

## Chapter 7: Active Crisis Management By Governments

Democratic government has the innate capacity to protect its people against disasters once considered inevitable, to solve problems once considered unsolvable. (F D Roosevelt, inauguration speech 1937.)

Given the large number of components that combine in non-additive fashion, ... our knowledge of how to design these (institutional) systems will continue to grow, but will never be complete. As soon as one design has proved itself in one environment, innovations in strategies adopted by participants or changes in the environment in which a humanly designed system is in operation will produce unexpected results. (Ostrom 2005: 255).

### On the Demand for Governmental Crisis Management

Uncertainty can produce unpleasant surprises and losses greater than normal for the same reason that pleasant surprises produced profits in Knight's classic treatment of profit. The nature of surprise does not imply that one is completely blind-sided by an event, it simply means that some of the factors required to properly make rules, set aside reserves, or fund an insurance pool are unavailable before the surprise takes place. The fact that the existence of such missing factors or extraordinary possible losses is recognized allows one to take steps to reduce future losses.

In some cases, governments have a cost advantage at crisis management. For example, whenever there are economies of scale in response, in coordination, or if coercive power is required to address the anticipated problems governments may

be able to provide crisis management services at a lower cost than individuals or private organizations can.

In addition to these technological features of crisis management, other cost advantages for a subset of voters may be created through the fiscal system as was the case for social insurance. When a service is provided in a more or less uniform manner but financed through a progressive tax system low income persons get the service at a discount over what they would have had to pay in the private sector even if there are no technological advantages from government supply. The latter tends to increase reliance on governments as crisis managers beyond that attributable to governmental economies.

### Differences in Routines and Reserves for Risk and Crisis Management

The model developed above for the active management of risk management can be used as a point of departure for this chapter as well. In a setting of uncertainty, so of the information available to the median voter in the risk management case is unavailable in the crisis management case. For example, the probability of the loss generating event may be unknown or impossible to calculate as may be the extent of the losses with and without loss reducing measures.

Although it is still possible to take steps before hand to reduce losses, it is necessarily a more problematic calculation than in the previous case.

## Standing Routines for Crisis Management

Many of these steps that governments can take to reduce losses from crises are similar to those available to private persons: rules and reserves. For example rules will be made to reduce the likelihood of a loss or mitigate losses. The latter may include responses to a crisis as it unfolds that are prudent and so reduce losses from a broad range of unpleasant surprises. Such rules may include the use of reserves of equipment, supplies and manpower, both regarding the extent to which accumulating them appears to be useful, and how to deploy them when a crisis occurs.

It bears noting that one can expect to be surprised and plan to respond to them because surprises are often similar enough to allow them to be addressed with similar routines, although the details are never the same. That crisis include both novel and familiar aspects also allows past methods to be revised and applied to the new event, rather than requiring an entirely new approach to be worked out. Their novelty implies that responses are unlikely to be judged to be completely optimal after the fact, although they may have significantly reduced losses.

The common features of broad groups of crises allows governments to have standing routines for addressing classes of crises already tasked to them. For example, each new fire or automobile accidents presents new challenges. Yet they

are similar enough to past accidents and fires that first responders have a variety of routines that reduce losses. They are able to do so in part because they can be modified by persons on site to address the novel aspects of the problems at hand.

Nonetheless, applying old routines to entirely new problems, as with the fires in the World Trade Center associated with the 9-11 terrorist attack, may fail completely, because major innovations rather than refinements of existing methods may be required to address a crisis. The required innovations may be too great to be imagined and implemented in the time available.

Necessity is the mother of invention, but necessity alone is not sufficient to generate success, as the victims of many life-threatening crises demonstrate. In some cases, a large crisis can overwhelm the standing routines and reserves of equipment and manpower for moderating the effects of crisis.<sup>70</sup>

As demonstrated below, there are a number of parallels and differences and parallels between the politics of crisis and risk management.

## Economies of Scale in Crisis Response

On contrast between responses to crises and ordinary insurance is the extent to which economies of scale exist. Ignoring administrative costs, there are always economies of scale in risk pooling. The greater the pool of insured, the more predictable is the annual rate of loss and the prudent size of insurance funds. In

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<sup>70</sup> For example, had the fire teams been able to put out the burning jet fuel as easily and quickly as ordinary fires are addressed, the two tallest buildings in New York City would not have collapsed and nearly three thousand additional persons would have survived the surprise attack to tell their stories. But this was not possible with the equipment available in the time before the building structures were critically weakened. See Eagar and Musso (2001) and National Institute of Standards and Technology (NIST, 2002) for analyses of how fire weakened the structure of both buildings leading to their collapse. An overview of the NIST study can be found at: <http://www.nist.gov/el/disasterstudies/wtc/>.

contrast, the reserves that are deployed during times of crisis do not always exhibit such economies of scale. Some crises are best responded to by those affected. Others by private organizations at the local level, and others at the level of a community or region.

Although the best response to a fire, crime, or other crisis is often capital intensive, and no household or neighborhood can afford to maintain the required capital out of its own funds, it is not the case that a single large pool of fire trucks can reduce losses from fire better than a small pool of such equipment that is closer to the crisis at hand. A state fire department with all of its equipment in a single location would not be able to respond fast enough to limit damage from fires to individual buildings even if they have better capital and better trained crews than local fire departments. Entire neighborhoods might burn to the ground before equipment and manpower arrived from state capitals hundreds of miles away. Speed matters as well as the quality of the response during times of crisis.<sup>71</sup>

In other cases, such centralized responses might be the best possible ones, because of speed of response is less critical or scale of the response is more critical. In other cases, local responses may be impossible because of the nature of the crisis. Here one might note that large scale natural and military catastrophes may

completely undermine a locality or region's capacity to respond by destroying needed equipment, manpower, and organization.

Once the best level of response to a class of similar crises has been identified, standing reserves and procedures can be developed. The surprise nature of the problems addressed implies that the results will be imperfect, but none the less, the results will for the most part be superior to that without planning for unpleasant surprises.

### **Crises in Well-Functioning Democracy**

In democracies, policy decisions are ultimately made by representatives elected by eligible voters. Because those elected to public office generally wish to stay in office and remaining in office requires broad electoral support, policy makers in democracies tend to favor policies that advance the interests of a broad cross-section of voters. Electoral competition constrains the policy options of elected officials. In a "first-past-the-post" electoral system, electoral competition induces policy makers to adopt policies that maximize the welfare of the median voter (within the limits of their information).<sup>72</sup> Within a proportional representation (PR) system, electoral incentives are less sharp, but majority

<sup>71</sup> This property of crisis management is separate from the question of the optimal level of centralization. A centralized administrative structure may control a many local response teams. The point here is that having one large pool of reserves is often not as good as having a many separate, smaller reserves. Nonetheless, the relative merits of centralized and decentralized decisionmaking procedures are often similar. Some crises are better responded to by persons nearest the point where the crisis appears, rather than by more distant administrators who will take longer to respond to the problems at hand.

<sup>72</sup> Many economists argue that public policies should address public goods and externality problems. Electoral competition only assures that relatively broad policies of interest to a large number of voters will be addressed. These may or may not involve public goods.

(Narrower policies may also be adopted in cases in which politicians require resources to run their campaigns and significant asymmetries exist. Information asymmetries are addressed below in section V.)

coalitions usually include the representatives favored by the median voter. Consequently, democratic policy formation within both first-past-the-post and PR electoral systems tends to move toward the middle of the distributions of voter demands for government services and regulation.

The existence of a crisis does not usually change fundamental political incentives. That is to say, an "ordinary" crisis such as a new disease, major storm, accident, earthquake, or terrorist attack does not directly affect the balance of power within government, nor the incentives for choosing some policies over others. Elected officials remain principally interested in broad policy issues that advance majority interests, especially those of moderate voters; thus, democratic crisis management tends to focus on relatively severe and broad crises, because only those affect enough voters to influence future electoral prospects. The median voter remains interested in maximizing his or her lifetime utility, whether in a crisis or not, and will vote for politicians and parties whose crisis management most advances his or her interests, given his or her own understanding of the policy alternatives and problems at hand.

The surprise and urgency of policy decisions during times of crisis, however, imply that voters will fail to assess their long-run interests accurately. Surprise implies that the policies in place before a crisis are based on incomplete knowledge of the consequences of existing policies or the full range of circumstances in which those policies would be applied. Urgency implies that policy responses to crisis will be based on less information than would have been available if policy decisions could be postponed. Surprise also implies that elected officials will not have an electoral mandate to address a crisis with specific policies,

but rather have to discern hurriedly the interests of his or her electoral majority. Urgency rules out a careful analysis of long-term political interests.

Democratic crisis management is, consequently, more error prone than normal democratic policy making because it is based on less information, less analysis, and lacks a clear mandate from the electorate. Although political decision makers remain interested in advancing the interests of pivotal voters, the urgency of crisis management implies that new policies are less likely to advance those interests than policies adopted in less urgent times, in part because the voters themselves are less able to determine their own interests.

Policy mistakes are more obvious after new policies are put into place than at the time they are adopted, because more information becomes available as experience and research accumulates. This implies that incumbents are more likely to lose elections following a crisis than in less urgent times, insofar as voters punish politicians for their past policy mistakes. The policy decisions adopted during times of crisis, however, are not less legitimate than ordinary decisions if they are made using procedures that satisfy constitutional constraints. Government officials will simply appear to be less competent after periods of crisis than in ordinary times. Indeed, the logic of crisis management implies that this is necessarily the case!

### **On the Demand for Governmental Crisis Management**

Uncertainty can produce unpleasant surprises and losses greater than normal for the same reason that pleasant surprises produced profits in Knights classic treatment of profit. Electoral demands for crisis management occur when voters

believe that governments can moderate losses from crises at a lower cost than private actors can. Initially, it will be useful to analyze cases in which voters accurately assess the relative costs of crisis management. The extent to which this belief is likely to be accurate or not is taken up later in the chapter.

The nature of surprise does not imply that one is completely blind-sided by an event, it simply means that some of the factors required to properly make rules, set aside reserves, or fund an insurance pool are unavailable before the surprise takes place. The fact that the existence of such missing factors or extraordinary possible losses is recognized allows one take steps to reduce future losses. Many of these steps are the same as those available to private persons. For example rules will be made to mitigate losses and determine some types of responses that may be helpful. Given the latter, reserves of equipment, supplies and manpower will be set aside.

Generally, governments have a cost advantage at crisis management whenever there are economies of scale in response, as tends to be the case for ordinary risk pooling, or in coordination, or if coercive power is required to address the anticipated problems. In addition to these technological features of crisis management, other cost advantages for a subset of voters may be created through the fiscal system as was the case for social insurance. When a service is provided in a more or less uniform manner but financed through a progressive tax system low income persons get the service at a discount over what they would have had to pay in the private sector even if there are no technological advantages from government supply. The latter tends to increase reliance on governments as crisis managers beyond that attributable to governmental economies.

## **Standing Routines for Crisis Management**

Particular surprises are normally new in many ways, yet often similar in other ways to crises dealt with in the past. The latter often allows past methods to be revised and applied to the new event, rather than requiring an entirely new approach to be worked out. This allows governments, as individuals, to have standing routines for addressing classes of crises already tasked to them. For example, each new fire or automobile accidents presents new challenges. Yet they are similar enough to past fires that existing routines can be modified by persons on site to address the new problems.

The common elements of many unpleasant surprises allows standing, but flexible, routines to be worked out to address broad classes of similar crises. As a consequence, efforts to limit losses from fire and other accidents are normally responses of specialized agencies (often called first responders), who devise effective methods that can be easily be adjusted to cope with the novel elements of “ordinary” surprises as they occur. And, with experience, the adjustments tend to become almost automatic as the range of losses and possible responses becomes better understood.

Nonetheless, applying old routines to entirely new problems, as with the fires in the World Trade Center associated with the 9-11 attack, may fail completely, because major innovations rather than refinements of existing methods may be required, innovations that are too great to be generated in the time available. Necessity is the mother of invention, but necessity alone is not sufficient to generate success, as the victims of many life-threatening crises would attest, if they

could. For example, had the fire teams been able to put out the burning jet fuel as easily and quickly as ordinary fires are addressed, the two tallest buildings in New York City would not have collapsed and nearly three thousand additional persons would have survived the surprise attack to tell their stories.<sup>73</sup>

In some cases, a large crisis can overwhelm the standing routines and reserves of equipment and manpower for moderating the effects of crisis.

### **Economies of Scale in Crisis Response**

Responses to crisis do not all exhibit economies of scale. Some crises are best responded to by those affected. Others by private organizations at the local level, and others at the level of a community or region. The best response to a fire, crime, or other crisis is often capital intensive, and no household or neighborhood can afford to maintain the required capital out of its own funds. For example,, there are clearly economies of scale in police and fire protection. Nonetheless, the economies of scale associated with capital intensive responses are often limited because of the need for fast response or for multiple responses. A state fire department with all of its equipment in a single location would not be able to respond fast enough to limit damage from fires to individual buildings even if they have better capital and better trained crews than local fire departments. Speed matters as well as the quality of the response. Entire neighborhoods might burn to

the ground before equipment and manpower arrived from state capitals hundreds of miles away.<sup>74</sup>

In other cases, such centralized responses might be the best possible ones, because of speed of response is less critical or scale of the response is more critical. In other cases, local responses may be impossible because of the nature of the crisis. Here one might note that large scale natural and military catastrophes my completely undermine a localities or regions capacity to respond by destroying needed equipment, manpower, and organization.

Once the best level of response to a class of similar crises have been identified, standing reserves and procedures can be developed. The surprise nature of the problems addressed implies that the results will be imperfect, but none the less, the results will for the most part be superior to that without planning for unpleasant surprises. add

### **A Simple Model of Planning for a Crisis**

Suppose that all individuals confront the same loss-generating function in which losses are generated by combinations of stochastically generated exogenous factors,  $F_1$  and  $F_2$ , and policies,  $P_1$  and  $P_2$ , in place at the time of interest.

$$L_t = l(F_{1t}, F_{2t}, P_{1t}, P_{2t}) \quad (1)$$

<sup>73</sup> See Eagar and Musso (2001) and National Institute of Standards and Technology (NIST, 2002) for analyses of how fire weakened the structure of both buildings leading to their collapse. An overview of the NIST study can be found at: <http://www.nist.gov/el/disasterstudies/wtc/>.

<sup>74</sup> Of course, a centralized administrative structure may control a variety of local response teams. The point here is that decentralized responses are often superior to centralized ones. The relative merits of centralized and decentralized decisionmaking procedures, however, are often similar. Some crisis are better responded to by persons at the point where the crisis appears rather than by uninformed administrators further from the events of concern.

Assume that the first derivatives of  $L$  are positive, the cross partials positive, and the second derivatives negative. This assures that  $L$  is concave.

Suppose also that there is a parallel wealth- or reserve-generating function driven by the same variables:

$$W_t = w(F_{1t}, F_{2t}, P_{1t}, P_{2t}) \quad (2)$$

Assume that  $W$  also has positive first derivatives and cross partials and negative second derivatives. Net additions to individual and social reserves at time  $t$  are thus:

$$R_t = w(F_{1t}, F_{2t}, P_{1t}, P_{2t}) - l(F_{1t}, F_{2t}, P_{1t}, P_{2t}) \quad (3)$$

Reserves are accumulated when  $R_t > 0$  and depleted when  $R_t < 0$ .

The total reserves at time  $T$ ,  $R_T$ , reflect initial endowments and past accumulations and losses:<sup>75</sup>

$$R_T = R_0 + \int_0^T R_t dt \quad (4)$$

The initial endowment of reserves,  $R_0$ , may reflect environmental resource conditions at the place of interest at the point when a settlement begins, as in Diamond's discussion of the various Pacific Island settlements. Or, it may simply be the existing reserves moment at which the analysis begins or a problem is confronted. Social reserves in this first model are simply  $N$  times those of the average individual.

In the case in which reserves and the reserve-generating functions are identical among individuals, anything said about individuals applies equally to society. In this setting, both individuals and society are assumed to be nonviable at time  $T$ , if their reserves fall below zero in a period of reserve depletion. Given this survivorship threshold (0) and an assumption that the relevant functions are partly driven by stochastic exogenous factors, an individual and an individual's and community's survival-maximizing policies at time  $t$  are those that maximize the accumulation of reserves.

The time series of best policies (strategies) for doing so can be characterized by differentiating equation 3 with respect to  $P_1$  and  $P_2$  and setting the results equal to zero.<sup>76</sup> These first order conditions, together with the implicit function theorem,

<sup>75</sup> It is interesting to note that the reserve accumulation functions can be strictly concave at the same time that the process generating the exogenous state variables may be neither concave nor concave, as with the processes that produce the power density of solar radiation at a given location on earth, which resemble sin waves. As a consequence, cyclic time series for reserves are commonplace in agriculture and in many other areas of life, as illustrated in figure 1.

<sup>76</sup> The assumption of positive derivatives for the policy variables in the loss- and wealth-generating functions neglects cases in which the same policies may have opposite effects on wealth and losses (over some range). These sorts of policies tend to imply corner solutions. For example, a policy that increases wealth and diminishes losses over the entire range of interest should be set at infinity. A policy that diminishes wealth and increases losses over the entire range of interest should be set at zero, or if feasible, negative infinity.

imply that the survival-maximizing policy combination at each moment in time can be characterized as:

$$P^*_{1t} = f_1(F_{1t}, F_{2t}) \quad (5a)$$

$$P^*_{2t} = f_2(F_{1t}, F_{2t}) \quad (5a)$$

In this setting, there is a survival-maximizing policy response for all possible states of the world and an ideal policy path for every sequence of states of the world. In a well-run, well-informed community that aims only for long-run survival, it is the policies described by equations 5a and 5b that we would observe to be in place.

Even with such perfectly robust plans, however, it bears noting that there are catastrophic states of the world in which even the best possible responses do not produce sufficient reserves to survive. One may ride a tiger for a while, but eventually tire (deplete reserves), lose control, and be mauled by the tiger. The sun may explode, a large asteroid may land on one's village. There are no guarantees that solutions exist for every problem. However, given the assumed partial derivatives, communities with the above plans survive a wider range of calamities than those with suboptimal policy-response rules. Communities with the best possible plans may be said to be robust communities.

Within the “non-catastrophic” or normal range of crises, the time path described by the policy response rule[  $P^*_{1t} = f_1(F_{1t}, F_{2t})$ ,  $P^*_{2t} = f_2(F_{1t}, F_{2t})$  ] achieves viability (positive reserves).<sup>77</sup>

Given the uniform nature of the loss generating phenomena of interest, there would be unanimous agreement to adopt such rules, and to do so at the appropriate level of decentralization assuming that the costs maintaining the appropriate level of reserves is also uniformly distributed.

### **Politically Feasible Responses: Surprises and Imperfect Policy Choices**

Unfortunately, such perfectly robust policy rules are rarely possible in a world in which crises are possible. Social and physical systems are complex and may also be partly stochastic. Some exogenous causal factors may not be fully understood. Some of the effects of policy may not be fully understood. The future is not completely known and unpleasant surprises may be confronted by individuals, organizations, and societies. Moreover, the politics of such rules may be difficult because the effects are not uniform within the community of interest.

For example, under a progressive tax system too many rather than too few reserves would be held, which will make the rule and society more, rather than less robust. If, however, the distribution of losses is also non-uniform, the combination of progressive taxes and uneven losses may generate deficient as well as excessive reserves.

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<sup>77</sup> This is the optimistic universe characterized by Diamond (xxxx) toward the end of his book on collapse.



There are also a number of nonfiscal reasons why communities may fail to adopt policies that maximize survival prospects. They may not know or be able to observe the causal factors (state variables) on which the best policy choice depends. They may not be able to fully control all the relevant policy variables, because of institutional or technological constraints. They may have other goals that conflict with survival.

In a two-factor, two-policy world, it is plausible that all decision makers completely understand their wealth- and loss-generating functions: the exogenous processes that generate the state variables, the range of exogenous factor values that they may confront, the entire range of policy responses that may be adopted, and the effects of those policies on states of the world for all possible values of the exogenous factors. Such settings are the ones normally examined in economic and game-theoretic models. In such cases, all decision makers have complete and optimal plans of action that specify the best possible response for every possible situation, as described in equations 5a and 5b.

However, perfectly robust policy response rules are less likely to be feasible in settings in which the number of exogenous causal factors is very large, the process generating them complex, and the number of possible policy responses is also very large. Information and planning costs and/or the nature of processes generating the states of the can rule out the existence of completely robust plans. Some of the processes generating state variables may be non-ergodic or very long term phenomena, and therefore many possible states of the world and losses associated with them would not been experienced and may not have been predictable ex ante.

Decision makers may, for example, have experienced many spring floods, but not a 200-year flood (one taking place only once every 200 years). In such circumstances, both surprises and crises may occur. Indeed, they may be commonplace, rather than the exception. New plans may have to be devised and adopted rapidly, without much preparation, as the water rises to levels never before experienced.

### **Social Dilemmas: Commons Problems and Coordinated, Managed, Solutions**

The crises analyzed above are exogenous ones in which all persons in a community confront similar losses and can independently address the crisis through their own policy choices. We now shift to cases in which addressing a crisis requires some coordination or management, such as required by a variety of social dilemmas. In most social dilemmas, the crisis is at least partly endogenous in the sense that extraordinary losses are partly the consequence of the joint decisions (policy rules) of the individuals in the community of interest.

This shift in focus allows us to explore the importance of governmental institutions for recognizing and coping with crises. The analysis continues to assume that individuals are all interested in maximizing prospects for survival, but in the context of social dilemma, even such persons may adopt policies that place themselves and their community at greater risk than necessary. Governments may also induce crises, but this possibility is not taken up until section III of the paper.

The dilemma of greatest relevance for the resource management and environmental issues focused on in Diamond's book is the classic commons

problem. The above net-reserve accumulation functions can be used to analyze commons problems by interpreting the known causal factor (F1) as the total use of some common resource by other persons in the community of interest and the policy decision as an individual's own use rate of the commons. In a two-person society, the exogenous factor confronted by person A is the use of the commons by person B and vice versa. Policy 1 is each person's own use rate. In a larger N-person community, the exogenous factor would be the use rates of the N-1 other persons in the community.

The nature of a commons problem is such that beyond some collective use rate  $U^*$ , the total output of the commons falls, although the typical individual's own harvest increases, if other users do not increase their usage. Although problems are not associated with every commons setting, there are many in which the Nash equilibrium use rates are excessive and net output from the commons is below the maximal output.

At the symmetric Nash equilibrium each person in a community of size N chooses:

$$P^1_t = f_1((N-1)P^1_t | P^2_t, F^2_t) \quad (7a)$$

and, when there is a problem, the total usage is:

$$N P^1_t > U^* \quad (7b)$$

Modest overusage problems reduce the accumulation of reserves, which places the society at somewhat greater risk of failure than it needs to be, but not at an existential risk. However, there are clearly cases in which a commons problem

can completely undermine a society's prospects for survival, as when the resource in question is the only source of food or water in the region of interest. The result in either case is similar to that depicted in figure 2 in which the reserve accumulation function is reduced for each individual (and thus the community as a whole) and reserves may be depleted, rather than accumulated, over the period of interest.

Because such commons problems are themselves relatively common, a variety of methods for addressing resource overuse problems have been adopted by societies throughout history, as indicated by Ostrom's case studies and analysis (1990, 2005). Most require collective action of some kind to create standing institutions for limiting access or otherwise changing incentives to overuse the commons of interest.

One widely used solution is the introduction of formal use rights of various kinds, as with rights "to use and exclude." In addition to privatization, communities may regulate access through resident user fees, permits, and norms of various kinds. These may be applied uniformly, so that individual use rates falls from  $P^1_t$  to  $U^*/N$ , or they may be applied in an asymmetric fashion in which some users receive greater access than others, with a total usage equal to or below  $U^*$ .

Which type of solution is chosen, if any, will vary with the process through which policies are chosen in the community of interest <sup>3/4</sup> that is, with the type of government in place, and whether the government recognizes the overuse problem and adopts policies to address it.

## Conclusions: Robust Routines for Dealing with Crises

Sensible policies for democratic crisis management are essentially similar to those for individuals. Policy makers should attempt to avoid big mistakes. A well-designed constitution should be crisis proof. It should be designed to handle the urgent unforeseen problems in a manner that does not threaten its fundamental decision procedures and constraints. Urgency implies that streamlined decision processes can be productive during times of crisis. However, emergency powers should not be used as a method of circumventing normal constitution practices. The standing procedures of crisis management should also allow persons other than those charged with crisis management to determine when the crisis has ended so that the normal decision processes are reinstated. (An example of such an architecture is provided by the U. S. constitution, which gives Congress the power to declare war, but makes the President the commander in chief. Moreover, a war can only be continued with Congressional approval insofar as Congress controls funding for the military on a year to year basis.)

Obviously, it is sensible to investigate and plan for crises before they happen. Although surprise is a fundamental characteristic of crises, ignorance about crisis scenarios and possible policy responses to them can be reduced by creative analysis and planning. One can never fully anticipate the exact time and place of an earthquake, flood, contagious disease, or terrorist attack, but many responses to such crises are similar regardless of specific details. A careful analysis of real and imagined crisis scenarios allows rapid policy responses to be chosen from a menu of well-understood policy options. For example, an individual crime or fire

remains a crisis in the sense that each case is a surprise and calls for an immediate response. However, responses to individual crimes and fires have long been routinized, and, thus, “normal” crimes and fires are no longer regarded to be crises. In this manner, policy research can reduce losses associated with mistakes made during times of crisis; although it cannot entirely eliminate crises or mistakes.

Second, because policy mistakes are unavoidable during times of crisis, the standing procedures for dealing with crisis should allow policy mistakes to be discovered and corrected at relatively low cost. This is, of course, one reason for having regular and routine popular elections rather than electing persons for lifetime terms of office. It is also the reason why emergency policies should have "sunset" provisions so that they expire or are carefully reviewed after the immediate crisis has passed and better information becomes available.

Third, because not all crises can be eliminated, some of the downside risks can be eliminated through insurance like policies. A common method for addressing losses associated with a crisis and with the mistakes of crisis management is ex post social insurance, in which taxpayers “bailout” those whose losses are greatest or deemed most likely to lead to subsequent crises. These programs are not always trivial in size, as evident in the most recent financial crisis. Moreover, ex post insurance, but its nature is a product that is difficult for private markets to provide since the payments go to those damaged by events that were not widely anticipated and so could not be prepaid in the normal way with insurance fees.

Fourth, robust institutions for addressing crises should be crisis proof. It should be designed to handle the urgent unforeseen problems in a manner that does not threaten its fundamental decision procedures and constraints. Standing

procedures should allow times of crisis to be identified so that streamlined decision processes are put in place only temporarily. The streamlined decision making should be narrowly focused on the crisis at hand to reduce agency problems and the magnitude of policy mistakes. There should be clear lines of responsibility so that mistakes, malfeasance, and incompetence can be readily identified and punished. The standing procedures of crisis management should also specify persons (other than those charged with crisis management) to determine when the crisis has ended so that the normal decision processes are reinstated. (Emergency powers are less likely to threaten the constitution in this case.) This is, of course, one reason for having regular and routine popular elections rather than electing persons for lifetime terms of office. All emergency policies should have explicit "sunset" provisions so that policies are carefully reviewed after the immediate crisis has passed and better information becomes available

Democracies differ from leviathan in that the median voter's interest in crisis management concerns not average losses, but his or her own losses and the losses of others insofar as his or her social norms and altruism takes account of them. As a consequence of both factors, democratic governments tend to be tasked with broader responsibilities for crisis management than authoritarian regimes. For example, during poor weather agricultural output tends to fall, as will average food consumption in a manner that cannot be directly affected by government policy. However, the distribution of food can be affected in a manner that limits losses for those with below average income. Democracies evidently

have electoral pressures to undertake such policies, which, as Sen (xxxx) suggests, is the reason that there are fewer famines in democracies than in dictatorships.

### **Is Crisis Management a Pure Public Good?**

The fact that governments often address broad loss generating surprises does not imply that such efforts are efforts to produce pure public goods. Neither the losses nor the crisis management undertaken are necessarily shared by everyone. For example, during a flood, those on high ground are essentially unaffected by the rising water itself, whereas those on low ground are. If the government coordinate or provides methods for persons to leave the flooded areas, most of the methods used affect one person or small groups at a time, as with buses or mass-transit tickets. Similarly, programs to limit the losses of those already harmed during a crisis, by, for example, handing out food, clothing, and tents, are providing private goods rather than public goods.

If in the future, large new capital structures (dikes) are built to limit future losses those services, in contrast, often resemble classic public goods. These are not crisis management, but loss reducing services analogous to rules and regulations discussed in chapter 5. The breath of benefits associated with such programs usually reflects economies of scale associated with some risk reducing services. (Its often far less expensive to build one large dike system than dikes around each house). Economies of scale imply that all may benefit from programs that realize such economies, and in this sense crisis management may have

properties similar to a pure public good when everyone in the society faces similar risks. This, however, is not always the case.

## Chapter 8: Risk, Uncertainty, and Constitutional Design

That there are differences in the risks and uncertainties confronted by democratic and authoritarian governments have implications for shifts and policies that tend to occur during transitions from authoritarian to democratic governments, and vice versa. Dictators have strong interests to adopt rules that extend their time in office, which in turn tends to promote their own survival and prosperity. Democratic governments also attempt to prolong their time in office, but are constrained to win regular elections to do so. As a consequence, the rules adopted in democracies tend to advance voter interests, particularly those of moderate voters. In this, it can be said that differences in particular rules and enforcement methods are indirect consequences of risks generated by their respective constitutional environments.

### Constitutions as Rules for Governing

To adapt to surprise events, organizations require somewhat flexible rules and procedures. As external circumstances change, organizations that have routines for adjusting their team's production to take advantage of the new circumstances will tend to do better than organizations that do not. This has a number of implications for the nature of relationships inside organizations and for the governments of such organizations.

For example, very long term commitments tend to be avoided and most contracts will allow one or both parties to escape their obligations in unusual circumstances. Tenured teachers and professors can be fired for cause and because

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of financial problems. Well developed futures markets exist only for deliveries and prices over the course of a year or two. Essentially all long term contractual relationships have more escape clauses of various kinds, except in cases in which laws or the nature of the service (as with life insurance) prevent such flexibility.

Similarly, reward systems that can be adjusted to induce their teams to be more effective in new circumstances will tend to dominate those that cannot. Wages and salaries are normally contingent on "performance," where performance may be redefined during the term of the employment, and may partly a consequence of external circumstances. Market prices for outputs and complementary inputs may occur. Innovation may change the most efficient method of organization, or imply that particular product lines are less profitable (buggy whips). To adopt to such changes, performance criteria may be adjusted at the margin to encourage somewhat different (more profitable) behavior or methods of production. Such adjustments help to manage risk and avoid crises by reducing the losses that would otherwise have been borne by the organization.

### *Organizational Constitutions*

Essentially every large, durable, organization has a "constitution," a body of internal procedures for making policy decisions that serve as its charter or constitution for governance. The standing rules normally specify: the officeholders who participate in major decisions, the manner in which those officials interact to make decisions, and how those persons are selected for their offices. The standing procedures of long-lived organizations also include rules governing the selection and succession of officeholders, and standing procedures for modifying the

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organization's charter. Many of the policy making groups will be based on the "king and council" template, for reasons discussed in Congleton (2011) and later in this chapter.<sup>78</sup>

Insofar as particular standing rules and procedures have proven to manage risk and crises better than others, institutional designs in large organizations will tend to be similar in many respects. For example, governments use similar methods for detecting surprise events inside and outside their organizations (or territories), and for responding to those events. A "big problem" is brought to the attention of "more senior" management, who determines whether the problem is real or not, and if so, how it should be managed.

#### *Institutional Stability*

The short term nature of most contracts and the amendability of organizational constitutions allows policies and decisionmaking architecture to be changed at (nearly) a moment's notice. However, *durable organizations do and will not do so, because excessive adjustment tends to be a source of new problems and uncertainty.*

Organizations benefit from reducing uncertainty for their team members, support, and trading networks. Durable organizations thus tend to have standing policies for recruiting and rewarding team members, because it is in the interests of most organizational governments to have predictable policies on these matters.

The core procedures for making organizational policy decisions also tend to be stable, partly because of advantages associated with predictable policies, and partly because governance stability reduces unproductive internal conflict. Reward and governance systems are only adjusted in circumstances in which the benefits are expected to exceed the cost of lost predictability.<sup>79</sup>

Nonetheless, neither policies nor institutions can be completely stable if the external environment is not. To moderate the uncertainties produced by adaptation, the policy changes tend to be "local" and "piece-wise," focused at solving particular problems, rather than reinventing the organization or its core routines. Just as economic and other scientific theorizing works best in an "other things being equal" environment, so do policy and institutional reforms.

Such modest reforms preserve advantages associated with existing procedures and reduce unforeseen costs generated by larger, more mistake prone, policy and institutional experiments. Moreover, although many reforms will be proposed and evaluated, only a few will be adopted, because of the risks associated with them.

Because limited time and attention imply that only a few problems or opportunities can be analyzed simultaneously, a common decisionmaking procedure is to group problems into more or less independent and separable subsets that can be dealt with one at a time. After such problems sets are

<sup>78</sup> In cases in which errors are made in detecting disobedience, the expected payoffs will have a similar probabilistic structure. In this case, there will be some probability that an obedient team member will be punished (receive Z) rather than rewarded. And there will also be some probability that a disobedient team member will be rewarded (receive R) rather than be punished. Monitoring also tends to reduce the cost of compensation systems. See chapter 4 below.

<sup>79</sup> An interesting example of how economic organizations may benefit from predictability is the case of pricing. Firms have incentives to adjust their prices more slowly than technologically feasible, because it tends to increase sales. In effect, such firms "insure" their customers from fluctuations in input prices and so encourage greater sales. In an extreme case, Coca Cola held its price for cola at 5¢/6.5 ounce bottle for more than seventy years (Levy and Young, 2004).

identified, they can be ranked from most important to least important (from those most likely to those least likely to significantly affect organizational (formateur) interests.

This allows the time and attention of policymaker-managers to be efficiently allocated among problem sets. Information is gathered and analyzed, as necessary, to rank both problems and alternative solutions for the problem class at hand. When this is done perfectly, the most important decisions are made first, the second most important second, and so forth.

If circumstances appear to be stable and few obvious mistakes have been made, past decisions will be left in place. Reforms are adopted only when new problems emerge or better solutions are discovered. The result in durable organizations is a series of standing policies and rules that remain in force for significant periods, often decades at a time. This produces an organizational “law of the land,” but a “law” that evolves to blunt the effects of unpleasant surprises and to realize the fruits of pleasant ones.

#### *Why Organizational Governance Are Neglected by Economists, But Should Not Be*

The standing procedures for making policy decisions within organizations have attracted far less attention by economists and other rational choice analysts than have their internal incentive systems. For example, Williamson’s widely read books on corporate governance (1975, 1987), implicitly assumes that the institutions for choosing policies are already well-known, in place, and essentially automatic. The same could be said about Alchian and Demsetz’ (1972) analysis of team production, Vicker’s (1985) analysis of delegation, and Laffont and Tirole’s

(1993) analysis of relationships between firms and between government regulators and firms.

A partial defense of that neglect is that an organization’s government is often an instance of team production. In most cases an organization’s standing policies are jointly produced by several team members. Information is collected about internal and external circumstances, the information analyzed, alternatives evaluated, and decisions made. In only the simplest of organizations and circumstances is all this done by a single individual.

As a consequence, those participating in organizational governance normally have “artificial” incentives that are largely determined by the organization’s standing system of rewards, because the usual problems of team production have to be overcome to create an effective organizational government. However, an organization is more than an incentive system.

The “outputs” of an organization’s government are very different from those of its other teams. An organization’s government essentially produces the organization itself and revises it through time. It determines whether a cherry-picking firm will continue to pick cherries, whether a pear harvesting coop will switch to apples, and whether a fishing club will shift from fishing to shipping, and, if so, it determines which ships will head which port cities, and substantially what and who will be on board them. The ruling body of a regional government determines what will be taxed, who will collect the taxes, and whether to expand its territory by invading its neighbors or not. As a consequence, there are informational, collective choice, and bargaining aspects to organizational



governance that are absent, or much smaller, for other teams within large organizations.

### **Risk Management in Territorial Governments**

When the above analysis is applied to territorial governance, it implies that governance will tend to be rule bound, but flexible, and that policymaking authority is likely to be shared in practice, rather than vested in a single person or committee. This contrasts with most pure models of dictatorship and democracy analyzed by most political scientists and political economists. It also challenges the practical relevance of political theories that rely on or defend undivided sovereignty, such as Hobbes' (1651) theory of social contracts.

Many governments have architectures that are drawn from the “king and council template,” because that template solves a variety of long term governance problems that arise in settings of uncertainty. The king and council template provides several robust solutions for succession problems and allows authority to be shifted between the king and council in a manner that can improve organizational decision making in response to external and internal surprises.

Authority, veto power, and methods for selecting members can be varied in a variety of ways that create a continuum of governance that can be “finely tuned” to take advantage of new circumstances and the talent and skills of the members of the organizational government, without changing the fundamental architecture of the organization's government (Congleton 2001, 2011). This continuum reduces many of the uncertainties of reform while allow significant flexibility.

### *Risk Management as a Fundamental Task of Governance*

It is the main tasks undertaken by governments that is the focus of this book rather than their form. What exactly is it that most governments do? And why to they do what they do? The organization of territorial governments nonetheless has effects on the latter, insofar as the organizational structure determines how office holders come to office and the steps that they should take to continue and prosper in office.

One of those is especially relevant for the purposes of this book, namely the difference between the incentives of unelected king-dominated versions of the king and council template (dictatorships) and ones in which all members of government are broadly elected. Although Managing risk and uncertainties tends to be central to all governance, the types of risk that attract greatest attention tend to vary with governmental type. Consequently, the shift from more or less authoritarian to more or less democratic forms of government tends to have predictable and large effects on the specific kinds of services provided by government. For example, social insurance and crisis management become substantially more important tasks.

In authoritarian regimes, two types of risks tend to attract the most attention: (1) those that threaten the authority of rulers (security risks) and those that threaten the fruits of office (income risks), roughly in that order. Mancur Olson (2000) among others has noted that royal income can be increased by providing a variety of public services, including law in order, although in some cases, there may be a conflict between increasing the taxable income of one's subject and security

risks (Congleton, xxxx), and so national income tends to be less than that which maximizes tax revenues.

In democratic regimes, both risks also exist for those holding high offices. However, reducing the risk of “overthrow” requires pleasing a majority of voters, rather than suppressing decent. whose interest in risk, crisis, and income often differs from that of authoritarians. To please voters, the analysis of part I of this book suggests that democratic states are likely to provide a variety of risk and crisis management services, because many risks and uncertainties are less than perfectly managed through the efforts of individuals and small groups. A subset of these will differ from those provided by stable authoritarian regimes.

### **Type of Government and the Risks Managed**

Among the most important organizations in a given regions are those with the ability to impose rules on all persons within a given territory, to collect taxes, and punish those who fail to follow the rule established or pay their tax obligations. Regional governments, as true of all organizations, are always engaged in risk and crisis management problems insofar as their survival is by no means guaranteed. In the case of democratic governments, regional governments are often tasked with a variety of risk management and crisis management services for the community at large, because voter believe governments can do so better than they can themselves or than the non-governmental organizations available for providing those services

In many cases, the interests of rulers and those ruled are well aligned. For example, both benefit from prosperity and so rulers tend to adopt policies that

increase the net incomes of “their” regions. In addition, both rulers and those ruled often benefit by reducing a subset of security risks, especially ones that improve security for each. In a few very important cases discussed below, income is increased by increasing the security of property and persons within the region of interest.

Because it seems fairly obvious that the residents of a region benefit from laws that protect their persons and property, the analysis of this section will stress the interests that authoritarian regimes have in reducing such risks for (most) of their citizens.

Of greater interest than the form of government for the purposes of this book is the type of rules that tend to be adopted.

### **The Rule of Law as a Procedure for Reducing Risks**

As a point of departure, imagine a setting in which one person controls a region through a well-organized hierarchical army. Discipline down through the ranks may be encouraged by physical threats and/or by sharing the fruits of conquest and rule. This is not the only possible source of law and order, as stressed in *Perfecting Parliament* (chapter 4), but it is a widely used metaphor, in part because it is the easiest to discuss. And, moreover, if security and income increasing services are provided by such a government, more representative, less coercive governments will have even stronger reasons to provide them.

To realize those fruits, the Authoritarian’s army must, of course, retain control over its territory. This requires, at a minimum, that rival armies be kept out of the territory of interest. Thus, regional or national defense is a natural part of the risk

and crisis management services provided by authoritarian governments. If it cannot provide that service, it will not be able to retain its control over the region or nation of interest. In addition to reducing the risks and uncertainties associated with invasions, the army must also reduce the risk of internal revolt and revolution. That is to say, it cannot tolerate other significant military organizations within the territory ruled.<sup>80</sup> The existence of such groups would, of course, threaten not only the security of the rulers, but also the fruits of rule by attempting to “harvest” the surplus production of those who can be threatened by such internal rivals. By eliminating other internal power centers, it is likely to increase personal security within its territory by reducing the number of potential organized threats to households to a single source, namely itself.

After internal and external security has been achieved, the ruling government (here the leadership of our ruling army) may turn its attention to maximizing the fruits realized through its control of the territory of interest. And the same force and threat of force can be used to enslave the persons in the territories, taking all of their production above subsistence.

At this point, the rules would have a base income and those in the territories would have reason to flee to other territories whose rulers were not slave drivers.

To simplify analysis further, assume that exit is not possible, and so enslavement is possible.

One problem with such system is that only coercive threats serve as motivation, and because the “tax rate” is one hundred percent, no resident has an incentive to work harder than the threat requires. All the thinking--apart from attempting to avoid work and punishment simultaneously--would be done by the top levels of the organization, by the army’s leadership.

However, insofar as local knowledge is important and/or work effort not easy to monitor, allowing residents to keep part of the fruits of their efforts tends to increase output and potential harvest by the army. Similarly, insofar as savings and investments are better done in a decentralized manner than in a centralized one, there are reasons to provide both a bit of discretion and protection of “personal property,” that property the resident-slaves are able to call their own. Such rights to output and savings are not acts of generosity (although it may be useful to call them such) but practical ways of increasing the fruits of office for our authoritarians.

Limits in the time and attention of the rulers is a sufficient reason to establish limited property rights over goods and services, and some freedom to manage “private” affairs. Here it bears noting that from the earliest days, it appears that

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<sup>80</sup> I ignore the problem of organizing and funding a ruling in army, in order to focus on the types of security services that are likely to be provided. In many cases, large armies have historically be federations of many smaller armies, with the “ruler” being the person or group with the largest or pivotal military organization. For example, in Medieval Europe, national or imperial armies were composed of a montage of regional and local armies, each with its own hierarchy. Such local armies were often, however, the main source of local rules and rent extraction, rather than the central “national” government and army. The analysis above applies either to the individual local rulers or to the central ruler according to which is the principle source of rules and rule enforcement--e.g. which actually rules. Alliances and confederations can field large armies, but these large armies do not control the territory from which they are composed in any meaningful sense.

agriculture-based societies had what might called civil laws, laws that protect individuals from attack and enslavement and basic property laws that assign rights to use, harvest, and exclude others from a particular piece of “property” to individuals, families, or small groups.

Whether the existence of laws dealing with property and persons reflects and ancient contract, an innovative dictator, or evolutionary forces is less important than the fact that such rules exist in both authoritarian and democratic polities. This suggests that laws that increase the security of personal property and personal health benefit authoritarians (larger tax base), interest groups (greater wealth), and voters (greater wealth and security).

### **Amendments as Responses to and Causes of Crisis**

The logic of crisis management implies that constitutional amendments during times of crisis should be avoided to the extent possible, because changes in the fundamental procedures and constraints of governance are difficult to reverse; thus, constitutional mistakes can be far more costly than ordinary policy mistakes. To avoid fundamental mistakes, procedures for dealing with crises should be designed, implemented, and revised during times that are relatively free of crisis. Even during an extraordinary crisis in which constitutional procedures fail, temporary rather than permanent changes to decision-making processes are preferable to constitutional reforms to avoid costly mistakes that tend to be very difficult to correct.

### **Governance, Narrow Interests, and Survival**

Having established a model of crisis and the need for coordinated responses to cope with a subset of crises, we next analyze whether some forms of government select policies that are systematically more favorable for survival than others. In a perfectly informed setting with an effective, survival-oriented government, collapse can only occur if an overwhelming loss-increasing or wealth-reducing event occurs. Such policy choices cannot be taken for granted both because of the informational reasons discussed above and because governments may not always have interests that are strongly aligned with community survival.

The existence of a government is not a sufficient condition for avoiding all crises. Less ideal governments may use procedures or have interests that reduce their ability to detect and respond to crises or may themselves induce crises through policy decisions. Diamond, for example, notes several cases in which government policies created crises, as with his Tokugawa and Rwanda case studies. Indeed, with respect to environmental crises, it can be argued that once an environmental “problem” is identified, it only continues to exist because of government failures of one kind or another. The proximate cause of such crises are not exogenous shocks or private social dilemmas but that governments or other organizations fail to adopt and implement policies to address those shocks or dilemmas.

The remainder of this section of the paper attempts to characterize political institutions that align the interests of policy makers with the survival

interests of their communities. The advantages of centralized information collection and/or response depends partly on the nature of the crises confronted and partly on the efficiency of the government and its alignment with general interests in the community of interest.

There is a broad public choice and constitutional political economy literature on the effects of institutions on public policies, on which the following analysis draws heavily. In addition, there is an economic growth and development literature in which an active debate on the effects of institutions on economic growth rates is taking place. On balance, that literature suggests that the quality of political and economic institutions contributes to economic growth and development. Such macro-institutional analysis is consistent with the above model of survivorship insofar as prosperous societies tend to have relatively large reserves.<sup>81</sup>

Institutions that encourage the development of better policies, by definition, tend to reduce losses and increase growth, and thereby promote the accumulation of survival-relevant reserves, including both biological and economic resources. A robust society, however, requires more than the accumulation of wealth. A robust society also requires institutions that reduce the number of crises confronted, and governments that are able to recognize crises, to devise and implement solutions, and also policies that ameliorate the effects of a crisis in a timely manner at a relatively low cost.

*Overly narrow governmental interests as a cause of collapse*

To analyze problems associated with misaligned or narrow government interests, it is useful to drop the assumption that crises and policy responses have the same effects on all persons in the community of interest. With that in mind, assume that there are three roughly equal-sized groups of persons [i, j, k] with different loss- and wealth-generating functions. In this case, a crisis may affect only a single group, two groups, or all three groups according to assumptions made about the three sets of functions. A broad crisis may have larger effects on some groups than others. Similarly, the government may be controlled by one group, two groups, or all groups, and its crisis-moderating and/or -avoiding policies (P1) may be targeted at one, two, or all groups.

In cases in which a subset of the community controls policy choices, communities will often fail to address a crisis or will inappropriately address a crisis, in the sense that risks are increased for a significant subset of community residents.

In order to analyze how different types of governments address crises, some assumptions about how crisis prevention and amelioration are paid for are also necessary. A slight modification of the most common financing assumption used in political economy models is adopted. Suppose that government reserves and policy responses to a crisis are financed through a uniform proportional tax on individual net reserves (wealth). The government is also assumed to be constrained

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<sup>81</sup> Useful windows into those literatures are provided by Mueller (2003), Congleton and Swedenborg (2006), Knack and Keefer (1995), Rodrik et. al. (2002), and La Porta et. al. (2006). Institutional quality is often measured in a way that historically tends to be associated with prosperity—that is as indices of liberalism, an assessment further supported by this paper.

to spend the revenues from that tax entirely on crisis prevention or amelioration activity  $P1$  at a cost of  $c(P1)$ ; that is, crisis prevention and insurance is paid for through a simple, broadly based, earmarked tax on wealth.

The conventional financing assumption has several implicit effects. First, it facilitates modeling policy choices by simplifying mathematical representations of the policy decisions. Second, the uniform tax assumption implies that governments cannot use Lindahl or Pigovian pricing for risk-management services. Third, the uniform tax and earmarking assumptions reduce downside risks for persons outside government by eliminating the possibility that special taxes can be imposed on groups not represented in government and simply kept by the groups controlling the government. It also implies that governments are not residual claimants on “their” societies.

#### *Minority Rule*

As a point of departure, assume that one of the groups,  $k$ , initially controls the government and can choose any policy that it wishes subject only to the fiscal constraint. If the group (or its leadership) has pragmatic survival interests, it will be inclined to focus anti-crisis measures on itself ( $P1k$ ), using tax revenues raised from the entire community to pay for them. The tax rate  $t^*$  required to do so satisfies:  $t^* \sum_{ijk} RT = c(P1k)$ .

Such focused responses tend to protect or reduce losses for the group receiving the crisis-management services, here the ruling group, while increasing risks for those taxed to pay for it. Such crises as floods, famines, and banking crises may be addressed with dikes, food banks, emergency reserves, and other

forms of crisis insurance, all of which can be targeted at specific regions or industries and generate only modest direct benefits for persons located in other regions or industries. Insofar as both losses and taxes deplete reserves in the unserved parts of the community (groups  $i$  and  $j$ ), such policies lessen survival prospects for members of those groups.

Extreme cases of such governments include Diamond’s Rwanda case study, South Africa in its apartheid period, or contemporary Zimbabwe. Other examples include most medieval European governments and many contemporary Middle Eastern governments, where religious and/or sex differences imply significant difference in legal rights and public services.

Insofar as the three groups in the model form a self-sustaining (complementary) community, the community itself will be at somewhat greater risk from such policies, although the ruling group is likely to survive and will to some extent take account of the complementary effects when choosing policies. Such problems are also smaller if anti-crisis measures are necessarily communitywide public goods and so reduce losses for all groups in a community. Such cases may include steps to reduce military threats and those associated with large-scale environmental, weather, and economic problems. However, these better outcomes are the result of the nature of the policy instruments used, rather than the institutions of governance per se.

The authoritarian case (single-group government) examined above is an instance of what might be called the “extractive state” or what North, Wallace, and Weingast (2009) call the “natural state.” Such governments maximize their own

reserves, and thereby prospects for survival, by extracting maximal rents from the policies under their control.<sup>82</sup>

### *Majority Rule*

Majoritarian states have broader interests than minority states, because they must, by definition, advance the interests of a majority of their communities to remain in authority. If the groups in the community (polity) are about equal in size, a government would have to provide crisis management services for at least two of the three “i, j, k” groups.

A pragmatic majoritarian government would be inclined to tailor crisis-avoiding infrastructure projects and crisis insurance programs to favor its electoral supporters alone, leaving one of the three groups without risk-reducing services. Again, if complementarity exists among community survival interests, a pragmatic majoritarian government would also take account of them. However, a majoritarian government’s interests are too narrow to maximize community-wide survival prospects, although a smaller group’s survival interests are neglected by a majoritarian government than a minoritarian one.

### *Majority Rule with Constitutional Protection of Minorities*

If we rule out unanimous agreement as a feasible decision rule for large communities, an alternative to unconstrained majoritarian governments is majoritarian government with constitutional constraints that limit an elected government’s ability to target government services or taxes at specific groups. For

example, a government constrained by a takings rule (Epstein 1985) and a generality rule (Buchanan and Congleton 1998) would tend to use its existing authority to provide risk-reducing and risk-management policies to all persons in the community.

The result would not necessarily be survival maximizing, because risk-management services would be more nearly optimal for risks faced by the majority than the minority. Moreover, risks may differ among the communities and most effectively addressing them might require difference in crisis management services. Nonetheless, the minority’s risks are likely to be moderated by the policies adopted.

It also bears noting that not every alignment of voter interests has a stable majority or median voter equilibrium associated with it. In the absence of a stable majority, majoritarian cycles are likely and shifting proposals over how the potential surplus may be divided would produce an endless cycle of proposal and counterproposal, with the result that the some crises may not be addressed and a good deal of resources may be wasted in policy deliberation (Congleton and Tollison 1999). Such cycles are also reduced by takings, generality, and universality norms under which all members of the community are assured equal protection of the law and equal fruits of collective action (Buchanan and Congleton 1998, Weingast 1979).

Together, these points suggest that constitutionally constrained majoritarian states are more likely to survive in the long run than unconstrained

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<sup>82</sup> Among the group-specific crises managed would be risks associated with overthrow, which may require a variety of “loyalty” increasing policies, large loyal armies (possibly with officers chosen from its own group), castle walls, a secret police, and emergency reserves in gold or foreign bank accounts (Wintrobe 1998, De Mesquita et. al. 2005).

ones. The use of majority rule together with constitutionalizing “equality before the law” tend to align a government’s interests better with community survival prospects than unconstrained majoritarian and minoritarian governance.

*An illustration: Governance and choice of commons solutions*

We now return to the case of the commons problem, which may exist for the entire territory governed by each of the three above governmental types.

With respect to internal commons problems, a minority government may simply privatize the commons by taking it under state control, taking all the surplus for itself. This solves the overuse problem, but reduces survival prospects for other former users of the commons. A somewhat less grim solution for an extractive state would be to impose a monopoly user fee (or rental rate) on all users of the commons. Such a monopoly price would induce usage somewhat below the surplus maximizing level of  $U^*$ , but allow residents to share in the output of the commons. The maximal rent, user-fee, or excise tax revenues could then be used to finance other crisis-management services for the group in power.

Note that roughly the same commons-management solutions may be adopted by majoritarian as by minority governments. The majority may quasi-privatize by limiting access to members of the majority and limit usage by members through use rights or fees if they would otherwise overuse the commons. Alternatively, revenues from the commons may be maximized and the proceeds used to provide crisis-management services to the majority. Insofar as production from the commons is an important source of net reserves, a larger number of persons have their survival prospects increased than under the first arrangement.

In both cases, however, the majority’s survival interests are more advanced than those of the minority.

A majoritarian government constrained by a generality principle could not exclude the minority from the commons, nor could it use revenues generated from the commons to advance only its own narrow interests. Thus, a constitutionally constrained majoritarian regime will tend to advance the survival interests of the entire community, although it does not necessarily maximize communitywide survival prospects, because to the extent possible government policy will still favor the majority.

Moreover, if the commons problem is a serious one and there is no median voter or stable majority coalition, the majoritarian cycling problem implies that majoritarian governments are unlikely to survive in the long run in the absence of generality and takings rules. This provides a possible explanation for the rarity of majoritarian governments historically.

**Divisions of authority within and among governments**

Besides issues associated with how policies for a given community should be chosen, there are a variety of other institutional design issues associated with how authority should be divided within and among community governments to increase survival prospects.

*The King and Council*

A minority or a majority-based government could select or elect a single person to make all policy decisions for the community (a dictatorship or elected



king). Alternatively a committee or council may be selected or elected and vested with policy-making authority (ruling council, junta, or congress). Various combinations of the two are also possible, as with the “king and council” system of governance. The latter has a variety of advantages that are outlined in Congleton (2010: ch. 2–4). The king and council system provides a relatively efficient solution to a variety of information, succession, and agency problems that the pure council and pure executive systems suffer from. The king and council template also provides a continuum of governmental types that can be fine tuned during a crisis to increase the effectiveness with which a particular crisis is addressed.

These features make that architecture more robust than most other systems of governance. Its robustness is evident in that this template is widely used by national and regional governments and by firms, churches, and universities as an institutional architecture for choosing and revising policies.

#### *Dividing Authority among Levels of Governance*

In addition to the internal structure of the policymaking system within government, there are also issues associated with the degree to which policymaking authority should be centralized. The latter varies by type of problem addressed and with the type of policy response to be adopted. In principle, centralization and subsidiarity issues span the gamut from individual to worldwide organizations and the optimal degrees of centralization and type of organization may differ for every component of policy according to the crisis at hand. Most large organizations use a variety of decentralized decision making procedures to address crises that occur on a more or less regular basis (“putting out fires”).

A broad range of cases exist in which losses from crises can be most effectively reduced through a combination of centralized and decentralized policy responses. For example, a tsunami alarm can be maintained by a central government and flight to high ground after an alarm is sounded can be organized at the local government, family, and individual levels. Before and during a crisis, the informational problem associated with recognizing a greater-than-usual risk can also be done one person at a time, through centralized research and dissemination or through combinations of the two. After and during significant crisis, the affected persons and organizations may demand insurance to limit losses or other safety nets, which may be provided by cooperatives, commercial firms, and/or national governments.

#### *Federalism and crisis management*

Historically, community governments have often formed new higher levels of governments through treaties and mergers to address crises of various sorts, especially military ones. In such cases, federal or confederal institutions emerge from the bottom up rather than from the top down. Similar steps are taking place today with respect to international environmental problems, motivated partly by politically active groups that believe that international environmental problems are a long-term existential crisis that can only be addressed through policies that are coordinated at regional or global levels. A very large number of transnational organizations have been created in the past three decades, although most have to this point been delegated only very limited authority (Congleton 2001, 2006).

Given a federal or confederal institutional structure, policy responsibilities can be distributed among more or less independent central, regional, and local

governments to solve a variety of political and economic problems, including those associated with overly narrow governance and those associated with externalities and economies of scale. The initial assignment of authority in federal systems normally reflects the interests of those who negotiated the original treaty or constitutional agreements, but they are often revised from time to time to address unanticipated problems and associated shifts in bargaining power.

When there are no coordination responses to be overcome or economies of scale in information gathering and policy response, the same subsidiarity principle implies that individual decision makers are the appropriate level for crisis analysis and response. Institutions that “localize” crises and crisis response, as with privatizing a commons, rather than using collective management methods, also facilitate the use of lower levels of government to address problems.<sup>83</sup>

When upper levels of government represent relatively narrow interests and the powerless or minority groups are clustered in particular regions, federalism provides a possible institutional solution to the institutional problem of overly narrow governmental interests. A regional crisis may not attract as much attention from a central government as it would from the communities directly threatened. In such cases, groups not served by the central government may have crisis avoidance and insurance programs provided by their own subnational regional or local governments. Moreover, to facilitate such responses, constitutional provisions may explicitly delegate authority to the lowest level of government that

can address the crisis of interest in order to assure that relatively more homogeneous communities make the relevant tax and crisis amelioration decisions to address crises and reduce the likelihood of collapse.

It bears noting that even centrally organized responses do not always require very much centralization. Centralization of a subset of the policy response vector is often sufficient to realize the network and scale advantages of organized responses, as with centralization of flood alarms. Other parts of the policy response vector may remain largely decentralized, as with the organization of exit strategies from a flood or determining how to best use limited water rations during a drought.

### **Centralized versus decentralized methods of crisis detection**

However, during times of major emergencies, new advantages of centralization often arise, with the result that in some cases entirely new levels of governments are formed, as noted above. In cases in which policy coordination problems are significant, information gathering exhibits significant economies of scale, and government interests are well aligned with resident interests, centralization tends to be superior to fully decentralized information gathering and response systems.

<sup>83</sup> The economics of decentralization are explored in the fiscal federalism literature. See, for example, Oates (1972) for a nice overview of core economic issues and for his highly “decentralization theorem.” The main political issues are the extent to which organized responses are more effective than uncoordinated responses, and the extent to which government at a particular level is likely to be better able to detect and implement policies. The main economic issues have to do with economies of scale and inter-district policy externalities.

For example, forecasting flood levels is not extremely difficult, having to do with rainfalls in the catchment basin and melting rates of winter ice packs, but there are clearly gains from specialization and economies of scale in the production of this information. Rather than have everyone in the community make daily trips to the catchment basin to check on their private rainfall tubes and measure snow-melt rates, a single individual (or small number of individuals) can do this and share their information with those downstream. There tends to be a free-rider problem in attempting to do this privately in that a single subscriber might share his information with friends and families and so on who fail to subscribe to the service. So, this kind of information might not be adequately provided through single-purpose informational subscriptions, and so it may be provided via community or a catchment area cooperatives or community governments. The service might also be provided by general purpose local newspapers insofar as readership increases sufficiently by including such reports to attract additional advertisers.

On the other hand, information about many threats appears sporadically and is subject to a variety of interpretation, which often makes decentralized modes of crisis detection not only relatively efficient, but the most likely mechanism to be in place for detecting true surprises.

Institutional designs can increase the effectiveness of decentralized crisis detection systems by increasing the extent to which individual-level information is aggregated or used to coordinate decisions. The use of private markets (including futures markets) and majority-based elections tend to promote information aggregation (Hayek 1945; Fama 1970, Jensen and Meckling 1990; Grofman, Owen,

and Feld 1983; Congleton 2007). Under such institutions, decentralized information gathering and individual responses can be more effective than a panel of government experts, because relevant data may be far easier to gather at the individual level and may be better aggregated through market and electoral processes than by small groups of government employees.

*Emergency powers, crisis invention, and crisis response lags*

In many short-term crises, organized policy responses dominate those made by individuals acting independently or decisions at local levels. As noted above, centralized management is useful in situations in which significant economies of scale in gathering information about future and current crises exist and/or when significant advantages to coordinating crisis responses exist. In many cases, the need for rapid policy responses appears to require delegating additional discretion (emergency powers) to policy makers to both detect and manage major short-run crises (emergencies).

Similar delegation may also occur for long-run crises, although to a lesser extent, because the period of detection and policy analysis for long-term crises extends over several election cycles, giving voters time to assess the merits of arguments regarding the existence of a crisis and appropriate policy responses.

*The “boy who cried wolf” and optimal policy responsiveness*

Unfortunately, emergency powers also increase the ability of policy makers to pursue their own interests, which salary and status systems many not perfectly align with the relevant community’s or organization’s survival interests. Within democracies, the electoral constraints on government officials tend to align their

interests with those of the median voter or with those of pivotal members of a stable majority coalition. This, as noted above, tends to increase prospects for community survival by assuring somewhat broader reserves and crisis-avoiding or -ameliorating policies than narrower forms of government.

However, during emergencies, asymmetries in information possessed by government officials relative to voters tend to reduce that alignment, although not usually to that of authoritarian governments. The fact that increased governmental discretion in the short run can be used to advance narrow interests (narrower than majoritarian interests) as well as broad interests, together with governmental responsibility for detecting crises, can tempt elected (and appointed) officials to “manufacture” crises in order to increase their short-run discretion over policies. Similar proclamations of emergency are often useful for authoritarians facing constitutional or practical constraints on their ability to adjust policies in the short run. A proclamation that an emergency is at hand often produces support for emergency powers of various kinds.

When voters or other influential persons recognize that a governmental bias toward “crisis exaggeration” exists, they will be inclined to discount claims by government officials that a major crisis is at hand. This strategy allows them to reduce the costs of rent extraction through crisis invention by their governments. However, it poses the risk that a genuine crisis will be ignored or responded to more slowly than optimal.

This “boy who cried wolf” dilemma is a problem that cannot be easily avoided in such circumstances and implies that policy responses to short-run crises will tend to be slower than optimal, which tends to somewhat deplete social

reserves and reduce survival prospects. However, to immediately grant emergency powers to government officials after every claim of existential crisis would also tend to reduce the reserves of persons outside government and so reduce prospects for survival of individuals, families, and nongovernmental organizations that do not share in the rents extracted by governments able to obtain emergency powers under false pretenses.

This informational dilemma (excessive proclamation of emergencies and neglect of those proclamations) can also be moderated through institutions. For example, the over-detection of crises can be reduced to some extent through nongovernmental or other independent methods of crisis detection and ex post policy assessment, as with a free press, support for academic research, and think tanks.

These solutions, however, are not perfect, because nongovernmental organizations may also benefit from over-detecting crises. Relevant bureaucracies, private think tanks, news organizations, and academic research groups normally receive additional resources during times of emergency. “Crisis sells” because focusing attention on existential problems is widely recognized to improve survival prospects at the individual, organizational, and social levels. Fortunately, competition among bureaus, academics, and think tanks moderates this problem to some extent by assuring that alternative interpretations of the evidence reaches a broad audience (Breton and Wintrobe 1975).

Excess “crisis detection” is also moderated by the electoral process of majoritarian states, which to the extent that voters are “modestly” informed, tends

to generate relatively accurate assessments of the existence of a crisis or not (via the Jury theorem).

### **Institutional adjustment as a method of crisis management**

Most of the problems discussed in Collapse are long-run rather than short-term crises; that is, they are cases in which circumstances are changing in a manner that makes existing policies suboptimal, but there is a good deal of time available before a lack of response produces a collapse. Long-run solutions thus do not usually require emergency powers, because the need for response is not immediate. However, solutions may require amendments of long-standing routines and institutions of various kinds, including political and legal ones. The policies in place, after all, reflect the political, economic, and environmental equilibria that emerge under the existing institutions, given the information available.

As discussed above, some institutional mixes and distributions of authority are more effective in particular environments than others, and survivorship implies that institutional structures have been adjusted to address the problems previously encountered. Dealing with new existential problems, however, may require significant adjustments to existing institutions that increase their ability to adopt and implement an effective crisis response.

Not all governmental institutions can be easily adjusted, but the ones that are likely to survive are those that can be adjusted at the margin to address real crises as they emerge. It bears noting that both “king and council” governance and federal systems are institutional structures that can easily be fine tuned to address a

new crisis. These structures allow authority to be shifted incrementally between the king and council and between levels of government without the requirement for major institutional innovations that would be required by the polar versions of these systems (pure king or council, completely centralized or decentralized, systems).

It also bears noting that although formal written constitutions are a relatively recent invention, these tend to reduce institutional flexibility, while increasing predictability of policy choices and reducing opportunities for rent-extraction. Nonetheless, constitutional negotiators and designers realize that their institutions are likely to need fine tuning to survive in the long run. Thus, most written democratic constitutions include amendment procedures that allow reforms to be introduced when they appear to advance broad interests, as may be the case during an existential crisis.

Governmental templates that have stood the test of time, have avoided collapse by coping with crises large and small through the centuries, often by temporarily or permanently amending their policy making and implementation procedures.

#### *Disappearance may be adaptation, rather than collapse*

In the long run, it bears noting that this processes of amendment, policy reform, and adaptation can gradually produce quite new divisions of authority and quite new customs and culture.

The reform of existing political institutions, economic practices, and educational curricula can transform one culture or society into another. Such transformations may occur in response to a series of crises through innovation,

exposure to superior practices, and through trial, error, and survival. Although it may be said that a society disappears in such cases, these are instances of adaptation, or partial collapse, rather than collapse in the Diamond sense.

Many of the societies, states, and towns that have disappeared in the past appear to be instances of survival-enhancing adaptation, rather than cases in which comfortable societies were undone through poor policy choices. Here, one may point to the pre-Roman cultures of England, France, and Spain; the pre-Moslem cultures of northern Africa; or the English culture brought to North America by English settlers. In these and many other cases, older societies, states, and towns have disappeared, because their institutions and standing policies were gradually adjusted to take account of new technological, environmental, economic, and/or military realities.

This, after all, is what modern Westerners largely mean by progress.

### **Preliminary Conclusions: Political Institutions for Avoiding and/or Moderating Crises**

All the above suggests that societies tend to become more immune to collapse through time, because both policy rules and institutions are gradually fine-tuned for their environments. Survivorship and adaptation imply that we have more robust institutions for avoiding crises, for recognizing them when they occur, and for ameliorating their worse effects after they arise tend to emerge through time than societies in the past. As a consequence, both individuals and their polities tend to become more adept at coping with the crises associated with particular physical and social environments.

This does not, however, imply that contemporary societies are entirely immune to crisis or collapse. Unknown unknowns continue to exist. Thus, an unfamiliar surprise can overwhelm standing routines and institutions for detecting and dealing with crises by posing problems never considered or responded to. In the contemporary U.S., the terrorist attacks on New York City using jet airplanes, the floods of New Orleans induced by Hurricane Katrina, and the financial crisis of 2007-09 are recent instances of surprise events that had to be quickly addressed by the U.S. government. Only the latter was an existential threat, but major policy innovations occurred in response to each case.

Collapse in contemporary societies may occur because new more subtle problems emerge in settings in which margins for error are small, and less than the best policy responses are chosen to address those problems. As a consequence, avoidable losses may accumulate, reserves may be depleted, and communities may disintegrate as people leave for other places. Several contemporary regions of Africa seem to be prone to such problems. When exit is not possible, a community may literally fade away as it ceases to have the resources necessary to support human life.

Not all surprises are existential ones of the nature stressed in Diamond's book, but survival in the very long run requires addressing a long series of crises, and unfortunately past success is not a guarantee of future success, as many of Diamond's case studies indicate.

#### *Rules of thumb for robust societies*

This paper suggests that there are a variety of institutions and routines that increase a society's prospects for long-run survival. These were not given much

attention in Diamond's narrative, although various hints about the performance of institutions are provided in passing.

The analysis of this paper suggests that a community's political, legal, and economic institutions should assure that social (the sum of individual) reserves are substantial and should increase far more often than they decrease. History suggests that agricultural societies do this better than hunter-gatherer societies, that commercial societies with an honest, representative government do so better than societies based on agriculture alone, and that commercial societies that promote innovation and capital accumulation do this better than early commercial societies. An unusually cold or long winter is no longer an existential crisis in the West.

Differences in the robustness of societies are not merely technological, but also include facilitating legal and political institutions (North 1990, Congleton 2011). This paper suggests that a number of institutional features can help a community limit losses from crises. With respect to political institutions, the analysis suggests (1) that crisis reduction, management, and amelioration tend to be better within constitutional democracies than authoritarian governments, because more crises and more of the effects of crises will be addressed by governments with broad interests than narrow interests. In addition, the electoral process of democracies often, although not always, does a better job of detecting crises, because of the informational aggregation properties of elections (as per the Condorcet jury theorem). (2) The majoritarian governments that are most likely to survive have constitutional or other durable rules that limit rent-extraction possibilities of government officials and ruling coalitions. Such institutions include (3) generality rules and takings rules, (4) assigning responsibility to address crises at

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the lowest possible level of government (including individuals), and (5) relatively open markets for ideas (a free press, web, academia, and independent think tanks). Such standing rules and procedures reduce the likelihood and risks associated with policy mistakes, while moderating tendencies of majorities to exploit minorities through the use of emergency powers in a manner that undermines minority and community survival.

Although history suggests that not all crises can be survived by all communities, it also suggests that the probability of survival increases with reserves, the right institutions, and knowledge that improves the effectiveness of standing plans and institutions. Understanding how institutions operate during times of crisis helps to avoid future collapse by increasing a community's ability to effectively tweak (or not) existing institutions to increase survival prospects in response to long run crises. To do this properly, institutions have to be flexible but not too flexible. Major institutional and policy reforms in response to false or modest alarms should be avoided, while true emergencies should be responded to with alacrity.

### **Agency Problems in Large Organizations: Crisis Management with Asymmetric Information**

The above problems and solutions are ones that are confronted and can be adopted by individuals, small groups, and large organizations. Large organizations such as national governments often confront additional problems during times of crisis that occur because subsets of relevant

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decision makers may have substantially different information available to them. For example, information asymmetries allow elected governments to adopt policies that are not in the general interest or those of electoral majorities, because voters will not know every policy adopted. This allows governments to adopt policies that favor campaign contributors, friends, or favored regions of the country with little fear of electoral consequences.

Political agency problems tend to be larger during times of crisis, because most crises increase the knowledge asymmetries between voters and government experts. Increases in the speed of public policy formation to deal with a crisis implies that more policy reforms must be scrutinized by voters than in ordinary times and many of those policies will address unfamiliar problems. Crisis, consequently, tends to increase voter demands for policy-relevant information, which, as usual, will be supplied by organizations with relatively more information and expertise available to them. However, because voters have little direct experience with the problems and solutions analyzed during times of crisis, they are less able to judge the quality of the information supplied. Their relatively greater reliance on secondhand information makes them more susceptible to manipulation than in long-standing policy areas in which voter assessments of policy are more firmly rooted in their own independent observations and judgment. Being aware of their own relatively greater ignorance, voters are naturally

more willing to defer to governmental and other experts during times of crisis.

All these effects tend to alter the informal balance of power between voters and elected officials in a manner that reduces voter control of public policy—at least in the short run. Bureaus may secure larger budgets and interest groups may be able to secure more favorable tax or regulatory treatments than possible during ordinary times, because voters and their elected representatives are more willing to accept the arguments and assertions of agency experts in times of crisis than in ordinary times and less able to monitor policy decisions. “Ideological shirking” may also increase as elected politicians may advance policy agendas of their own with less fear of voter retribution (at least in the short run) (Kalt and Zupan 1984). Increased dependence on secondhand information tends to reduce the ability of majority rule to function as an efficient information aggregation process (Congleton 2004). (Indeed, the increased influence of interest groups during times of crisis provides them with an incentive to “manufacture” public policy crises.)

All these characteristics of urgent policy crises in a setting of asymmetric information increase the likelihood of policy mistakes (suboptimalities from the perspective of the median voter) relative to



ordinary policies under asymmetric information and relative to crisis management in the symmetric information case.

### *Crisis and Scientific Progress*

Urgency would not generate future policy problems without knowledge problems, but knowledge problems are an essential feature of all surprises and, therefore, much of the effort of crisis management is informational in nature. The demand for new information tends to induce greater investments in both innovation (ignorance reduction) and ordinary scientific research. Insofar as scientific progress can be understood as a combination of increased sampling in known domains and expansions of the domains in which samples may be knowingly acquired, crises thereby tend to stimulate scientific advance. What Kuhn (1995) calls ordinary scientific progress is generally not a matter of the elimination of ignorance in the sense used here, but rather of gradual increases in precision.

A good deal of and perhaps most scientific progress results from gradually refining theories over event spaces that have been fully appreciated for a long time. Everyone knew there were stars long before the geocentric interpretation of stellar motion was replaced with heliocentric ones. The basic ideas of agriculture have been appreciated for millennia. Many manufactured products, such as pottery, clothing, or books, result from successful efforts to refine technologies and possibilities long acknowledged

to exist. Such gradual learning is also clearly evident in the slow refinement of most methods for constructing bridges, buildings, gardens, jewelry, and pastries. In all such areas of progress, rational search and the Bayesian representation of learning are powerful and useful models of the incremental improvement in our understanding of familiar phenomena.

On the other hand, it must be acknowledged that technological progress can also result from genuine innovation and discovery. The Iron Age evidently replaced the Stone Age, because new possibilities for using particular kinds of rocks were discovered. Moreover, in many cases, reductions in one kind of ignorance lead to unanticipated increases in knowledge in other areas. For example, technological progress often reduces ignorance indirectly in other areas by allowing new, *previously unimagined* phenomena to be considered. The compass, the telescope, the microscope, probability theory, satellites, submersibles, and other recent information-gathering innovations have allowed previously unobserved—indeed unobservable—phenomena to be seen and analyzed for the first time.

New intellectual developments or theories—what Kuhn (1995) calls paradigm shifts—may similarly provide such radical reinterpretations of familiar data that entirely new issues and possibilities are brought to the fore; for example, modern chemistry has allowed previously unimagined materials

to be developed. Such instances of intellectual and technological advancement both reduce ignorance and provide new processes by which ignorance—fundamental ignorance—may be reduced in the future. These processes are not directly amenable to Bayesian analysis, insofar as *new* phenomena or hypotheses are created rather than old ones reassessed.

The demand for insurance benefit levels, however, may vary considerably among citizens, and program support levels will necessarily be decided politically. The distribution of voter ideal income security programs can be determined by rank ordering individual ideal points— $t^*$ 's in the model above—from low to high and plotting the associated frequency distribution of citizen preferences for benefit levels. Figure 1 illustrates such a frequency distribution of citizen ideal points. As depicted, it is assumed that the ideal points are interior solutions to equation 14.3, although the existence of corner solutions would not materially affect the conclusions, as long as such interior solutions were sufficiently common that the median voter has an interior solution.<sup>84</sup>

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<sup>84</sup>Figure 1 implicitly assumes that the cost savings of the public program are sufficient to cause all individuals to prefer some uniformly provided public provision to the available private clubs. This geometry is implied by the discussion of exit costs in the previous section of the paper.

A more expensive private income security program may be preferred to a less expensive governmental alternative by individuals who find the public program far too small. This problem can (and often is) be reduced by linking benefit levels and contributions to income levels. In such cases, support for public provision tends to increase insofar as desired benefit levels and income are positively correlated.

If citizen preferences are approximately spatial (as they are in the model developed above), figure 1 can also be used to illustrate how different procedures for quasi-constitutional reform may affect the level of income security adopted under various decision rules. In the case depicted, unanimous support exists for a range of public insurance programs over the more expensive guarantees provided by private insurance clubs. Such programs characterize the liberal welfare state. Although this liberal range can be broad, the majoritarian range of acceptable programs tends to be wider. Thus, the program chosen may depart from the "liberal" range, although it need not.

First, it is clear that the level of political support *falls* as income support levels increase. The level of support for program  $t$  is characterized by the area under the frequency distribution to the right of  $t/2$ . Those citizens with ideal points to the left of  $t/2$  prefer no government program, 0, to program  $t$ ; those voters to the right prefer of  $t/2$  prefer  $t$  to 0. Second, if an entirely new income security program is to be adopted, it is possible that quite large programs gain majority approval, because of the all-or-nothing nature of an initial proposal. Indeed, figure 1 demonstrates that the largest

program with majority support relative to no income security program can even exceed  $t^{00}$ , the largest program that is ideal for an individual voter! Third, if instead of an single all or nothing offer, a sequence of votes ultimately determines program levels, in which each new proposal is judged relative to the last one to obtain majority approval, the median citizen's ideal program is adopted,  $t^{med}$ . No increase beyond  $t^{med}$  will secure majority support, although every increment up to  $t^{med}$  will receive majority support.

Fourth, if the status quo ante or initial point of negotiation is the maximal security program,  $t = 100\%$ , is unlikely to be adopted, because unanimous agreement will exist to adopt a less generous programs. Perhaps surprisingly, the smallest program that could secure majority approval over the maximal program can be below the smallest program considered ideal by any voter,  $t^0$ . Again, the all-or-nothing nature of an initial offer allows somewhat extreme policies to be adopted by majority rule. The smallest program that is preferred to the maximal program is approximately twice as far below the maximal program as is the median voter's ideal policy.

Fifth, a series of votes over successively smaller programs using majority rule would continue until  $t^{med}$  is reached, the same program as emerged when the status quo ante consisted of only private programs. For reasons related to the median voter theorem rather than the Coase theorem,

an incremental decisionmaking procedure under majority rule reaches the same policy result regardless of the starting point. In the long run, the program adopted under majority rule would reflect *median* perceptions of risk and risk aversion,  $t^{med}$ , rather than the ideology of the initial agenda setter. This political outcome is not necessarily liberal in the sense used in this paper, but tends to be liberal if the costs savings of the public program are substantial.<sup>85</sup>

Sixth, under other decision rules, the starting point of constitutional negotiations will matter, as indicated by the two unanimity cases. For example, a series of small increases adopted by a two-thirds supermajority rule with 0 as the initial point of departure will yield an income security program that is smaller than that preferred by the median voter. This point is labeled  $t^{min}$  in figure 1, where area I is twice as large as area II. Similarly, a two-thirds rule will produce an income security program that is larger than that desired by the median voter if the status quo ante is initially above the median citizen's ideal and incremental reductions are voted on. In the case illustrated, the policy chosen will be  $t^{max}$ , where area IV is twice as large as area III.

Seventh, if supermajority decision rules are used to determine the level of income security constitutionalized, the political bargains struck in

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<sup>85</sup> Low demanders of insurance in the liberal case receive (and pay for) more insurance than they would have purchased in the private market, but at a sufficiently lower cost to make them better off. High demanders may "top up" their public insurance by purchasing joining private supplemental insurance clubs.

social welfare states and liberal welfare states differ, because the initial points of departure differ. In such cases, *a liberal welfare state tends to adopt a constitutional income guarantee that is below that preferred by the median voter, and a initially social democratic state will adopt one that is higher.* In the former case, however, local governments and private income security clubs would be free to provide additional support according to local circumstances and demand. Political procedures and starting points, as well as citizen demands for services both affect the bargain reached.

The present book does not provide an explanation for the regime types in place. For such analyzes, one can consult Congleton (2011), North, Weingast, and Wallis (2009) or Asemoglu and Robinson (2005). It is sufficient for the purposes of this book to point out that the types of risks that capture the attention and resources of government varies with governmental types. As a consequence, as the type of government changes, the types of risks addressed through public policies also tends to change. This, as developed further in chapter xx, helps explain why policies with respect to risk change substantially during the late nineteenth century Europe. That technological developments also affect the both types of risks faced and the techniques available for managing them helps to account for much of the shift in governmental risk-management services provided during both the late nineteenth century and also during the twentieth century within liberal democracies.

This books, follows Hobbes, in suggesting that the management of both natural and social risks is a primary explanation for the governments and for the

rules that are adopted. This chapter suggests that such responsibilities have been present from the earliest governments that we have documentary evidence from and continues to the present time. The particular risk-managing services change through time, but many of the core rules have been amazingly stable through time, as with the fundamentals of tort and criminal law.

It bears noting that the rules adopted, like those in families, tend to be fine grained and rather detailed. This is not as true of legal principles, which allow one to understand the basic rationale of a legal system, then of the judicial and legislative decisions that deal with specific cases. Some rules simply outlaw behavior that is known to generate risks. One cannot simply take a gun and use it to shoot out one's neighbor's windows, regardless of whether the neighbor is in any immediate danger or not from such target practicing and regardless of how much it improves one's marksmanship. Nor can one simply take one's neighbor's property and use it for oneself, regardless of whether your use is of greater value than that of the neighbor. The risks associated with allowing such behavior are more or less obvious, and are discouraged through a variety of penalties.

"Treasonous activities" in an authoritarian regimes, may threaten only the rulers, but of course it is the rulers who make the rules and will do so to limit there risks unless there are obvious advantages for not doing so.

Although the rules and other risk managing methods of interest in Part II are those developed by governments, it bears noting that a wide range of similar rules are used by most organizations. Who use rules to reduce risks for the organization themselves and for their employee-team members.

The chapter suggests that the emergence of stationary communities at the time of the agricultural revolution in 10,000 bce is likely to have been associated with their ability to manage a variety of risks. First, through relatively more stable food supplies they helped reduce existential risks for their residents. Second, it is likely that they adopted a series of what we now call criminal and civil laws to moderate risks posed by their residents to one another. And in cases in which an “elite” served as rule makers, the early governments doubtless made it a crime to threaten the elite. Note that the Code of Hammurabi punished crimes against the state and church far more severely than crimes against freeman.

In modern democracies, the risk that attract the interests of those with the authority to make rules tend to be those confronted by ordinary voters rather than political elites, although the latter are not entirely neglected. To be elected to higher office, voters must anticipate better services--usually better risk management services--from their preferred candidates than from their rivals.

It may be said that the communities with the best set of rules for avoiding existential list prove to be the most robust and durable. It may also be said that the most robust and durable legal codes will tend to be the most copied by successive governments. The best rules limit a wide variety of risks and so tend to produce stable (predictable and relatively safe) and prosperous communities. Communities with the worst rules will tend to be frail, poor, and short-lived as Hobbesian anarchy reestablishes itself.

If governance is about ruling, much of the productivity of government arises from its ability to adopt and enforce rules that reduce risks and thereby increase a society’s viability.

When losses from surprise events exhaust both private insurance, private rainy day funds, and lines of credit, the affected groups will attempt to secure additional resources through other means. For example they may form new private organization, new public organizations, or lobby government decision makers for loans at below market interest rates or for direct payments or services, which limit the losses for the crisis at hand, as developed in parts II and III of this volume.

This happens frequently enough, that most governments have a variety of standing programs for providing such “supplemental” crisis insurance. In most democracies, the central government provides flood insurance, unemployment insurance, and insures bank deposits (from runs and poor management) using earmarked fees and taxes. Such standing programs often resemble ordinary insurance programs insofar as they are funded before the emergencies arise. They differ in that during unusually unfortunate times the coverage is normally extended beyond those pre-funded reserves.

Thus, one does not have to accept with Hobbes’ social contract theory to argue that governments--both authoritarian and democratic--tend to focus most of their resources on the risks associated with life in communities. Even without the threat of a war of every man against every other, there is a constant demand for “security” increasing rules and services by the rulers themselves, by interest groups, and by voters. The remainder of the book focuses on why and how such services are provided by government, beginning with rules securing persons and property.

## Chapter 9: On the Limits of Governmental Crisis Management

The analysis of chapters 5-8 examine how and why governments tend to be tasked with both risk and crisis management. They provide numerous cases in which voters will demand such services from their governments. Chapter 8 suggests that risks and crises also play a role in the emergence and structure of governments themselves, both authoritarian and democratic ones.

This chapter suggests that after all this is accounted for, governments still remain limited in what steps they can take to reduce risks and address crises. Institutions necessarily remain incomplete and imperfect, and internal and external crises can overwhelm even relatively robust political institution. Moreover, governments themselves may create crises through mistaken responses.

### On the Limits of Rules and Support for Governmental Insurance

For voter-consumers to favor interventions beyond insurance regulation requires other problems that governments may be able to fix. Three other problems may add to those of ordinary private insurance for income and health variations, as opposed to fire or liability insurance. The first is the adverse selection problem. Consumers will be inclined to purchase such insurance when they expect to have financial or health problems. If they can estimate the likelihood of such personal problems better than insurance companies, this tends to increase the cost of private insurance. Such problems may not be insurmountable insofar as companies add a “bias” or fudge factor to their estimates of payments to their

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customers, but it tends to make broad coverage more expensive and less attractive, in part because those with lower risks will be less likely to subscribe. Second, there is the moral hazard problem. The behavior that insured persons may undertake may increase their risks. Those with complete income or health insurance may take up activities that increase their health risks, as with speculating in futures markets or with skiing and smoking, which increases the cost of insurance, which again implies that even relatively low-risk prudent persons may find insurance too expensive, since their true risks are over priced.

Third, there is the problem of large correlated risks that may make it very difficult for private firms to have sufficient reserves to cover all losses. In the case of income insurance, the existence of business cycles and their correlation with asset markets implies that huge numbers of claims may be filed at the same time that private reserves--no matter how prudently managed--are depleted by asset price movements. Again, such problems can be finessed by placing relatively large reserves in low return safe assets, as with insured accounts and short term US treasury notes and bonds, but again this has the effect of increasing the cost of insurance and reducing the range and type of persons who purchase insurance.

The net effect of these three factors is that there tends to be a larger latent demand for income and health insurance than markets are likely to satisfy. In such cases, voter-consumers may ask their governments to directly provide insurance if they expect costs for equivalent coverage to decline. Many of these price increasing problems can be addressed, at least in principle, through government provided insurance.

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with decreasing degrees of risk aversion, and therefore willingness to pay for insurance of any kind.

The assumed lower cost of the government program implies that anyone that would have purchased private insurance now favors government insurance. The lower price also implies that at least a few persons, such as B, who would have gone without insurance (or self insured) in the private insurance case will now support government insurance. However, only if the government price is very low, or the distribution of voter-consumer risk aversion all quite risk averse, would there be universal support for the switch. With only moderate savings relatively less risk averse persons may still prefer to self insure over the government plan as C and D.

If government is far better able to address moral hazard, self selection, and correlated risk problems than the private sector, possibly because of better credit ratings, it can do so on a voluntary basis without relying on its coercive or tax authority. Nonetheless, if voters vary in their risk aversion, the savings would be very large to have essentially unanimous among consumer-voters. For example, if such programs reduced the overhead cost of public programs to  $C < 0.05$ , the most risk averse persons in table 6.2 would favor the insurance (ignoring any associated new risks from such governmental policies).

If moral hazard and adverse selection problems are very large, and can only be solved through mandated programs and other rules, support for such programs may be broad, not because of equity concerns but simply because in that case government insurance is economically more efficient than the feasible private alternatives. In such cases, a welfare state may be liberal in the sense that it has essentially universal support.

Degree of Risk Aversion		<b>A</b> <b>a = 0.3</b>	<b>B</b> <b>a = 0.5</b>	<b>C</b> <b>a = 0.7</b>	<b>D</b> <b>a = 0.9</b>
Event X, $P_x = .1$	-5	0.5	0.5	0.5	0.5
Event Y, $P_y = .2$	-2	0.5	0.5	0.5	0.5
Event Z, $P_z = .7$	2	0.5	0.5	0.5	0.5
<b>Average Income</b>	0.5	0.5	0.5	0.5	0.5
Avg Utility (priv)		1.813	2.694	4.005	5.954
Avg Utility (gov)		1.815	2.739	4.017	5.977
Avg Utility (none)		1.8	2.689	4.038	6.095

Table 6.2 illustrates the manner in which a cost reducing government insurance program may attract support over a private plan, although not universal support. The support varies both with the perceived risk and the perceived cost advantage (if any) of the government program. For the purposes of the illustration, table 6.2 uses the same utility function as in 6.1 to calculate the expected utilities,  $U = (W - C + Y)^a$ , with the same value for  $W$  and the same probabilities and range of  $Y$  outcomes as in table 6.1. The cost of the private insurance is again assumed to be  $C = 0.24$  and the new government program is assumed to be less 12% less expensive, with  $C = 0.21$ . Column 2 shows the risk environment and columns 3-6 show the result under income smoothing income insurance programs for persons

## Crisis Cascades and Constitutional Crises

In cases in which one policy error begets many subsequent crises, voters may reasonably come to question the competence of their leaders and the performance of their fundamental political institutions. (It is often difficult to distinguish among bad luck, incompetence, and institutional failure.) Consequently, crisis cascades can easily lead to constitutional crises as routine governmental procedures fail to produce satisfactory policy decisions for the crises at hand. A constitutional crisis may also arise because of internal or external attacks on constitutional procedures, as when elected officials willfully ignore constitutional limits, challenge long-standing constitutional practices, or a coup d'état is undertaken. Crisis cascades may encourage such attacks, as when hyperinflation undermines support for the existing constitutional regime. In either case, a major crisis can produce significant reforms of the fundamental procedures by which governments make decisions.

For the purposes of this paper, however, only lawful changes to a polity's constitution are of interest. A coup d'état is not an acceptable form of crisis management within a constitutional democracy, although it may be stimulated by a constitutional crisis.<sup>86</sup> A coup violates both the concepts of rule of law and popular sovereignty, bedrock premises of modern democracy.

When lawful amendment procedures are used to resolve a constitutional crisis in an otherwise well-functioning democracy, crisis management is again simply “politics as usual” in a more mistake-prone decision environment. Lawful procedures of constitutional reform generally require broad support from current and future majorities, and proposed reforms will reflect those interests—at least as they are currently understood by voters and their representatives.

There are, however, two significant differences between constitutional reform and ordinary policy reform. Constitutional crises are among the most serious that a democracy can face, because losses can be very large. Mistaken changes to fundamental decision-making procedures can generate enormous losses, because changes in the fundamental procedures and constraints of governance will affect all subsequent policy decisions. Moreover, the losses associated with constitutional mistakes are also likely to continue for longer periods than ordinary policy mistakes, because constitutional mistakes are inherently more difficult to reverse than ordinary policies.

Procedures for revising constitutions are generally more demanding than are procedures for adopting ordinary legislation. A series of legislative decisions separated by an election may be required, a national referendum might be called for, or supermajority approval by several elective bodies may be necessary for adopting constitutional reforms. Such procedures are designed to reduce the likelihood of constitutional mistakes by subjecting proposed reforms to repeated analysis and decision points. Constitutional reforms adopted during times of crisis,

<sup>86</sup> Consider, the hastily adopted constitutional revisions adopted within Italy and Germany between the World Wars I and II and the many coups d'état in South America and Africa during the 1970s and 80s.



however, pass rapidly through this process, eliminating most of the careful deliberation and debate of reforms adopted during less urgent times.

After the crisis has ended, constitutional mistakes will be difficult to correct both because of the requirements of the amendment process and because constitutional reforms often create a new balance of political power—so that the groups that adopted the reform cannot repeal them if the new procedures or constraints perform less well than anticipated. The problem of irreversibility is increased by requirements of supermajority support in that reversion to previous rules can be blocked by a minority. (Here, the American experience with prohibition is instructive.)

Of course, all constitutional reforms are difficult to reverse; that is what allows amendments to function as new rules for the political game. The cost of the initial constitutional reform is high and the losses associated with constitutional mistakes are also high, which implies that relatively few reforms will attract the interest of a sufficient number of constitutional reformers to be lawfully enacted. The difficulty of lawful constitutional reform is generally a useful feature of constitutional designs and tends to increase the stability of constitutional rules and reduce the risk that one constitutional crisis will beget subsequent crises. Moreover, although haste increases the likelihood of mistakes, haste does not always imply waste. Many hastily adopted constitutional reforms have proven themselves to be beneficial in the long run, as with the emancipation of Southern slaves during the American Civil War.

The essential problem of constitutional crisis management is not irreversibility, but rather the mistake-prone nature of rapid decision making in

circumstances of limited information. The irreversibility of constitutional amendments simply increases the downside risk of policy mistakes. Fortunately, to the extent that this risk is taken into account by political decision makers, it implies that relatively few hasty constitutional amendments will be adopted.

### **Agency Problems: Crisis Management with Asymmetric Information**

More serious problems are associated with crisis management in settings in which policy makers and voters have substantially different information available to them. Information asymmetries allow elected governments to adopt policies that are not in the general interest or those of electoral majorities, because voters will not know every policy adopted. This allows governments to adopt policies that favor campaign contributors, friends, or favored regions of the country with little fear of electoral consequences.

Political agency problems tend to be larger during times of crisis, because most crises increase the knowledge asymmetries between voters and government experts. Increases in the speed of public policy formation to deal with a crisis implies that more policy reforms must be scrutinized by voters than in ordinary times and many of those policies will address unfamiliar problems. Crisis, consequently, tends to increase demands for policy-relevant information, which, as usual, will be supplied by organizations with relatively more information and expertise available to them. However, because voters have little direct experience with the problems and solutions analyzed during times of crisis, they are less able to judge the quality of the information supplied. Their relatively greater reliance on

secondhand information makes them more susceptible to manipulation than in long-standing policy areas in which voter assessments of policy are more firmly rooted in their own independent observations and judgment.<sup>87</sup> Being aware of their own relatively greater ignorance, voters are naturally more willing to defer to governmental and other experts during times of crisis.

All these effects tend to alter the informal balance of power between voters and elected officials in a manner that reduces voter control of public policy—at least in the short run. Bureaus may secure larger budgets and interest groups may be able to secure more favorable tax or regulatory treatments than possible during ordinary times, because voters and their elected representatives are more willing to accept the arguments and assertions of agency experts in times of crisis than in ordinary times and less able to monitor policy decisions. “Ideological shirking” may also increase as elected politicians may advance policy agendas of their own with less fear of voter retribution (at least in the short run) (Kalt and Zupan 1984). Increased dependence on secondhand information tends to reduce the ability of majority rule to function as an efficient information aggregation process (Congleton 2004). Indeed, the increased influence of interest groups during times of crisis provides them with an incentive to “manufacture” public policy crises.

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<sup>87</sup>Times of crisis, thus, present interest groups inside and outside government with unusually great opportunities to profit by influencing the details of the policies adopted privately within the legislature and publicly through media campaigns.

Of course, voters realize that secondhand information is not always accurate or unbiased and take this into account as much as possible. The lack of direct experience on the policy issues at hand, however, limit the extent to which this is possible. To the extent that disseminating information has any systematic effect on voter knowledge, it can be used to influence voter assessments of the relative merits of policy. Such effects are very evident in new areas of environmental regulation and in recent responses among nations to the threat of international terrorist attacks.

All these characteristics of urgent policy making in a setting of asymmetric information increase the likelihood of policy mistakes (suboptimality from the perspective of the median voter) relative to ordinary policies under asymmetric information and relative to crisis management in the symmetric information case.

### **Constitutional Provisions for Crisis Management**

Although all crises are surprises, this does not mean that routine procedures for handling crises cannot be designed and implemented. Although every crisis has unique features, they also have many common general features that can be addressed through institutional design. The above analysis has several general implications for "routinizing" crisis management.

First, it is sensible to investigate and plan for crises before they happen. Although surprise is a fundamental characteristic of crises, ignorance of crisis scenarios and policy responses to them can be reduced by analysis and planning. One can never fully anticipate the exact time and place of an earthquake, contagious disease, or terrorist attack, but many of the policy responses to these crises are similar regardless of specific details. A careful analysis of real and imagined crisis scenarios allows rapid policy responses to be chosen from a menu of well-understood policy options. For example, an individual crime or fire remains

a crisis in the sense that each case is a surprise and calls for an immediate response. However, responses to individual crimes and fires have been long routinized, and, thus, “crime” and “fire” are no longer regarded to be crisis areas. In this manner, policy research can reduce losses associated with mistakes made during times of crisis; although it cannot entirely eliminate crises or mistakes.

Second, because policy mistakes are unavoidable during times of crisis, the standing procedures for dealing with crisis should allow policy mistakes to be discovered and corrected at relatively low cost. This is, of course, one reason for having regular and routine popular elections rather than electing persons for lifetime terms of office. It is also the reason why emergency policies should have "sunset" provisions so that they expire or are carefully reviewed after the immediate crisis has passed and as better information becomes available.

Third, a well-designed constitution should be crisis proof. It should be designed to handle the urgent unforeseen problems in a manner that does not threaten its fundamental decision procedures and constraints. Standing procedures should allow times of crisis to be identified so that streamlined decision processes can be put in place temporarily. The streamlined decision making should be narrowly focused on the crisis at hand to reduce agency problems and the magnitude of policy mistakes. There should be clear lines of responsibility so that mistakes, malfeasance, and incompetence can be readily identified and punished. The standing procedures of crisis management should also specify persons (other than those charged with crisis management) to determine when the crisis has ended so that the normal decision processes are reinstated. (Emergency powers are less likely to threaten the constitution in this case.)

Fourth, constitutional amendments during times of crisis should be avoided to the extent possible, because changes in the fundamental procedures and constraints of governance are difficult to reverse and, consequently, constitutional mistakes tend to be far more costly than are ordinary policy mistakes. To avoid fundamental mistakes, procedures for dealing with crises should be designed, implemented, and revised during times that are relatively free of crisis. Even during an extraordinary crisis in which constitutional procedures fail, temporary rather than permanent changes to decision-making processes are preferable to constitutional reforms to avoid costly mistakes that tend to be very difficult to correct.

### **Crisis and Collapse**

Jared Diamond (2011) does an excellent job of reminding us that societies do not last forever. They may be destroyed or undermined through war, a dearth of resources, and unsustainable political decisions. By doing so, he reminds us that long-term survival should not be taken for granted, although he regards himself to be an optimist by suggesting that long-term survival is possible. As a professor of physiology and geography, his book naturally tends to focus on physical causes of collapse, although he acknowledges many other possibilities. Other possibilities somewhat neglected in his book include exogenous meteorological shocks (changing climate and/or unusually bad weather), institutional competition, and changes in economic circumstances.

His narrative centers on natural resource constraints and resource management problems. The Greenland case was evidently largely induced by

northern hemispheric cooling.<sup>88</sup> After more than three centuries of life in Greenland, farm crops became even less certain than usual and emergency supplies from other communities were limited by ice flows, reducing both the average standard of living and reserves for withstanding unusually bad years. Although temperatures warmed in the following century, the colony evidently never recovered. A more dramatic, albeit smaller and less famous, instance of collapse occurred 30 miles from where this piece is being written, where a small prosperous town was erased by rare, very strong, river floods, and fires between 1886–88 and never recovered. The flood destroyed a good deal of the capital stock of the town, which undermined its economics (milling, logging, and tourism), and evidently the capital could not be easily replenished in the post-flood economic environment, in part because the perceived risks in that particular valley had been reassessed.

In both cases, an exogenous natural shock (the Little Ice Age and floods) may be said to have undermined the sustainability of a community by depleting reserves (food stocks and other capital) and increasing perceived risks associated with particular places. This paper attempts to shed some light on these and other similar cases in which communities are undermined by exogenous shocks and policy choices.

This chapter develops a relatively lean model of collapse and uses it to analyze the institutions and economics of surviving crises. Space considerations necessitate a somewhat brisk and tight analysis. Section I develops a model that

provides economic and informational foundations for crisis, crisis management, and collapse. The analysis provides a framework for analyzing crisis and collapse from a rational choice perspective. The model focuses on the accumulation and depletion of reserves in settings in which the choice environment is not fully understood. The analysis generates a number of general conclusions and provides a useful point of departure for additional research. Section II briefly describes social dilemmas that require organized responses. Overcoming such problems requires governments or similar organizations. Section III suggests that governing decisions can cause crises in cases in which the interests of government officials are not well aligned with those of “their” communities. Section IV suggests that some governmental institutions are likely to be relatively more effective at promoting the accumulation of reserves; detecting, addressing, and surviving crises; and thereby avoiding collapse. Section V summarizes the results of the analysis.

The analysis suggests that political institutions for ameliorating short-run and long-run crises share a number of properties, as do many of the standing policies for avoiding a collapse. Although crisis and collapse may occur even when a society's political institutions and policies are perfectly robust, a society is far more likely to survive unpleasant surprises, if it has institutions in place that encourage the accumulation of reserves and assures an early detection of and effective response to crises.

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<sup>88</sup> Diamond mentions the fact that the Inuit survived through this period, although they faced similar difficulties. However, even if the Norwegian-Icelandic settlers had mimicked the Inuit, it could still have been said that the original Scandanavian-based society collapsed largely as a result of climatic change.

To provide a bit of structure for the analysis of crisis and crisis response, a model is often useful. A model focuses on a subset of factors thought to be important so that relationships among factors can be better understood. The model below focuses on a choice setting that is prone to exogenous shocks of various kinds that require reserves to survive. The analysis focuses on informational problems and other policy problems that affect the probability of survival in such settings; however, as a point of reference it first analyzes a setting in which there are no policy mistakes.

Reserves are stocks of natural and/or accumulated resources that can be drawn on for sustenance during difficult times. “Difficult times” may be generated by exogenous factors that cause unusual losses, unusually poor conditions for producing goods and services that can be used for reserves, or a combination of the two. During most of human history, winter has been a period in which reserves were depleted and summer is a time in which they are replenished in communities located well north or south of the equator. Many firms in the West, similarly, have seasonal sales that account for the bulk of their profits and hope to weather the remainder of the year on reserves accumulated during that period.

In principle, each person or organization in such communities may have different wealth- and loss-generating functions, and those functions may each be driven by a large number of exogenous factors and control variables. Nonetheless, a model that includes uniform wealth- and loss-generating functions with just two exogenous factors and two control variables sheds light on many key issues and can be easily extended to account for greater complexity.

### **Conclusions: Crisis Management in Perspective**

Both large and small unpleasant surprises happen every day to individuals, private organizations, and governments. Many require urgent responses. This paper has addressed both the difficulties of rationally dealing with such emergencies and the opportunities for politicians and interest groups to exploit such crises to advance their own interests. Most of these difficulties arise because of informational problems implicit in surprise events. Surprise implies substantial ignorance about the nature of the problems faced and of the effects associated with alternative policies for addressing those problems.

The fact that urgency and ignorance are essential features of crisis management has important implications for policy making during times of crisis, some of which have been explored above. Urgency implies that a rapid policy response is necessary. Ignorance implies that responses to crises are more error prone than are responses to less urgent and better understood policy problems. Ignorance also allows interest groups both inside and outside of government to exploit information asymmetries to advance their own agendas in a manner that may or may not address the crisis itself. The failures of one round of crisis management may also generate subsequent emergencies that have to be dealt with rapidly. In this manner, ordinary policy crises may escalate to constitutional crises that threaten a nation's fundamental procedures and constraints of governance.

On the other hand, although crises are by their nature unanticipated and unanticipatable, crisis management can be routinized within limits. The costs of policy mistakes can be minimized by conducting policy research on crisis

management, creating streamlined decision procedures for making emergency decisions with clear lines of responsibility and making emergency decisions narrow, temporary, and easily reversible as new knowledge becomes available. The costs of crisis management can also be reduced by avoiding constitutional reforms during times of crisis.

That ignorance is an essential feature of crisis management implies that errors cannot be entirely avoided during times of crisis, but this itself suggests that routines for dealing with crisis should acknowledge the likelihood of error and be designed accordingly. That crises are fairly common events implies that every durable government must have standing procedures for dealing with urgent unexpected problems.