



THE WILLIAM DAVIDSON INSTITUTE  
AT THE UNIVERSITY OF MICHIGAN BUSINESS SCHOOL

*Political Instability and Growth in Proprietary Economies*

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Working Paper Number 172  
August 1998

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## **Abstract for Political Instability and Growth in Proprietary Economies**

Developing country leaders typically resemble proprietors more than benevolent social planners, i.e., they are powerful individuals pursuing their own interests while they remain in power. We model growth in a "proprietary economy" facing each period an endogenous probability of "political catastrophe" that would hurt foreign investors and extinguish the proprietor's wealth extraction ability. We develop a model in which domestic capital exhibits a bifurcation point determining economic growth or shrinkage. With low initial domestic capital the proprietor plunders the country's resources and the economy shrinks, even when shrinkage is not socially optimal. With high initial domestic capital the economy grows faster than is socially optimal.

# Political Instability and Growth in Proprietary Economies\*

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August 14, 1998

## Abstract

Developing country leaders typically resemble proprietors more than benevolent social planners, i.e., they are powerful individuals pursuing their own interests while they remain in power. We model growth in a "proprietary economy" facing each period an endogenous probability of "political catastrophe" that would hurt foreign investors and extinguish the proprietor's wealth extraction ability. We develop a model in which domestic capital exhibits a bifurcation point determining economic growth or shrinkage. With low initial domestic capital the proprietor plunders the country's

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\*This research was generously supported by IREX, the National Council on Soviet and East European Research and the New Economic School in Moscow. We especially thank Vadim Arkin and Alexander Slastnikov. We also thank Steven Beckman, Oded Galor, Herschel Grossman, Barry Ickes, Steven Medema, David Weil and seminar participants at Brown University, Royal Holloway College, University of Colorado, Denver, Chinese University of Hong Kong, Hong Kong University of Science and Technology, the Institute of Economics of the Academia Sinica, the 1997 Society for Economic Dynamics Conference, the 1997 GET Conference in Moscow and the 1998 CEPR-Davidson Institute Transition Economics Workshop in Prague. In addition we thank Kuo mei Chen and Okun Kovuncu for excellent research assistance.

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**Keywords: Political Economy, Growth, Proprietary Economy, Bifurcation, and Political Catastrophe**

**JEL Classification: D9, O1, and H**

## 1. Introduction

This paper concerns the relationship between growth and political instability. We are interested in poor countries with the potential to achieve rapid growth, as well as other countries in danger of precipitous and long-term decline. One obvious fact about these economies is that few are stable democracies (DeLong (1997) and Bardhan (1997)). Rather, they are generally run by strong individuals or elite groups that take a proprietary attitude toward their country and its wealth – we refer to these individuals or groups as “proprietors” or “dictators”.<sup>1</sup>

Despite their ubiquity and apparent importance, the theoretical growth literature has not concerned itself with the possible implications of regimes of this type.<sup>2</sup> At the same time, there is now a rapidly growing political economy literature that studies the behavior of proprietary regimes, but little of this literature considers dynamic models.<sup>3</sup> Our model is at the intersection of these approaches, studying the consequences of proprietary politics for growth as mediated through political instability.

Sah (1991) likens the choice of dictatorship to that of a risky asset because some grow very fast while others fail miserably. Robert Barro, in “Getting It Right,” (1996b - p.3), expresses the similar view that dictators

“come in two types: one whose personal objectives often conflict with growth promotion and another whose interests dictate a preoccupation with economic development....The theory that determines which kind of dictatorship will prevail is missing.”

We actually provide such a theory. The proprietary leaders in our model come in exactly the two types Barro proposes. One forces a growth rate that is too

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<sup>1</sup>Classic examples of the kind of regimes we are thinking of include: Suharto’s Indonesia in which the ruler’s extended family, together with the top military leadership and ethnic Chinese-run conglomerates owned essentially all the country’s industry (Bardhan (1997)); Mobutu sese, Seko in Zaire who plundered the country’s natural resources for himself and his coterie (Bardhan (1997)). We could easily list many more contemporary cases. Grossmann and Noh, (1994) assert that this type of proprietary government is the rule in non-democracies.

<sup>2</sup>There is, however, a large empirical literature on the subject surveyed in Przeworski and Limongi (1993) and Sinowy and Inkeles (1990), with the recent contribution of Barro (1996a) (see section four). Easterly (1997) discusses the gap between academic growth literature and the realities of developing economies (p.25).

<sup>3</sup>Grossman and Noh (1990) is an early model putting proprietary politics into a dynamic, although not a growth, context.

high relative to the social optimum. The other type plunders the economy into the ground. The determination of dictatorial type is endogenous. That is, we provide an intuitively appealing theory that determines whether a proprietary economy (dictatorship) grows or declines.

Political instability is a major impediment to economic growth in a wide variety of countries.<sup>4</sup> Instability, implying risk, limits investments, and hence growth. This is recognized in the academic political economy literature in which models often include some form of political instability (i.e., Alesina and Tabellini (1990), Grossman and Noh (1990 & 1994), Hess and Orphanides (1995) and Bertocchi and Spagat (1997)). Moreover, since physical capital is becoming increasingly mobile across counties and regions, the role of political instability in economic decision making is increasing as foreign investment and capital flight respond ever more sensitively to changes in countries' political environments.<sup>5</sup>

While the above considerations are standard, in this paper we introduce the more novel assumption that domestic capital development contributes to political stabilization while domestic capital deterioration causes political destabilization. The idea underlying this relationship is that domestic capital development increases the number and influence of individuals with a strong interest in the continuance of the current political status quo, thereby stabilizing the system.

We also consider a different formulation under which instability is a function of domestic consumption as an alternative to domestic-capital-based instability. This is in accordance with the view of a proprietor trying to mollify the population and gain increased stability through higher aggregate consumption.<sup>6</sup> Of course there is a natural relationship between these two sources of political instability,

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<sup>4</sup>According to de la Balze (1995), "Among the group of fifteen most advanced prewar nations, Argentina distinguished itself ... with the greatest political instability of the postwar period." (p.4) Of course Argentina is famous for its economic decline during this long period of political instability (see footnote 6 for details). Other examples abound; Somalia, Haiti and the countries that comprised the former Yugoslavia are recent examples of the economic catastrophe that attends extreme political instability.

<sup>5</sup>Sachs and Warner (1995) demonstrates that global capital mobility has been growing rapidly in recent years, on its way to a return to the level it had attained in 1900. Taylor (1998) argues that the relations in international capital markets have an especially large effect on countries at the periphery.

<sup>6</sup>The postwar Argentinian government under Peron is an example of a government that sacrificed domestic investment and hence economic growth for increased domestic consumption (De Long (1997, ch. 21, p.7-9)). Although in 1950 they were as rich as any large county in Europe their current GDP per capita is roughly 1/3 that of France or Germany (de la Balze (1995)).

since more domestic capital increases output, and thus allows more consumption. All of our main results hold under both sources of political instability, although they vary in the details in interesting ways.

The proprietor in our model maximizes the discounted present value of his own consumption – an increasing function of aggregate consumption – while he remains in office. His stochastic and endogenous survival process is determined by political stability, which evolves over time. We contrast the proprietor's behavior with that of a social planner, with the distinction being that the former does not care what happens to the economy after he loses power, while the latter maximizes a full infinite discounted stream of utility.

Our first result is that in proprietorships there are only three possible qualitative paths for domestic capital: steady growth, steady decline, or zero growth.<sup>7</sup> In particular, a “U-shape” scenario under which domestic capital first deteriorates and then reverses course cannot occur. There is a very straightforward intuition underlying this result. Domestic capital deterioration decreases stability, worsening the conditions for domestic capital investment, leading to further deterioration, completing a vicious cycle. Under these conditions the proprietor aggressively plunders the country's resources, even while realizing that in doing so he hastens his departure from power and, hence, his ability to continue extracting wealth. The key insight here is that in an unstable environment the proprietor expects to remain in power for only a short period so a plundering strategy dominates investment.

On the other hand, there is a self-reinforcing cycle underlying steady growth that has mirror-image intuition: domestic capital growth increases stability, improving the conditions for increased domestic capital investment leading to further growth, completing a virtuous circle. In this case, the proprietor is restrained in his wealth extraction in order to lengthen the time he will enjoy the benefits of continued power. In particular, more investment leads to more stability, extending the proprietor's effective time horizon.

A related central result is that if the economy begins with sufficient domestic capital to promote political stability, then there is steady growth; otherwise, there is steady deterioration. In other words, there is a critical level of domestic capital, which defines a bifurcation point: an economy below this level finds itself in

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<sup>7</sup>Zero growth requires that the economy's initial domestic capital level begins precisely at its point of bifurcation between growth and decline. This is an unstable steady state from which any positive (negative) deviation puts the economy onto a permanent growth (shrinkage) path, and as such, does not figure prominently in our analysis.

a development trap whereas one above this threshold follows a plan of steady growth.<sup>8</sup> These results are robust to whether the source of political instability is consumption-based or domestic capital-based.

Next, we analyze how the bifurcation point depends on the underlying parameters. It is increasing in the world interest rate and the proprietor's time discount, but decreasing in the technology of domestic-capital development and the technology of political stabilization.

The shape of the policy function, giving consumption as a function of domestic capital, is of special interest (see figure 3.1 for an example). It shows that consumption rises up to the bifurcation point, reverses course and then once again increases. This means that if the proprietor, not expecting to be around very long, chooses for the economy to shrink, then more domestic capital simply leads to more consumption. On the other hand, if the economy is just fit enough to grow (domestic capital is slightly above the bifurcation point) then the proprietor invests more than any domestic capital windfall he receives. We believe that this result provides insight into the rapid growth experience of the Asian Tiger economies and other "proprietorships" that had declining consumption rates (and increasing saving rates) during their takeoff phases.<sup>9</sup>

We then explore the differences between the proprietor's and social planner's behavior. The most glaring distinction is that the social planner does not exhibit bifurcation. It can be optimal to allow the economy to deteriorate, e.g., if time discounting is very strong. However, the decision of whether to grow or shrink for the social planner can never depend on the initial capital stock as it does for the proprietor. Related to this result is the fact that the planner's policy function is always monotonically increasing rather than displaying the increasing-decreasing-increasing pattern of the proprietor.

When domestic capital is above the bifurcation point for the proprietor, it grows (sub-optimally) faster than the social planner's economy. The intuition is that the proprietor expects high growth rates to prolong his tenure in power. Thus, when the proprietor chooses growth, he chooses *rapid* growth in order to increase the longevity of his rule.<sup>10</sup> This fits with empirical evidence that democracy may actually slow growth (Barro 1996a). On the other hand, there

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<sup>8</sup>See Azariadis and Drazen (1990) and Murphy, Shleifer and Vishny (1989) on development traps.

<sup>9</sup>Mankiw, Romer, and Weil (1992) and Overland (1997) document these increasing savings rates.

<sup>10</sup>De Long (1997, ch.2) shows that from the 60's on many dictatorships on the non-Communist fringe of Pacific Asia and in Saharan Africa experienced rapid growth.



are also a wide range of parameters for which proprietary economies below the bifurcation point shrink when, with the same endowment, social planners would choose to grow. Finally, even in cases where a planner would choose shrinkage, the corresponding proprietorship will decline faster. These latter two results are due to the tendency for dictators to plunder their country's wealth when their hold on power is insecure.

These facts have interesting connections with some common ideas on growth and dictatorship. First, one often encounters the view that kleptocratic regimes will inevitably decline.<sup>11</sup> But, within our framework this is not necessarily the case. Below the bifurcation point our regimes, which are by nature kleptocratic, do indeed decline rapidly. But above bifurcation they grow very fast. This is not to say that our results would support a view that proprietary regimes are optimal. In fact, we show they are not optimal, but that they may experience especially rapid growth. A second common view is that insecure dictators will tend to plunder their economies into decline (e.g. Olson (1991) &(1993)). Again, this is true only below bifurcation in our model. It is true that instability leads to what we call a "horizon- shortening effect" that operates against growth in all cases. But at the same time there is also an "endogenous-survival effect" that works in the opposite direction. Since rapid investment shifts to the right the probability distribution over the proprietor's time in power, there is a tendency for overinvestment by moderately insecure dictators. In other words, a desire to stabilize his position might lead a dictator to favor rapid growth.

We also look at the differences between the behavior of regimes in which instability is consumption-based and those in which instability is domestic capital-based. We find that consumption-based instability expands the basin of attraction of the poverty trap, i.e., consumption-based instability *raises* the bifurcation point. There is a range of domestic capital levels over which growth is optimal if

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<sup>11</sup>Barro (1996a) states: "... the effects of an autocracy are adverse, however, if the dictator uses his or her power to steal the nation's wealth...". Bardhan (1997) writes "when public resources meant for building productivity-enhancing infrastructure are diverted for politicians' private consumption ... growth rates obviously will be adversely affected." De Long (1997) lists a group of countries with proprietary regimes that have not followed the above-bifurcation growth path in which "...the average person is probably poorer in *absolute* terms than their counterparts back in 1965..." This group includes Mozambique, Togo, Ethiopia, Tanzania, Senegal, Ghana, Zaire (now Republic of Congo), Uganda, Argentina, Bolivia, Chile, El Salvador, Peru, Nicaragua, and Jamaica. De Long attributes these countries' steady decline to "Government by Thieves" or "*kleptocracy*" -situations where the leaders have "sacrificed economic development and the long-run interests of all to the short run interests of a relative few." (ch. 21, p.3).

instability is domestic capital-based that leads a proprietor facing consumption-based instability to run down the economy. Furthermore, when two otherwise identical economies are both above their respective bifurcation points, capital-based instability tends to lead to faster growth.

Finally, we present some empirical evidence in favor of our model. Using the Barro-Lee data set (Barro (1996a)) we show that countries rated to have low political rights (Gastil (1990)) vary much more in their growth rates than high political rights countries.<sup>12</sup> Moreover, the former are much more likely to experience either rapid growth or decline than the latter. These results are broadly consistent with our results comparing proprietary with social planner outcomes. Third we show, consistent with our bifurcation result, that the low political rights countries that decline tend to start with lower per capita GDP than those that experience rapid growth.

The literature closest to this paper would probably be Grossman and Noh (1990 & 1994) since they model an endogenous survival process for a proprietary regime, although they are concerned with taxation issues rather than growth. Perotti (1993), Alesina and Rodrik (1994), and Perrson and Tabellini (1994) combine politics and growth, although they all work within a democratic framework with majority voting and study the effects of inequality. There are various other non-growth but dynamic political economy models. Models of political business cycles are surveyed in Alesina and Roubini with Cohen (1997). Dewatripont and Roland (1992) and Rodrik (1996) focus on the political economy of transition and policy reform, inherently dynamic contexts.

The plan of the paper is as follows. In section two we present the model. The results are presented and analyzed in section three. We give some evidence for our theory in section four and conclude in section five.

## 2. The Model

### 2.1. Production

The economy's production function is

$$G(F_t, D_t) = F_t^\alpha D_t^{1-\alpha} \quad (2.1)$$

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<sup>12</sup>Lucas (1988) points out that growth rates tend to be far less stable in developing countries than in established democracies, but the growth literature has not followed up on this idea.

where  $F_t$  is foreign capital and  $D_t$  is domestic capital at time  $t$  respectively and where  $t = 1, 2, \dots$  is measured in discrete intervals. We think in terms of a broad concept of domestic capital that goes beyond traditional physical capital to include physical infrastructure (roads, bridges, telephone lines etc.), market infrastructure (stock, bond, and derivatives markets, banks, a functioning legal system, etc.), and human capital. Foreign capital is complementary to domestic capital and includes such factors as advanced technology, sophisticated physical capital and modern managerial skills – factors of production not readily available in the domestic economy.

Note that we can get all of our qualitative results without foreign investment. However, it does enhance the quantitative power of the results and is a realistic element in our context so we choose to leave it in.

## 2.2. Political Catastrophes

A key feature in the model is that in every period there is an endogenous probability of a political catastrophe, the possibility of which has major implications for the economy and the government. A political catastrophe has the following two consequences: 1) the proprietor is permanently removed from power – gaining zero utility in perpetuity; 2) foreign capital earns a rate of return of zero percent during the period of political catastrophe. This implies that a positive probability of political catastrophe shortens the proprietor's planning horizon and makes foreign investment more risky.

The catastrophe probability in period  $t$  is given by

$$q_t = q(D_t) = e^{-\theta D_t} \quad (2.2)$$

where  $0 < \theta < \infty$ . The idea is that as domestic capital grows the number and influence of people who have a stake in preventing a catastrophe grow and, therefore, the catastrophe probability decreases. This idea is very intuitive. As human capital, physical infrastructure and market infrastructure grow, the number of people with high earning power under the current regime also grows. These people and interests are gravely concerned with preventing catastrophes.<sup>13</sup>

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<sup>13</sup> A companion paper by Bertocchi, Overland and Spagat (1998) establishes microfoundations for the co-optation by the elite of the poor. This is achieved through transfer payments that provide entry into the middle class for those poor who receive them. The elite wish to preserve their hold on power and when members of the poor are co-opted they acquire a vested interest

### 2.3. Foreign Investment

In the small open economy framework of the model, foreign investors pour capital into or take capital out of the economy every period until the risk-adjusted rate of return,  $r_t$ , is equal to a fixed and riskless world rate of return  $r^*$ . For simplicity, we assume that investors are risk neutral and that the only risk in each period is the possibility of political catastrophe, in which case the rate of return is zero.<sup>14</sup> If there is no catastrophe, then  $r_t$  equals the marginal product of foreign capital,  $\alpha F_t^{\alpha-1} D_t^{1-\alpha}$ . Therefore investors demanding an expected return of  $r^*$  set  $r_t = \frac{r^*}{(1-q(D_t))} = \alpha F_t^{\alpha-1} D_t^{1-\alpha}$  so that foreign investment is decreasing in instability and the riskless rate, and increasing in the level of domestic capital:

$$F_t = \left( \left( \frac{1-q(D_t)}{r^*} \right) \alpha \right)^{1-\alpha} D_t \quad (2.3)$$

### 2.4. The Rate of Return on Domestic Capital

Domestic capital earns its marginal product, so that its rate of return  $w_t$  is

$$w_t = w(q(D_t)) = (1-\alpha) \left( \frac{\alpha(1-q(D_t))}{r^*} \right)^{\frac{\alpha}{1-\alpha}} \quad (2.4)$$

Thus, gross domestic earnings are  $w_t D_t$  and are decreasing in instability and the riskless rate.

### 2.5. Domestic Capital Development

Let  $I_t \geq 0$  denote investment in domestic capital in period  $t$ . The difference equation governing domestic capital evolution is

$$D_{t+1} = (1-\delta) D_t + \gamma I_t, \quad (2.5)$$

in maintaining the status quo. Thus, political instability and the risk of political catastrophe are reduced.

<sup>14</sup>This formulation assumes that in the event of political catastrophe foreign investors lose their interest but not their principal. However, we can easily add to the model expropriation of all or part of the principal and the qualitative results are the same.

where  $0 \leq \delta \leq 1$  is the rate of decay and  $\gamma > 0$  parameterizes the production function for turning output into domestic capital. This formulation builds some persistence into the domestic capital stock while requiring investment if the stock is to be maintained or increased. Formally, we have a two-sector model in which existing domestic capital cannot be consumed and current output cannot be transformed one-to-one into domestic capital (unless  $\gamma = 1$ )

## 2.6. Objective of the Policymaker

We are interested in the behavior of a proprietorship concerned with the portion of domestic consumption that it takes in every period up until a catastrophe point – if one occurs. Total output in period  $t$  satisfies (using Euler’s theorem)  $F^\alpha D^{1-\alpha} = r_t F_t + w_t D_t$ , but  $r_t F_t$  is taken out of the country by foreign investors and does not contribute to domestic welfare. Of the remaining  $w_t D_t$ ,  $I_t$  is invested in domestic capital development and is not consumed. The proprietor chooses the split of output between consumption and investment, but not the fraction of consumption that he gets to appropriate.<sup>15</sup> Aggregate consumption,  $C_t$ , is therefore

$$C_t = w_t D_t - I_t \tag{2.6}$$

with the proprietor’s share being  $\lambda C_t$  where  $0 < \lambda < 1$ .

A fundamental factor in this model is that the proprietor receives utility only if political catastrophe does not occur in period  $t$ . If political catastrophe occurs then the proprietor’s utility is 0 in perpetuity.

Since the model allows for growth, we use isoelastic utility to represent the instantaneous utility function for the proprietor and planner. Assuming a discount factor of  $0 < \beta < 1$  and subject to equations 2.1 – 2.6, the proprietor’s problem can be written as

$$\max_{\{C_t\}_{t=0}^{\infty}} E \sum_{t=0}^{\tau} \beta^t U(\lambda C_t) \tag{2.7}$$

where  $\tau$  is a random variable with range  $\{0, 1, 2, \dots\}$  giving the stochastic and endogenous time when the catastrophe occurs. Since the solution to the above

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<sup>15</sup>Although for convenience we model the proprietor as collecting a flat tax, or rent, on consumption, our results are robust to any “taking function” that is increasing in aggregate consumption.

problem is unchanged for any positive linear transformation of the maximand, we can solve the problem

$$\max_{\{C_t\}_{t=0}^{\infty}} E \sum_{t=0}^{\tau} \beta^t U(C_t) \quad (2.8)$$

to get the proprietor's solution.<sup>16</sup> Note that the solution to the problem is a fixed sequence  $\{C_t\}_{t=0}^{\infty}$ , which represents consumption up to the point of catastrophe, (if one occurs). After a catastrophe, the proprietor's choices are irrelevant, since he will not be in power.

Next, as a basis for comparison, we consider the problem of a benevolent social planner. This problem coincides with the proprietor's problem, but with one key difference; the social planner does not view political catastrophe as terminating positive utility. The difference between the criteria of the social planner and the proprietor is that the proprietor weighs a given future period's utility by the probability of avoiding catastrophe up to that point, while the social planner takes into account the path of the economy after catastrophe.<sup>17</sup> After a political upheaval, the economy continues on with different leadership but still provides utility to the population. The planner's problem is thus given by

$$\max_{\{C_t\}_{t=0}^{\infty}} E \sum_{t=0}^{\infty} \beta^t U(C_t) \quad (2.9)$$

The difference between (2.8) and (2.9) is that the sum in the former runs from 0 to the random  $\tau$  while that in the latter runs with certainty to  $\infty$ . We can get further perspective on this difference by rewriting (2.8) as

$$\max_{\{C_t\}_{t=0}^{\infty}} E \sum_{t=0}^{\infty} \beta^t \left[ \prod_{\tau=1}^t (1 - q(D_{\tau})) \right] U(C_t) \quad (2.10)$$

Equation (2.10) seems to suggest that the possibility of political catastrophe, and hence the termination of the proprietor's reign, acts simply to intensify time.

<sup>16</sup>In the case of log utility, which we use in our computer simulations,  $U(\lambda C_t) = \ln \lambda + \ln C_t$ , or more generally for CRRA  $U(\lambda C_t) = \frac{(\lambda C_t)^{1-\sigma}}{1-\sigma} = \lambda^{1-\sigma} U(C_t)$ . For other instantaneous utility functions we would have to distinguish between the function in (2.7) and that in (2.8) but we could still use the same general methods.

<sup>17</sup>We have avoided a further divergence between social planner and proprietor by assuming the proprietor always steal a fixed fraction and has isoelastic utility (see the previous footnote). Under these conditions there is no operative difference between the proprietor's instantaneous utility function and that of the social planner.

discounting. Although there is some truth in this it misses the most crucial point about the model; the proprietor's survival probability is *endogenously* determined. Thus, our formulation allows the proprietor, in effect, control over discounting: a factor that is the key to our analysis.

## 2.7. Dynamic Programming Formulation

The Bellman equation for the proprietor's problem, using equations (2.4) and (2.8), is

$$V(D) = \max_{0 \leq C \leq w(D)D} U(C) + \beta(1 - q[(1 - \delta)D + \gamma(w(D)D - C)])V((1 - \delta)D + \gamma(w(D)D - C)) \quad (2.11)$$

Equation (2.11) just says that the value to a proprietor of a given level of domestic capital, having avoided catastrophe this period, is the utility of consumption plus the value of the resultant domestic capital next period discounted by  $\beta$  and the probability of avoiding catastrophe. It is well known that this formulation is equivalent to (2.8).

Similarly, the Bellman equation for the social planner is

$$V(D) = \max_{0 \leq C \leq w(D)D} U(C) + \beta V((1 - \delta)D + \gamma(w(D)D - C)). \quad (2.12)$$

## 2.8. Consumption Based Instability

The development of the model with consumption-based instability is parallel to that shown for domestic capital-based instability. All differences stem from the alternative formulation of the catastrophe function

$$q_t = q(C_{t-1}) = e^{-\theta C_{t-1}} \quad (2.13)$$

which assumes that the probability of catastrophe in period  $t$  depends on the consumption in period  $t - 1$  and where  $0 < \theta < \infty$ . This leads to Bellman equations for the proprietor

$$V(D) = \max_{0 \leq C \leq w(D)D} U(C) + \beta(1 - q(C))V((1 - \delta)D + \gamma(w(D)D - C)) \quad (2.14)$$

and planner

$$V(D) = \max_{0 \leq C \leq w(D)D} U(C) + \beta V((1 - \delta)D + \gamma(w(D)D - C)) \quad (2.15)$$

which, as in the case of domestic capital-based instability, share the difference that the proprietor discounts future utility by the probability of political catastrophe whereas the planner does not.

## 2.9. Discussion of the General Set-up

To elucidate the meaning of political catastrophe, we offer the following examples. Communist revolutions would always qualify as political catastrophes, because they curtail the ability of the overthrown elite to enjoy the benefits of power and are also bad for foreign investors. An electoral defeat of a ruling party may or may not qualify. In stable democracies such as the US and Western Europe transfers of power involve shifts in political patronage, giving them some elements of criterion one. But these transfers typically have at most slight implications both for elite groups and for foreign investors, so they would not be political catastrophes. On the other hand, if Gennadi Zyganov had defeated Boris Yeltsin in Russia's 1996 presidential election, this would have constituted a political catastrophe achieved through democratic means. In Hong Kong after the British transfer of power to the Chinese, there are various scenarios under which a political catastrophe could occur. For example, there is some chance that the island will experience a downward spiral of protest and repression. A possible result could be disenfranchisement of the current Hong Kong power structure, a possible political catastrophe. Another scenario is that corrupt Chinese officials might, in effect, extort money and property from both Hong Kong and foreign business interests, leading to a catastrophic loss of confidence in the local economy. Most of the peaceful revolutions that took place throughout Eastern Europe in 1989 probably would not be political catastrophes, since they caused surprisingly little turnover in the region's power elite.

We emphasize that political catastrophe, as we define it, does not necessarily entail revolution, although revolutions often do cause political catastrophes. At the same time peaceful and democratic transfers of power can satisfy our definition. Political catastrophe is really orthogonal to democratization. The key requirement is that there must be a major turnover in ruling elites.



Next consider our working hypothesis that more domestic capital causes greater stability. Of course, this cannot be considered an iron law of nature. In certain situations rapid growth may be destabilizing (see Olson (1963)). However, note that the overthrow of an autocrat following an episode of rapid growth does not necessarily mean that the growth was a destabilizing factor. For example, before World War I when Russia was experiencing rapid growth Prime Minister Stolypin initiated his “wager on the strong and sober”, a policy that brought ambitious peasants into the middle class. Lenin greatly feared this policy, opining that “if this should continue for very long periods of time ... it might force us to renounce any agrarian program at all.” (Moorhead (1958), p. 69). Within the framework of our model we can see the rapid growth as a survival strategy reflecting the insecurity of the tsar who simply was not sufficiently fortunate to hang on long enough to achieve stability.

It is true that there exists a clear correlation between development and democracy. However, democratization does not necessarily involve political catastrophe in our sense. Many countries democratize over time without overthrowing their elite groups. Moreover, Przeworski et. al. (1996) and Przeworski and Limongi (1997) show that growing dictatorships are less likely to democratize than shrinking ones. The correlation is explained by the fact that new democracies can revert back to dictatorships, but these reversals become increasingly unlikely the richer is the democracy.

### **3. Results**

#### **3.1. The Basic Approach**

The problem is too complicated to yield an analytical solution so we solve it numerically. The baseline parameters used for the pictures that follow are given in table 1. Note that none of our results depend on the use of this particular parameter set and are robust to an extremely broad range of parameters including all those plausible for the parameters for which there are empirical estimates.

Table 1

Parameter	Value
$\alpha$	.5
$\theta$	1
$r^*$	.1
$\delta$	.3
$\beta$	.9
$\gamma$	.7

### 3.2. Dependence on Initial Domestic Capital-Bifurcation

In this subsection and the next we consider the proprietor's behavior under both domestic capital-based and consumption-based instability. Our first result is that *under both types of instability there is a bifurcation point for domestic capital in the solution to the proprietor's problem. That is, if initial domestic capital begins above some level  $\bar{D}$ , then it will always increase, but if domestic capital begins below  $\bar{D}$  it will always decrease.*

The main reason for this behavior is captured by the following mechanism. If initial domestic capital is low then the dictator knows he has a low probability of retaining power for very long. Thus, it is pointless to invest and, therefore, he allows the capital stock to deteriorate while he plunders the economy. This is consistent with the idea that insecure dictators do not favor growth (Olson (1991) & (1993)). On the other hand, if initial domestic capital is high then the dictator can look forward to a long reign in power and therefore will wish to invest, further delaying his expected departure date. In this case, the proprietor's strategy is to restrain his plundering in exchange for increasing his longevity in power. Thus, moderate insecurity is consistent with economic growth.<sup>18</sup>

Somewhat surprisingly, these stories still hold even when political instability is consumption-based. In this case, high domestic capital allows for high consumption and therefore stability, encouraging the proprietor to invest. Low domestic capital induces domestic capital shrinkage through an opposite channel - either consumption is low, leading to high instability and a poor incentive for the dictator to invest, or consumption is set at an unsustainably high level, undermining investment in domestic capital and leading to decline.

<sup>18</sup>Foreign investment enhances these effects. When domestic capital is low foreign investors face significant risk - thereby making foreign capital scarce. When domestic capital is high foreign capital flows more freely into the economy

If we interpret  $D$  as human capital then this bifurcation result has an interesting connection with the issue of human capital investment in Russia. It is often argued that human capital should be allowed to deteriorate temporarily at an early stage in Russia's transition process while other more pressing concerns are attended to.<sup>19</sup> According to this view human capital growth could resume after stability has been achieved. But the present model would suggest that such a U-shape scenario might not be a feasible path for Russia.

### 3.3. Bifurcation Sensitivity and Parameter Choice

It is valuable to study the movement of the bifurcation point as the underlying parameters of the model vary. Our sensitivity analysis yields the following results. *Under both domestic capital-based and consumption-based instability the bifurcation point for the proprietor is increasing in the risk-free rate,  $r^*$ , and depreciation rate,  $\delta$ , but decreasing in stabilization potential,  $\theta$ , efficiency of investment in domestic capital,  $\gamma$ , and the discount factor,  $\beta$ .*

These relationships are intuitive. For example, as the risk-free interest rate,  $r^*$ , increases, foreign capital flows less freely, and as a consequence accumulating domestic capital loses its attractiveness. Thus, for positive growth to be optimal a higher domestic capital threshold must be crossed. Similarly, increased stabilization potential,  $\theta$ , means greater stability for any given level of domestic capital, lowering the threshold for positive growth. As time preference declines, ( $\beta$  rises), the proprietor is less myopic and the bifurcation point falls. Higher efficiency of investment,  $\gamma$ , or a lower depreciation rate,  $\delta$ , increase the productivity of domestic capital investments, again lowering the growth threshold.

The effect of changing  $\theta$  may be of special interest if we consider that different countries may have different  $\theta$ 's due to factors exogenous to our model. For example, one might argue that Taiwan and South Korea in the 1950s were able to achieve higher political stability at a similar level of development than was the Philippines, due to higher equality resulting from land reform. The differences in  $\theta$ 's might have put these countries on different sides of their respective bifurcation points, at least for some time periods, resulting in the large differences in per capita GDPs they experience today.

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<sup>19</sup>For details see Overland and Spagat (1996) and Fan, Overland and Spagat (1997) who argue against the common view.

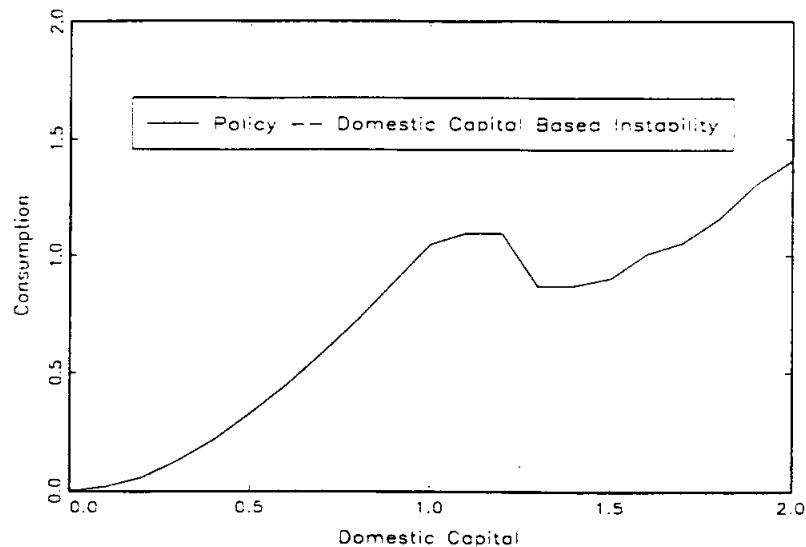


Figure 3.1:

### 3.4. The Proprietor's Policy Function

Figure 3.1 shows a typical policy function when instability is domestic-capital based, graphing consumption as a function of domestic capital. *The interesting point is the non-monotonicity of consumption as a function of domestic capital (hence income): consumption first rises, then falls, and then rises again.* The reason for this behavior is closely connected with the above discussion of bifurcation. If domestic capital is below the bifurcation point, then the optimal choice is to allow it to deteriorate. This implies that an increase in domestic capital that does not push the economy above the bifurcation point simply leads to higher current consumption. When the bifurcation point is crossed, however, the basic plan shifts from plundering the economy and extinguishing domestic capital to building it up. There is then an interval of higher domestic capital levels over which improved conditions for investing in domestic capital induce the policy-maker to cut consumption. The bifurcation point for an economy occurs at the beginning of this interval of declining consumption. At even higher

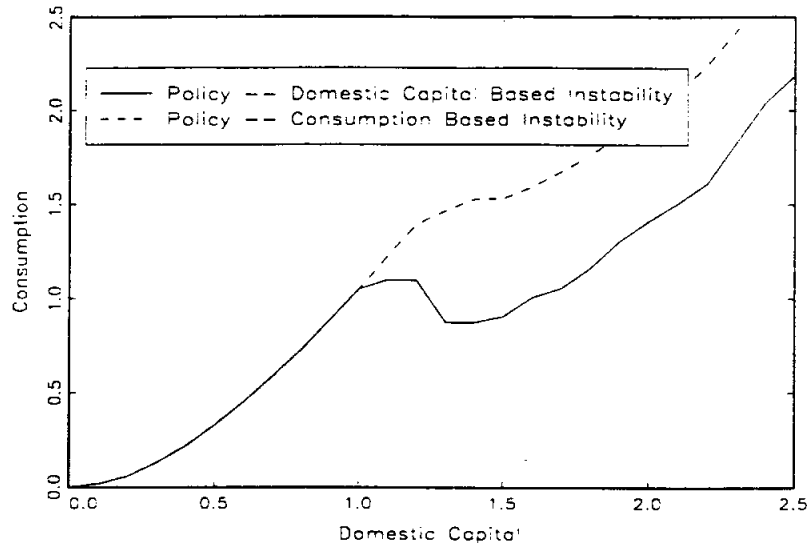


Figure 3.2:

levels of domestic capital, consumption once again begins to increase. Note that, this is consistent with the experience of the Asian tigers discussed above (see footnote 9).

Figure 3.2 shows the proprietor's policy functions for both domestic capital-based and consumption-based instability for a typical parameter set. Note that *for consumption-based instability the bifurcation point is higher and the decline in consumption at bifurcation less pronounced than for domestic capital-based instability*. This contrast is typical over the entire range of parameters tested. Both the higher bifurcation point and the less pronounced decline in consumption at bifurcation are explained as follows. In the consumption-based economy, the proprietor must raise consumption to lower instability. But this reduces domestic investment (equation 2.6), which renders continued high consumption untenable. Thus, the proprietor requires a higher level of domestic capital before he can "afford" to undertake both stabilization and growth. Even above bifurcation, the proprietor must be wary of reducing consumption too much lest he raise instability substantially and jeopardize his tenure.

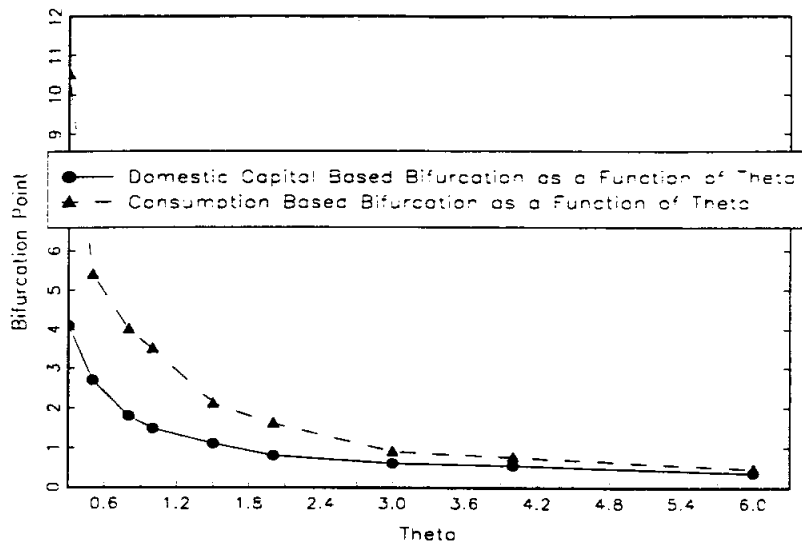


Figure 3.3:

Related to this result is the fact that as  $\theta$  rises, increasing the stabilization potential, the bifurcation points of the two types of proprietorships converge, as shown in figure 3.3. As  $\theta$  rises, the level of stability required for the proprietor to choose growth is achieved with lower consumption (less domestic capital) in the case of the consumption-based instability (domestic capital-based instability), but the consumption-based proprietor receives an added inducement to embark on the growth path. The fact that the consumption-based proprietor can get away with lower consumption allows more domestic investment, which leads to a wealthier economy and greater ability to sustain and raise future consumption. With high  $\theta$ , he largely escapes the trap of being forced to underinvest in domestic capital to maintain stability.

### 3.5. The Dictator versus the Social Planner

The crucial difference between the planner and the proprietor is that *the planner does not exhibit bifurcation*. The planner might choose shrinkage, e.g., if dis-

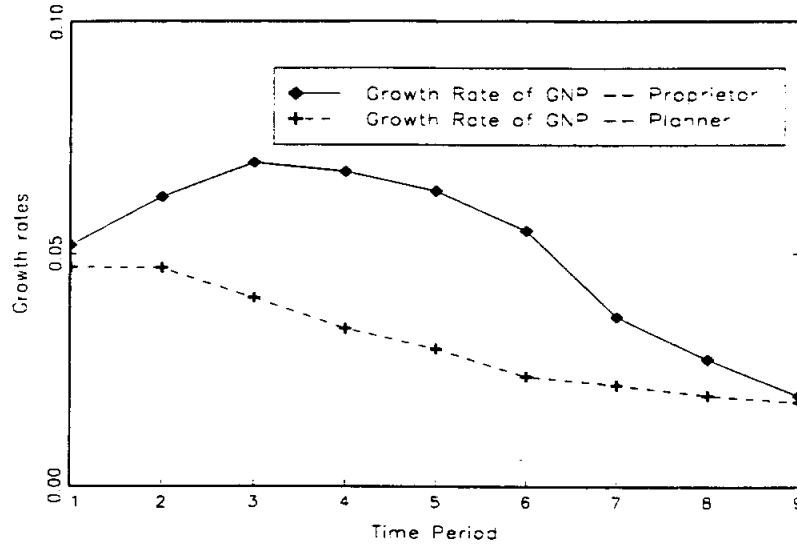


Figure 3.4:

counting is very strong but this choice will never depend on the initial capital stock.

Figure 3.4 illustrates the interesting fact that *when the dictatorial economy has an initial domestic capital level above its bifurcation point, it achieves a higher growth rate than the socially-planned economy*. The intuition behind this result is that the dictator, but not the social planner, cares about the probability of survival. This endogenous probability is increased by heavy investment in domestic capital (equation 2.2). Thus, the dictator has a unique incentive to push for a high growth rate. The result is that dictatorial economies, when they expand, grow faster than is optimal.

It is, perhaps, surprising that there are any circumstances at all under which the dictator outgrows the social planner. This is because the dictator, in effect, discounts the future more than the planner because the former's planning horizon is truncated (stochastically) by the possibility that he will be removed from power. How is it that the one who discounts the future most strongly invests the most? Because the dictator can affect his survival prospects through his investment strategy: more investment leads to a longer expected term in office. Thus, the endogeneity of the political catastrophe is the reason for high investment.<sup>20</sup>

These considerations are clearly displayed by taking the first derivatives of the RHSs of Bellman equations (2.11) and (2.12), giving respectively

$$U'(C) + \beta \{ [1 - q(D_2)] V'(D_2) - q'(D_2) V(D_2) \} \quad (3.1)$$

$$U'(C) + \beta V'(D_2) \quad (3.2)$$

where  $D_2 \equiv (1 - \delta) D + \gamma I$ , i.e., it is next period's domestic capital stock. It is clear that for the dictator the marginal value of more capital next period is discounted by the extra  $1 - q(D_2)$  relative to the planner. This "horizon-shortening effect" argues for less investment. On the other hand, the term  $-q'(D_2) V(D_2) > 0$  reflects an "endogenous-survival effect" that argues for more investment. It turns out that the latter effect dominates the former above bifurcation.

The present result can also be anticipated by noting the difference between the shapes of typical proprietors' and planners' policy functions as shown in figure 3.5. Above bifurcation consumption in the dictatorial economy falls to a level below that in the planner's economy, leading to faster growth. For high levels of domestic capital, policies of the dictator and social planner converge because instability is extremely low (equations 2.11 and 2.12 demonstrate this mathematically). Indeed, when the threat of political overthrow is tiny, the dictator and social planner become indistinguishable.

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<sup>20</sup>Roberts and Rodriguez (1997) provide an interesting growth model for Soviet-type economies. They explain why transition economies have invested much less than their centrally planned parents by invoking a change in the applicable discount rate. But in our model the planner and the dictator always have the same discount rate, strictly defined.



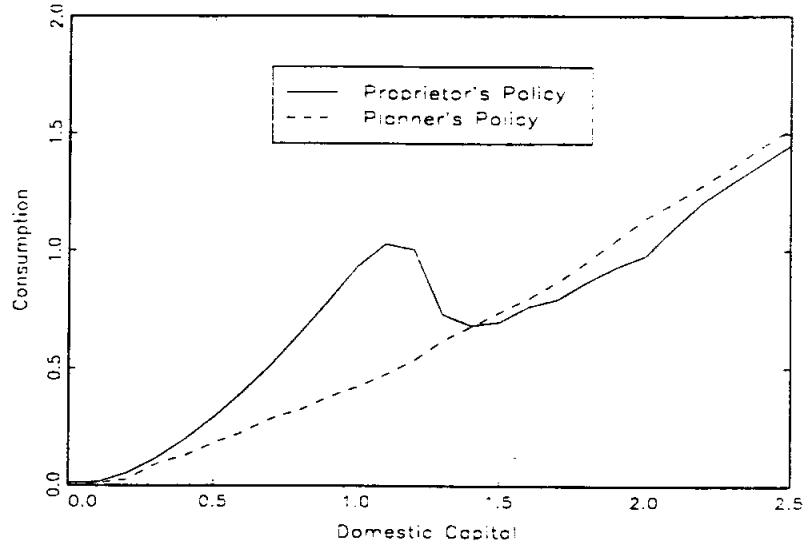


Figure 3.5:

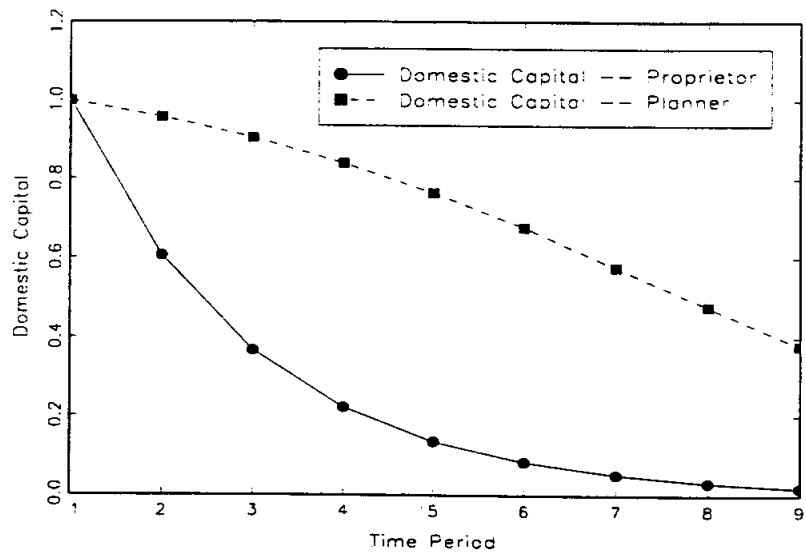


Figure 3.6:

The result carries through for the case of consumption-based instability, but with somewhat different intuition. Above bifurcation, the proprietor must nurture domestic capital growth so as to expand national income and consumption. Thus increasing domestic capital indirectly lowers instability.

Our next result is that *there is always a range of initial capital stock over which the proprietor will choose to run down the capital stock when growth would be optimal*. This occurs over the region where consumption in the proprietary economy is much greater than in the socially planned economy. In figure 3.5 this corresponds to the region between .4 and 1.2 on the domestic capital axis.

Finally, note that *when shrinkage is optimal for both planner and proprietor, the proprietor chooses to shrink faster*. This is because a shrinking domestic capital base leads to rapidly growing instability that encourages accelerated plundering. This naturally holds for consumption-based instability as well, since shrinking domestic capital, and thus a forced decline in consumption, leads to a decline similar to that described above. Figure 3.6 shows a typical case of accelerated shrinkage for the proprietary economy.

The last two results are rather surprising in light of the previous one and equations (2.16) and (2.17). The same horizon-shortening and endogenous-survival effects are at work. However, it turns out that below bifurcation the former effect dominates while above bifurcation the opposite is true.

#### 4. Some Evidence

There is a large empirical literature on growth and political regimes surveyed in Przeworski and Limongi (1993) and Sirowy, L, and A. Inkeles (1990) concerned with whether dictatorships are good or bad for growth. Both studies conclude that it would be very difficult to argue for a strong effect either way. Some researchers find mild results in one direction or the other while others find that the effects are ambiguous. Barro (1996a) finds some evidence that, while extreme dictatorships may harm growth, softer dictatorships may actually be good for growth.

For the present paper the important point about these works is that they concern average growth rates rather than some measure of the variability of the rates. Our theory does not predict that growth rates would be either higher or lower on average in dictatorships compared to democracies. But it would suggest that some dictatorships would grow very fast while others would experience secular decline. In other words, we would not be surprised to see dictatorships growing like democracies on average but would expect highly variable growth rates in

dictatorships.

We tested this prediction using the Barro-Lee data set.<sup>21</sup> For our limited purposes this means that we are using the Summers-Heston data (augmented by World Bank data when necessary) together with the annual ratings of political freedom carried out by Gastil (see Gastil (1990 and various years)). The Gastil concept of political freedom is mainly about the extent to which people are allowed to participate meaningfully in political processes. To score very well a country would need genuinely contested executive and legislative elections under fair conditions, regular shifts in power, freedom from foreign or military control and no major oppression of minority groups. The ratings are, of course, subjective in the final analysis but they do generally accord with common sense.

We use data between 1970 and 1990 and calculate growth rates of real GDP per capita over both 5-year periods (1970-75, 75-80, 80-85, & 85-90) and 10-year periods (1970-80 & 80-90) for different exercises. We divide the countries into high political rights countries (Gastil index  $< 3$ ), middle rights countries ( $3 \leq \text{index} < 5$ ) and low rights countries ( $5 \leq \text{index} \leq 7$ ). This is done by averaging for each country over the time period in question. Note that the political category of a country can vary across time periods.

Table 2 gives the percent of observations in each political category that experience negative growth according to various definitions ranging from  $< 0\%$  per year to  $< -4\%$  per year over a ten-year period. Thus, out of all high political rights observations 18.8% did not grow on average over a ten-year period, 11.8% declined faster than one percent per year, etc.. The table clearly shows a much higher prevalence of negative growth experiences for low political rights countries than in high or middle rights countries. The results are the same if we use 5-year averages. North America is the only region of the world that does not contribute to the list of negative-growth-low-political-rights countries but the main contributors are Africa, the Caribbean and South America.

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<sup>21</sup>The data together with a detailed description is available at <http://www.nber.org/pub/barro.lee>. Barro (1996a) carries out a growth regression exercise involving about 100 countries between 1960 and 1990, controlling for a large number of factors. His figure 4 (p. 15) shows the partial residuals of growth rates, controlling for everything except political freedom, plotted against political freedom. Inspection of this picture makes it fairly obvious that, consistent with our prediction, the variability of growth rates for low freedom countries is quite a bit larger than that for high freedom countries.

**Table 2. % by Political Category with Various Negative Growth Rates**

Political Rights	$g < 0\%$	$g < -1\%$	$g < -2\%$	$g < -3\%$	$g < -4\%$
High	18.8	11.8	4.7	2.4	0
Middle	31.1	20.0	11.1	6.7	4.4
Low	45.8	32.2	17.8	9.3	5.9

Now consider rapid growth as defined by annual rates over 10-year periods averaging more than 4%, 5%, 6%, and 7% as given in table 3. Again we see that rapid growth is more frequent in dictatorships than democracies, although it is actually most common in the middle rights countries. The results are the same with 5-year averages. The list of high-growth-low-political-rights countries has representatives from every major region other than North America and the Caribbean, but the East Asian presence is especially strong. Perhaps surprisingly a fair number of African countries appear at least during certain time periods (e.g., Kenya, Lesotho, Nigeria, Tunisia).

**Table 3. % by Political Category with Various Rapid Growth Rates**

Political Rights	$g > 4\%$	$g > 5\%$	$g > 6\%$	$g > 7\%$
High	10.6	7.1	2.4	1.2
Middle	22.2	15.6	6.7	2.2
Low	17.8	9.3	5.1	2.5

Since our theory predicts that dictatorship should be associated with both very high and also negative growth rates one would expect that the variance of the growth rate should be higher for low political rights countries than for high ones. Table 4 confirms this prediction.

**Table 4. Sample Variance in Growth Rates vs. Political Rights**

Time Periods	High	Middle	Low
5-year average	6.0	13.2	15.3
10-year average	4.4	8.7	10.8

Since political rights are positively correlated with income it is possible that table four is really just picking up a tendency for poor countries to have more variable growth rates than rich countries so we ran a regression to control for income. We divided the countries into ten GDP per capita classes, 0–2000, 2000–4000, ..., and 18,000–20,000 (designated 1, 2, ..., 10 respectively). Next we broke

down each income group into three subgroups for low, medium and high political rights (designated 1, 2, 3 respectively). Finally we calculated sample variances for growth rates over five-year periods for each of these thirty groups. We got the following result in which the GDP variable is insignificant and low political rights are associated with high variance in growth rates.

$$\text{Variance of Growth Rates} = 51.6 + \underset{(2.8)}{2.0} (\text{GDP}) - \underset{(-2.3)}{19.2} (\text{Political Rights}) \quad (4.1)$$

Finally, we focus on our bifurcation result that suggests that in dictatorships negative growth should be associated with low initial income and rapid growth with high initial income. Table 5 is consistent with this prediction.

**Table 5. Average GDP: Dictatorships with Negative or Rapid Growth**

Growth Rate	5-year average	10-year average
>4%	1775	2116
<-1%	1664	1852

## 5. Conclusion

The most obvious consequence of this work is that we should not confuse rapid economic growth of a dictatorship with good performance. These regimes are especially prone to rush the development process regardless of the costs.

Our analysis also suggests that proprietary rule engenders conditions that lead countries to play out their futures in one of two contrasting scenarios. On the one hand, they have the potential to break out of the poverty trap and achieve (sub-optimally) rapid growth – as seen, for example, in China, Ecuador, Indonesia, Lesotho, South Korea, and Tunisia. On the other hand, proprietary leadership can send countries such as Haiti, Iraq, Paraguay, Somalia, Yugoslavia and Zaire on a downward spiral of economic deterioration. Many such countries eventually require the intervention of the international community and may become focal points for global instability (e.g., Somalia, Haiti, former Yugoslavia and recently many East Asian countries).

Predicting the effects of foreign aid and policy prescriptions on developing countries requires modelling that takes into account the realities of proprietary government. The history of the success of foreign aid programs has been mixed at best (DeLong (1997) & Hirschman (1981)). This paper shows that part of

the reason for this is that the choices made by proprietary governments facing instability tend to vary from those predicted by standard growth models in which a benevolent social planner makes decisions. With this in mind we conclude with some brief observations that relate policy and proprietary governance.

The natural policy question that arises is that of how to push an economy over its bifurcation point – that is, what kind of policy can lead to an economic takeoff? Of course, the most obvious intervention is to directly increase domestic capital. Many World Bank programs can be viewed precisely in these terms. The theme that flows from this paper is the importance of implementing a critical mass of domestic capital programs that push the economy past the take-off point.

An intervention of another sort that is natural in our framework and is possibly more interesting is to increase, perhaps temporarily, the stabilization potential,  $\theta$ . In fact, one can view IMF programs in these terms. Their plans provide financing that gives governments room to implement difficult measures that can stabilize the environment in the medium term while not significantly sacrificing short-term stability. Moreover, the IMF stamp of approval is taken by international capital markets to certify that the risk of investing in the economy is now considered manageable even though the country's domestic capital has not improved. The model can capture this as a decrease in the probability of political catastrophe,  $q$ , without an increase in domestic capital, something that can only be accomplished by increasing the stabilization potential. It is not hard to imagine scenarios under which an increase in stabilization potential is sufficient to induce a takeoff which can then be sustained on the basis of a significantly improved domestic capital stock, even after stabilization potential reverts to its old level at some future date. We believe that such scenarios can be a fruitful avenue for future research.

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