribes are higher the lower \( \bar{Q} \) and the higher \( \alpha = \frac{N_w}{N_b} \) and \( \gamma \). Since bureaucrats are homogeneous, however, in equilibrium each winds up with the same political capital as the average, \( Q_b(t) = Q^w_b(t) \), and neither reaps any ex post gains by competing over relative power.

The idea behind these specifications of the net income functions is that a bureaucrat’s rent depends on his relative political power both within the \( B \) group and across the \( B \) and \( W \) groups. By contrast, a worker’s net income depends just on her relative power to avoid high payments to \( B \) or receive some favors as well. The basic choice for both remains their optimal investment strategies.

The decision rule is given by equation (5), except that it applies separately to \( W \) and \( B \). As in Section II, the optimization analysis for each bureaucrat takes as given the group’s average political capital \( \bar{Q}^w_b(t) \), but the solution is then modified by the equilibrium condition \( Q_b(t) = \bar{Q}^w_b(t) \).

B. Competitive Solutions: Multiple Equilibria

The interaction between the investment strategies of members of \( W \) and \( B \) increases the number of admissible steady states. As in Section II, however, there are just three development stages: poverty trap, stagnant development equilibrium (which is, again, unstable), and self-sustaining growth equilibrium. These are supported by (a) zero investments in \( H \) by both \( W \) and \( B \) (a poverty trap); (b) positive investments in \( H \) by either group or both (at equal rates), but sufficient to support just a stagnant (development) equilibrium; or (c) large enough investments in \( H \) by either group or both (at equal rates) that yield persistent and balanced growth. Each stage of development, in turn, is attainable through two categories of admissible
steady states of balanced growth: either both $W$ and $B$ invest equally in political capital or only $B$ invest in such capital (see table 1). The admissible steady states must be consistent with the equilibrium condition that $B$’s net income is at least as high as $W$’s, or $c_b(t) > c_w(t)$, so that $B$ do not switch to $W$.

The multiplicity of admissible steady states reflects the influence of two types of externalities inherent in the competitive case: within the $B$ group and across groups. A bureaucrat acting independently lacks the incentive to take into account the effects of his own investment in bureaucratic power on similar investments by competing bureaucrats, or on workers’ incentive to invest in productive human capital.

As in the homogeneous agents case, a sufficiently large degree of government size may not be consistent with growth equilibrium; hence the general expectation that a higher $\gamma$ would be associated with a lower level of per capita income. Similarly, under two of the persistent growth equilibria (sets I and IIa in table 1), a higher $\gamma$ is expected to lower the short-run level as well as long-run rate of growth of income for $W$ or $B$ or both. In contrast, greater preference for the future ($\beta$) will raise both income growth and corruption for $W$ or $B$ or both. An exception applies under the full-specialization equilibrium case (set IIb) in which $B$ specialize just in accumulating political capital and $W$ specialize in production and investment in

<table>
<thead>
<tr>
<th>Poverty Trap</th>
<th>Development (Unstable)</th>
<th>Persistent Growth</th>
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<tbody>
<tr>
<td>Set I: $B$ and $W$ Invest Equally in Political Capital ($q_w = q_b &gt; 0$ or $\bar{Q} = Q_w/Q_b = Constant$)</td>
<td>$h_a = h_b = 0$</td>
<td>$h_a = h_b = h &gt; 0$</td>
</tr>
<tr>
<td>Low-level stagnant equilibrium</td>
<td>$H_a = constant$</td>
<td>$A_h = A_h &gt; 1$</td>
</tr>
<tr>
<td></td>
<td>Unstable, stagnant</td>
<td>$c_a$, $c_b$ grow by the same percentage</td>
</tr>
<tr>
<td>equilibrium</td>
<td>equilibrium</td>
<td></td>
</tr>
<tr>
<td>Set II: Only $B$ Invest in Political Capital ($Q_w = 0$ or $\bar{Q} = Q_w/Q_b = 0$)</td>
<td>$h_a = h_b = 0$</td>
<td>$h_a = 0$, $h_b &gt; 0$</td>
</tr>
<tr>
<td>$q_b = [\delta(1 + \gamma)\beta]/(1 - \beta + \delta\beta)$</td>
<td>$H_b = constant$</td>
<td>$A_h &gt; 1$ (inefficient)</td>
</tr>
<tr>
<td>Low-level stagnant equilibrium</td>
<td>Unstable, stagnant</td>
<td>$0 &lt; h_a = \beta^{1-\gamma}A^{(1-\gamma)/\alpha} &lt; 1$</td>
</tr>
<tr>
<td>equilibrium</td>
<td>equilibrium</td>
<td>$A_h &gt; 1$ if $\beta A &gt; 1$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$c_a$, $c_b$ grow by the same percentage</td>
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<tr>
<td></td>
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<td>(full specialization)</td>
</tr>
</tbody>
</table>
human capital. This results in a higher growth rate of output per capita relative to the other admissible growth equilibria in table 1.\(^1\) Here the equilibrium level of investment in human capital can be shown equal to \(h_w = \beta A^{1-\alpha} < 1\), whereas the growth rate of workers’ output, and thus per capita income and consumption (given \(\alpha\)), converges on

\[
1 + g \equiv A h_w = (\beta A)^{1/\alpha} > 1,
\]

provided that \(\beta A > 1\).

C. Monopoly Equilibrium: “Organized Corruption”

Suppose now that bureaucrats are endowed not just with superior political capital, but also with a tightly controlling political organization—an autocratic regime—in which a powerful, but rational, leadership is capable of imposing its will on all members. Politically disenfranchised workers, in contrast, continue to behave competitively (\(N\) is too large or weak to organize). In such a regime, the leader can arrive at an “organized corruption” scheme that simulates an efficient monopoly solution.

*The opportunity set and optimal choices.*—The only change in the technology underlying the monopoly versus competitive case is the modified net income distribution function for bureaucrats:

\[
e_i(t) = Y_i(t) + \alpha \gamma \left[1 - Q(t)\right] Y_w(t),
\]

where \(Q(t) \equiv Q_w(t)/Q^*_w(t)\). The solution for bureaucrats’ investment strategy now internalizes the two types of externalities weighing on the competitive structure: (a) a contest over relative bureaucratic influence, which results in overinvestment in political capital; and (b) a lack of individual incentive to consider the impact of the group’s average bureaucratic power on the behavior of workers—especially their investment in human capital. These externalities are internalized if the party’s autocratic (but informed) leadership chose directly the average stock of bureaucratic power for the group and enforced it on each member. This could be achieved through a tight hierarchical structure, fortified by harsh penalties for noncompliance with the leadership’s imposed limits on accumulating political power for graft.

*Permissible steady states.*—Remarkably, the modified investment strategy in political capital now yields only three admissible steady-state equilibria for the economy.

\(^1\) By eq. (6), which here applies to workers, as \(t \to \infty, A h_w = 1 + g_w = \beta A (1 - q_*).\) Since \(q_* = 0, g_w\), which here represents the long-term growth rate of per capita income for both workers and bureaucrats, is maximized.
bureaucratic corruption

i) Unique poverty trap. Investments in political and human capital must be identical for both \( B \) and \( W \), or \( h_w = h_b = 0 \) and \( q_w = q_b = q > 0 \), so \( \overline{Q} \equiv \frac{Q_w}{Q_b} \) remains constant. There is a similar solution under competition, except that \( q \) is lower here, as competition among bureaucrats is eliminated.

ii) Stagnant development equilibrium. For a given value of \( \overline{Q} \equiv \frac{Q_w}{Q_b} \), equilibrium is similar to that under competition, or \( h_w > 0, h_b > 0, \) and \( q_w = q_b = q > 0 \). Investment in human capital just supports stagnant levels of \( H_w \) and \( H_b \). This steady state may not exist. The solution is underdetermined because optimal \( \overline{Q} \) in this case may be incompatible with the initial endowment ratio \( \overline{Q}(0) \).

iii) Unique growth equilibrium. The only admissible steady state is a “specialization solution”: \( Q_w = 0, 0 < q^*_w < 1 \) (i.e., \( \overline{Q} = 0 \)); \( h_b = 0 \); and \( 0 < h_w = B^{1-\sigma} A^{(1-\sigma)/\sigma} < 1 \). The steady-state growth rate thus converges on the same level achievable under the full-specialization competitive growth equilibrium (eq. [11]). The solutions are identical except that, in the monopoly case, \( B \)'s investment in political capital need not be at its upper level \( (q_b = 1) \). Since \( W \) refrain from any investment in political capital, or \( Q_w(t) = 0, B \) can maintain \( Q_b(t) \) at a level just sufficient to ensure that \( \overline{Q}(t) = \frac{Q_w(t)}{Q_b(t)} = 0 \) in equation (12), which provides maximal distributional rents for \( B \). By devoting some of their time to work, bureaucrats can now achieve added earnings in the amount of \( Y_b(t) = \overline{H}(1 - q_b(t)) \), which represent an added constant monopoly rent.\(^{12}\)

D. Monopoly versus Competitive Solutions

Under the competitive political market structure, it was possible for a specific set of parameters \( (\alpha, \gamma, \beta, \sigma, A, B, \) and \( \overline{H} \) to support any one of the three stages of development, including growth equilibrium, depending on the initial capital endowments of \( W \) and \( B \). Under the monopolistic structure, in contrast, such a parameter set is predicted to yield only the growth equilibrium steady state, regardless of initial conditions. Put differently, if the production technol-

\(^{12}\) Shleifer and Vishny (1993) reach a somewhat similar conclusion when comparing the static efficiency of a monopolistic relative to a monopolistically competitive system of rent seekers essentially because of the added waste involved in competition among bureaucrats. This analysis addresses the effects of alternative market structures on both the level and rate of growth of personal income. Note that per capita output and consumption levels under monopoly do not necessarily exceed those under the analogous competitive solution since the relative magnitudes depend on the ratios of \( B \) to \( W \) in the two regimes, \( \alpha = N_b/N_w \), the initial levels of human capital in each, and the direct costs of enforcing the monopoly regime, which the formal analysis ignored for simplicity.
ology and preferences are consistent with growth, the monopoly structure guarantees its eventual occurrence.

Proof. Suppose that the monopoly were to find itself initially in one of the admissible stagnant equilibria solutions outlined in subsection C above (cases i and ii), whereby $q_w = q_b = q$ and $h_w = h_b \geq 0$. The monopoly’s leadership would then realize that by raising $q_b$ just a trifle above $q_w$, it could eventually reap very large distributional gains at minimal cost. The reason is that if $q_b > q_w$, then over time $Q_w / Q_b \equiv \bar{Q}$ will tend to zero. But the optimality condition for investment in political capital by workers can be shown to imply that if $\bar{Q} = 0$, workers would lose any incentive to invest in political power, or $q_w = 0$, which contradicts the requirement that $q_w = q_b > 0$ in the stagnant or development steady states. Thus, if technically feasible, only the growth equilibrium would emerge in practice.

The rationale can be stated more intuitively: bureaucrats’ rents are proportional to workers’ productivity, which is the bureaucracy’s bread ticket. To the extent that the system’s technological constraints are consistent with self-sustaining growth in workers’ productivity, decisions on the accumulation of political capital by an efficiently organized bureaucracy would strive to maximize workers’ productivity. Indeed, this solution obtains when workers refrain from any investment in political capital.\(^{13}\)

E. Implications for the Growth Experience of Different Regimes

The preceding propositions provide some insights about the empirical evidence that motivated this paper. The analysis shows that efficient “monopolistic” systems may produce the same asymptotic long-term growth rate of per capita income as “competitive” systems, or even higher. The growth rates approach equality when competitive systems are in growth equilibrium involving a full-specialization solution similar to the monopoly case (eq. [11]). It is tempting to equate these competitive versus monopolistic equilibria metaphorically with developed democratic countries versus autocratic but efficiently managed (at least over some lengthy period) auto-

\(^{13}\) As for the ranking of investments in political and human capital across the steady-state equilibria that exist under the monopoly setup, it is easy to show that, for workers, it is the same as the ranking proved in the homogeneous agents case: the two are negatively correlated along the development path. For bureaucrats, however, investment in human capital is nil in the growth equilibrium whereas investment in political capital may not be the lowest. Under the competitive setup, the same ranking as in the homogeneous agents case clearly applies in all cases of nonspecialization equilibria, where both W and B invest equally in political capital.
Bureaucratic corruption. On this interpretation, the steady-state growth rates of per capita income in the autocratic regimes may be higher than, or converge on the same level as, those in successful democratic systems, although the level of per capita income in the former regimes may lag behind that in the latter (see n. 12).

Moreover, under the full-specialization equilibria, the growth rate is not expected to be affected by exogenous changes in the size of government ($\gamma$) or the relative sizes of $B$ and $W$ ($\alpha$). The reason is that workers are specialized in accumulating human capital, and bureaucrats devote full time to accumulating political capital (in the competitive case) or investing in it an amount just sufficient to ensure their edge over workers (in the monopoly case), while refraining from investment in human capital.

To be sure, this result holds only within certain bounds: if government size ($\gamma$) were to exceed a critical level, say $\gamma^*$, the model’s basic set of parameters would no longer be supportive of persistent growth equilibrium. However, under competitive political structures, growth may result from a nonspecialization equilibrium whereby both workers and bureaucrats invest equally in human and political capital (set I of table 1). This case is analogous to the homogeneous agent case of Section II. In this case, an increase in $\gamma$ lowers the optimal investment in human capital, as well as working time, and hence unambiguously both the level and rate of growth of per capita income.

The model further suggests that under all stable stagnant equilibria, greater government intervention, which may be especially high in a command economy, would cause a fall in the level of human capital accumulation. The likely delay in the economy’s takeoff from a stagnant to a growth equilibrium as a result (see Sec. II) implies that real per capita output and consumption levels in all growth equilibria would also be lower the bigger government size ($\gamma$), regardless of its impact on growth ($g$).

The preceding implications emphasize the interaction between government and growth through corruption. Since corruption and

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14 An efficient monopoly is therefore expected to limit the degree of government intervention in the economy below such a critical level, and the same can be expected of an efficient democratic regime, where competing pressure groups may hold down the deadweight costs of government (see Becker 1983).

15 Average output, or per capita income, equals $Y^* = Y_2\mu + Y_1(1 - \mu)$, where $\mu = \alpha/(1 - \alpha)$, and $\alpha = N_u/N$. If larger government or a command economy is associated with a larger share of the labor force in government, then government size would affect per capita output directly: Since $Y_u \geq Y_1$ in all stable equilibria, a higher $\alpha$ will lower $Y^*$. Since $B$'s contribution to output is measured as government spending in national income accounts, however, this effect may not be captured by conventional GDP per capita measures.
growth are endogenous variables, there is no causal relationship between the two. Under a competitive bureaucratic structure, however, exogenous changes in corruption (given $\gamma$) would reduce both the level and rate of growth of per capita income in the nonspecialization growth equilibrium, as was true under the homogeneous agents case. In the full-specialization case, the long-run growth rate is independent of both government size and the bureaucratic corruption level. An exogenous increase in corruption lowers working time, however, and hence per capita income. But since the long-run equilibrium values of workers’ investment in human capital remain unchanged, the fall in per capita output may be followed by an increase in its short-run growth rate over the period of the economy’s return to its equilibrium growth path.

F. Some Supportive Evidence

Table 2 presents the results of a regression analysis using Summers and Heston’s (1991, 1995) panel data concerning real per capita GDP and the government share of GDP ($G$). The full sample contains 152 countries over the period 1960–92, although data for individual countries are often available for shorter periods. The dependent variable is the log of real per capita GDP (LRGDPC), and all regressions are based on a fixed-effects regression model. The basic specification is

$$LRGDPC = a_0 + a_1 T + a_2 T \times IG + a_3 T \times COMM$$

$$+ a_4 LIG + a_5 COMM.$$  \hspace{1cm} (13)

In (13), $a_0$ is a vector of country-specific dummy variables (they are suppressed in table 2). The average growth rate of real per capita income over the sample period is estimated by the regression coefficient of LRGDPC on chronological time, $T$. How government intervention ($G$) affects the growth rate is estimated via an interaction term of $T$ and the log of the initial level of $G$ ($LIG$) in each country. Initial rather than current log value of $G$ ($LG$) is emphasized (but both are used) because the latter is likely to be simultaneously determined with current levels of per capita income. The variable COMM is a dummy variable distinguishing 11 communist countries (COMM = 1) from other countries in the sample (see n. 17 below). These countries represent empirically a distinct set of autocratic command economies over the sample period. The interaction term $T \times COMM$ thus estimates the difference between the growth rate in communist relative to noncommunist countries. The variables LIG and LCOMM are also introduced in the regression to account for
### TABLE 2
**Government, Political Regime, and Growth Regressions, 1960–92**

**Dependent Variable:** Log(RGDPC)

<table>
<thead>
<tr>
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<td></td>
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<td>(29.31)</td>
<td>(9.45)</td>
<td>(10.50)</td>
<td>(6.07)</td>
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<td>.006</td>
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<td>.005</td>
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<td>(5.17)</td>
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<td>-.007</td>
<td>.0005</td>
<td>.002</td>
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<td>-.002</td>
<td>-.001</td>
<td>-.004</td>
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<td>(-2.20)</td>
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<td>-.958</td>
<td>-.1033</td>
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<td>-.1254</td>
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<td>(16.93)</td>
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<td>-.224</td>
<td>-.224</td>
<td>-.224</td>
<td>-.224</td>
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<td>.295</td>
<td>.295</td>
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<td>.295</td>
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<td>(7.45)</td>
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<td>.9635</td>
<td>.965</td>
<td>.9684</td>
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<td>.8786</td>
<td>.8968</td>
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**Note:** The range of observations varies for different countries. Numbers in parentheses are estimated coefficients over their standard errors.
their effects on the RGDPC level across countries. This specification helps separate between the effects of \( G \) and COMM on the level versus rate of growth of RGDPC.

The full-sample regressions are summarized in columns 1 and 2 of table 2. The effect of government size, as captured by IG, is shown to have a significant adverse effect on the growth rate of RGDPC and a negative, albeit insignificant, effect on its level. The communist subset in this sample is shown to have a higher level as well as rate of growth of per capita GDP relative to noncommunist countries (model 1). That COMM raises even the RGDPC level is attributable to the inclusion of poor countries in the sample, which may not have yet joined a persistent growth regime.

To isolate better a set of developed countries that arguably experienced persistent growth, the same regression model is estimated in columns 3 and 4 of table 2 just for the 29 European countries in the sample, eight of which are former communist countries. In columns 5 and 6, the model is also estimated for the OECD countries—the richest group in the sample—including and excluding the relatively richer six European communist countries. The results are generally consistent with the predictions of subsection \( E \) above. Both \( G \) and COMM now exhibit a negative and significant effect on the level of per capita GDP. The communist subset is still showing a relatively higher growth rate, but the discrepancy over the developed countries’ growth rate is much narrower than in the full sample. Moreover, government size has an insignificant effect on the growth rate of the more developed countries, and this is true for the higher-income communist countries as well. The results provide some support for the proposition that the long-term growth rate in advanced democratic or efficient autocratic regimes may be little affected by either the size of government or the nature of the political regime.

Table 3 presents some complementary results concerning the relationship between some available corruption measures and growth. Two corruption indices, based on surveys of the business community conducted by correspondents of Business International (see Mauro

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16 European countries include Austria, Belgium, Bulgaria, Cyprus, Czechoslovakia, Denmark, Finland, France, East Germany, West Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden, Switzerland, Turkey, United Kingdom, USSR, and Yugoslavia.

17 The OECD countries over the sample period include, in addition, Australia, Canada, Japan, New Zealand, and the United States but exclude Cyprus and Malta and all former communist countries. The six communist countries added to this set in cols. 5 and 6 are the eight listed in the European set less Bulgaria and Romania, whose RGDPC is below the group mean of the 11 communist countries in the full sample, which includes China, Laos, and Mongolia.
TABLE 3
Corruption and Growth Regressions, 1981–92 (N = 763)
Dependent Variable: Log(RGDPc)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
<th>Model 6</th>
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<tr>
<td>T</td>
<td>-.006</td>
<td>.009</td>
<td>.039</td>
<td>.063</td>
<td>.047</td>
<td>.067</td>
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<tr>
<td></td>
<td>(-1.99)</td>
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<td>(4.06)</td>
<td>(6.59)</td>
<td>(5.22)</td>
<td>(7.37)</td>
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<td>T × IREDTAPE</td>
<td>.005</td>
<td>.002</td>
<td>.002</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>(5.97)</td>
<td>(4.79)</td>
<td>(4.63)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>T × ICORRUPT</td>
<td>.0004</td>
<td>.0004</td>
<td>-.0001</td>
<td>.0001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.80)</td>
<td>(.80)</td>
<td>(-.28)</td>
<td>(.29)</td>
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<tr>
<td>T × LIG</td>
<td>-.155</td>
<td>-.155</td>
<td>-.018</td>
<td>-.018</td>
<td>-.018</td>
<td>-.021</td>
</tr>
<tr>
<td></td>
<td>(-4.99)</td>
<td>(-4.99)</td>
<td>(-6.07)</td>
<td>(-6.07)</td>
<td>(-6.31)</td>
<td>(-7.18)</td>
</tr>
<tr>
<td>T × LG</td>
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<td></td>
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<td>(-7.18)</td>
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<tr>
<td>IREDTAPE</td>
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</tr>
<tr>
<td></td>
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<td>(12.70)</td>
<td>(12.86)</td>
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<td>ICORRUPT</td>
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<td>.120</td>
<td>.120</td>
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<td>LIG</td>
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<td>.396</td>
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<tr>
<td></td>
<td>(3.61)</td>
<td>(4.31)</td>
<td>(4.31)</td>
<td>(4.31)</td>
<td>(4.31)</td>
<td>(4.31)</td>
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</tbody>
</table>

Adjusted $R^2$ | .9884 | .9878 | .9888 | .9884 | .9895 | .9892 |

Note.—See note to table 2.
1995), are explored: REDTAPE, measuring “the regulatory environment foreign firms must face when seeking approval and permits—the degree to which it represents an obstacle to business”; and CORRUPT, measuring “the degree to which business transactions involve corruption or questionable payments.” Both are ranked in descending degree of corruption severity from most (0) to least (10) corrupt. Mauro collected and used the Business International indices for 1981–84 to measure their impact on the rate of growth of RGDPC over the same four-year period.\(^\text{18}\) Since corruption is an endogenous variable, however, in this analysis only the initial (i.e., 1981) levels of the indices (prefixed by I) are used in the regressions. They are intended to estimate the impact of predetermined corruption measures on the level and rate of growth of RGDPC over 1981–92, using the same Summers and Heston data as in table 2. The regression model is essentially the same as (13), with the levels and time interaction terms of the two indices added to the regression. The sample size, consisting of a panel of only 68 countries with partial or complete corruption data over this period, is much more limited, however, than that used in the full set of table 2. Also, the average level of GDP in this set was over 30 percent higher than the average in the full sample of table 2 (both circa 1980), and no data were available for communist countries.

Both IREDETAPE and ICORRUPT (the initial values of these variables) appear to exert a significant adverse effect (as indicated by their positive signs) on the level of per capita GDP. The variable IREDETAPE also exerts a significant adverse effect on the rate of growth of RGDPC, whereas ICORRUPT has an insignificant effect on it, perhaps because bureaucratic red tape is a better measure of corruption opportunities created through government intervention in the economy. The analyses in Sections II and III indicate that shifts in some unmeasured exogenous factors, such as time preference for consumption, may even cause productivity growth and corruption to shift in the same direction, especially in the more developed countries, where the long-term growth rate may be independent of the incidence of corruption. The estimated effects of government conform even more sharply to those obtained in the full-set regressions of table 2. When treated as a predetermined variable, initial government size, IG, is found to have an adverse, and significant, effect on both the level and rate of growth of RGDPC. The combined results of tables 2 and 3 are generally consistent with

\(^{18}\) Both are ranked in descending degree of severity of corruption from most (0) to least (10) corrupt. We are indebted to Paulo Mauro for providing the electronic data files.
the implication of model 2, that exogenous changes in both government size and corruption would adversely affect the level of per capita income, but not necessarily its long-term growth rate in the more developed countries.

IV. Concluding Remarks

The two models outlined in this paper are subject to a number of limitations. Government is taken to play a neutral role in the economy, and the role of law enforcement against corruption is ignored. It is recognized implicitly only in the autocratic (monopoly) model, where the leadership is assumed to have tight control over excessive accumulation of power by bureaucrats. The heterogeneous agents model abstracts from a determination of the equilibrium distribution of agents between worker and bureaucrat groups, pinning it on differences in inherited political capital by members of each group. This problem is resolved, however, by the general equilibrium analysis of Section II, yielding generally consistent inferences. The analysis recognizes just two extreme bureaucratic structures—competitive and monopolistic—abstracting from the possibility of intermediate structures. Also, the assumption that agents make investment choices as dynasty heads for the benefit of all future offspring may be more questionable for the monopoly case. Since the right of succession to such a leadership position of power is uncertain under monopoly, the leadership in such a regime is more likely to operate on a shorter, and thus less efficient, horizon than competitive structures.

Yet these simplified models produce some testable insights into the relationship between corruption, government, and growth. A major implication of the analysis is that, in contrast to the case of conventional felonies in which wealth and crime are positively associated (see Ehrlich 1996), corruption and per capita income level are expected to be negatively correlated across different stages of economic development. The difference is that corruption depends on investment in political capital as a ticket for entry to the bureaucratic rank, unlike entry to many criminal activities, which requires little skill. Such an investment has repercussions on the incentive of productive agents to invest in human capital. The relationship between corruption and the economy is thus explained as an endogenous outcome of competition between growth-enhancing and socially unproductive investments and its reaction to exogenous factors, especially government intervention in private economic activity.

The analysis also indicates that the relationship between government, corruption, and the economy’s growth is nonlinear. Govern-
ment intervention in private economic activity hurts most in the poorest countries and those at a critical takeoff level. This may explain the prevalence of corruption in countries trapped in poverty, such as Zaire and Haiti. It can also explain the unstable growth experience in countries such as Bangladesh, India, and Mexico, where a high degree of past government intervention has contributed to unstable growth experiences. The evidence presented in Section III F lends support to the hypothesis that large government size will have an adverse effect on the level of income at any stage of development and generally, but not necessarily, on the rate of growth of income in all countries. The analysis and findings indicate that government size may have little impact on the economy’s growth rate in the more developed countries. Likewise, the impact of *exogenous* corruption shocks is expected to be nonlinear, having an adverse effect on the level but not necessarily the rate of growth of per capita income in the more advanced economies.

Perhaps the most intriguing result of the analysis concerns the possibility that autocratic regimes, such as the command economies of the former Soviet bloc, could in principle achieve a rate of growth equal to or higher than decentralized democracies, albeit not a higher level of per capita income. These economies can be successful as long as an informed leadership is operating to maximize the long-term growth potential of productive agents and constrains bureaucratic corruption to a degree commensurate with this objective. This explains why economically successful autocratic regimes often resort to forceful anticorruption campaigns and why corruption often intensifies when the leadership loses its grip on power. At the same time, the analysis also anticipates the potential failure of autocratic regimes because of the leadership’s inability to focus on long-term goals, its susceptibility to ideologically induced policy errors, and the general deadweight costs associated with protecting an autocratic regime by brute force.

**References**


