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**MARKETS, DISTRIBUTION, AND EXCHANGE
AFTER SOCIETAL CATAclySM**

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<p>The report identifies constraints and opportunities for the restoration of economic exchange following nuclear war. Four survival scenarios are postulated based on high or low levels of damage to (1) institutions that signal trading opportunities, reduce transaction costs, and regulate and enforce contracts, and (2) resources that are used to create and define wealth. The four scenarios are <u>best case</u>, <u>worst case</u>, <u>resource abundance</u>, and an <u>institution intensive case</u>.</p> <p>Three kinds of literature were reviewed, (1) the economics literature on formal markets, (2) the sociological literature on informal markets, and (3) the economic anthropology literature on pre-capitalist and pre-industrial exchange. From this corpus a set of non-market and market <u>exchange structures</u> are derived and rendered as <u>rules vectors</u> describing their operation. Each of the four survival scenarios is expounded as a subset of the possible exchange structures that is logically compatible with the constraints defining that scenario. (Over)</p>					
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This procedure yielded a range of tentative conclusions for all four scenarios. First, property rights in surviving resources are likely to be problematic in all but the best case and may place severe pressures on dispute resolution mechanisms and civil order.

Second, barter is not always less efficient than money, as is usually assumed. It may overcome trading difficulties where prices take time to adjust to changing supply and demand information. Attempts to restore currency where national institutions have been destroyed, will depend upon the credibility of the institution that emerges to underwrite it.

Third, prestige exchange is inextricably linked to conspicuous consumption and, sometimes, the extravagant destruction of property. Nevertheless, it may be a necessary precursor to the establishment of trust between traders as well as the restoration of currency and credit.

Fourth, planning for the recovery of markets for particular goods should recognize that there will be major shifts in supply and demand. The value of goods and services may undergo tremendous changes that are difficult to detect from price information, even where it is available. Also, the uses to which goods and services are put systematically lose their attractiveness because of socially generated changes in demand.

Fifth, a critical problem will be the maintenance of trust and authority. The more drastic the change from pre-attack society, the more difficulty people have in deciding whom to trust, who has the skills that they advertise, and who will behave with fiduciary responsibility.

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PREFACE

The Federal Emergency Management Agency (FEMA) is responsible for coordinating national planning concerning emergency preparedness, natural disasters, civil defense, major industrial accidents, and mobilization of resources for national security purposes. These activities place the agency in the role of a risk manager and, in some cases, make it responsible for planning where too little is known about the likelihood or consequences of the risk. One area where risk analysis and management are particularly difficult is preparing for a societal cataclysm, for example, on the scale of nuclear war.

Among the research areas related to this risk are issues pertaining to the restoration of the mechanisms for exchange and distribution of goods and services in the wake of societal cataclysm. Investigations of this type present two major challenges to the analyst. First, the range of uncertainties involved implies that the number of possible scenarios to be examined must be capable of providing sufficient insight to be useful for planning purposes, while reasonably limited in number to be feasibly researched. Second, the unique nature of this problem implies that the theoretical and empirical evidence must be extracted from a number of disciplines, including anthropology, economics, and sociology. Thus, the investigation requires the construction of a novel approach merging very diverse bodies of existing research.

This study of post nuclear-war markets arose from previous FEMA sponsored research at Oak Ridge National Laboratory (Hill 1987) addressing questions of post-disaster economic recovery and what would be the best way to distribute goods and services following a nuclear cataclysm. The body of economics literature reviewed by Hill indicated that market mechanisms would be the most rational solution to this question, but did not address the question of what constraints the conditions of survival would place on post nuclear-war markets. A major recommendation of Hill's study was that further analysis was needed to understand how institutional damage would affect market activity.

Hence, our research question concerns the socioeconomic conditions that would have to pertain for rational mechanisms of distribution and exchange to function in the wake of a major societal disaster. Specifically, what kinds of markets would be viable following the destruction or severe impairment of existing institutions, which regulate and enforce contracts, and resources, which define wealth? By institutions we mean social agencies and rules whose functions facilitate demand and supply transactions. Institutions therefore include currency, stock and commodity exchanges, courts, legislatures, and regulatory agencies.

One strategy here would be to extrapolate from existing experience on the effects of natural disasters on markets. However, this might not be the most fruitful approach because the effects of natural disasters are usually so localized that the general system of law and of

institutions to enforce contracts and regulate transactions, can be assumed to have survived, at least beyond the area of immediate devastation.

Even where these mechanisms are impaired or destroyed locally there will be, in the United States at least, a higher authority with external resources to step in and restore order (Mileti et al 1975; Haas et al. 1977). Past experience with natural disasters suggests that there is not the opportunity to establish new institutions governing patterns of distribution and exchange, the enforcement of contracts, and maintenance of property rights.

In the case of a major societal catastrophe, the survival of a broad economic and legal infrastructure governing markets cannot be assumed, even where there are surplus goods and services and willingness to participate in exchanges. Hence, novel adaptations of familiar market arrangements may arise, according to local circumstances, in order to maintain trust between economic agents or to substitute confidence in an institution that will enforce contracts where that trust is missing. This report represents a comparative evaluation of how market exchanges and property rights are likely to be maintained under alternative institutional arrangements that may arise.

Although the results of natural-disaster research are of very limited help to this research, it was considered prudent to examine the guidelines offered by disaster-planning research in constructing a research design for modeling post-attack markets.

In one very important aspect the two problems are identical in that, "the ultimate goal in such planning is to enable an effective and efficient start towards the restoration of normal routines" (Dynes et al. 1981).

The problem is similar to natural disasters in that FEMA has very limited influence on the occurrence of the disaster event. To some extent, FEMA is constrained to accept the position that planning is necessary to reduce the uncertainty of the event following societal catastrophe, rather than preventing the catastrophe from happening.

The parallel problems suggest that planning for societal disaster may benefit from existing guidelines for natural-disaster planning. However, a closer examination of major specific guidelines reveals that some guidelines are very applicable while others are inappropriate and, if applied, could be misleading for societal-disaster planners. Below, we consider four of the important disaster planning guidelines from the literature on natural disasters.

1. Emphasize the appropriate over the fast response. This guideline is particularly important for the market problem since other response concerns are likely to dominate in the period immediately following the disaster. In fact, the restoration of market activities generally does not reflect the crisis characteristics of what we consider emergencies. Thus, determining the appropriate response is likely to depend on allowing a sufficient amount of time to elapse so

that potential trading agents are less concerned with emergency activities and have begun reconstruction of social, political, and economic relationships.

2. Plan for most likely probability. This guideline is appropriate in the natural-disaster context, where data exist from which probability information can be drawn. The lack of actual data even remotely applicable to our disaster event implies that we would have great difficulty in specifying most likely cases. Thus, considering a limited number of extreme cases is more suited to societal disaster planning. This follows from the need to keep the planning process tractable, while recognizing that the unusual may occur. Lack of direct experience from which to define likely scenarios is one of the more difficult problems of planning for societal cataclysm.

3. Focus on principles. Given that uncertainty is prevalent in the analysis, we believe that this guideline is crucial to the planning research design. We structured our analysis to emphasize the rules by which social interactions and exchange are governed. By doing so, we were able to specify market structures as packages of rules governing demand, supply, and transactions. This specification allows direct comparison among the different types of market structures. More importantly, it facilitates the identification of social or technical conditions that give rise to particular rules and suggests principles to follow which account for these conditions.

4. Only exercised plans are realistic. Although sensible in concept, this guideline is not very practical for the global disaster problem. However, we agree that some application of the potential policy is desirable. For the market problem, this implies some application of the policies that are recommended to facilitate market exchange under various assumptions regarding the surviving infrastructure and resources. Alas this was not possible in the terms of the present study, however, one possibility for future research would be to use experimental economic methods (Plott 1986, Smith 1986) to construct defined market structures under which participants may exchange.

An additional set of guidelines emerged as a result of our research of the market problem that we believe can be useful to similar planning questions. These guidelines are more concerned with disaster-planning research design, an area not well explored in the natural-disaster planning area. This is not an oversight of the natural-disaster literature, since such research is strongly based in actual disaster-response experiences. Without the benefit of actual data, the societal disaster planner must rely on a well-developed research design to suggest the possible circumstances that will necessitate a response. Furthermore, the research design must be capable of suggesting the efficacy of possible disaster responses, again without the benefit of real-world applications.

1. Limit the possibilities in a meaningful way. This guideline encourages the development of a defensible framework for determining the logical possibilities. Furthermore, given the number of scenarios that may be generated from incremental changes in the important variables, some reasoning also is necessary to constrain the analysis. In our study, we specified the range of initial scenarios within which institutional adaptations could arise in the wake of large-scale material and institutional devastation. Any such catastrophe may be presumed to affect existing markets in two important ways: 1) destruction of resources (skills, goods, and currency to exchange), and 2) destruction of institutions. Depending on the extent of the catastrophe and the location of the affected market, either or both of these factors may sustain light or heavy damage. The possible combinations of these factors generate four distinct scenarios, described in chapter one, and determine the initial conditions for the development of possible post-disaster market arrangements.

2. Guidelines should combine models and disciplines. Societal-disaster planning problems will necessarily involve questions addressed by different literatures and conceptual models. In order to specify the necessary conditions for markets to operate under each of the above scenarios, this report reviews the theoretical foundations of the concept of exchange in economics, sociology, and economic anthropology. Existing studies of unconventional and traditional markets are examined to see how exchanges actually occur in conditions other than the ideal situations postulated by theoretical models. The resulting framework is then applied to the four scenarios in order to generate the necessary conditions for market activity in each case and to explore policy-relevant factors. Thus, some guidelines must be followed in the research design to combine this diverse information. Three aspects of combining diverse literatures were particularly important for our research design problem.

First, it was important to recognize inconsistencies across and between levels of analysis. To study the rules governing exchange within each scenario, we referred to models of exchange from anthropology, economics, and sociology. Unfortunately, these models are rarely consistent with each other, especially with respect to the level of analysis. Thus, models of collective, individual, social-network, firm, and industry behavior were reviewed. One of the more difficult problems was determining which level of abstraction in these models was appropriate to provide useful information to the analysis without losing a realistic perspective. For example, we resisted the reductionism of formal economic models that rely on the extreme version of utility theory. At a high level of abstraction from social-network factors, these models tend to represent market decisions using only the individual perspective, where all factors are reduced to individual costs and benefits.

A second consistency problem emerged in the combination of different areas of applied research. We based the characteristics of markets, with varying conditions and levels of participation, on existing evidence from four fields of study. These fields included formal market behavior in economics, past efforts at emergency rationing

and market regulation, informal economies in peace and wartime, and primitive markets and trading. Many of these areas have been seen as incompatible by other researchers. However, we found that by transforming the information into the rules governing market behavior and exchange, we were able to construct a common framework for the study areas. The rules approach allowed us to compare the very diverse applied research in a consistent and efficient manner.

Finally, pooling diverse research areas to address the global disaster planning problem reveals a number of unanswered questions as well as generating some new ones. The research design must acknowledge these questions to point out important areas of missing information underlying the recommended planning actions. For example, one surprising finding was that no rigorous and consistent definition could be found for a free market in all of the literature examined. Although we uncovered a number of very specific definitions, we found they ranged from the general idea of a sphere where supply and demand come together (Miller 1978) to only those transactions that are conducted among completely anonymous traders (Williamson 1985). Thus, the first definition includes just about every exchange imaginable, while the second excludes any market where contracts or social-networks are present. Finally, unanswered questions inevitably are raised by our analytical framework since the rules derived from theoretical models are extremely difficult to test while the rules derived from applied work in other cultures may not be valid for the surviving U.S. population.

3. Beware of the ethnocentric influence of past research, existing theoretical or empirical information. Economic theory generates universal models of markets, however, these are applied to real-world situations in which the constraints on exchange behavior are limited to a range of factors that are familiar to citizens of modern industrial societies. The environmental and social-structural constraints may be very different in post-attack society, particularly under the scenarios where institutional damage is great. It may be erroneous to assume that survivors will continue to trust in the pre-attack institutions and ways of doing things that they maintained prior to the disaster. The continuation of pre-attack preferences, values, and cultural priorities, likewise, cannot be wholly assumed. The constraints on exchange may more closely resemble those pertaining in societies or relationships that are very different from current US experiences. Instead of market activities that are driven by the influences of supply and demand, allocations may tend to be fixed by rules other than market choice.

Most economists and formalist anthropologists do not consider that primitive or traditional markets operate or are motivated by factors that differ in any significant respect from those used to model modern capitalism. Other schools of anthropology, so-called substantivists, claim that the exchange systems of traditional societies are exempt from universal modeling. Formalist generalizations may be ultimately vacuous at their extremes (if everything one does is defined as maximizing one's utility function, utility maximization becomes tautologous as an explanation of behavior). On the other hand, substantivist explanations are ultimately limited, since they only permit us to appreciate the

variety of cultural patterns without being able to make helpful comparisons.

We have sought to join the growing body of anthropological economics that avoids this polarization (Cook 1970). Our approach has been to render exchange systems as systems of rules, and we have included constraints such as traditional allocation rules in our ideal-typical models. Thus we have sought to retain the benefits of generalization offered by economic models without losing sight of the breadth of human ingenuity in regulating its economic behavior.

We have also violated an established distinction between economic and social factors in explanations of human behavior. Following Homans (1958) and Schneider (1974) we envisage both social and economic behavior as essentially systems of transaction involving the exchange of both material and non-material goods. A similar view is adopted by economists such as Smith (1974) and Hirshleifer (1985).

Because of a number of ethical issues raised by this study, we conclude our preface with some thoughts on the researcher's moral dilemma when engaging in societal disaster-planning research. In general, these problems do not confront the the natural-disaster planner whose role is regarded as necessary and, to some extent, a public good.

First, it is often argued that societal-disaster planning may be admitting defeat in the sense that being prepared makes the event seem more acceptable and, therefore, more likely to occur. This concern is raised frequently concerning research into man-made global disasters such as nuclear war or carbon-dioxide induced climate changes (Gerlach and Rayner 1988). Opponents of this kind of research apparently prefer to rely on the strategy of "just say no" to societal disaster.

Second, because so many of the critical policy options are untestable in the pre-disaster world, there is an additional burden placed on the planner regarding the consequences of being wrong.

In contrast, the positive aspects of this research should be acknowledged. Thinking the unthinkable provides an opportunity to foster new ideas about old areas of research, even stimulating new criticisms of accepted conventions in research areas. There are spin-off contributions to other areas of study. For example, our work has important implications for research into economic development .

Finally, there is the consideration that a moral obligation exists to use pre-attack research skills in order to leave societal-disaster survivors with the best possible information. In the following chapters, we attempt to contribute to such a body of knowledge.

EXECUTIVE SUMMARY

This document examines the social and economic conditions for reestablishing rational market mechanisms of distribution and exchange following a nuclear war or other major societal disaster. Two variables are used to define the circumstances of survival under which post-disaster economic activity is envisaged. These are:

- (1) the level of institutional survival affecting regulatory systems, banks, stock exchanges, enforcement agencies, etc; and
- (2) the extent of remaining resources, such as land, products, and machinery, as well as human resources such as labor, skills, and knowledge.

Combining these key produces four extreme survival scenarios. These are:

- (1) best case, in which both institutions and endowments survive largely intact;
- (2) worst case, in which both resources and institutions suffer heavy damage;
- (3) resource abundance, where the resources survive but the institutions suffer heavy damage; and
- (4) institution intensive scenario, where resources are considerably restricted but the institutions, including government, remain strong.

GENERAL CONDITIONS FOR ECONOMIC RECOVERY

Economic recovery is defined not as the restoration of modern industrial capitalism but as the achievement of a sustainable system of production and exchange that lays the conditions for subsequent economic and technical development. To establish this we identify eight primary functions that are general conditions of any sustainable economic activity and six secondary functions that emerge to increase the efficiency of trading once it exists.

The primary functions are: defining property rights; conveying information; providing a marketplace; limiting the provisions of legitimate contracts; non-coercive enforcing of contracts, settling disputes; maintaining civil order; and legitimating the other functions.

The secondary functions are: guaranteeing currency; administering distributive justice; monitoring operations; mitigating risk; exploiting comparative advantage, specialization, and the division of labor; and reducing transaction costs.

A MARKET PROCESS

The economics literature reveals that little attention has been given to understanding how markets emerge from social interaction. We also were unable to find any consensual definition of the market process. From the variety of approaches reviewed, the following five-part definition is derived:

- (1) while an accepted shared definition of property rights must exist to define control over goods and services, the absence of private property rights does not preclude market process;
- (2) there must be a desire to exchange based on differences in personal tastes and endowments which present an opportunity to gain from exchange;
- (3) the perceived gains from an exchange must exceed all the costs from completing the transaction;
- (4) traders must have some choice over trading partners and/or trading periods; and
- (5) there must be trust that the exchange will be completed in an atmosphere of non-coercion.

A market process exists where these conditions are present for at least two or more traders who are able to exchange goods and services where the options are wider than to exchange or not to exchange. This general definition is not dependent on the existence of any particular form of organizational arrangement but, in practice, is constrained by social institutions and the rules governing individual behavior within economic interaction.

EXCHANGE STRUCTURES

We define a combination of the rules governing demand, supply and transaction options for a particular set of transactions as an exchange structure. Where the exchange structure fulfills the conditions of the market process, it is also a market structure but the reverse need not be true.

The packages of rules (rules vectors) that describe each exchange structure are drawn from literatures on ideal types of markets and empirical descriptions of specific situated markets. The complete rules vector for each exchange structure includes: demand rules, that regulate the types of traders who can signal their intentions to obtain goods or services; supply rules, that regulate who may supply goods and services and how supply is affected by technology; and transactions rules which govern choices over transaction options. Such a framework is of sufficient generality to include exchanges in the financial, familial, and group spheres and is also sufficiently interdisciplinary to transcend the myopia of disciplinary specialism. It acknowledges the interrelationship of formal markets with their informal counterparts

while, simultaneously, accommodating primitive and subsistence forms of non-market exchange.

The non-market structures consist of:

(1) subsistence exchanges, comprised of small, co-residential groups of producers and consumers, limited in their productive capacity by simple technology, elementary storage capabilities, low division of labor, and restricted geographical range;

(2) prestige exchange, which consists of the ritual transfer of certain restricted items held in high esteem by the participants;

(3) intimate exchange, which occurs in extended family networks, self-help organizations, co-operatives and communes. The object of exchange is to emphasize interdependency while providing otherwise unobtainable goods and services. (This exchange structure is particularly relevant to post-disaster recovery, because it shows how non-market exchange structures co-exist with the market exchange structures of industrial society.)

Market structures consist of:

(1) peasant market exchange, consisting of people who produce primarily for trade in localized marketplaces rather than for self-sufficiency;

(2) associational exchange, motivated by a desire to obtain goods at below market price, or those in short supply, but it also provides status. Where goods and services are directly illegal and result from theft, vice, and smuggling, a separate, if sometimes overlapping, criminal variant of this type of exchange exists;

(3) perfect competition, where the large number of buyers and sellers have equal and easy access to the market, and demand and supply a diverse range of goods and services;

(4) monopoly exchange, where there is only one supplier and no close substitutes for goods and services;

(5) oligopoly exchange, where a small number of suppliers dominate the market; and

(6) imperfectly competitive exchange, where the number of sellers is so large that no one firm has market power and there is easy exit and entry, and where a minor attribute of any one supplier differentiates it from rivals.

THE BEST CASE

Under the best case post-disaster scenario the nation's institutional infrastructure including government and finance, and most of its resources, survive the limited nuclear exchange. Consequently, all of the exchange structures can be expected to be present in varying degrees, and the contemporary U.S. economy serves as a baseline for comparison. Recovery in the disaster area is considerably influenced by the capacity of these exchange structures to lend assistance and the national economy is affected as a result of its concentrations on recovery. Reconstruction is likely to take the form of restoration of the basic institutional infrastructure either without or with resource development.

Research on regional disasters is highly relevant to this scenario and shows that overall the disaster-area economy suffers no long term negative effects and often a positive effect as a result of the inflow of outside resources, such as funds and capital assistance from federal and state agencies. However, these relief programs alter the balance of exchange structures. Community networks emerge to deal with recovery efforts and to strengthen demand-side market power. Procedures to distribute relief funds may purge inefficiencies of pre-disaster imperfect competition, such as oligopolistic pricing. New firms enter the area, increasing the tendency to perfectly competitive exchange structures. Perfect competition is facilitated by increased information flows resulting from the government's assumption of information costs and the reduction of risk through subsidies for new businesses. Under the best case scenario, the functions necessary for sustaining economic recovery are performed by the same institutions that perform these currently.

THE WORST CASE

In the worst case scenario both resources and institutions sustain heavy damage. This means the collapse of currency and banking, loss of records of property ownership and pre-attack contracts, absence of law enforcement, insurance, and other mechanisms of risk reduction. Armed militia, survivalist groups, religious and secular arbitrators, and bandits exist as the primary power brokers defining property rights and acting as independent economic units in this environment of scarce resources and fragile, decentralized authority.

The principal productive unit is the extended family, which accounts for the exchange and consumption of subsistence goods through intimate and associational exchange networks. Military gangs are an important additional consumption unit as well as a supplier of security services. The risk-reducing benefits of intimate and associational trading is especially important in times of high uncertainty.

In the scramble for surviving resources, survivors may develop a domestic mode of production in which currency will be displaced by barter for exchanges of subsistence goods and a system of fixed allocations may be established. Currency is likely to be confined to the prestige sphere, or for obtaining particularly lumpy goods, and

probably will consist of precious metals and gems. Major shifts in demand and supply are likely as there will be a strong incentive for communities to restrict the range of wants among members to avoid disruption from demands that cannot be satisfied.

THE RESOURCE ABUNDANCE SCENARIO

The resource abundance scenario is based on the assumption that material and human resources survive a cataclysmic disaster while the institutional infrastructure of industrial society is heavily damaged. Under these assumptions, there is no currency, banking, commerce, or government, except for that which exists at a local level. Unable to sustain the social organization necessary to sustain production of specialized industrial goods, a society in this scenario is likely to make use of the non-specialized self-sufficiency of domestic production. While producing at a low standard of living there may be high satisfaction among survivors because of lowered expectations. Given the absence of money and significant levels of uncertainty, little incentive exists to engage in material exchange but associational and prestige exchange may emerge using barter to cement social bonds. Prestige and the enhancement of social relationships may become the main incentives for trading.

Contract enforcement, dispute settlement, and the maintenance of civil order may occur via the remaining local courts and legal system, which is now decentralized and without a national framework. Alongside the courts, other methods of dispute settlement may arise such as settlement-directed talking or community mediation. Here justice is negotiated and greater use is made of pre-existing private-justice institutions. Finally, resource abundance provides significant possibilities for a return to industrial market-exchange structures based upon the surviving energy sources and existing local, decentralized institutions.

THE INSTITUTION INTENSIVE SCENARIO

Finally, the institution intensive scenario is considered. This is based on the assumption that resources are destroyed but the institutions of government, banking, and commerce, survive. Evidence from American and British wartime experience shows that government can be effective in managing consumption, transportation and agricultural production through the use of rationing, quota setting, regulations, subsidies and price controls. Public compliance was high but support for such policies also was affected by corporate interest groups who were likely to benefit from the change, and by those groups who were harmed by the costs imposed on them. Reliance on the market mechanism may be undermined by voluntary, self-imposed regulations as corporations seek ways to achieve general recovery and long-term profits.

The use of selective intervention by governments responding to these pressures is more likely to affect markets for essential goods and services. Whether it succeeds will reflect the extent to which it is able to balance market controls with appropriate fiscal and monetary policy. Intervention through fiscal policy uses taxation,

subsidization, and government procurement to shift supply and demand, so as to alter production and consumption processes. Monetary policy may be used to remove purchasing power from demand and direct resources. If government controls and intervention are not popular, informal associational and criminal economic exchange structures will arise, as has occurred in Eastern Europe and many developing countries.

The government is likely to perform such functions as: the conveyance of supply and demand information; the legitimation of other functions; mitigation of risk; and the reduction of transaction costs. We expect a much narrower range of formal market structures to function in the post-attack environment because of the absence of resources to support market diversity and the factors commonly underlying market failure. In these circumstances surviving groups are likely to increase demands for government intervention.

CONCLUSIONS

Examining the ways in which the relevant exchange structures may combine under each of the four scenarios points to a range of problem areas where specific policies need to be developed. For the scenarios based on high levels of institutional survival, these policies probably would be directed towards surviving government agencies concerned with facilitating recovery. For scenarios with low survival of institutions, policies probably would best take the form of leaving pertinent information and recovery guidelines for the use of surviving populations. The form in which such information could best be left for survivors also is an issue for further research.

The following conclusions concerning sustainable post-attack economic recovery are of primary importance:

- (1) It will be important to establish appropriate property rights for particular combinations of resources and infrastructure.
- (2) Private-justice institutions will play a significant role in dispute settlement under low-infrastructure survival.
- (3) It will be important, for long-term recovery, to recognize the central role of social bonding through the exchange of goods and services, particularly in the low-infrastructure scenarios. This will warn against a myopic focus on prematurely re-establishing industrial capitalism in advance of the growth of the secure social conditions for its sustenance.
- (4) There are circumstances in which barter actually may be more efficient than cash.
- (5) It will be important to recognize the way money and credit can emerge from prestige exchange systems and not to proscribe, what appears on the surface to be, non-essential, extravagant consumption.

(6) Especially in the high-infrastructure scenarios, it will be important to remain flexible and accommodate changing demand for certain goods and a reduced division of labor.

(7) Surviving national government should recognize the importance of balancing fairness and efficiency in the distribution of surviving essential resources to encourage trust and support for its authority.

We also consider the dynamics of exchange structures as society moves from a low-level of resources and institutions to higher levels. While traditional rules encourage activities that are necessary precursors to many social functions that constitute formal market structures, to have a true market process the traditional rules of fixed allocation must be replaced by rules that expand the transaction choices that are available to traders. Such innovation in the rules may be internally or externally stimulated. The expansion of potential trade opportunities in an environment of civil order provides the necessary conditions for the emergence of middlemen and corporate groups. These institutions respond to incentives offered by the more flexible structure because transaction costs of identification, negotiation, and enforcement are within tolerable levels. Perhaps facilitated by the emergence of a system of generalized currency, these institutions separate the sale and purchase activities of traders and, thereby, reinforce the emerging flexibility of rules governing a market process of resource allocation. This is the core of most commercial U.S. trade.

ABSTRACT

The report identifies constraints and opportunities for the restoration of economic exchange following nuclear war. Four survival scenarios are postulated based on high or low levels of damage to (1) institutions that signal trading opportunities, reduce transaction costs, and regulate and enforce contracts, and (2) resources that are used to create and define wealth. The four scenarios are best case, worst case, resource abundance, and an institution intensive case.

Three kinds of literature were reviewed, (1) the economics literature on formal markets, (2) the sociological literature on informal markets, and (3) the economic anthropology literature on pre-capitalist and pre-industrial exchange. From this corpus a set of non-market and market exchange structures are derived and rendered as rules vectors describing their operation. Each of the four survival scenarios is expounded as a subset of the possible exchange structures that is logically compatible with the constraints defining that scenario.

This procedure yielded a range of tentative conclusions for all four scenarios. First, property rights in surviving resources are likely to be problematic in all but the best case and may place severe pressures on dispute resolution mechanisms and civil order.

Second, barter is not always less efficient than money, as is usually assumed. It may overcome trading difficulties where prices take time to adjust to changing supply and demand information. Attempts to restore currency where national institutions have been destroyed, will depend upon the credibility of the institution that emerges to underwrite it.

Third, prestige exchange is inextricably linked to conspicuous consumption and, sometimes, the extravagant destruction of property. Nevertheless, it may be a necessary precursor to the establishment of trust between traders as well as the restoration of currency and credit.

Fourth, planning for the recovery of markets for particular goods should recognize that there will be major shifts in supply and demand. The value of goods and services may undergo tremendous changes that are difficult to detect from price information, even where it is available. Also, the uses to which goods and services are put systematically lose their attractiveness because of socially generated changes in demand.

Fifth, a critical problem will be the maintenance of trust and authority. The more drastic the change from pre-attack society, the more difficulty people may have in deciding whom to trust, who has the skills that they advertise, and who will behave with fiduciary responsibility.