

Political Instability, Foreign Investment and Growth in Proprietary Economies*

Jody Overland

University of Colorado at Denver, 73110.3621@compuserve.com

Michael Spagat

Royal Holloway College, University of London, M.Spagat@rhbnc.ac.uk

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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 provide theory 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.

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1. Introduction

This paper studies the relationship between growth, foreign investment, and political instability in poor countries that have the potential to break out of poverty and achieve rapid growth, as well as in relatively rich countries where there is a danger of precipitous and long-term decline. One obvious fact about economies of either type is that few are stable democracies.¹ Rather, strong individuals or groups that take a proprietary attitude toward their country and its wealth are generally at the helm – we refer to these individuals or groups as dictators.² It is fair to say that the enormous growth literature has not yet concerned itself with the possible implications of regimes of this type.³ 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 growth models. Our model is at the intersection of these approaches, studying the consequences of proprietary politics for growth as mediated through foreign investment and political instability.

Robert Barro, in "Getting It Right," (1996 - p.3), states that dictators

"come in two types: one whose personal objectives often conflict

¹To quote De Long (1997) "In most countries the political aftermath of decolonization was a catastrophe... parliamentary politics and independent judiciaries soon became rare exceptions ... regimes emerged that derived their authority not from electoral politics but from the army and the police..." (Ch 21, p.1). See also Bardhan (1997). Lucas (1988) points out that growth rates tend to be far less stable in developing countries than in established democracies, but no one seems to have followed up on this idea.

²Grosman, H. and S. Noh, (1994) assert that this type of government is the rule in non-democracies. Indonesia serves as a prime example; in 1965 hyperinflation triggered a communist-led rebellion that was put down by Suharto. Since then he has led his country through an extended period of low inflation and rapid growth. However, there is the caveat that the Suharto family and the top military leadership "in cahoots with ethnic Chinese-run conglomerates" own essentially all of the industry in Indonesia (Bardhan (1997)). Haggard (1992) describes the imprisonment of the leading business figures of South Korea in 1961 who were only released after assuring their cooperation with the administration. Another case is that of the former Zaire where Mobutu sese Seko ruled Zaire with an iron hand, plundering the country's natural resources with the help of foreign interests, most notably the French, greatly enriching himself and his coterie while the economy declined. Rather than develop domestic infrastructure, Mobutu accepted millions of dollars in bribes to allow foreign interests to essentially steal the country's mineral wealth (Bardhan 1997). De la Balze (1995) in reference to Argentina states "...those who control the government believe they own the government...."

³Easterly (1997) discusses the gap between academic growth literature and the realities of developing economies (p.25).

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."

This paper provides an intuitively appealing theory that determines which of two paths a proprietary economy (dictatorship) is likely to follow – growth or decay.

Political instability is a major impediment to economic growth in a wide variety of countries.⁴ Instability, implying risk, limits investments, and hence growth. Political risk assessments play a major role in business investment decision making.⁵ This is recognized in the academic political economy literature in which models often include some form of political instability.⁶ 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.⁷

Emerging markets by their very nature have underdeveloped "domestic capital" relative to the world's richest countries. This is especially true if we adopt a broad concept of domestic capital that goes beyond traditional physical capital. As used in this paper, the term domestic capital is meant 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. It is generally well accepted that all of these domestic capital elements are crucial for attracting foreign investment – a factor that figures prominently in our model.

While the above considerations are standard, in this paper we introduce the more novel assumption that domestic capital development contributes to political

⁴According 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 9 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.

⁵Evidence of this is the many business that sell political risk assessments. For example, the Economist Intelligence Unit publishes periodic ratings.

⁶Alesina and Tabellini (1990), Hess and Ophanides (1992), and Bertocchi and Spagat (1997) have dynamic models with exogenous political instability. Grossman and Noh (1990 & 1994) model endogenous political instability in a static setting.

⁷Jeffery Sachs (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.

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.⁸

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 increased aggregate consumption.⁹ Of course there is a natural relationship between these two sources of political instability, since more domestic capital increases output, and thus allows more consumption. All of our results hold under both sources of political instability, although they vary in the details in interesting ways.

The model economy evolves over time with a proprietary leader determining public investment in domestic capital in every period. Domestic and foreign capital are complementary, so foreign investors are directly attracted by good domestic capital. Foreign investors are also attracted by the political stability that is a consequence of either good domestic capital or high current consumption.¹⁰

The proprietor 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.

Models in which political stability is determined jointly with other factors and evolves dynamically tend to be too complex for complete analysis, and ours is not an exception. We are able to represent our model in the form of a dynamic pro-

⁸See Bertocchi, Overland and Spagat (1998) for a micro foundation for this assumption.

⁹De Long (ch. 21, p.7-9) states that the postwar Argentinian government under Peron sacrificed domestic investment and hence economic growth for increased domestic consumption. Although in 1950 they were as rich as any large county in Europe, by 1960 they were "poorer than Italy and had only two-thirds of the GDP per capita of France or West Germany." In de la Balze (1995) we find that Argentina, a country with roughly the same GDP per capita as France and Germany in the first four decades of the country now has a GDP per capita of roughly 1/3 these countries.

¹⁰Przeworski and Limongi (1993) survey many empirical works on links between growth and form of government (democracy, autocracy, and bureaucratic). Minier (1997) is a very recent empirical study on the effects of political stability and democracy on growth in which the nature of various international regimes is documented.

gram and so have been able to implement a computer algorithm that determines optimal government policy. This enables us to solve for the full dynamic paths of the evolution of domestic capital, economic output, aggregate consumption, and political stability for any set of initial conditions.

Our first result is that there are only three possible qualitative paths for domestic capital: steady growth, steady deterioration, or zero growth.¹¹ 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, realizing that in doing so he hastens his departure from power and, hence, his ability to continue extracting wealth.

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.

A related key 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 a development trap whereas one above this threshold follows a path of steady growth.¹² These results are robust to whether the source of political instability is consumption-based or domestic capital-based.

Next, we are able to analyze how the bifurcation point depends on the underlying parameters. In particular, 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 10 for an example). It shows that

¹¹Zero 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.

¹²See Azariadis and Drazen (1990) and Murphy, Shleifer and Vishny (1989) for discussion related to development traps in growth.

consumption increases up to the bifurcation point, reverses course and then once again begins to increase. This means that if the proprietor chooses for the economy to shrink, then more domestic capital simply means more consumption. In effect, the proprietor does not expect to be around very long, so he enjoys himself as much as possible while he has the chance. On the other hand, if the proprietor considers the economy just fit enough to grow (domestic capital is slightly above the bifurcation point) then he invests much more than he would if domestic capital were just below the bifurcation point. So if the proprietor chooses growth, then he chooses *rapid* growth in order to increase the longevity of his rule.

We then explore the dynamic consequences of the differences between the proprietor's and social planner's policy functions. When domestic capital is above the bifurcation point, the proprietary economy tends to grow (sub-optimally) faster than the social planner's economy. This is consistent with empirical evidence that democracy may actually slow growth. We believe that this result provides insight into the rapid growth experience of the Asian Tiger economies¹³ and other "proprietorships" that had declining consumption rates (and increasing saving rates) during their takeoff phases.¹³ Again, the intuition is that the proprietor expects high growth rates to prolong his tenure in power. Contrapositively, proprietary economies below the bifurcation point tend to shrink when, with the same endowment, social planners would choose to grow – or else shrink faster than would socially-planned economies.¹⁴

We 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

¹³Mankiw, Romer, and Weil (1992) and Overland (1997) document these increasing savings rates. De Long (1997) referring to the period from the 60's on states "Relatively less oppressive modern dictatorships produced rapid growth and impressive economic growth in the non-Communist fringe of Pacific Asia and in Saharan Africa" (ch.2), (p.2).

¹⁴Barro (1996) 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) states that "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).

poverty trap, in other words, consumption-based instability raises the bifurcation point. There is a range of domestic capital levels over which growth is optimal if instability is domestic capital-based that lead 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.

The plan of the paper is as follows. In section two we present the model with domestic capital-based instability and then at the end of the section we introduce the consumption-based instability version. The results are shown and analyzed in section three, and we conclude in section four.

2. The Model

2.1. Production

The economy's production function is

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

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. As mentioned above, our generalized concept of domestic capital includes low-technology capital, physical infrastructure, market infrastructure 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.

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. 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.

To elucidate the meaning of political catastrophe, we offer the following examples. Communist revolutions would always qualify as political catastrophes, because they are bad for foreign investors and curtail the ability of the overthrown elite to enjoy the benefits of power. 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 for foreign investors, so they would not qualify as political catastrophes. On the other hand, if Gennadi Zyganov had defeated Boris Yeltsin in Russia's presidential election of 1996, that would have been a clear case of 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 (criterion one). However, such a situation may or may not be a blow to foreign investors and, hence, a 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 general loss of confidence in the local economy. This would most likely constitute a political catastrophe.

Most of the peaceful revolutions that took place throughout Eastern Europe in 1989 would not be political catastrophes. They did cause a big turnover in the region's power elite, although perhaps not quite to the extent that is commonly supposed. However, as a rule they were not all bad for foreign investors.¹⁵

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 the influence of people who have a stake in preventing a catastrophe grows 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 peo-

¹⁵Note 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.

ple and interests are gravely concerned with preventing catastrophes.¹⁶ Note that in both Hong Kong and Russia wealthy business interests are a stabilizing force in politics, since these groups have the most to lose from a political catastrophe.¹⁷

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. 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.

¹⁶A companion paper by Bertocchi, Overland and Spagat (1998) establishes microfoundations for the co-optation of the poor by the elite. This is achieved by means of 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 in maintaining the status quo. Thus political instability and the risk of political catastrophe are reduced.

¹⁷In section 2.8 we adapt the model to consumption-based instability.

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

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

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.

2.6. Objective of the Policymaker

As noted above, our policymaker is a proprietary government that is concerned only with the portion of domestic consumption that it takes in every period up to the 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.¹⁸ Aggregate consumption, C_t , is therefore

$$C_t = w_t D_t - I_t \quad (2.6)$$

with the proprietor's share being λC_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

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

¹⁸Although 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.

where τ is a random variable with range $\{1, 2, 3, \dots\}$ giving the stochastic and endogenous time when the catastrophe occurs. Since the solution to the above problem is unchanged for any monotonic (weakly) increasing transformation of the maximand, we can solve the problem

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

to get the proprietor's solution.¹⁹ 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 it 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.²⁰ 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 τ while that in the latter runs with certainty to ∞ . As we show below, the possibility of political catastrophe complicates the optimal policy of the proprietor, including too little or too much investment relative to that chosen by a social planner.

¹⁹In 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 utility, $U(\lambda C_t) = \frac{(\lambda C_t)^{1-\sigma}}{1-\sigma} = \frac{\lambda^{1-\sigma}}{1-\sigma} U(C_t)$, and so $\arg \max U(\lambda C_t) = \arg \max U(C_t)$. 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.

²⁰We 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 difference between the proprietor's instantaneous utility function and that of the social planner.

2.7. Dynamic Programming Formulation

Equation (2.8) and (2.9) show most clearly the mathematical difference between the problems of the proprietor and social planner. The Bellman equation for the proprietor's problem, using equations (2.4) and (2.8), is

$$V(D) = \max_{0 \leq C \leq w(D)D} U(C) + \beta [1 - q((1 - \delta)D + \gamma I)] V((1 - \delta)D + \gamma I) \quad (2.10)$$

Equation (2.10) 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 β and the probability of avoiding catastrophe. It is well known that this formulation is equivalent to (2.8).

Similarly, the Bellman equation is social planner is

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

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

$$q_t = q(C_{t-1}) = e^{-\theta C_{t-1}} \quad (2.12)$$

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

$$V(D) = \max_{0 \leq C \leq w(D)D} U(C) + \beta (1 - q(C)) V((1 - \delta)D + \gamma I) \quad (2.13)$$

and planner

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

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.

3. Results

3.1. The Basic Approach

The problem is too complicated to yield an analytical solution. However, we wrote a Gauss program that rapidly returns numerical solutions for optimal policy for the proprietor and social planner for any set of parameter values. The results in this section are based on numerical analysis using these programs. The baseline parameters used for simulations are given in table 1.²¹

Table 1

Parameter	Value
α	.5
θ	1
r^*	.1
δ	.3
β	.9
γ	.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. The following figures graphically display our main result: the dependence of domestic capital paths on initial domestic capital. Whether the economy grows or shrinks depends on which side of the bifurcation point its initial level of domestic capital lies.

Result 1. For an extremely wide range of parameter values and under both domestic capital-based and consumption-based 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 of \bar{D} , then it will always increase, but if domestic capital begins below \bar{D} it will always decrease.

²¹ None of our results are dependent 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.

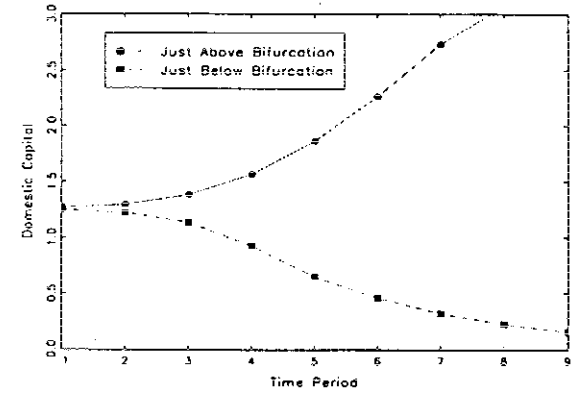


Figure 3.1:

Figure 3.1 demonstrates the bifurcation phenomenon in the case of domestic capital-based instability while figure 3.2 does the same for consumption-based instability. When initial domestic capital is just above the bifurcation point the domestic capital stock is monotonically increasing and when it is just below bifurcation domestic capital stock is monotonically decreasing. In fact, we get increasing paths for any initial condition above the bifurcation point and decreasing paths for initial conditions below the bifurcation point. This bifurcation in the initial domestic capital stock holds for a very wide range of parameter values.

The main reason for this behavior is described by the following mechanism. If initial domestic capital is low, then foreign investors face significant risk – thereby making foreign capital scarce. Building up domestic capital only diminishes investor risk slightly in the short run, and thus the present value of the return on increasing domestic capital is low. It is therefore better for the proprietor to plunder resources while allowing domestic capital to deteriorate. On the other hand, if initial domestic capital is high then foreign capital flows more freely into the economy and is highly responsive to domestic capital improvements. In this case, the proprietor's strategy is to restrain his plundering in exchange for increasing

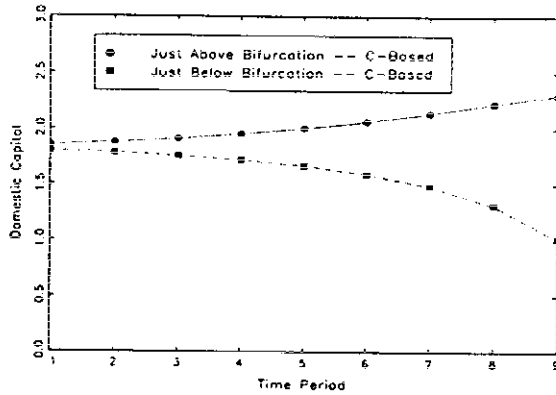


Figure 3.2:

his longevity in power.

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, drawing in foreign investment and encouraging growth. Low domestic capital induces domestic capital shrinkage through an opposite channel - either consumption is low, leading to high instability and low foreign investment, or consumption is set at an unsustainably high level, undermining investment in domestic capital and leading to decline.

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.

Result 2. 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, δ , but decreasing in stabilization potential, θ , efficiency of investment in domestic capital, γ , and the discount rate, β .*

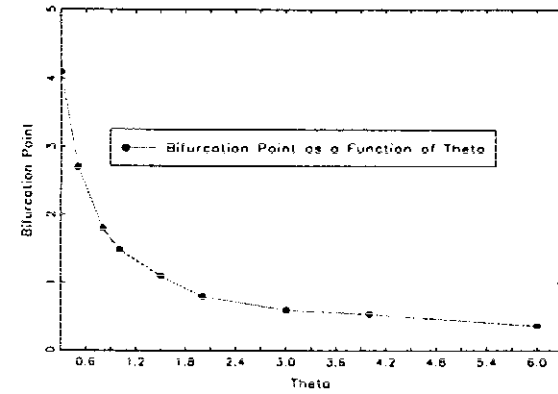


Figure 3.3:

The figures below are drawn for the case of domestic capital-based instability and are qualitatively identical to those for a proprietary economy with consumption-based instability.

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, θ , means greater stability for any given level of domestic capital, lowering the threshold for positive growth. As time preference declines (β rises), the proprietor is less myopic and the bifurcation point falls. Higher efficiency of investment, γ , or a lower depreciation rate, δ , increase the productivity of domestic capital investments, again lowering the growth threshold.

3.4. The Proprietor's Policy Function

Figure 3.8 shows a typical policy function when instability is domestic capital based, graphing consumption as a function of domestic capital. The interesting

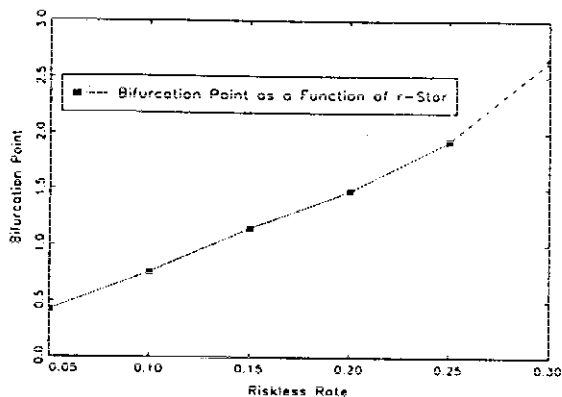


Figure 3.4:

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 increases 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 policymaker to cut the consumption rate. The bifurcation point for an economy occurs at the beginning of this interval of declining consumption. At even higher 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 12).

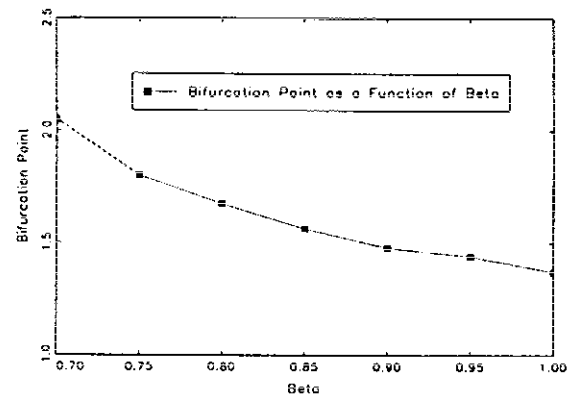


Figure 3.5:

Result 3. For an extremely wide range of parameter values and under both domestic capital-based and consumption-based instability, the rate of consumption as a function of domestic capital increases for low values of D , then decreases, and then increases again.

Figure 3.9 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

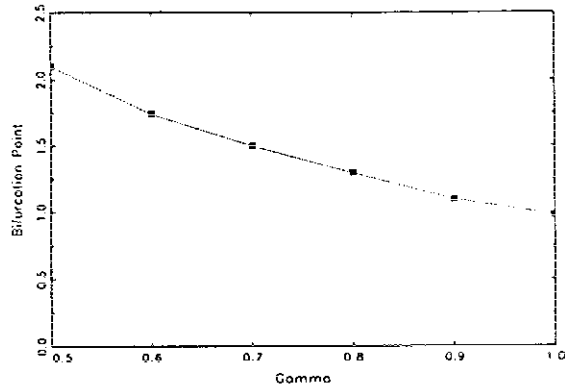


Figure 3.6:

proprietor must be wary of reducing consumption too much lest he raise instability substantially and drive away foreign investment.

Result 4. For an extremely wide range of parameter values the bifurcation point is lower, and the decrease in consumption above bifurcation more pronounced, when political instability is domestic capital-based rather than consumption-based.

A consequence *result 4* is that as θ rises, increasing the stabilization potential, the bifurcation points of the two types of proprietorships converge, as shown in figure 3.10. As θ 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

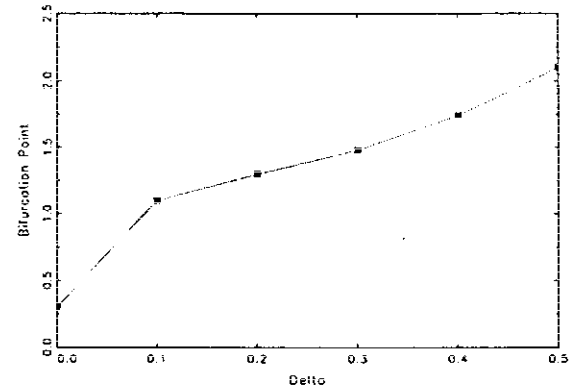


Figure 3.7:

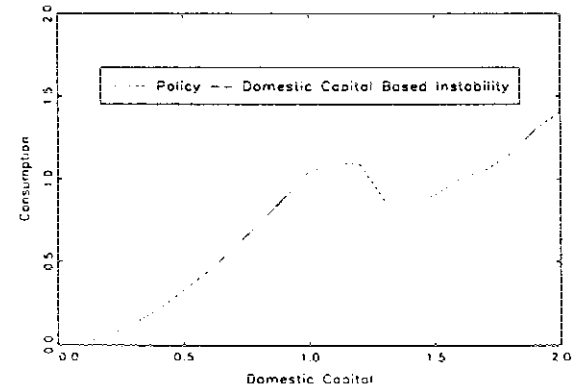


Figure 3.8:

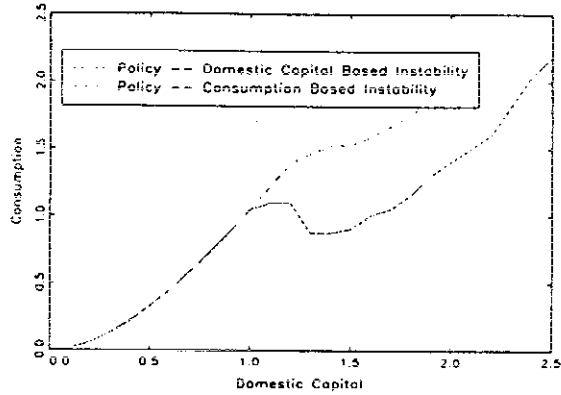


Figure 3.9:

economy and greater ability to sustain and raise future consumption. With high θ , he largely escapes the trap of being forced to underinvest in domestic capital to maintain and improve stability.

3.5. The Proprietor versus the Social Planner

Figure 3.11 shows that when the proprietary 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 only the proprietor cares about the probability of survival, which is increased by heavy investment in domestic capital (equation 2.2). Thus, the proprietor has a unique incentive to push for a fast growth rate. The result is that proprietary economies, when they expand, grow faster than is optimal. This can be anticipated by noting the difference between the shapes of typical proprietors' and planners' policy functions as shown in figure 3.12. Above bifurcation consumption in the proprietary 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 proprietor and social

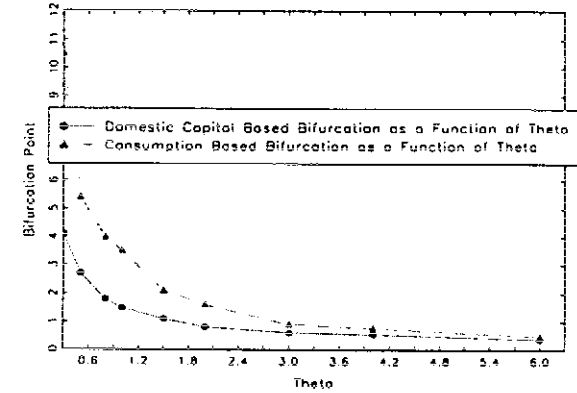


Figure 3.10:

planner converge because instability is extremely low (equations 2.10 and 2.11 demonstrate this mathematically). Indeed, when the threat of political overthrow is tiny, the proprietor and social planner become indistinguishable.

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

Result 5. For an extremely wide range of parameter values, and under both domestic capital-based and consumption-based instability, proprietary economies that grow do so faster than the equivalent socially-planned economics.

For an extremely wide range of parameter sets, including all reasonable ones tested, 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

shrink faster than the equivalent social-planner economies when shrinkage is optimal.

4. Conclusion

Our analysis 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 South Korea and Singapore. On the other hand, myopically self-interested leadership can send countries without the combination of sufficient political stability and domestic capital on a downward spiral of economic deterioration. Such countries eventually require the intervention of the international community and may become focal points for global instability (Somalia, Haiti, and the countries of the former Yugoslavia and North Korea come to mind as recent examples).

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.²² 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.

Intervention of another sort that is natural in our framework and is possibly more interesting is to increase, perhaps temporarily, the stabilization potential, θ . 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, g , without 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 takeoff which can then be sustained on the basis of a significant improved domestic capital stock, even after stabilization potential reverts to its old level at some future date.

The existence of bifurcation in the proprietary economy implies that resources devoted to assisting developing countries to "takeoff," or enter a virtuous cycle of sustained growth, should be concentrated on a few most promising candidate countries rather than dispersed widely. This paper shows that if a proprietary regime does not receive sufficient impetus in the form of either domestic capital or lower instability, it will simply consume whatever aid it does receive as it runs down the economy. If the bifurcation point can be bridged, then the proprietary regime will "get with the program" and promote a growth and stabilization plan. Since a temporary consumption subsidy is probably not what most aid organizations have in mind, and is certainly not what most donor countries believe they are paying for, the issue of bifurcation has significant normative impact.

One last point is that we can expect austerity measures required by aid organizations to be resisted by the proprietor if he perceives that development aid will be insufficient to put the economy above the bifurcation point. This should hold whether instability is consumption-based or domestic capital-based.

²²See De Long (1997) or Hirschman (1981)

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