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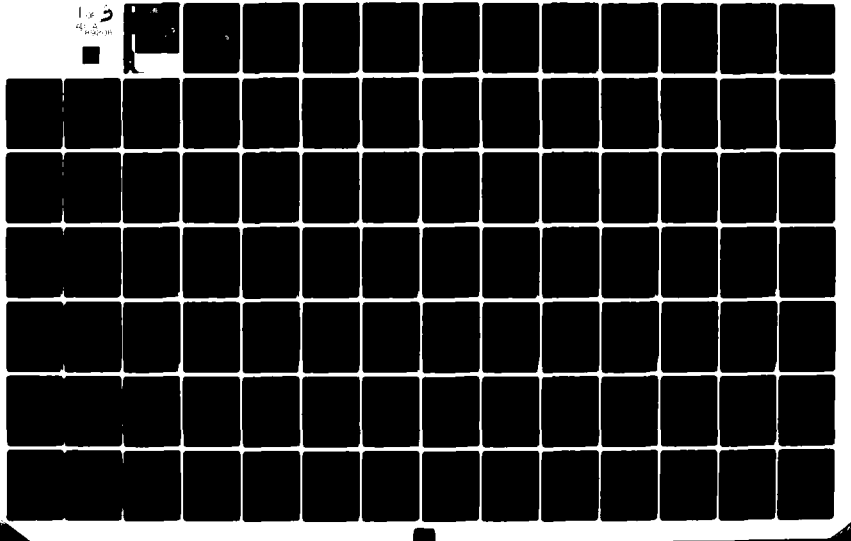

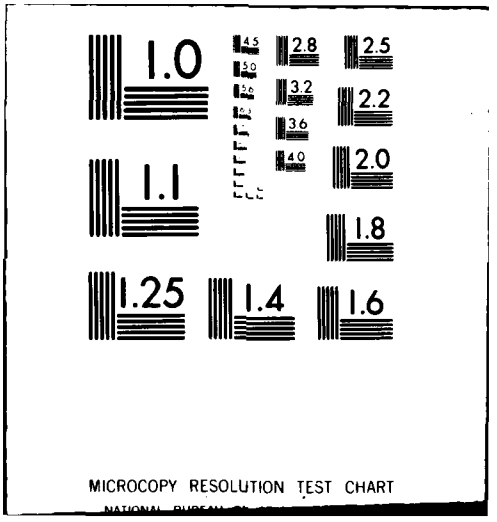
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LEVEL II

Final Report

KEY ECONOMIC PROBLEMS AND GUIDELINES FOR CRISIS RELOCATION

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Federal Emergency Management Agency
Washington, D.C. 20472

Contract: EMW-78-C-0237
Work Unit: 2313E

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(9) Final Report

(6) KEY ECONOMIC PROBLEMS AND GUIDELINES FOR CRISIS RELOCATION,

by

(10) Richard Laurino
Frank Trinkl
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This report, the third in a series on economic problems of crisis relocation, presents a detailed analysis of the post-crisis impact of crisis relocation on the economy in general, and on business and financial institutions in particular. The analysis includes results obtained with TEMCRIS II, an econometric model that predicts aggregate economic effects on a quarterly basis for the first year after peaceful resolution of the crisis. Another product of this report is (over)

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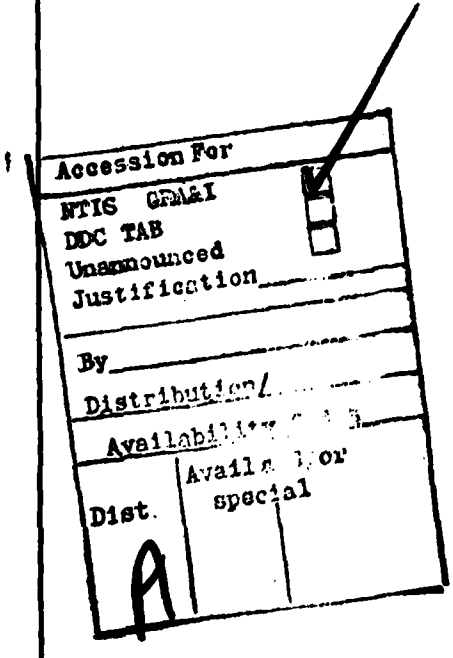

DETACHABLE SUMMARY

KEY ECONOMIC PROBLEMS AND GUIDELINES FOR CRISIS RELOCATION
Contract No. DCPA01-78-C-0227, Work Unit 2313E

Background

This report is the third in a series investigating the problems of economic impact resulting from crisis relocation. The preceding two reports have developed the concept of economic impact, modeled the process of national impact, identified appropriate economic policies, and analyzed specific problems of business and financial institutions prior to and during crisis relocation.* The present report is oriented primarily toward evaluating the economic problems occurring after a peaceful resolution of the crisis, and includes investigations of national economic impact and liquidity and solvency of business and financial institutions. The report also summarizes the principal findings of all three reports in the series and provides suggested guidance and plan formats for CR planners.

In some ways, the process of reestablishing the economy after a peaceful resolution of a CR crisis could be as complex as the process of instituting and maintaining crisis relocation. Government will have to ensure the orderly return of the risk-area populations, including the provision or restoration of means of transportation, traffic control, etc. Because of the demands of the earlier crisis phases, the risk areas will not automatically be ready to receive the inhabitants. In the absence of planning, systems such as food, public health, safety, local transportation, etc. might not be immediately available. Also, repair and reclamation services will be required in host areas to ameliorate the effects of hosting and sheltering more than 100 million risk-area people.

Economic problems attendant to the relaxation of the relocation posture could also be complex and demanding. Economic losses prior to and during a two-week CR period have been estimated at about $40-50 billion excluding emergency costs (1976 dollars). Losses in the weeks and months following return could equal or exceed this amount if business experienced a slow recovery. Prompt assistance from the government and the financial sector after the crisis would appear to be essential to avoid this eventuality.

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* R. Laurino, F. Trinkl, et al., Economic and Industrial Aspects of Crisis Relocation: An Overview, for DCPA, Center for Planning and Research, Inc., Palo Alto, CA, May 1977. A041503

R. Laurino, F. Trinkl, et al., Impacts of Crisis Relocation on U.S. Economic and Industrial Activity, for DCPA, Center for Planning and Research, Inc., Palo Alto, CA, October 1978. A061699

While the costs of crisis relocation are large by current peacetime standards, these costs should be viewed in the light of other costs of the overall strategic situation. Considerably larger costs would be associated with the military actions and economic disruptions that would accompany a CR movement.

Government should be prepared to support evacuees on their return from host areas. Financial and other support would be required for many in this group until funds flowed in from other sources (e.g., pay checks, rents, etc.). A large segment of the business community would also need assistance in raising the necessary operating capital to resume operations quickly. Possible continuing unsettled economic conditions could preclude the removal of government stabilization and other measures for some time after the crisis. The necessity of rapid recovery would dictate prompt settlements by government of claims arising from services and damage associated with hosting during the crisis relocation period.

Relationship of CR Economic Impact to the Strategic Environment

A crisis relocation by the United States would be only one facet of a strategic confrontation with the Soviet Union. Such a U.S. action would presumably occur only in response to some grave threat such as a CR movement by the Soviet Union. This and other strategic conditions would significantly influence economic performance prior to, during, and after the crisis.

In the crisis period prior to relocation, problems that would be experienced include: accelerated deposit withdrawals from banks, changes in demand patterns, depletion of essential product inventories, forced liquidations of assets, increased absenteeism, and other problems. Crisis relocation would include a substantial reduction or complete cessation of many forms of economic activity including mail systems, payments, financial systems, risk-area employment and production, and others. The impacts of these disruptions would be factors in determining recovery over the early months following the relaxation of the CR posture.

Post-CR perceptions of the soundness of the future economy would also be an important factor in determining the rapidity and completeness of economic recovery. A favorable outcome to the crisis would aid the recovery process, while an unfavorable outcome would leave continued uncertainty as to recovery. Such a pessimistic view could result in reduced investment and risk

taking in general. Basic structural changes in the economy could occur with far-reaching consequences. A shift in investment patterns could reduce long-term capital growth and affect the productivity for many years. A shift in savings patterns could reduce the funds available for investment, further reducing funds for long-term growth. A perceived continuing threat to urban areas could also cause a general decrease in the desirability of urban living, leading to an exodus of many workers and businesses from such areas over a period of time. This trend might be countered by continuing industrial mobilization which would increase the requirements for workers in urban areas.

A series of CR events over a short period of time has been suggested as a possibility resulting from an indeterminate crisis outcome or deliberate Soviet intent. Dictating against successive CR events is the consideration that such repetition would also be costly and burdensome for the Soviet Union. However, if a series of CR events is considered to be a likely scenario, then alternative CR designs that keep a larger fraction of risk-area industry functioning during CR should probably be considered.

Economic Impact of CR Reconstitution on Business

The primary objective of this economic impact analysis of CR reconstitution on U.S. business has been to identify sectors, size groups, and other segments of business most vulnerable to temporary loss of sales or revenues or to unanticipated costs, delayed receivables, and other pressures on liquidity and solvency.

The results of a review of the financial status of business indicate the following:

- Business in most sectors could suspend operations for a period of two to three weeks without incurring critical liquidity or solvency problems. For longer periods, the financial problems would rapidly increase. The most vulnerable sectors appear to be food processors, small contractors, and certain trade sectors, notably food retailers and wholesalers, and auto dealers and service stations.

- Potential cash requirements over and above normal business operating capital for risk-area business are estimated to be about $50-60 billion for a four-week suspension of operations (e.g., one week pre-CR, two weeks CR maintenance, and one week post-CR). This estimate includes business fixed costs and labor costs.

- Only the durable goods sector, construction activities, and other investment sectors are likely to be in a position to recoup CR sales losses by expanding activity after the end of the crisis. A poor investment climate may delay even these benefits for several quarters.

- While business on the average is capable of weathering crisis relocation, many marginal businesses (both large and small) would experience liquidity and solvency problems within a period of two weeks' suspension of operations. Many such firms would be put in an underfinanced position which would affect their credit worthiness and raise the prospect of bankruptcy. Any major increase in bankruptcies would be a significant additional factor delaying economic recovery.

Economic Impact of CR Reconstitution on Financial Institutions

The economic impact on financial institutions in the CR reconstitution period will be largely a result of the disruptions induced during the pre-CR crisis, CR initiation, and CR maintenance periods. Disruptive actions that would occur prior to crisis relocation movement include: accelerated deposit withdrawals, disruptions of stock and commodity exchanges, decreased availability of inter- and intra-bank funds, changes in retail credit availability and demand, and uncertainties affecting earnings asset management, and others. During the CR initiation and maintenance periods, risk-area banks would be closed along with important national and regional systems such as centralized check clearing, computer accounting systems, and electronic transfer of funds systems. Host-area banks might remain open to provide minimal services to depositors (e.g., over-the-counter cash transactions) but would have little check clearing and accounting support. The Federal Reserve banks in a relocated posture could provide cash and credit services to banks remaining open but would have to shelve cash items for processing in the CR reconstitution period.

In the immediate CR reconstitution period, banks would play a pivotal role as the nation's principal short-term financial intermediary. The review of this role in the light of the crisis conditions indicates the following:

- Early resumption of production would depend heavily on the expectation that banks would continue their normal role by allowing withdrawals and by granting substantial short-term credit. Denials or even delays in honoring deposits or granting credit would certainly result in reduced output over the short term and would probably substantially worsen expectations over the long term.

- During reconstitution, banks would have to meet the demands resulting from deposit accounts and other liabilities at a time when receipts on earnings assets were delayed and demands for short-term credit were increasing. Banks facing continued deposit withdrawals or slowed redeposits and generally increased economic uncertainty would first attend to the liquidity problem and then to the demand for loans. The banks' concern suggests that the Federal Reserve policies should stabilize credit markets to increase the likelihood that banks would not suffer substantial losses on sales of assets needed to improve liquidity.

- Provided that withdrawals and transfers are carefully controlled prior to, during, and immediately after a CR crisis, the financial capacity of the banking system should be adequate to meet the credit needs of qualified business borrowers. However, because of CR losses, many former borrowers of bank funds would no longer be considered qualified. This possibility suggests the need for government guarantees of some classes of loans.

- Savings and loan associations are less able to adjust to the problems of crisis than commercial banks. Throughout the crisis, liquidity could be severely affected by underpayment of loans and by withdrawals (particularly certificates of deposit). Unlike the case of banks, the liquidity requirements could exceed possible inter-S&L and intra-S&L transfers of funds.

- Several Federal Government policies should be evaluated for use in the CR reconstitution phase: enhanced controls to moderate changes in the money supply; interest rate subsidies; extension of reserve settlement period; incentives for timely loan payments; loan guarantees for business; increased availability of business credit; tax credits for business investment; rapid start-up of financial and non-financial business; and moderation of disproportionate CR losses.

Aggregate Economic Impact During the CR Reconstitution Period

The aggregate economic impact of crisis relocation was estimated using an economic model of aggregate demand (TEMCRIS II) which was developed as part of the early research efforts in this series. The model consists of 19 equations and 36 separate variables. Values of 17 of these variables (exogenous variables) are determined using independent estimates derived from likely scenarios for the pre-CR, CR initiation, CR maintenance, and CR reconstitution periods. Values of the remaining variables (endogenous variables) are determined by the model on a quarterly basis for a period of up to three years after the beginning of the reconstitution period.

Results for a CR maintenance period of two weeks indicate the following:

- Although there are significant economic losses, the nation's economy is able to withstand the shock associated with crisis relocation in times of nuclear confrontation.

- The disruptions introduced by earlier crisis phases would induce a moderate recession in the CR reconstitution period. The economic system would stabilize within about one year; government policies can further reduce this time frame. The specification and evaluation of these policies remain essential tasks.

- Reconstitution policies must be closely coordinated with CR crisis policies in order to avoid delays that would have further adverse effect on the nation's economy. Monetary and fiscal policies both for the CR crisis period and for the CR reconstitution period are also of critical importance. Business incentives appear to be a critical element in determining the robustness of recovery.

Suggested Planning Guidance and Plan Formats

The findings of this and prior studies of CR economic impact have been used to formulate a set of suggested guidance statements for consideration by the cognizant government planning agencies. Guidance statements for government action are presented below. Parallel guidance directed at business and financial institutions is presented in the main report.

- Government should attempt to minimize losses during the CR maintenance period by keeping the economy going to the fullest extent possible in non-risk areas. This policy should include maintaining or expanding essential industry production in non-risk areas and permitting non-essential business activity to continue in non-risk areas to the extent feasible within the available support resources.

- The overriding government policy during crisis relocation should be that no one is denied subsistence needs because of inability to pay.

- Prior to the crisis, government policies should be established as to whether essential services would be provided to individuals at government expense, or whether individuals or other economic units would be responsible for payment of all or part of the costs on a deferred basis.

- The nature of the economic controls to be used in CR should be developed by government well before the crisis. These controls rather than an uncontrolled cash economy would be needed to assist in the timely, efficient, and equitable distribution of essential

products and services. Part of this system should include non-monetary exchange mechanisms (e.g., invoices, etc.); price, rent, and wage freezes; rationing of essential items, etc.

- The use of cash during the CR maintenance period should be permitted as a means of facilitating some transactions and increasing the level of economic activity in non-risk areas; however, cash should not be required for subsistence and other equally essential products and services.

- The Federal Government should consider guaranteeing business against losses due to added costs associated with emergency production of essential goods and services. Government should also pay full costs of emergency operations (e.g., shelter construction and dismantling, relocation management, etc.).

- The Federal Government should declare some form of moratorium on any obligations that fall due during the CR maintenance period -- e.g., payments of prior obligations; invocation of statutes of limitations and penalty clauses of contracts; etc. The purpose of such a moratorium would be to defer rather than forgive payments.

- The Federal Government should also be prepared to extend selective moratoria into the CR reconstitution period to protect specific economic sectors and economic units that have been severely endangered by the impact of CR maintenance.

- Government should be prepared to make use of all traditional forms of emergency assistance on a nationwide basis, including emergency loans, loan guarantees, direct and indirect payments to the needy, etc. Because of the large obligation resulting from this policy, decisions should be made prior to the crisis as to the individual limits of such assistance.

- A coordinated set of actions and policies by government during and after CR is important to improve public perceptions as to the likelihood of a favorable economic climate in the CR reconstitution period.

- In the CR reconstitution period, the Federal Government should adopt monetary and fiscal policies of economic stimulation to restore aggregate demand. Applicable policy actions include: provision of credit; interest rate subsidies; rapid payment of CR obligations; timely additional transfer payments or loans to needy economic units; and other measures.

- Government planning for CR must consider the conflicts and tradeoffs inherent in industrial mobilization policies. For example, government investment in mobilization during and after a CR crisis could reduce availability of credit funds in the private sector in the CR reconstitution period, and thus delay overall rapid recovery.

- o Governments should develop strong emergency public information (EPI) programs for use prior to, during, and after crisis relocation. An important part of such information programs would be the channeling of individual actions into efforts that support the economic objectives associated with the CR option. Objectives would include: (a) in the pre-CR period, reducing premature actions (e.g., panic buying, absenteeism, etc.); (b) during the CR maintenance period, supporting essential industry efforts to maintain an adequate work force in risk areas; and (c) during the CR reconstitution period, encouraging rapid resumption of production.

Developing Emergency CR Plans for Business and Financial Institutions

Plan formats for business adapted from planning approaches developed by the Federal Government are presented in the main report. The parts of the plan should include:

- Identification of the type of emergency and the manner in which it would affect the company or facility.
- Brief description of what the plan is supposed to accomplish.
- The authority under which the plan would be implemented (i.e., company president, facility manager, etc.).
- The basic functions to be carried out (e.g., shutdown, relocation, etc.).
- The specific procedures that would be used to perform functions and the persons who would implement the procedures.
- Coordination requirements within the company and with outside government and business groups and agencies.
- Other basic information needed about resources in the area and the nature of the emergency.

A major problem in developing emergency plans for business is the problem of enlisting the cooperation of business in this enterprise. Motivation might be enhanced by educating major business groups regarding the importance of their role in a national emergency, as well as the economic losses that might be averted by preparation. More specific government incentives might include preferential treatment in contracting, priority treatment for loans in the post-crisis period, etc. Cooperation with planning would also increase if businessmen were included in the development of the planning guidance. Also, cooperation could be enhanced by a stronger government commitment to civil defense in general.

Business plans might also be developed, as might other civil defense plans, during any rapid enhancement of the U.S. defense in a period of prolonged crisis (e.g., several months to a year). For this eventuality, the government should distribute previously prepared sample plans and checklists to companies. Opportunities for developing such plans should be pursued vigorously by the Federal Government prior to crisis.

ABSTRACT

This report, the third in a series on economic problems of crisis relocation, presents a detailed analysis of the post-crisis impact of crisis relocation on the economy in general, and on business and financial institutions in particular. The analysis includes results obtained with TEMCRIS II, an econometric model that predicts aggregate economic effects on a quarterly basis for the first year after peaceful resolution of the crisis. Another product of this report is a series of guidelines and sample planning formats for use by the federal government and by businesses and financial institutions in planning for the CR option.

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I. INTRODUCTION

A. Background

The economic impact of crisis relocation (CR) has been recognized for several years as an important consideration in CR research and planning. The study effort reported here represents the third report in a series produced by the Center for Planning and Research to investigate the problems of economic impact. The preceding two reports have developed the concept of economic impact, modeled the process of national impact, identified appropriate economic policies, and analyzed specific problems of business and financial institutions prior to and during crisis relocation.* The present report is oriented primarily toward evaluating liquidity and solvency problems of business and financial institutions in the early post-CR period (i.e., CR reconstitution period). This report also presents estimates of the national impact after a peaceful resolution of such a crisis. In addition, this report summarizes the principal findings of all three reports in the series and provides suggested guidance for CR economic planning.

One of the principal factors affecting development of useful guidance for CR economic planning is the need for basic policy decisions by the Federal Government. While several studies have identified basic policy issues needed to permit substantive planning, decisions on these issues have not yet been made. Therefore the current study has had to proceed by assuming the outcomes of some of these basic issues. The assumptions were not wholly arbitrary since the study group has held discussions with agency representatives concerned with emergency preparedness, and has had access to the considerable literature on emergency economic preparedness, including selected working papers on CR economic policy. Nonetheless, the basic assumptions remain our own. The assumptions are stated explicitly so that the impact of alternative assumptions can be inferred. Moderate departure from these general assumptions will not invalidate the guidance.

The study has proceeded on the assumption that the traditional emergency preparedness concepts used by the government for operations and recovery would

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* R. Laurino, F. Trinkl, et al., Economic and Industrial Aspects of Crisis Relocation: An Overview, for DCPA, Center for Planning and Research, Inc., Palo Alto, CA, May 1977.

R. Laurino, F. Trinkl, et al., Impacts of Crisis Relocation on U.S. Economic and Industrial Activity, for DCPA, Center for Planning and Research, Inc., Palo Alto, CA, October 1978.

be applied to the CR situation wherever such concepts are applicable. Since these concepts and the policies and procedures deriving therefrom were developed for other types of emergency situations (i.e., regional natural disasters, postattack recovery, etc.), it cannot be expected that these policies would apply without modification. However, many of the basic principles on economic stabilization, government financial support, and government responsibility are relevant to the CR situation. What has been necessary is to think about these concepts in the light of the specific scenario conditions created by CR, and to assess how the timing, duration, and extent of economic disruption would affect the feasibility and degree of application of traditional measures.

The basic environmental conditions for crisis relocation have been described in many sources.* CR planning calls for a rapid relocation movement (e.g., lasting about three days) of over 100 million residents of risk areas (primarily metropolitan areas) to surrounding areas that are considered to be safer from nuclear weapon effects.** The relocated posture would be maintained for a period of one to a few weeks, pending resolution of the crisis. All business in risk areas except for those considered essential are to be shut down during the CR period (i.e., CR maintenance period), including financial institutions and related nationwide and regional systems such as U.S. mail, check clearing system, financial markets, etc. Subsequently, assuming a peaceful resolution of the crisis, the relocated population would return to the risk areas and attempt to restore pre-crisis conditions including economic activities.

Traditional government approaches are suitable for many of the post-CR problems, such as assisting needy individuals, assisting businesses facing liquidity and solvency problems, bearing the costs of emergency operations, selecting appropriate fiscal and monetary policies, allocating scarce resources, and others. The CR situation differs from natural disasters in several significant ways. It is of national rather than local or regional scale. The outlays and guarantees of the federal government could be much larger and would have a much greater impact on the national economy. The crisis buildup prior to

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* For example, a series of DCPA guidance documents, CPG-2-8 (A to F), of which the latest issue is CPG-2-8-C, Guide for Crisis Relocation Contingency Planning: Operations Planning for Risk and Host Areas, January 1979.

** Based on criteria in the document, High Risk Areas for Civil Preparedness Nuclear Defense Planning Purposes, DCPA, Washington, D.C.

relocation (i.e., pre-CR crisis period) might be of sufficient severity and duration to introduce significant distortions in the economy before the declaration of an emergency. Thus, selected government actions in the economy prior to relocation appear warranted. Assuming peaceful resolution, the losses sustained by economic units in a CR situation would be more a question of loss of income than a question of damage to capital facilities and equipment. For this reason, government assistance in ensuring the availability of adequate working capital arises as an added problem for policy attention. This is a significant shift in emphasis from postattack situations dominated by investment concerns.

The CR situation differs in several other respects from the normal scenario for postattack economic recovery. In the postattack recovery situation, damage levels would generally be great enough that most of the traditional economic processes could not be continued in the early postattack period. Normal incentives and practices would largely have to be set aside for a system of direct government control of the production, distribution, and final use of essential goods and services. The CR situation, ending in a peaceful resolution, would leave the economic structure essentially intact, so that the role of government would primarily be one of trying to provide the guidance and assistance needed to get normal economic processes functioning as quickly as possible with a minimum of government intervention.

Economic policies for CR can therefore make use of the full range of approaches that have been developed for other emergency situations, but such approaches would have to be selectively applied in a timely manner. The basic strategy would be to keep the economy going to the extent possible during the pre-CR crisis and CR maintenance periods and to assist the rapid restoration of the economy in the CR reconstitution period. The evidence indicates that the strength of the economy should be sufficient to withstand the losses with selective post-CR assistance to endangered economic units, and with selective controls or moratoria extending for a short time (e.g., a few weeks) into the CR reconstitution period.

B. Relationship of Post-CR Economic Recovery to the Strategic Environment

Crisis relocation in the United States would be only one facet of a strategic confrontation with the Soviet Union. A U.S. crisis relocation would be justified only if the strategic situation was extremely serious

such as a situation involving direct large-scale conflict of U.S. and Soviet forces in a major theater of operations, possibly involving the use of nuclear weapons. Current rationale is that the United States would invoke CR only in response to a CR movement initiated by the Soviet Union. In such a situation the two sides would presumably be trying to resolve the conflict short of a full strategic exchange. The utility of CR in this situation might depend on the U.S. capability to maintain the relocated posture as long as the Soviets, and also on the military capabilities of both sides.

Given a CR event, post-CR perceptions of the population about the soundness of the future economy would be an important factor in determining the rapidity and completeness of economic recovery. If the crisis were to be resolved with a clear U.S. advantage or at least on terms acceptable to the United States, then popular perceptions of the likelihood of a fully restored economy would aid the recovery process. A termination of crisis with uncertain peace conditions or with a clear U.S. disadvantage would open up the possibility of continued uncertainty in the future or even overt coercion of the United States by the Soviet Union.

Such unfavorable crisis outcomes could result in popular perception of continuing economic uncertainty which could hamper CR recovery. Such pessimistic views could result in reduced investment and risk taking in general. Basic structural changes in the economy could occur with far-reaching consequences. A shift in investment patterns could reduce long-term capital growth and affect productivity for many years. A shift in savings patterns could reduce the funds available for investment, further reducing funds for long-term growth. The perceived continuing threat to urban areas could cause a general decrease in the desirability of living there, leading to an exodus of many workers and businesses from urban areas over a period of time. Conversely, continuing industrial mobilization would increase the requirements for workers in urban areas.

The possibility of more than one CR event in a short period raises serious questions for CR planning including economic planning. It has been suggested that successive CR events might be caused by "false alarms" during an extended crisis period, possibly by Soviet design. Successive CR events

might also occur following an indeterminate outcome of an initial crisis. Economic as well as other CR problems would be compounded by such events, inflicting greater hardships on individuals, business, and government, and delaying recovery much longer than a one-time CR event.

Dictating against the likelihood of successive CR events is the consideration that such repetition would also be costly and burdensome for the Soviet Union. A single CR event is very likely to have a sobering effect on both sides. If successive CR's are considered to be a serious possibility, alternative designs for CR impacts and solutions should probably be considered. From the economic viewpoint, it would appear preferable to keep the whole economy (including risk areas) functioning at a moderate level during each successive CR maintenance period while limiting exposure to the threat of attack by having essential workers commute to risk areas, and having all employees (in risk and other areas) work staggered hours. This approach would limit to sustainable levels the economic losses due to extended or successive CR's. Such an approach would require much greater planning efforts than currently envisioned for the one-time CR event. Planning for business would especially require expansion. However, much of the current planning and planning experience (both economic and other) would be applicable to the further planning efforts required by extended or successive CR events.

The detailed description and evaluation of such modified CR concepts remain a task for the future. For purposes of the present study, the assumption has been made that there is a peaceful resolution of the CR crisis under conditions acceptable to the United States. These conditions are assumed to provide adequate assurance to the population that the CR will not be repeated in the foreseeable future.

C. Study Objectives

The objectives of this study are a continuation of the basic objectives of the preceding two studies. The formal objectives are:

- Evaluation of the economic factors relevant to industry emergency operations and financial management in host areas and risk areas during crisis relocation.
- Development of guidelines to assist industry and commercial survival and recovery in support of DCPA missions.

- Field testing, under DCPA supervision, of the significant research findings considered appropriate for technical transfer to the economic/industrial operational guidelines.

- Development of a prototype format adaptable for distribution as a civil preparedness planning manual.

In this study, particular emphasis was placed on the examination of the economic problems arising immediately after the peaceful resolution of the crisis (i.e., the CR reconstitution period). In addition, emphasis was placed on summarizing the findings of all three reports* and developing suggested guidance for CR economic planning efforts.

D. Preview of This Report

The problems created by crisis relocation would not end with the peaceful resolution of the crisis. There could be significant problems associated with moving the population back to the risk areas in an orderly way and supporting them for an interim period when they arrive. With respect to economic recovery, there would be a number of problems associated with the start-up of risk-area business, such as managing accounts payable/receivable and normalizing manufacturer-wholesaler-retailer relationships, and a number of problems associated with other actions driven by CR. Most importantly, the CR reconstitution period would be subjected to the impact of the accumulated losses created by the economic disruptions of the crisis.

Losses sustained during the crisis would manifest themselves in terms of conflicting and varying demand and supply imbalances: drops in demands for some non-essential products; selective rationing of funds available; and other such distortions. Operational and logistic problems of businesses (e.g., reduced inventories, etc.) could contribute to their slow start-up, with an attendant reduction in business and individual incomes, and possible liquidity and solvency problems for weaker economic units. As a result of these conditions, the nation as a whole could suffer a recession whose duration and severity would depend in part upon the preparedness of business and government to meet the problems.

As a first step toward understanding and preparing for such problems, this study presents an analysis of the impact of CR crisis induced problems on business and on financial institutions. The impacts of crisis relocation on

*The two reports listed in the footnote on page I-1, plus the present report.

business and on financial institutions have been identified including some arising as the crisis develops, others appearing during crisis maintenance, and finally those associated with start-up during the first weeks of crisis reconstitution. Nationwide cross-sector impacts have been analyzed by use of the TEMCRIS macroeconomic model previously developed in the study series.* The financial characteristics of business and financial institutions related to liquidity and solvency are considered in the light of likely losses and demands for credit. The overall impact of CR on the economic condition of the nation in the first year after CR is projected from the TEMCRIS runs.

The analyses in this and other studies have provided the basis for development of the findings on economic problems and solutions presented in this report. Findings were used to develop guidance statements suitable for CR planning by government, business, and financial institutions. Suggested plans and formats devised under the guidance should be particularly useful to essential industry and banks in preparing specific facility and company plans for crisis activities. The practical issues of motivating business to actually prepare CR plans are presented, and the requirements for government leadership and assistance are outlined.

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* See also Frank Trinkl et al., TEMCRIS LP I/O Model: An Interactive Model to Assess Policy Responses to Emergency Situations, for Federal Preparedness Agency, Center for Planning and Research, Inc., Palo Alto, CA, January 1979.

II. ECONOMIC IMPACT OF CR RECONSTITUTION ON BUSINESS

A. Overview

The immediate economic impact of CR is a loss of economic product of about 1% of national GNP per week of CR maintenance, and 1/2% per week during early CR reconstitution. The rationale for this estimate is that about three-fourths of GNP is generated in the risk areas but that a small portion of it, perhaps 10%, will be continued as essential production, and that some net increase of host-area activity will occur. Host-area product may increase to about a third of current national GNP because of some transfer of activity from risk areas, some augmentation of host-area work force by evacuees, and greatly increased demand in host areas for conventional services. The attendant general confusion in economic activity will lower net productivity, which will somewhat offset the other increases in host-area output and limit the net gain. Moreover, confusion and delays in start-up will similarly lower productivity in the risk areas during CR reconstitution.

Government uncertainties include questions of (1) whether some form of debt moratoria are promulgated, (2) whether the CR maintenance period is terminated with an increase in government transfer payments to cover shelter construction costs and pay losses, and (3) whether food and lodging are provided free to evacuees, sold for cash, or vouchered and treated as a form of loan. The nature of the CR resolution could greatly affect morale, business climate, and market values, as well as cost of mobilization or military expenditures and international trade. The primary economic impacts will relate to effects on consumer purchases, personal and business liquidity and solvency, credit requirements and credit availability, and the secondary effects of such factors on employment, inflation, and business investment.

B. Issues for Analysis and Policy Consideration

Two major issues often surface in the evaluation of the economic impacts of CR reconstitution: (1) debt moratoria, often suggested as remedies for relieving the financial burden of CR maintenance activities; and (2) the scenario and policy decisions affecting the definition of baseline economic values against which impacts of the reconstitution period could be measured. These issues are discussed below.

1. Debt Moratoria

To reduce the economic impact of crisis relocation, a moratorium on payments is often suggested, as if the effect of relocation is equivalent to that of a two-week vacation, which it is not. Also, there is a complex variety of conceivable moratoria. Perhaps the simplest version would be a temporary suspension of all payments due from pre-CR obligations for the duration of a specific grace period.* The grace period might be for the duration of CR maintenance only, for some portion of CR reconstitution as well, or for an arbitrary period up to a full year.

Continuing charges such as rents, property taxes, and interest on loans could all accumulate and be subject to interest charges for delayed payment but not subject to other penalties if paid prior to the expiration of the grace period. If wages due from past services are delayed in the pre-relocation period along with other unpaid payables, many people will be caught with insufficient cash during the CR maintenance period, and will require free food and lodging, or transfer payments from government to keep them financially liquid. A system of repayment geared to the timing specified in the moratorium could be developed for such CR concurrent obligations. The details of such a moratorium would have to be spelled out. For example, would both savings and checking account balances be frozen? Could they be used as collateral for new loans to individuals or businesses covering operations or expenditures? If no lending authority were granted the banks, what role would remain for the financial sectors? What would happen to the normal system of over-the-counter withdrawals and deposits? How would COD shipments be paid for? Where would current operating funds come from? Current policy statements for national emergencies specify that all banks are to continue essential operations to the extent possible. Thus it would appear necessary to exempt bank deposit liabilities from the moratorium but impose some constraints on withdrawals. Questions such as those raised above lead to others requring careful specifications of the kinds of obligations to be covered by the moratorium and the method of quarantining covered obligations from current transactions not covered.

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* Goods or services provided during the CR maintenance period would not be covered, but could be included in a deferred payment scheme.

2. Scenario and Policy Decisions

The analysis of policy options in CR plans requires some careful definition of an economic baseline against which differential impacts of alternatives can be estimated and tradeoffs evaluated. Such definition is not merely a question of modeling (e.g., baselines in the TEMCRIS model described in Chapter IV) but a question regarding the state of affairs at the point in the crisis when relocation is decided upon. Anticipatory economic analysis regarding crisis relocation is highly scenario dependent. Our major problem is one of developing an adequate set of scenarios. Questions regarding the possibility of recouping CR generated losses lead to many definitional and accounting problems. For example, the societal and economic values of expedient shelter construction are not readily or adequately treated by GNP accounting.

A possible scenario for the various economic sectors (with emphasis on business) is presented below.

Business problems start with CR initiation and (if the deepening crisis is visible to the general public) probably some days or weeks before. Panic buying of consumer goods may lead to favorable cash positions for certain retailers (those dealing in foodstuffs, recreational items, camping supplies, and product lines associated with risk-area residents' perceptions of their probable CR maintenance life styles) but after the evacuation has been completed, such sales will be greatly reduced in risk areas. The results will be extensive inventory depletion, empty shelves in certain grocery stores, and possible local surpluses of fresh fruits, vegetables, or other perishables that might spoil unless collected and transferred to host-area outlets.

During the CR maintenance period, business will continue to face costs such as rents, insurance, and taxes that must be either paid or accrued, as well as possible continuing labor costs. If uniform policies about wages, vacation pay, wage advances, and other payables are not explicitly covered in an official moratorium, a wide variety of employer-employee, landlord-tenant, and creditor-debtor arrangements will occur either by agreement or by default. In any case, the laissez-faire approach will probably result in greater uncertainty and nonuniformity, depending on the relative ability of various enterprises to defer payables or expedite receivables.

Although about 1% of annual GNP will vanish during each week of CR maintenance and some lesser amount will be lost during the reconstruction period, the initial incidence and ultimate distribution of this burden need to be resolved by government policies. If the government intervened strongly to assume or absorb the financial impact of the loss, the burden would be distributed among taxpayers.

In a more laissez-faire, status quo government stance, union workers would probably get paid for their involuntary vacation (as required by many contracts). Others would charge time against accumulated vacation allowances and receive pay accordingly, and still others would be effectively unemployed or on leave without pay.* The latter group might be eligible for unemployment insurance but disbursement of unemployment benefits to risk-area workers while in the host area would be impossible to process in the CR maintenance period. However, such unemployment benefits might be paid after the population returns to the risk area.

Many small landlords, pensioners, alimony recipients, and other groups dependent on periodic unearned income will fare differently in the CR reconstitution period, depending on whether their checks were due during the CR maintenance period, or whether they have managed to receive checks just before that period. Their predicament at the start of evacuation will also depend on what happened to their most recent receipts (i.e., whether deposited in checking accounts or received and converted to cash; or whether bank accounts were frozen or restricted by withdrawal limitations).

The solvency of marginal businesses in the CR reconstitution period will be substantially influenced by their ability to defer payables and expedite receipt of receivables or discount such as commercial paper (see Glossary).** CR maintenance losses will be augmented by an additional loss of productivity because of the uncertainties and inefficiencies occurring over time.

The problems of business in the CR reconstitution period will be dependent upon a variety of factors such as perceived strategic implications of the crisis settlement, the economic policies announced or implemented during or before the relocation period, and the apparent consequences of those policies. Many policy alternatives considered for mitigation of economic impact of crisis relocation entail compromises among conflicting objectives.

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* In the Three Mile Island crisis, many workers were absent without authorization.

** A glossary of financial terms is given in Appendix A.

The policy consequences will be sensitive to the compromises made. For example, Chapter III will identify emergency policies such as limiting withdrawals from bank accounts. Such limitations will greatly affect the liquidity of evacuees, the host-area residents, and businesses generally. A second example is the issue of a debt moratorium. If one is promulgated, what range of debts will be covered, will it be used merely to suspend bankruptcy or liquidation action, extended to cover all payments due on past obligations for some specified grace period, or extended still further to cover obligations incurred during crisis relocation? How will the grace period be defined? A third example concerns the policies announced regarding subsistence costs (food, lodging, medical, and other needs) for evacuees (and possibly for host-area residents) during the CR maintenance period. Will these be furnished free by the government, furnished by the government on the basis of a voucher system to be repaid after crisis resolution, or furnished for cash, with hardship cases resolved through extensions of the welfare system? As a final example, the labor associated with emergency activities during the CR maintenance period (e.g., expedient shelter construction) might be furnished either with or without payment.

In addition, there are questions concerning the course of the crisis and the nature of its ultimate resolution. The crisis is likely to have been accompanied by a full-scale mobilization. How far did mobilization progress in two weeks of CR maintenance, and is there a continuing need for a military buildup? The degree of mobilization would greatly affect the definition of essential industry, and hence the compromise achieved between the need for maintaining a high level of risk-area productivity and the desirability of minimizing the work force in risk areas.

Moreover, details of certain actions during the CR maintenance period will have influences on business arrangements. Present policy calls for suspension of postal service. This will delay all financial transactions handled via the mails (including orders placed, pension and other checks, billings), in the absence of explicit alternative arrangements (e.g., by courier, United Parcel, Brinks, Western Union, etc.). Unless the backlog of mail posted is at least collected and sorted, mail delays will persist for weeks after CR resolution. Telephone service, particularly in the risk area, may not be fully maintained. Moving supplies to risk-area essential industry and diverting

supplies to host-area activities will both be adversely affected. To what extent will rationing and price controls be attempted, and how successfully?

These and other changes to normal living conditions will affect the cash in the hands of the population, the liquidity of other forms of negotiable securities, the purchasing power of individuals, and their ability to pay pending full restoration of regular institutional arrangements. Unemployment during CR reconstitution may become widespread as reduced consumer purchases and other factors further delay reemployment of evacuees. In general, individuals will fall into one of several categories with respect to income received during CR maintenance and reconstitution.

• Income maintained and advances received	Some government employees, essential workers.
• Income maintained but checks delayed	Other government employees, union members, rentiers, pensioners, welfare and unemployment recipients.
• Income reduced or stopped	Self-employed, most risk-area workers not protected by union contracts, any others not qualifying for unemployment benefits.

C. General Findings

1. Vulnerability of Business Sectors

The primary objective of this analysis of economic impacts of CR reconstitution on U.S. business has been to identify sectors, size groups, and other segments of business most vulnerable to temporary loss of sales or revenues, or to unanticipated costs, delayed receivables, and other pressures on liquidity and solvency. The approach has been to screen sectors with respect to various characteristics potentially indicative of problems. Four such screening efforts have been explored, looking for vulnerable businesses with the following characteristics:

(1) Low ratio of cash to the costs of sales and operations.

(2) High potential cash requirements to sustain operations through several weeks of interrupted or low activity.

(3) Poor net worth or current asset position as compared with weekly costs of sales and operations.

(4) Poor or limited potential to make up for lowered output or sales by accelerated activity after the CR reconstitution period.

With respect to cash position or characteristic (1), food processing and food retailers, auto sales, service stations, and small construction contractors seemed to be most vulnerable to liquidity problems with only a couple of weeks of cash available to cover costs.* Changes in a broader definition of cash to include government securities and other current assets suggest that by 1974 the cash position of these more vulnerable sectors may have worsened.

For characteristic (2), potential cash requirements above cash reserves of risk-area firms were estimated by calculating the excess of two (and four) weeks' costs of sales and operations over cash for each sector. A total for all sectors with positive cash requirements gave an overall estimate of about $14 billion (in 1976 dollars) for a two-week period and $65 billion for a four-week period.** This result could be affected greatly by the degree of aggregation of data and could be an underestimate. In the absence of more disaggregated data, the aggregation effect was examined by repeating the calculations on a more aggregated basis resulting in lower estimates (as expected) of $11 billion for the two-week case, but $65 billion for the four-week case. The four-week estimate appears to be less affected by aggregation of data because all sectors are beginning to generate a positive cash requirement in the longer period. As a further check, the requirements were re-estimated using cash and other liquid assets plus receivables less payables (instead of the narrower definition of cash) to compare with costs of sales and operations for two and for four weeks. On this basis, funding requirements amounted to $30 billion for two weeks and $63 billion for four weeks. Whether a figure of over $60 billion for four weeks is a realistic estimate of potential demand for funds depends on the relative ability of individual firms to defer paying payables while expediting receipts of receivables.

Selective criteria of characteristic (3) were applicable to a relatively disaggregated group of companies by comparing net worth and total assets to

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* Based on 1963 data, the latest disaggregated data available: Internal Revenue Service, Corporation Income Tax Returns - 1963, U.S. Government Printing Office, Washington, D.C.

** Based on 1963 data, as above. The two-week availability of cash is a worst case estimate because it assumes that the businesses mentioned continue to incur not only their fixed costs but also salaries, materials, and other expenses included in the cost of sales.

weekly costs. The net worth ratio proved to be weak for several sectors -- i.e., less than 6 for general building construction, meat processing wholesale groceries, wholesale farm equipment dealers, food retailers, motor vehicle sales, and gasoline service stations. Continuing costs could have a significant effect on solvency of these sectors.

With respect to criteria of characteristic (4), it appears that investment goods and consumer durables would experience deferred activity and deferred demand, and that industries affected could recoup losses by accelerated activity after the CR reconstitution period, although delayed temporarily by recessionary effects. On the other hand, goods or services purchased for immediate consumption (e.g., energy usage) would be reduced, and normal revenues would be irrevocably lost. The demand for certain medicinals and certain luxury goods (ranging from tennis balls to pastries) would not increase enough after the CR reconstitution period to contribute to significant economic output. On the other hand, perishable foods, gasoline refining, and certain other products of continuous process industries with limited production or storage capacity might enjoy increased demand after the CR reconstitution period began, but would have limited ability to expand output.

Estimates of CR generated losses, liquidity effects, and business requirements for additional external credit have been based parametrically on a two- and four-week disruption of business activity for non-essential industry in the risk areas. The shorter period of two weeks corresponds to the accepted estimate of the duration of the CR maintenance period. The longer period could be construed either as doubling the CR maintenance period or as reflecting and capturing the effects of (a) productivity losses and other disruptions during crisis buildup and (b) slow start-up during CR reconstitution. The exhaustion of cash or other financial reserves and compensating credit needs grow somewhat nonlinearly with crisis duration, and the parametric approach serves to measure the potential acceleration of the effects by prolonging the effective crisis duration.

2. Adequacy of Business Liquidity for a CR Emergency

If return to normalcy is slow during CR reconstitution, many sectors and particular sizes of enterprises may experience cash flow problems. In order to identify such liquidity problems, Tables II-1 and II-2 show the ratio of cash holdings (defined as cash balances plus checking or time deposit

accounts with banks or other financial institutions) to weekly costs of sales and operations. These data were taken from corporate income tax returns* and apply only to corporations. For 1959-61 and 1963 the requisite data are available by industry sector, within which the corporations are grouped by size in terms of total assets. For 1976 (the last year for which the IRS data have been published), the cash data are available by sector for only the total number of corporations without regard to asset sizes. In Table II-3 which shows the 1974 data, the ratio of negotiable assets to costs of sales and operations is shown by sector; small corporations with less than $100,000 in assets are compared with all corporations regardless of size. In general from Tables II-1, II-2, and II-3, it appears that (contrary to plausible expectations) the smaller corporations do not have significantly poorer liquidity positions than larger corporations in the same sectors. Differences among sectors are more pronounced, however, and liquidity problems may be significant for certain trade sectors and for food processing. Difficulties that might have been expected for construction and services containing many small operators fail to appear in the data shown.

Table II-4 presents similar data on the ratio of cash to weekly costs aggregated over major economic sectors including manufacturing as a whole, and finance. The table also shows similar data for 1959-60 and for 1963 as indicators of trends.

In further examination of liquidity problems of business, data for a sample of corporations covered by Moody's Industrials with Comprehensive Financial Analyses** were collected and ratios calculated for cash as fractions of weekly costs of sales and operations. The results are summarized in Table II-5 and are generally consistent with the inferences drawn from the earlier (1963) IRS data. That is, businesses show a wide variety of cash holdings, but 43% of the companies may have less than one week's cash. As seen in Table II-5, over 70% of the large corporations will begin to experience problems after two weeks. If the crisis period were substantially longer than one week, even the companies with ratios of 2.0 to 2.5 would find their cash dwindling, with consequent deleterious effect on continued operation.

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* Internal Revenue Service, Corporation Income Tax Returns for 1959-60, 1963, and 1974, U.S. Government Printing Office, Washington, D.C.
** Moody's Industrials, 1978.

Table II-1

CORPORATE CASH HOLDINGS DIVIDED BY WEEKLY COSTS — 1959-60
(All Corporations and Those With Assets Under $100,000)

Sector	Under $25,000	$25,000-$50,000	$50,000-$100,000	All Sizes
Agriculture, Forestry & Fishing	4.8	3.7	4.3	4.4
Mining	9.4	8.7	7.0	9.3
Construction	2.0	2.6	2.8	3.1
Manufacturing				
Beverages	1.2	4.7	2.3	2.5
Food	1.5	2.0	1.8	1.9
Tobacco	1.9*	1.9*	1.9*	2.1
Apparel	1.7	2.3	3.5	1.8
Lumber & Wood	2.4	2.8	1.8	3.1
Furniture	2.4	2.6	2.6	2.8
Paper	3.6	2.7	2.6	2.4
Printing	4.8	5.8	5.2	5.7
Chemicals	5.7	4.3	5.1	4.3
Petroleum & Coal	-	-	3.0	2.9
Rubber	4.1	3.4	5.1	3.0
Leather	2.1	2.9	2.4	2.4
Stone, Clay & Glass	5.5	2.5	2.5	4.6
Primary Metals	2.5	1.9	1.3	3.9
Fabricated Metals	3.5	3.6	3.3	3.5
Machinery (Non-electrical)	4.7	5.3	4.4	4.3
Electrical Machinery	3.3	3.5	4.1	3.0
Motor Vehicles	5.9	-	2.2	2.2
Other Transporation Eq.	6.6	2.4	4.1	2.2
Instruments	5.2	2.5	5.0	3.4
Other	1.4	3.3	3.6	3.7
Subtotal	3.0	3.3	3.2	3.1
Utilities				
Transportation	4.2	6.3	5.2	5.0
Communications	11.2	14.3	9.4	3.3
Gas & Electric	11.7**	11.7**	11.7**	7.3
Water & Sanitation	15.0	15.4	4.5	15.4
Subtotal	4.8	6.8	5.5	5.2
Trade				
Wholesale	2.4	2.6	2.4	1.7
Food	0.7	1.7	1.6	1.0
Hardware, etc.	5.0	3.5	3.5	1.8
Other	3.0	2.8	2.7	1.8

Table II-1(Concluded)

Sector	Under $25,000	$25,000-$50,000	$50,000-$100,000	All Sizes
Retail	2.0	2.4	2.4	2.3
Food	1.2	1.4	1.2	1.6
General	2.5	3.1	4.0	3.7
Apparel	2.6	3.1	3.8	3.6
Home Furnishings	2.3	2.3	2.9	3.3
Auto Sales & Service	1.1	1.4	1.2	1.2
Dining & Drinking	2.8	4.0	4.3	4.6
Building Materials, Etc.	1.9	2.4	2.4	2.2
Other	2.7	2.9	2.9	3.0
Subtotal	2.2	2.5	2.4	2.0
Trade Not Allocable	3.4	2.7	1.6	2.5
Finance	127.0	275.5	316.3	196.5
Services	6.9	7.4	9.1	8.0
Business Not Allocable	27.4	27.6	78.2	51.3
Total All Sectors	4.1	4.3	4.1	8.6

Source: Internal Revenue Service, Corporation Income Tax Returns - 1959-69, U.S. Government Printing Office, Washington, D.C.

* Average for all asset classes under $1 million.

** Average for all asset classes under $100,000.

Table II-2

CASH DIVIDED BY WEEKLY COSTS OF SALES AND OPERATIONS BY SECTOR AND ASSET SIZE CLASS — 1963

Sector	Under $25,000	$25,000-$50,000	$50,000-$100,000	$100,000-$250,000	All Sizes
Agriculture, Forestry & Fishing	2.99	3.69	3.49	4.34	3.28
Mining	8.04	4.83	5.26	8.05	8.20
Construction	1.81	2.95	2.59	2.88	2.97
Manufacturing					
Food	2.53	1.90	1.75	2.14	2.13
Tobacco*	N.A.	N.A.	N.A.	N.A.	2.05
Textiles	2.49	1.60	3.89	2.70	2.29
Apparel	1.67	2.61	3.32	2.27	2.10
Lumber & Wood	2.65	2.03	2.65	2.53	2.89
Furniture	3.40	2.18	2.31	2.08	3.16
Paper	2.46	2.32	4.50	2.82	3.20
Printing	4.31	4.39	4.31	6.18	5.53
Chemicals	5.31	3.57	4.38	3.68	4.05
Petroleum & Coal	N.A.	← 4.48 →		4.75	3.15
Rubber	2.67	3.67	5.37	3.46	2.95
Leather	2.87	1.74	2.59	2.27	2.65
Stone, Clay & Glass	3.85	4.31	5.50	3.08	4.85
Primary Metals	3.40	5.82	3.75	2.71	3.81
Fabricated Metals	2.55	3.35	4.78	3.99	3.58
Machinery	4.17	3.92	4.68	5.25	4.20
Electrical & Electronic Eq.	4.65	4.59	3.44	3.89	3.57
Motor Vehicles	3.30	2.43	2.52	3.01	1.89
Other Transport Eq.	1.02	1.56	0.99	3.78	1.75
Instruments	4.24	7.07	6.97	5.12	3.50
Misc. & Ordnance	2.10	5.31	3.39	3.74	3.74
Mfg. Not Allocable	5.19	N.A.	3.60	N.A.	4.56
Subtotal	2.82	3.29	3.57	3.32	3.08
Utilities					
Transportation	3.65	4.67	4.18	4.88	4.57
Communications	9.68	9.08	6.92	11.11	4.11
Elec., Gas & Sanitation	11.68	7.80	6.09	8.22	5.90
Subtotal	4.01	5.04	4.41	5.34	4.81
Trade					
Wholesale	3.41	2.28	2.44	2.08	1.63
Food	1.51	1.12	1.15	1.27	0.98
Machinery & Equip.	5.29	2.77	3.32	2.71	2.39
Miscellaneous	3.56	2.48	2.61	2.21	1.72
Not Allocable	22.19	6.66	23.87	4.69	3.24

Table II-2 (Concluded)

Sector	Under $25,000	$25,000-$50,000	$50,000-$100,000	$100,000-$250,000	All Sizes
Retail	2.26	2.50	2.59	2.30	2.13
Building Materials, Etc.	2.21	1.91	2.62	2.51	2.49
General Merchandise	2.54	2.65	2.03	4.24	3.04
Food	1.29	1.73	1.53	1.46	1.56
Auto Sales & Service	1.46	1.57	1.41	1.14	1.07
Dining & Drinking	2.82	3.83	4.47	6.21	4.98
Miscellaneous	2.31	2.87	5.33	3.47	3.07
Apparel	3.74	3.03	3.69	4.26	3.51
Furniture	2.74	2.47	2.52	3.44	3.23
Subtotal	2.62	2.43	2.55	2.21	1.88
Trade Not Allocable	2.27	5.20	5.46	N.A.	2.61
Services					
Hotels	8.53	7.92	10.17	10.79	10.63
Personal Services	4.17	5.05	6.75	6.97	6.21
Business Services	6.72	6.12	6.79	7.72	6.67
Auto & Other Repair	3.73	5.13	5.33	6.91	6.98
Motion Pictures	7.39	13.54	8.27	11.76	9.51
Other Recreation	5.13	7.68	9.98	8.48	11.38
Miscellaneous	6.54	8.19	10.61	8.39	7.78
Subtotal	5.46	6.49	7.55*	8.01	7.63
Business Not Allocable	30.14	12.84	51.08	8.40	22.52
Total All Sectors	3.05	3.21	3.18	2.92	2.92

Source: Internal Revenue Service, Corporation Income Tax Returns — 1963, U.S. Government Printing Office, Washington, D.C.

* For $1 million but under $2.5 million, the cash would cover 2.41 weeks of costs.

Table II-3

CASH OR NEGOTIABLE CURRENT ASSETS OF CORPORATIONS

DIVIDED BY WEEKLY COSTS OF SALES AND OPERATIONS - 1974

All Active Corporations Compared to Those With Less Than $100,000 in Assets

Sector	Assets in Range $1 to $100,000 Negotiable Assets/Weekly Costs#	All Active Corporations	Cash/ Weekly Costs*
Agriculture, Forestry & Fishing	6.42	5.15	3.36
Mining	11.23	10.57	5.43
Construction			
General	3.02	7.94	2.79
Heavy	4.05	6.43	3.33
Special	3.39	4.82	2.76
Subtotal	3.25	6.58	2.88
Manufacturing			
Food	2.40	2.39	1.23
Tobacco	N.A.	1.87	1.05
Textiles	2.32	2.90	1.67
Apparel	2.63	3.25	1.93
Lumber & Wood	3.01	4.49	2.53
Furniture	2.14	3.04	1.87
Paper	N.A.	3.79	1.67
Printing	4.47	7.27	3.33
Chemicals	4.80	3.93	1.76
Petroleum & Coal	6.51**	2.95	0.67
Rubber & Plastics	4.04	2.85	1.80
Leather	6.45***	3.21	2.01
Stone, Clay & Glass	3.62	4.44	2.23
Primary Metals	3.90	5.44	1.80
Fabricated Metals	4.06	3.37	2.12
Machinery (Non-electrical)	4.70	9.83	2.24
Electrical & Electronic Eq.	3.07	7.79	2.09
Motor Vehicles	6.17***	2.51	1.14
Other Transporation Eq.	8.23	3.93	1.68
Instruments	5.38	5.58	1.49
Other	3.19	5.01	2.78
Subtotal	3.69	4.11	1.52
Utilities			
Transportation	4.84	7.50	3.01
Communications	10.38	13.21	2.33
Elec. Gas & Sanitation	5.05	6.96	2.61
Subtotal	4.85	8.45	2.74

Table II-3 (Concluded)

Sector	Assets in Range $1 to $100,000 Negotiable Assets/Weekly Costs#	All Active Corporations	Cash/ Weekly Costs*
Trade			
Wholesale	3.46	2.19	1.44
Food	1.64	1.15	0.80
Machinery & Equip.	4.59	2.77	1.99
Other	3.81	2.34	1.51
Retail	3.05	2.55	1.67
Building Materials, etc.	3.52	3.25	2.40
General Merchandise	3.56	2.97	1.75
Food	1.72	1.36	0.87
Auto Sales & Service	2.13	1.52	1.02
Apparel	4.48	5.68	4.14
Furniture	3.15	3.75	2.71
Dining & Drinking	4.48	5.97	4.13
Other	3.03	3.67	2.27
Subtotal	3.18	2.24	1.54
Trade Not Allocable	N.A.	5.20	3.30
Finance, Insurance, Rl. Estate	64.52	319.61	132.11
Services			
Hotels & Lodging	7.51	9.57	5.18
Personal Services	7.43	8.77	5.95
Business Services	7.57	11.28	5.91
Auto & Other Repair	4.80	7.70	5.13
Amusement & Recreation	7.28	13.99	6.43
Other	7.85	8.69	5.72
Subtotal	7.18	10.26	5.80
Business Not Allocable	4.05	7.98	3.36
Total All Sectors	5.26	16.75	7.07

Source: Internal Revenue Service, Corporation Income Tax Returns - 1974, U.S. Government Printing Office, Washington, D.C.

Negotiable assets -- cash plus government obligations plus other current assets consisting primarily of negotiable securities.

* For the small corporations with less than $100,000 in assets, cash/weekly costs is equal to 4.11 as compared with 7.07 for all active corporations.

** For products of petroleum and coal, the figure for current assets divided by weekly costs for small corporations covers all with assets under $500,000.

*** For leather and leather products and for motor vehicles, the figure for current assets divided by weekly costs for the small corporations covers all corporations with assets under $250,000.

Table II-4

CASH AND COST OF SALES AND OPERATIONS FOR ACTIVE CORPORATIONS

1959-60, 1963 and 1974, All Asset Sizes

Sector	Costs of Sales and Operations in Millions of Dollars			Cash Holdings in Millions of Dollars			Cash Divided by Weekly Costs		
	1959-60	1963	1974	1959-60	1963	1974	1959-60	1963	1974
Agriculture	2,536	5,685	18,427	214	358	1,192	4.38	3.28	3.86
Mining	5,812	7.295	22,796	1,034	1,150	2,382	9.25	8.20	5.43
Construction	26,610	37,748	109,462	1,559	2,153	6.069	3.05	2.97	2.88
Manufacturing	256,268	295,240	937,183	15,239	17,463	27,437	3.09	3.08	1.52
Utilities	35,330	44,571	132,102	3,559	4,120	6,969	5.24	4.81	2.74
Trade	202,995	241,543	707,574	7,651	8,723	20,928	1.96	1.88	1.54
Services	11,351	15,981	57,419	1,736	2,345	6,400	7.95	7.63	5.80
Not Allocable	74	66	601	73	29	39	51.26	22.52	3.36
Subtotal, Nonfinancial Corporations	540,977	648,128	1,985,566	31,066	36,341	71,416	2.99	2.92	1.87
Financial Corporations	16,085	24,843	82,503	60,790	72,434	209,607	196.53	151.61	132.11
Total	557,062	672,972	2,068,069	91,856	108,775	281,023	8.57	8.40	7.07

Table II-5

DISTRIBUTION OF THE RATIO OF CASH TO WEEKLY COSTS OF SALES AND OPERATIONS FOR A SAMPLE OF LARGE CORPORATIONS

Random Sample of Companies With Comprehensive Financial Data

Ratio of Cash to Weekly Costs of Sales and Operations	Number of Companies	Percent of Total	Cumulative Percent of Total
0 - 0.5	20	14.1%	14.1%
0.5 - 1.0	42	29.6	43.7
1.0 - 1.5	25	17.6	61.3
1.5 - 2.0	16	11.3	72.5
2.0 - 2.5	13	9.2	81.7
2.5 - 3.0	6	4.2	85.9
3.0 - 3.5	4	2.8	88.7
3.5 - 4.0	1	0.7	89.4
Over 4.0	15	10.6	100.0%
Total	142	100.0%	

Source: Moody's Industrials 1978.

3. Potential Requirements for Additional Cash

Delays or reductions in business revenues because of a crisis could generate cash requirements in excess of cash reserves normally held by business. Comparison of cash position and costs of sales and operations can also indicate these added cash requirements. Tables II-6, II-7, and II-8 address this question from various points of view but all employ two alternative durations for the CR maintenance period: a base case of two weeks and a prolonged crisis of four weeks.* In each table, cash or related financial reserves are subtracted from costs of sales and operations occurring over two weeks and also four weeks. When the difference is negative, no cash requirement is indicated and a cash surplus may exist. Because it is assumed that during the uncertainties of the early CR reconstitution period, non-financial corporations with such cash surpluses would be likely to retain them, potential requirements for cash from the financial sector are estimated by adding up the positive differences found while ignoring the negative difference. Clearly the level of aggregation employed in these calculations will affect the result. Table II-6 showing 1974 data makes use of the most disaggregated data available. To provide some insight regarding the possible aggregation effect, Table II-7 shows a still more aggregated version of Table II-6. Where Table II-6 is based strictly on cash reserves (defined as cash plus demand and time deposits), Table II-7 also includes a combination of cash and other current assets plus accounts receivable less accounts payable, here referred to as net liquid resources. Table II-7 thus provides a highly aggregated version of the potential requirements for external funding in both the "Based on Cash" column and the "Based on Net Liquid Resources" column.

It should first be noted that potential requirements for a four-week period turn out to exceed $60 billion in both Tables II-6 and II-8 and in the "Based on Cash" column in Table II-7. Netting out the liquid resources in manufacturing eliminates about $20 billion of the requirements shown in Table II-8 and reduces the estimated overall requirements under the net liquid resources concept which is about $44 billion** in the aggregated version presented in Table II-7.

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* The longer four-week period might be conceived as being composed of a two-week CR maintenance period and a two-week period initiating CR reconstitution, during which delays in the mails, reduced or delayed revenues, or other departures from normalcy will limit replenishment of cash reserves.

** Total requirement, excluding internal sources of funds.

Table II-6

POTENTIAL CR REQUIREMENTS FOR CASH--ALL ACTIVE NONFINANCIAL CORPORATIONS BY SECTOR

CR Maintenance Period of Two or Four Weeks
(Millions of Dollars)

Sector	Cost of Sales & Operations for a CRM Period of: 2 Weeks	4 Weeks	Cash Holdings	Potential Requirements for Cash* for a CRM Period of: 2 Weeks	4 Weeks
Agriculture	709	1,417	1,192	--	225
Mining	877	1,754	2,382	--	--
Construction					
General	1,951	3,902	2,718	--	1,184
Heavy	814	1,629	1,356	--	273
Special	1,445	2,889	1,996	--	893
Subtotal	4,210	8,420	6,070	--	2,350
Manufacturing					
Food	4,748	9,497	2,921	1,827	6,576
Tobacco	318	636	168	150	468
Textiles	924	1,848	770	154	1,078
Apparel	891	1,782	858	33	924
Lumber	847	1,695	1,070	--	625
Furniture	285	569	267	18	302
Paper	909	1,818	757	152	1,061
Printing	898	1,797	1,497	--	300
Chemicals	2,325	4,650	2,046	279	2,604
Petroleim & Coal	8,355	16,710	2,799	5,556	13,911
Rubber	663	1,326	597	66	729
Leather	212	424	213	--	211
Stone, Clay & Glass	698	1,397	780	--	617
Primary Metals	2,549	5,097	2,300	249	2,797
Fabricated Metals	1,646	3,292	1,744	--	1,548
Machinery	2,277	4,554	2,550	--	2,004
Electric Equipment	2,160	4,321	2.254	--	2.067
Motor Vehicles	3,151	6,301	1,790	--	4,511
Other Transport Eq.	1,194	2,388	1,003	1,361	1,385
Instruments	513	1,025	382	191	643
Other	482	964	671	131	293
Subtotal	36,045	72,091	27,437	10,167	44,659

Table II-6 (Concluded)

Sector	Cost of Sales & Operations for a CRM Period of: 2 Weeks	4 Weeks	Cash Holdings	Potential Requirements for Cash* for a CRM Period of: 2 Weeks	4 Weeks
Utilities					
Transportation	2,399	4,798	3,610	--	1,188
Communications	1,000	2,001	1,166	--	835
El., Gas & Sanitation	1,681	3,363	2,193	--	1,170
Subtotal	5,080	10,162	6,969	--	3,193
Wholesale Trade					
Food	2,606	5,213	1,037	1,569	4,176
Machinery & Equip.	1,703	3,407	1,691	12	1,716
Other	11,506	23,013	8,686	2,820	14,327
Subtotal	15,815	31,633	11,414	4,401	20,219
Retail Trade					
Building Materials	659	1,318	791	--	527
General Merchandise	1,967	3,935	1,718	249	2,216
Food	2,939	5,878	1,271	1,668	4,607
Auto Sales & Service	3,033	6,067	1,546	1,487	4,521
Apparel	474	947	980	--	--
Furniture	457	913	618	--	295
Dining & Drinking	499	998	1,031	--	--
Other	1,371	2,743	1,559	--	1,104
Subtotal	11,399	22,798	9,514	3,404	13,350
Services					
Hotels	170	339	439	--	--
Personal	164	327	487	--	--
Business	742	1,485	2,194	--	--
Auto Repair	241	482	619	--	--
Other	915	1,829	2,699	--	--
Subtotal	2,231	4,462	6,438	--	--
TOTAL	76,368	152,736	71,416	17,972	83,997

Source: Internal Revenue Service, Corporation Income Tax Returns - 1974, U.S. Government Printing Office, Washington, D.C.

* Potential requirements are cost of sales and operations less cash if cost is greater than cash, but are shown as dashes (--) if cash is greater than cost. The totals shown in the fourth and fifth data columns are summed over the constitutent sectors and thus generally exceed the differences between the total cash holding and the total cost of sales.

The potential reqruirements totals cover all active corporations. Only the risk-area non-essential industries are affected by CR. This translates to estimated requirements of $13.8 billion for two weeks and $64.6 billion for four weeks, in 1976 dollars.

Table II-7

POTENTIAL CR REQUIREMENTS FOR CASH--ALL ACTIVE CORPORATIONS
BY MAJOR ECONOMIC ACTIVITY

CR Maintenance Period of Two or Four Weeks
(Millions of Dollars)

Economic Activity	Cost of Sales & Operations for: 2 Weeks	Cost of Sales & Operations for: 4 Weeks	Cash Held	Net Liquid Resources*	Potential Requirements for External Funding** Based on Cash 2 Weeks	Based on Cash 4 Weeks	Based on Net Liquid Resources 2 Weeks	Based on Net Liquid Resources 4 Weeks
Agriculture	$ 709	$ 1,417	$ 1,192	$ -967	$ --	$ 225	$ 1,676	$ 2,384
Mining	877	1,754	2,382	10,002	--	--	--	--
Construction	4,210	8,420	6,070	8,426	--	2,350	--	--
Manufacturing	36,045	72,091	27,437	81,067	8,608	44,654	--	--
Utilities	5,080	10,162	6,969	6,271	--	3,193	--	3,891
Wholesale Trade	15,815	31,633	11,414	7,139	4,401	20,219	8,676	24,494
Retail Trade	11,399	22,798	9,514	-3,589	1,885	13,284	14,988	26,387
Services	2,231	4,462	6,438	6,072	--	--	--	--
Non-Financial	$76,368	$152,736	$71,416	$114,421	$14,894	$83,925	$25,340	$57,156
Finance	3,173	6,346	209,607	1,011,090	--	--	--	--
Total	$79,541	$159,082	$281,023	$1,125,508				

Source: Calculated from Internal Revenue Service, Corporation Income Tax Returns--1974, U.S. Government Printing Office, Washington, D.C.

*Net liquid resources are defined to equal cash and other current assets plus accounts receivable less accounts payable.

**Potential requirements for external funding are calculated by subtracting from costs of sales and operations either the cash held or the net liquid resources available. Because of aggregation, the results differ from the totals shown in Table II-6 and Table II-8, which follow.

The potential requirements should be multiplied by a factor of 0.77 to restrict them to risk-area non-essential business and convert to 1976 dollars. The result is $11.45 billion for two weeks and $64.51 billion for four weeks, based on cash, and $19.47 billion for two weeks and $43.94 billion for four weeks, based on liquid resources.

Table II-8

POTENTIAL CR REQUIREMENTS FOR EXTERNAL FUNDING - ALL ACTIVE NONFINANCIAL CORPORATIONS BY SECTOR

CR Maintenance Period of Two or Four Weeks
(Millions of Dollars)

	Cost of Sales & Operations for a CRM Period of:		Net Liquid	Potential Requirements for External Funds** for a CRM Period of:	
	2 Weeks	4 Weeks	Resources*	2 Weeks	4 Weeks
Agriculture	709	1,417	-967	1,676	2,384
Mining	877	1,754	10,002	--	--
Construction					
General	1,951	3,902	1,586	365	2,316
Heavy	814	1,629	2,836	--	--
Special	1,445	2,889	4.003	--	--
Subtotal	4,210	8.420	8,426	365	2,316
Manufacturing					
Food	4,748	9,497	4,320	425	5,174
Tobacco	318	636	-1,758	2,076	2,394
Textiles	924	1,848	1,387	--	461
Apparel	891	1,782	1,133	--	649
Lumber	847	1,695	749	98	946
Furniture	285	569	497	--	72
Paper	909	1,818	2,001	--	--
Printing	898	1,797	4,798	--	--
Chemicals	2,325	4,650	7,466	--	--
Petroleum & Coal	8,355	16,710	10,609	--	6,101
Rubber	663	1,326	1,868	--	--
Leather	212	424	301	--	123
Stone, Clay & Glass	698	1,397	2,007	--	--
Primary Metals	2,549	5,097	6,078	--	--
Fabricated Metals	1,646	3,292	2,873	--	419
Machinery	2,277	4,554	15,670	--	--
Electrical Equipment	2,160	4,321	7,356	--	--
Motor Vehicles	3,151	6,301	11,146	--	--
Other Transport Eq.	1,194	2,388	-1,700	2,894	4,088
Instruments	513	1,025	2,782	--	--
Other	482	964	1,486	--	--
Subtotal	36,045	72,091	81,067	5,493	20,427

Table II-8 (Concluded)

	Cost of Sales & Operations for a CRM Period of:		Net Liquid Resources*	Potential Requirements for External Funds ** for a CRM Period of:	
	2 Weeks	4 Weeks		2 Weeks	4 Weeks
Utilities					
Transportation	2,399	4,798	6,586	--	--
Communications	1,000	2,001	3,147	--	--
El., Gas & Sanitation	1,681	3,363	-3,462	5,143	6,825
Subtotal	5,080	10,162	6,271	5,143	6,825
Wholesale Trade					
Food	2,606	5,213	408	2,198	4,805
Machinery & Equip.	1,703	3,407	754	949	2,653
Other	11,506	23,013	5,977	5,529	17,036
Subtotal	15,815	31,633	7,139	8,676	24,494
Retail Trade					
Building Materials	659	1,318	454	205	864
General Merchandise	1,967	3,934	4,242	--	--
Food	2,939	5,878	-1,760	4,699	7,638
Auto Sales & Service	3,033	6,067	-7,385	10,418	13,452
Apparel	474	947	486	--	461
Furniture	457	913	579	--	334
Dining & Drinking	499	998	163	336	835
Other	1,371	2,743	-378	1,749	3,121
Subtotal	11,399	22,798	-3,589	17,407	26,705
Services					
Hotels	170	339	-303	473	642
Personal	164	327	668	--	--
Business	742	1,485	3,200	--	--
Auto Repair	241	482	-711	735	759
Other	915	1,829	3,218	--	--
Subtotal	2,231	4,462	6,072	1,208	1,401
TOTAL	76,368	152,736	114,421	39,603***	81,775***

* Net liquid resources are cash and other current assets plus receivables less payables.

** Potential requirements are costs of sales and operations less net liquid resources if cost is greater than cash, but are shown as dashes (--) if cash is greater than cost.

*** If the requirements are restricted to risk-area non-essential business and if 1976 dollars are used, the estimates of funding required are $30.44 billion for two weeks and $62.86 billion for four weeks.

In general, a period of four weeks suffices to fully deplete both the cash and net liquid resources of most of the corporations. However, both the position of the financial sector as indicated in Table II-7 and the discussion to be given in Chapter III suggest that a demand for short-term funds even to the extent of $60 billion could be met if corporate solvency remained secure. Table II-9 shows gross capital expenditures of manufacturing and trade during 1977 and the first half of 1978 and also shows the extent to which these outlays were financed by internal funds and the nature of the external funding required. External financing amounted to $35.4 billion in 1977, $55.3 billion in the first quarter of 1978, and $38.8 billion in the second quarter, expressing quarterly data at annual rates. Gross capital expenditures exceeded internal funds by $35.4 billion in 1977, $74.6 billion in the first quarter of 1978, and $7.0 billion in the second quarter, again expressed at annual rates. Financial requirements in the range of $20-60 billion thus appear to be a heavy levy on the funds market but if actually required are within the range of possibility.

4. Solvency

Table II-10 provides an indication of CR effects on solvency by comparing total assets and net worth with the weekly costs of sales and operations, again using 1974 data. Only for general construction, meat processing, wholesale groceries, food retailing, and auto dealers and service stations would four weeks of costs approximate net worth. These sectors are among those exhibiting possible liquidity problems, but even two weeks would leave many businesses underfinanced and would affect their credit worthiness.

It should be remembered, however, that sector averages reflect only one statistic of a possibly broad distribution. Many individual corporations in any given sector may encounter severe difficulties with either liquidity or solvency or both if the CR maintenance period is longer than two weeks or if their return to normal operations is delayed beyond the first week or two of CR reconstitution. Smaller companies, in particular, may have problems. Table II-11 presents some data on cash, weekly sales, total assets, and the ratio of cash to weekly sales and to total assets for a sample of small retailers reported by Robert Morris Associates. As indicated elsewhere, the food sector shows the poorest liquidity position, and the small retailers are apparently in even a poorer position than might be expected from sectoral averages shown in Tables II-1, II-2, and II-3.

Table II-9

GROSS CAPITAL EXPENDITURES, INTERNAL FUNDS, AND EXTERNAL FUNDS FOR MANUFACTURING AND TRADE CORPORATIONS -- 1977-78
(Millions of Current Dollars)

Industry	1977					1978 First Quarter [1]					1978 Second Quarter				
	Gross Capital Expenditures	Gross Internal Funds [2]	External Funds: Short-Term Loans	External Funds: Long-Term Loans	External Funds: Equity Capital	Gross Capital Expenditures	Gross Internal Funds	External Funds: Short-Term Loans	External Funds: Long-Term Loans	External Funds: Equity Capital	Gross Capital Expenditures	Gross Internal Funds	External Funds: Short-Term Loans	External Funds: Long-Term Loans	External Funds: Equity Capital
All Manufacturing Corporations	84,005	70,452	4,319	13,703	4,026	92,540	69,820	12,668	15,508	1,664	95,448	96,276	1,712	15,520	6,476
Nondurable Manufacturing Corporations	47,738	35,461	1,553	9,088	2,453	36,364	36,008	3,948	10,668	556	44,080	42,808	−1,888	10,000	2,296
Food and Kindred Products	7,327	4,455	389	1,286	1,246	4,248	6,260	852	1,800	−576	4,036	6,516	−1,260	1,684	168
Tobacco Manufactures	608	1,092	−324	324	−18	440	1,016	−212	244	−72	−612	1,272	−16	428	16
Textile Mill Products	832	910	114	−38	−350	2,780	2,184	656	108	−72	2,936	2,272	−1,216	1,472	388
Paper and Allied Products	5,165	3,768	123	1,629	396	2,288	6,304	−524	44	−60	3,920	3,536	100	1,036	−44
Printing and Publishing	2,348	2,693	259	605	−121	2,960	1,956	−496	680	20	3,316	2,708	584	568	−272
Chemicals and Allied Products	9,748	7,671	647	1,741	677	8,844	10,040	1,392	4,184	696	10,688	9,240	−756	3,856	1,144
Industrial chemicals and synthetics [3]	5,064	4,078	132	561	73	3,084	4,628	324	2,404	560	5,828	5,332	−100	1,824	404
Drugs [3]	786	905	116	136	20	1,016	1,352	−28	−116	72	2,148	1,460	512	784	528
Petroleum and Coal Products	18,422	11,977	−97	3,204	545	10,180	11,560	764	2,456	264	15,808	14,676	−816	1,244	660
Rubber and Miscellaneous Plastics Products	2,615	1,850	567	376	183	2,652	276	1,096	776	304	528	2,068	−48	−444	76
Other Nondurable Manufacturing Corporations	672	1,047	−123	−41	−105	1,964	408	404	376	52	3,464	520	1,552	164	156
Durable Manufacturing Corporations	36,266	34,991	2,767	4,615	1,573	56,180	33,816	8,716	4,844	1,108	51,368	53,468	3,600	5,512	4,188
Stone, Clay and Glass Products	1,550	1,693	5	−40	174	2,984	1,012	496	660	−232	3,428	3,572	404	528	820
Primary Metal Industries	3,944	2,984	629	1,819	410	3,164	1,796	−2,024	844	−676	5,524	5,620	344	1,204	804
Iron and steel [3]	3,515	1,926	106	1,683	372	92	1,260	112	108	−368	3,468	148	−124	−120	96
Nonferrous metals [3]	429	1,057	523	135	36	3,072	536	−2,140	736	−300	2,052	1,532	472	1,324	708
Fabricated Metal Products	3,217	3,277	441	783	81	4,788	1,932	1,780	592	372	5,376	5,148	476	1,560	−404
Machinery, except Electrical	9,173	7,222	722	922	562	13,588	7,160	4,764	2,540	928	11,456	11,520	280	1,268	1,888
Electrical and Electronic Equipment	5,297	5,965	−56	425	370	8,916	5,800	2,084	748	−552	8,844	6,536	888	524	1,576
Transportation Equipment	8,428	8,641	279	750	37	11,904	9,568	1,536	−4,576	572	9,904	13,164	−300	272	1,268
Motor vehicles and equipment [3]	6,682	6,691	56	25	−31	6,624	7,312	268	−456	224	5,552	10,072	368	72	1,304
Aircraft, guided missiles and parts [3]	613	1,306	127	563	206	3,132	1,592	−24	−3,832	164	2,804	1,840	−220	124	−32
Instruments and Related Products	2,027	2,841	131	72	173	3,852	3,096	268	936	412	1,804	2,980	−144	−96	1,176
Other Durable Manufacturing Corporations	2,632	2,371	615	−114	−233	6,988	3,456	−184	3,096	284	5,036	4,936	1,656	256	−584
All Retail Trade Corporations	20,680	13,409	4,451	3,827	65	36,132	4,904	7,872	−252	4,808	19,820	22,032	6,979	2,948	−1,024
All Wholesale Trade Corporations	11,872	5,201	−164	4,658	551	18,720	4,044	9,920	2,832	296	16,120	6,056	2,628	320	3,228

[1] Quarterly dollar amounts are expressed at annual rates, not seasonally adjusted.
[2] Gross internal funds consist of retained earnings and depreciation and depletion. Inventory valuation and capital consumption adjustments, which are commonly used in aggregate gross internal funds definitions, are not available by industry.
[3] Included in major industry above.

Source: U.S. Department of Commerce; Fedederal Trade Commission.

Source: U.S. Industrial Outlook, 1979.

Table II-10

TOTAL ASSETS AND NET WORTH DIVIDED BY WEEKLY COSTS OF SALES AND OPERATIONS - 1974

All Active Corporations by Major and Selected* Minor Sector

Sector	Total Assets	Net Worth	Weekly Cost of Sales and Operations	Assets ÷ Weekly Costs	Net Worth ÷ Weekly Costs
Agriculture, Forestry & Fishing	19,284	6,307	354	54.42	17.80
Mining	47,040	21,373	438	107.30	48.75
Construction					
General	33,820	5,402	925	36.55	5.84
Heavy	16,060	5,651	407	39.37	13.88
Subtotal	74,108	17,289	2,105	35.20	8.21
Manufacturing					
Food	70,520	32,153	2,374	29.70	13.54
Meet Products	8,889	3,030	639	13.92	4.74
Canned Foods	10,222	5,042	194	52.82	26.05
Tobacco	14,032	6,554	159	88.23	41.21
Textiles	19,142	9.282	462	41.43	20.09
Apparel	13,843	6,047	445	31.07	13.57
Lumber & Wood	24,550	10,443	424	57.94	24.65
Furniture	5,421	2,677	142	38.08	18.81
Paper	25,333	13,246	455	55.73	29.14
Printing	25,976	13,042	449	57.83	29.03
Chemicals	75,593	39,498	1,163	65.03	33.98
Petroleum & Coal	15,770	82,534	4,178	31.75	19.76
Rubber	16,881	7,259	332	50.91	21.89
Leather	4,436	2,116	106	41.84	19.96
Stone, Clay & Glass	22,189	11,320	349	63.56	32.42
Primary Metals	76,685	35,864	1,274	60.18	28.14
Fabricated Metals	35,586	16,562	823	43.23	20.12
Machinery	86,254	39,989	1,138	75.77	35.13
Electrical & Electronic Eq.	73,161	25,894	1,080	67.73	23.97
Motor Vehicles & Eq.	76,804	29,737	1,575	48.76	18.88
Other Transport & Eq.	31,068	11,355	597	52.05	19.02
Instruments	17,427	10,169	256	67.98	39.67
Other	13,224	5,538	241	54.86	22.97
Subtotal	885,823	411,277	18,023	49.15	22.82

Table II-10 (Concluded)

Sector	Total Assets	Net Worth	Weekly Costs of Sales and Operations	Assets ÷ Weekly Costs	Net Worth ÷ Weekly Costs
Utilities					
Transportation	100,766	36,723	1,200	84.00	30.61
Communications	115,654	50,618	500	231.20	101.19
Elec., Gas & Sanitation	198,270	75,950	841	235.85	90.34
Subtotal	414,691	162,291	2,540	163.24	64.28
Trade					
Wholesale	159,567	61,117	7,908	20.18	7.73
Food	13,081	4,313	1,303	10.04	3.31
Drugs	14,083	8,986	401	35.12	22.41
Retail	153,647	56,427	5,698	26.97	9.90
Food	17.751	7,117	1,469	12.08	4.84
Auto Sales & Service	27,593	7,751	1,516	18.20	5.11
Apparel	9,246	4,300	237	39.05	18.16
Subtotal	313,305	117,569	13,607	23.02	8.64
Finance	2,176,652	253,148	1,587	1,371.91	159.55
Services	84,980	25,225	1,104	76.96	22.84

Source: Internal Revenue Service, Corporation Income Tax Returns - 1974, U.S. Government Printing Office, Washington, D.C.

* Minor sectors generally selected to show extremes in ratios.

Table II-11

CASH WEEKLY SALES, TOTAL ASSETS, AND
THEIR RATIOS FOR A SAMPLE OF SMALL RETAILERS

	Cash	Weekly Sales	Cash ÷ Weekly Sales	Total Assets	Cash ÷ Total Assets
Grocery Stores	$14,400	$17,904	0.804	$136.000	0.106
Drug Stores	8,331	7,932	1.050	122,510	0.068
Appliance Retailers	13,155	7,758	1.696	137,030	0.096
Furniture Retailers	10,936	6,404	1.708	147,780	0.074

Source: Robert Morris Associates, Statement Studies, Annual, 1972, Philadelphia, Pa.

5. Indirect Measures of Corporate Liquidity and Solvency

Crisis relocation will have a variety of direct and indirect effects on the economy. Direct effects will be those that are readily apparent, such as shutdown or curtailment of operations at most risk-area plants. Indirect effects will be caused by direct effects and will occur shortly after or simultaneously with direct effects -- for example, loss of productive output and shortages of goods ensuing from a plant shutdown. Another class of indirect effects may be called longer-term effects, such as those accompanying a CR recession (itself an indirect effect of plant shutdowns, tight money, etc.).

The total short-term losses may carry dollar valuation of $40-50 billion, not including emergency costs. This rough estimate is based on adding wages and salaries to fixed expenses to cover the financial counterpart of goods and services that have not been economically utilized. The wages will presumably be paid to government employees and most workers covered by union contracts.

Some wage earners will be essentially locked out and will personally lose benefits of employment. To the extent that this loss is covered by unemployment insurance, the dollar value will be a levy on government and industry. In any case, the total will reflect a loss to the economy. Fixed expenses such as rents, interest, advertising (if covered by long-term contracts) will continue for risk-area businesses with little or no economic advantage gained. For the United States as a whole, and for all private non-financial corporations, the wages and fixed expenses come to about $16 billion per week (based on 1974 data and thus in 1974 dollars -- see Table II-12). Assuming that some risk-area activities continue (e.g., essential industries) and some activities are transferred to the host-area, the actual losses would approximate $10 or $11 billion per week (excluding emergency costs), based on the rough estimate that activity of non-financial corporations may drop to about one-third of normal, or about $12 billion per week in 1976 dollars.

This loss of value also serves as a rough measure of the credit requirements of non-financial business for expenses built up during the CR maintenance period only, because the expenses cited will continue in spite of suspension of sales, output, and income. The cash and security positions of business may cover this loss for two weeks but such liquid assets are probably required for a return to normal operating condition in the CR reconstitution period. A portion of these assets might be liquidated just before the relocation period through issue of payroll checks and similar disbursements but these would constitute a run on the banking system, which would have some of the impact of a surge in demand for bank credit immediately after the CR maintenance period.

In any case, the loss to non-financial corporations could be of the order of $12 billion per week during the CR maintenance period. Pre-crisis anticipatory actions will probably cut productivity somewhat even before the CR operation is initiated, including effects of early spontaneous evacuation. Also, slow start-up of many industries in the early CR reconstitution period should be added in. A two-week CR maintenance period would thus expand into an equivalent of perhaps four weeks of total loss in the short run. This places a price tag on the whole short run effects of roughly $40-50 billion exclusive of emergency costs.

Table II-12

FIXED CONTINUING EXPENSES AND CR-INDUCED POTENTIAL REQUIREMENTS
FOR CREDIT--NON-FINANCIAL BUSINESS
(Billions of 1974 Dollars)

	All Active Corporations	Finance	All Non-Financial	Agricul.	Mining	Construct.	Manufact.	Utilit.	Trade	Services
Wages	602.99	39.79	563.19	7.60	8.85	45.97	211.24	57.08	127.23	105.23
Officers Compensation	53.04	7.69	45.35	0.78	0.41	4.67	10.77	1.99	15.22	11.47
Repairs	22.35	1.22	21.13	0.44	0.42	0.73	14.99	.49	2.90	1.16
Rent	37.74	3.77	33.97	0.47	0.26	0.86	10.35	5.52	12.08	4.43
Taxes	74.71	8.31	66.39	0.51	0.95	2.82	32.42	12.99	12.78	3.89
Interest	132.95	82.04	50.91	0.73	0.79	1.88	21.85	12.90	9.53	3.22
Advertising	26.64	2.24	22.40	0.07	0.03	0.29	11.65	0.80	8.04	1.50
Pensions	23.03	2.08	20.96	0.08	0.21	0.75	11.99	3.42	2.56	1.93
Benefits	13.53	0.77	12.76	0.03	0.14	0.49	8.45	1.62	1.49	0.55
Total	984.98	147.92	837.07	10.71	12.07	58.46	333.71	96.80	191.82	133.36
Total per Week	18.94	2.85	16.10	0.21	0.23	1.12	6.42	1.86	3.69	2.57
Potential Credit Need per Week* (Non-Financial Business)			10.73	0.14	0.15	0.75	4.28	1.24	2.46	1.71
Accounts Receivable	998.35	646.19	352.36	1.96	11.08	21.05	194.96	24.84	84.78	13.62
Potential Credit Needs for 4 Weeks			42.92	0.56	0.60	3.00	17.12	4.96	9.84	6.84

Sources: (a) Financial data taken from Internal Revenue Service, Corporation Income Tax Returns--1974, Table 2, pp. 20-23 except as noted below.
(b) Wages from The National Income and Product Accounts of the United States, 1929-1974 Statement Tables.

* Estimated as two-thirds of the continuing expenses, reflecting a reduction of economic activity to one-third of normal. Converting to 1976 dollars would increase these figures by 15%.

Security analysts customarily rate the liquidity and solvency of individual firms by constructing (from balance sheet data) a variety of ratios including the following:

(a) Current Ratio. This is by definition the ratio of current assets to current liabilities. The mean value varies with industry but is ideally about 2.

(b) Quick Ratio. This is a variant of the current ratio, with the current liabilities, which form the denominator, defined exactly the same as in (a) but with the numerator restricted to those current assets that are readily liquidated (i.e., excluding inventories). The ideal value for the quick ratio is about 1 because inventories tend to constitute about one-half of the current assets.

(c) Cash/Current Liabilities. This is a yet more stringent version of the current ratio, with the full current liabilities in the denominator but with the numerator restricted to cash on hand, bank deposits, or other demand or time deposits held by financial institutions, and U.S. Government or other short-term securities. This ratio is generally in the range from 0.12 to 0.5 and ideally 0.5.

(d) Equity/Debt. Here equity includes stock value plus retained earnings. Debt includes all debt (that is both short-term and long-term debt) but sometimes excludes installment debt.

(e) Current Liabilities/Total Debt. Using total (long plus short term) debt as a denominator against current liabilities as a numerator gives a measure of debt maturity structure and indicates the firm's reliance on short-term financing. This is relevant to its liquidity position.

(f) Debt/Total Assets. The portion of total assets of a firm represented by debt reflects financial leverage and riskiness to a potential lender.

Table II-13 presents equity/debt, cash/current liabilities, and current assets/current liabilities ratios for the manufacturing and trade sectors. Table II-14 presents quick ratios for non-financial corporations in 1974.

Examining the liquidity and solvency of corporations by CR induced changes in these various ratios provides some insights regarding the impact of CR on marginal companies, and also provides a basis for an estimate of the potential demand for credit likely to be generated by an interruption of full productive economic activity. As indicated above, the impact increases with the length and severity of the interruption. A period equivalent to four weeks of interruption has been taken as a basis for analysis, covering two weeks of CR

Table II-13

LIQUIDITY RATIOS IN MANUFACTURING AND TRADE CORPORATIONS -- 1975-78

Industry	Equity/Debt Ratio [1]					Cash/Current Liabilities Ratio [2]					Current Assets/Current Liabilities Ratio				
				1978					1978					1978	
	1975	1976	1977	1st Qtr.	2nd Qtr.	1975	1976	1977	1st Qtr.	2nd Qtr.	1975	1976	1977	1st Qtr.	2nd Qtr.
All Manufacturing Corporations	2.44	2.60	2.62	2.54	2.56	0.27	0.32	0.30	0.27	0.26	2.02	2.02	1.99	1.91	1.91
Nondurable Manufacturing Corporations	2.56	2.59	2.55	2.48	2.49	0.32	0.35	0.30	0.28	0.26	2.02	2.04	2.00	1.94	1.94
Food and Kindred Products	1.82	2.03	2.07	1.96	1.98	0.24	0.25	0.24	0.21	0.22	1.83	1.91	1.90	1.84	1.85
Tobacco Manufactures	1.54	1.46	1.60	1.72	1.73	0.12	0.10	0.19	0.13	0.19	2.47	2.48	2.94	2.46	2.40
Textile Mill Products	2.04	2.16	2.16	2.10	2.16	0.23	0.21	0.19	0.22	0.24	2.30	2.25	2.22	2.28	2.33
Paper and Allied Products	1.87	2.05	2.00	2.01	2.00	0.32	0.37	0.33	0.30	0.28	2.06	2.15	2.20	2.16	2.10
Printing and Publishing	3.01	3.18	2.90	3.07	2.96	0.45	0.54	0.50	0.48	0.44	2.13	2.21	2.08	2.06	2.06
Chemicals and Allied Products	2.39	2.37	2.32	2.24	2.23	0.32	0.38	0.29	0.26	0.25	2.31	2.36	2.26	2.17	2.20
Industrial chemicals and synthetics [3]	2.04	2.02	2.00	1.93	1.91	0.28	0.30	0.22	0.20	0.21	2.24	2.32	2.26	2.18	2.21
Drugs [3]	3.42	3.33	3.28	3.44	3.24	0.36	0.42	0.28	0.25	0.23	2.57	2.44	2.13	2.08	2.10
Petroleum and Coal Products	4.56	3.88	3.73	3.58	3.64	0.49	0.48	0.38	0.35	0.30	1.74	1.65	1.61	1.54	1.52
Rubber and Miscellaneous Plastics Products	1.90	2.11	2.02	1.87	1.95	0.20	0.26	0.23	0.19	0.21	2.13	2.22	2.06	1.99	2.00
Other Nondurable Manufacturing Corporations	2.08	2.31	2.40	2.47	2.24	0.22	0.22	0.22	0.23	0.18	2.20	2.18	2.24	2.26	2.17
Durable Manufacturing Corporations	2.34	2.61	2.68	2.61	2.64	0.23	0.30	0.29	0.26	0.26	2.02	2.01	1.97	1.89	1.89
Stone, Clay and Glass Products	2.22	2.26	2.43	2.33	2.38	0.30	0.40	0.36	0.32	0.32	2.16	2.23	2.20	2.19	2.15
Primary Metal Industries	2.26	2.08	1.88	1.81	1.81	0.33	0.27	0.23	0.25	0.26	2.12	2.14	2.03	1.98	1.96
Iron and steel [3]	2.54	2.33	2.02	1.90	1.95	0.37	0.31	0.27	0.29	0.31	2.05	2.10	2.01	1.94	1.90
Nonferrous metals [3]	1.92	1.74	1.66	1.66	1.61	0.26	0.20	0.15	0.17	0.15	2.27	2.21	2.06	2.05	2.08
Fabricated Metal Products	2.15	2.54	2.46	2.32	2.28	0.23	0.32	0.29	0.25	0.23	2.05	2.11	2.05	1.96	1.95
Machinery, except Electrical	2.56	2.93	3.00	2.79	2.85	0.32	0.41	0.36	0.29	0.26	2.21	2.30	2.20	2.06	2.06
Electrical and Electronic Equipment	2.24	2.72	3.00	2.97	2.99	0.18	0.23	0.26	0.25	0.22	2.01	1.88	1.91	1.87	1.86
Transportation Equipment	2.53	3.26	3.70	3.87	4.06	0.12	0.23	0.26	0.24	0.28	1.64	1.63	1.63	1.54	1.55
Motor vehicles and equipment [3]	3.70	5.27	5.78	6.16	6.35	0.17	0.36	0.33	0.28	0.37	1.79	1.80	1.78	1.68	1.71
Aircraft, guided missiles and parts [3]	1.70	2.07	2.60	2.95	3.06	0.06	0.12	0.22	0.26	0.24	1.49	1.49	1.50	1.42	1.41
Instruments and Related Products	3.45	3.64	3.93	3.90	3.99	0.36	0.48	0.49	0.48	0.42	2.64	2.67	2.71	2.67	2.73
Other Durable Manufacturing Corporations	1.62	1.75	1.75	1.66	1.65	0.26	0.27	0.23	0.21	0.20	2.16	2.15	2.05	1.98	1.96
All Retail Trade Corporations	1.57	1.53	1.42	1.41	1.41	0.23	0.22	0.20	0.19	0.12	1.78	1.75	1.71	1.70	1.71
All Wholesale Trade Corporations	1.45	1.50	1.41	1.28	1.29	0.20	0.18	0.16	0.14	0.14	1.62	1.63	1.61	1.59	1.56

[1] Equity includes stock value plus retained earnings. Debt includes all short-term and long-term debt but excludes installment debt, which is included in the Quarterly Financial Report calculation of the ratio.

[2] Total cash refers to cash on hand, bank deposits in financial institutions, and U.S. Government and other short-term securities.

[3] Included in major industry above.

Source: U.S. Industrial Outlook, 1979

Table II-14

QUICK RATIOS FOR NON-FINANCIAL CORPORATIONS--1974
For Selected Asset Size Classes
(Assets in Millions of 1974 Dollars)

Sector and Asset Size	Notes & Accounts Receivable	Cash, Govt. Obligations, Other Current Assets	Total Quick Assets	Notes & Accounts Payable	Other Current Liabilities	Total Current Liabilities	Quick Ratio
Agriculture							
1 to 100,000	56	120	176	183	26	209	.841
5 to 10 million	129	100	230	337	51	388	.592
50 to 100 million	122	94	216	125	97	223	.971
All sizes	1,964	1,824	3,788	4,755	833	5,588	.678
Mining							
1 to 100,000	16	34	50	45	23	68	.735
5 to 10 million	370	342	712	437	169	606	1.175
50 to 100 million	477	318	795	363	182	545	1.460
All sizes	11,060	4,632	15,692	5,690	9,624	15,314	1.025
Construction							
1 to 100,000	890	706	1,596	1,432	321	1,753	.911
5 to 10 million	1,932	1,356	3,288	2,486	1,082	3,568	.922
50 to 100 million	637	626	1,263	981	381	1,362	.928
All sizes	21,045	13,848	34,893	26,467	8,837	35,304	.988
Manufacturing							
1 to 100,000	821	474	1,295	1,076	371	1,448	.894
5 to 10 million	5,166	2,154	7,320	6,068	1,862	7,930	.923
50 to 100 million	6,798	2,689	9,487	6,165	2,741	8,907	1.065
All sizes	194,964	74,058	269,022	187,955	71,709	259,664	1.036

Table II-14 (concluded)

Sector and Asset Size	Notes & Accounts Receivable	Cash, Govt. Obligations, Other Current Assets	Total Quick Assets	Notes & Accounts Payable	Other Current Liabilities	Total Current Liabilities	Quick Ratio
Utilities							
1 to 100,000	247	273	520	487	96	583	.892
5 to 10 million	541	444	985	845	260	1,105	.892
50 to 100 million	762	545	1,307	1,138	525	1,663	.785
All sizes	24,838	21,454	46,292	40,023	23,139	63,162	.733
Trade							
1 to 100,000	1,795	1,989	3,783	3,753	916	4,668	.810
5 to 10 million	5,386	1,798	7,184	7,248	1,363	8,611	.834
50 to 100 million	3,836	1,468	5,304	4,899	1,180	6,079	.873
All sizes	84,778	31,854	116,632	113,083	24,982	138,064	.845
Services							
1 to 100,000	1,040	1,672	2,712	1,746	698	2,444	1.110
5 to 10 million	727	554	1,282	1,062	337	1,399	.916
50 to 100 million	1,021	587	1,609	1,062	397	1,459	1.102
All sizes	13,617	11,330	24,947	18,928	7,214	26,142	.954

Source: Internal Revenue Service, Corporation Income Tax Returns--1974, Table 6, p. 40-73, U.S. Government Printing Office, Washington, D.C.

maintenance plus a fraction of a week lost in pre-CR activities and a week lost to slow starting over the first several weeks of the CR reconstitution period.

The CR maintenance period in particular will increase current liabilities by wages and fringe benefits either paid or accrued, and by fixed expenses such as rents, interest, taxes, and repairs. Normally, production would either generate cash from sales or cause increases in inventories. With production interrupted or reduced, the various ratios using current liabilities in the denominator (even including the current ratio) would drop because the numerator would be essentially unchanged but the denominator would increase. The normal ratios could be restored or maintained only by borrowing an amount equal to the increase in liabilities. For the assessed four-week equivalent loss of output, about $43 billion in 1974 dollars or $49 billion in 1976 dollars would have been required.

These requirements for funds could be augmented by any slowdown in collections of receivables such as might be expected from a declared or de facto moratorium (inevitable if mails stop and risk-area banks close) or as a domino effect from any increase in business failure ratio. A 1% reduction in collection of receivables would translate into $3.5 billion in additional credit needed by the surviving companies. To these requirements should be added some portion of the total debt to reflect maturities falling in the relocation period.

Table II-15 shows the details of the calculations leading to these estimates. It also shows the quick ratios before CR and those after CR obtained by adding the inescapable fixed expenses for four weeks to the current liabilities. Finally it also shows the quick ratios after subtracting 1% of the accounts receivable from the current assets reflecting slower payments or insolvency. Generally, a delay in collection of 1% of the receivables causes only about 1% reduction in the quick ratio. A delay of 10% could have an appreciable effect, however, of a size approaching the effect of the inescapable fixed expenses. The fixed expenses have the greatest effect on the labor intensive service industries for which the current ratio drops about 20%.

The requirements of individual businesses for funds will depend significantly on whether wages that would have been paid during the crisis relocation

Table II-15

CALCULATION DETAILS FOR CREDIT REQUIREMENTS AND QUICK RATIOS OF NON-FINANCIAL BUSINESS
(Billions of Dollars)

	All Active Corporations	Finance	All Non-Financial	Agricul.	Mining	Construct.	Manufact.	Utilit.	Trade	Services
Total Continuing Expenses	$948.98	$147.92	$837.07	$10.71	$12.07	$58.46	$333.71	$96.80	$191.82	$133.36
Total per Week	18.94	2.85	16.10	0.21	0.23	1.12	6.42	1.86	3.69	2.57
Potential Credit Needs per Week, Non-Financial Corporation			10.73	0.14	0.15	0.75	4.28	1.24	2.46	1.71
Accounts Receivable	998.35	646.19	352.36	1.96	11.08	21.05	194.96	24.84	84.78	13.62
Potential Credit Needs for Four Weeks, Non-Financial Corporation			42.92	0.56	0.60	3.00	17.12	4.96	9.84	6.84
1% of Accounts Receivable			3.52	0.02	0.11	0.21	1.95	0.25	0.85	0.14
5% of Accounts Receivable			17.62	0.10	0.55	1.05	9.75	1.24	4.24	0.68
10% of Accounts Receivable			35.24	0.20	1.11	2.11	19.50	2.48	8.48	1.36
Quick Assets			511.45	3.79	15.69	34.89	269.02	46.29	116.63	24.95
Current Liabilities			543.42	5.59	15.31	35.30	259.66	63.16	138.07	26.14
Quick Ratios:										
Before CR			0.94	0.68	1.02	0.99	1.04	0.73	0.84	0.95
After CR			0.87	0.62	0.99	0.91	0.97	0.68	0.79	0.76
After CR Plus Delay of 1%			0.87	0.61	0.98	0.91	0.96	0.68	0.78	0.75
After CR Plus Delay of 10%			0.82	0.60	0.92	0.86	0.91	0.66	0.75	0.73

Source: Table II-12.

were paid by the employer either during the pre-crisis period (as advances) or soon after the return to risk areas. These wages are a cost of crisis relocation, whether lost to the worker, paid by the employer, or partially covered by unemployment insurance or other transfer payments from government. The estimates of total costs per week as given here have included such wages. The estimates of potential requirements for funds by business have also included such wages under the assumption that business might incur them even though no product or revenue was obtained.

If this assumption is correct and a major portion of the wage impact is borne by business, the solvency problems of many businesses would be most severe. If a major portion of the wages in question were lost by the employees, the result would be a reduction in personal and disposable income and thus in personal consumption expenditures. If the major portion of this loss is borne by government either by transfer payments or by guarantees of loans to businesses or individuals, the result would be either an immediate or a partially deferred increment to government transfer payments and thus to the budget deficit. Unless underwritten by government and considered as an increment to government requirements for funds, the wage impact is unlikely to contribute to effective demand for funds from financial institutions. Requirements for funds by individuals or marginal businesses are unlikely to be met by financial institutions applying standards of credit worthiness even more severe than in normal economic conditions. Without government guarantees, such financial needs will not contribute to the effective demand for funds from financial institutions.

As will be seen, although certain TEMCRIS projections of direct and induced impacts seem surprising, they are not internally inconsistent. These impacts are: (1) a fall in effective demand for credit (i.e., demand from highly qualified borrowers), (2) a price deflation associated with the post-CR recession, and (3) a drop in interest rates because of a reduction in effective demand for investment funds and other credit. TEMCRIS results, however, were not based on any explicit assumptions concerning the financial requirements generated by the wage impact. A detailed analysis of such requirements would entail specification of business and government policies -- a task beyond the scope of this report.

Government transfer payments to persons are included in TEMCRIS, and projected changes include allowances for both emergency costs and a wage loss impact. The portion of the wage impact falling on the individual worker is reflected by the increase in Labor Force Time Lost (LFTL).

6. Conclusions

The results of a review of the financial status of business indicate the following:

- Business in most sectors could suspend operations for a period of two to three weeks without incurring critical liquidity or solvency problems. For longer periods, the financial problems would rapidly increase. The most vulnerable sectors appear to be food processors, small contractors, and certain trade sectors, notably food retailers and wholesalers, and auto dealers and service stations.

- Potential cash requirements over and above normal operating capital for risk-area business are estimated to be about $50 to $60 billion for a four-week suspension of operations (e.g., one week pre-CR, two weeks CR maintenance, and one week post-CR). This estimate includes business fixed costs and labor costs, and would depend on the ability of firms to qualify for loans, or on government guarantees of business loans.

- Only the durable goods sector, construction activities, and other investment sectors are likely to be in a position to recoup CR sales losses by expanding activity after the end of the crisis. A poor investment climate may delay even these benefits for several quarters.

- While business on the average is capable of weathering crisis relocation, many marginal businesses (both large and small) would experience liquidity and solvency problems within a period of two weeks' suspension of operations. Many such firms would be put in an underfinanced position which would affect their credit worthiness. Any major increase in bankruptcies would be a significant additional factor delaying economic recovery.

III. ECONOMIC IMPACT OF CR RECONSTITUTION ON FINANCIAL INSTITUTIONS

The problems confronting financial institutions in the CR reconstitution period will be partly a continuation of the earlier problems, and partly a series of new problems arising out of the nature and needs of reconstitution. In order to achieve perspective over all these problems, it is necessary to understand the operations of financial institutions in the normal environment, and then to determine how and to what extent the normal operations will be changed by the crisis relocation environment. When the magnitude of CR effects has been determined, solutions and guidelines can be proposed for coping with these effects, so as to minimize the economic impact and restore economic functioning in the most efficient manner.

Accordingly, this discussion begins with a description of normal financial operations, highlighting those operations that are sensitive to CR impacts. Subsequently, a detailed treatment of the problems imposed by crisis relocation is presented, with primary emphasis on CR reconstitution problems. Finally, a section on government policies indicates the nature and extent of government intervention necessary to alleviate the problems.

A. Normal Financial Operations vs Crisis Operations

Financial institutions, like other business firms, must efficiently manage assets and liabilities so as to achieve reasonable profits consistent with governmental regulations and changing circumstances. All financial and business firms face common problems: the future values of assets and liabilities are not known with certainty; moreover, making changes in the structure of assets and liabilities is not without cost. Management of assets and liabilities within financial institutions is guided by broadly based objectives. Consistent with regulations, these objectives are:

- Maximize earnings for stockholders.
- Provide adequate liquid assets and cash.
- Maintain a reserve for contingencies.
- Manage activities prudently so that the funds of others are safeguarded.
- Meet the community's need for funds.[1*]

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* Superscripts designate references listed at the end of this chapter.

Not all of these objectives can be met simultaneously; a balance among them must be achieved. Achieving a balance, however, becomes a more difficult task during and after a CR-crisis period, especially because of the uncertain impact that crisis relocation is likely to have on the assets and liabilities of financial institutions, and their ability to play a role as primary lending agencies.

Although many of the issues developed here are shared by all financial institutions, emphasis is placed on commercial banks and savings and loan associations. Initially, the discussion focuses on the commercial banking system, followed by a discussion of savings and loan associations.

B. Normal Operations of Commercial Banks

1. Operational Management

One traditional measure of the extent to which banks commit funds to loans rather than to investments is the ratio of loans to deposits. Over the recent past, large banks have consistently maintained a higher loan-deposit ratio than smaller or medium size banks. Several reasons explain the differences: (1) the portfolios of larger banks contain loans to, and deposits of, a number of diversified large industries, while the portfolios of smaller banks are primarily limited to activities with smaller industries and individuals; (2) the resultant characteristics of assets and liabilities in smaller banks lead to greater volatility, to a greater need for liquidity (conversion of assets to cash), and to lower loan-deposit ratios; and (3) larger banks have greater access to the various elements of the money market* and can more easily "buy" money should deposits decline.[2] Moreover the loan-deposit ratios vary widely over the range of size classes of banks.

Commercial banks are able to rearrange their assets relatively easily over time. When loan demands are high, government securities are reduced; weak loan demands are accompanied by an increase in government securities. Generally, the loan-deposit ratio was reduced during postwar recessions, but resumed its upward trend after each recession ended. Also, because of a greater degree of uncertainty in liquidity needs over time, banks have been placing increased emphasis on shorter-term government securities as a tool for asset management. The larger fraction of short-term government securities

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* "Money market" and other terms used herein are defined in a glossary (Appendix A) at the end of this report.

allows banks to have a source for cash should demand for loans increase, and to earn interest on short-term securities should demand for loans slacken. Bank earnings, however, are heavily dependent on interest rate spreads. Fluctuation in these rates, especially short-term rates, affect the profitability of banks; severe fluctuations may also affect the solvency of some individual banks.

Since crisis relocation entails moving large populations as well as many activities from risk areas to host areas, large fluctuations may occur -- loan demands in the risk area will decrease while demands in the host areas will increase, notably affecting smaller banks in those areas.

a. Liquidity Needs for Loans and Deposits. To meet unanticipated change in the level of loans and deposits, banks must be in a position to secure cash quickly without excessive cost. Bank liquidity needs are considered sufficient if the level of liquidity covers loan and deposit fluctuations. The extent of fluctuations in loans and deposits depends on nationwide economic trends, on government policies, on the local economic environment, and on individual and business expectations. Conventionally, banks plan their liquidity needs by projecting deposits and loans over a planning period (generally 12 months). One approach in determining liquidity needs for deposits is to project net deposits (excluding negotiable certificates of deposit) and determine a deposit floor (the probable lowest level of deposits). *The deposit liquidity need at any time is defined as the difference between the deposit floor and net deposits (after adjusting for reserve requirements).[3]

A similar approach is used to determine loan liquidity. Non-market money loans are projected over the planning period, and a loan ceiling (the probable highest level of loans) is established. The loan liquidity need at any time is defined as the difference between the loan ceiling and projected loan volume.[3] Liquidity need for loans and deposits is the sum of the deposit liquidity need and the loan liquidity need. A CR situation would cause unanticipated fluctuations in the level of loans or deposits that could greatly change estimates of liquidity needs. Thus, the conventional approach

*Econometric studies (e.g., Barth and Bennett's paper listed in Appendix E) have shown that cash availability is strongly influenced by actual demand deposit variation, but bank planning guides do not systematically take this relationship into account.

to liquidity needs, while adequate in the normal environment, does not appear to be adequate for the magnitude of the potential problems likely to arise from CR situations. (Observations on alternative approaches will be discussed later.)

b. Asset Management to Meet Liquidity Needs. One of the two methods available to meet liquidity needs is asset management (the other is liabilities management, to be discussed subsequently). Contrary to common belief, cash in vaults, deposits at the Federal Reserve and with correspondent banks, and cash items (e.g., checks) in the process of collection are not major sources of liquidity because these funds are kept at minimal levels. Generally, money market assets are the instruments available to meet liquidity needs -- e.g., short-term U.S. Government and Federal agency issues; other U.S. Government and agency securities with a near-term maturity date; Public Housing Authority notes; Federal funds sales; loans to others under repurchase agreements; bankers' acceptances; commercial paper; finance company short-term obligations; and dealer and broker loans.* One approach is to project money market assets over the planning period and superimpose the liquidity need for loans and deposits (as previously discussed). The difference between money market assets and the liquidity needs for loans and deposits represents net liquidity surplus (or deficit) for loans and deposits.[4]

Another important source of liquidity is gross loan repayment. The argument against more widespread use of this source appears to be the alleged complexity in tabulating loan maturities, estimating the volume of rollovers, estimating the volume of new loans, and combining these results to obtain an estimate of the gross extensions of new loans.[5] While this approach may appear to be cumbersome, especially for smaller banks, situations such as crisis relocation are severe enough to warrant the banks' careful attention to loan repayment as a source of liquidity.

c. Liability Management to Meet Liquidity Needs. In situations such as crisis relocation, liability management -- ability to get cash quickly through borrowing -- to meet liquidity needs may be severely limited because of disruptions in the financial markets. Additional funds can be raised by issuing certificates of deposit (CD). However, it is uncertain whether individuals or businesses would be willing to acquire high-volume, high-valued CDs during the initial phase of CR reconstitution. Whatever the level

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* See Glossary, Appendix A.

of cash inflow, a substantial proportion of these proceeds may have to be earmarked for repayment of matured CDs. Money market deposits and liabilities, other than CDs already discussed, include the sale of commercial paper that is held; Eurodollars; Federal funds purchased; and Federal Reserve borrowings. These sources of funds in turn induce a further liquidity need as follows: A projection of these deposits and liabilities is made over the planning period. A floor is set representing the level expected to be retained in tight money markets. The difference between the estimated money market deposits/liabilities and the floor represents an additional requirement for liquidity.[3] Normally, the liquidity need for deposits plus the liquidity need for loans plus the liquidity need for money market deposits and liabilities relative to total money market assets is a dependable indicator of the economic health of a bank. A deliberate policy of incurring money market liabilities in the aftermath of crisis relocation is discussed subsequently.

d. Coordinating Asset and Liability Management. The issue of whether to sell short-term assets or to purchase liabilities to meet liquidity needs depends on the interest rate structure existing at a particular point in time. Although rates in short-term assets and liabilities move closely together, there are advantages to each of the approaches. This advantage is reflected in the opportunity cost foregone and depends on the rate differential and capital gains. Typically, the need for liquidity is dependent upon the business cycle. Banks' profitability partly depends on their success in correctly anticipating changes over the business cycle in the yield curve; this curve establishes the relation between short- and long-term interest rates.

Crisis relocation would cause a downturn in the economy. Unlike a conventional economic downturn, however, during which a bank has more time to rebuild liquidity, shorten asset maturities, keep liability maturities short, and reduce the volume of liabilities, the events arising from crisis relocation are apt to move swiftly. Likewise, the aftermath of relocation requires speedy actions and responses by banks, in order to enhance recovery. The situation facing banks is significantly changed from the normal situation, and the timing of events and actions is compressed. In addition, the problem of speedy action may be made more difficult by the aftermath because the banks

may be acting under the pressure of changing government requirements, which may impose a new element for decision-making.

2. Financial Position of Banks

To support an efficient expansion of the U.S. economy, a continued inflow of deposits is essential. Events such as crisis relocation, which disrupt such inflows, will have a notable impact on the state of the economy. The financial position of banks in the normal environment provides a basis for analyzing the impact of a CR crisis and CR reconstitution on these institutions.

Table III-1 summarizes the assets, liabilities, and indicators of performance for all insured commercial banks by asset size. As seen in the table, all 14,412 banks have total assets amounting to $1,339.2 billion. Smaller banks with asset size under $25 million (60% of the total number of banks) have 8% of the total assets. Larger banks with asset size over $300 million (3% of the total number of banks) have 67% of the total assets. Smaller banks account for 11% of deposits -- demand and time deposits* -- held by individuals, partnerships, and corporations (IPC), while the large banks account for 56% of all deposits by IPC. Based on information for year-end 1975, individuals held 57% of the demand deposits and 77% of the time deposits, whereas business held 23% of the demand deposits and only 5% of the time deposits. (These figures do not include holdings of large certificates of deposit.)

Indicators of bank performance show notable differences with asset size of banks. While the percentage of U.S. Treasury securities to total securities averages nearly 40% for all banks, this percentage is 56% for smaller banks. Banks commonly use Treasury securities as collateral in obtaining loans from Federal Reserve banks. If collateral requirements remain unchanged, the smaller banks would be in a better position than the larger banks, in a crisis relocation situation. Emergency planning by the Federal Reserve System[6] would allow relaxation of collateral requirements, which would help to alleviate the situation.

The other indicators in Table III-1 would also generally tend to work against larger banks in a CR situation, particularly the larger banks in the

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*"Time" deposits are also called "time and savings" deposits, as in the TEMCRIS model (Chapter IV).

Table III-1

ASSETS, LIABILITIES, AND INDICATORS OF PERFORMANCE FOR INSURED COMMERCIAL BANKS
(December 31, 1977)

	Commercial Banks with Total Assets (Millions of Dollars)						
	All Banks	Under 5	5 to 10	10.0 to 25	25 to 100	100 to 300	300 or more
Number of Banks	14,412	1,197	2,593	4,911	4,464	822	425
Total Assets							
Cash & Due from Banks	$ 242,988	$ 468	$ 1,893	$ 7,702	$ 20,145	$ 14,956	$ 197,823
U.S. Treasury Securities	95,953	654	2,534	9,099	21,009	13,380	49,277
Govt. Oblig. & Other Securities	168,474	528	2,957	14,511	38,920	23,883	87,674
Fed. Funds Sold & Sec. Purchased	49,840	339	1,147	3,992	7,818	5,197	31,348
Loans, Net	715,800	2,111	10,222	43,517	111,334	69,638	478,979
Other Assets	66,183	118	507	2,204	6,888	4,874	51,594
Total	1,339,237*	4,217	19,258	81,025	206,113**	131,928	896,696
Total Liabilities							
Demand Deposits, IPC	287,304	1,322	5,324	21,671	54,600	34,472	169,915
Time & Savings Deposits, IPC	473,303	1,895	9,863	42,977	108,350	64,716	245,501
Other Deposits	165,121	473	2,126	8,717	21,120	17,137	114,150
Deposits Foreign Offices	190,758	0	0	0	0	68	190,690
Fed. Funds Purch. & Sec. Sold	83,315	9	62	322	2,032	3,915	76,974
Other Borrowed Money	14,195	4	11	98	332	352	13,399
Other Liab. & Notes & Debts	45,950	19	104	662	2,732	2,149	40,283
Equity Capital	79,291	496	1,768	6,577	15,547	9,119	45,783
Total	1,339,237*	4,217	19,258	81,025	206,113**	131,928	896,696
Indicators of Bank Performance (%)							
Security Mix							
U.S. Treasury Sec./Total Sec.	39.9%	56.0%	46.4%	38.3%	34.7%	34.8%	36.2%
Loan Mix							
Real Estate Loans/Total Loans	33.5	24.0	29.5	34.1	37.3	37.2	29.7
Com'l & Indiv. Loans/Total Loans	19.7	15.3	16.0	18.1	22.0	28.1	32.7
Loans to Indiv./Total Loans	28.6	26.9	26.7	28.5	30.6	28.5	25.4
Asset & Liability Ratios							
Investment Sec./Total Deposits	23.7	32.0	31.7	32.2	32.6	32.0	19.0
Net Loans/Total Deposits	59.4	56.4	59.0	59.4	59.9	59.9	62.6
Ownership of Deposits							
IPC/Total Deposits	87.4	86.6	87.7	88.1	88.0	85.4	78.6
Governments/Total Deposits	10.7	11.7	11.0	10.5	10.4	10.9	10.3
Capital							
Equity Capital/Total Deposits	9.0	10.7	9.8	9.0	8.4	7.9	7.6
Earnings							
Operating Expense/Operating Income	85.1	86.7	85.7	84.6	84.3	86.4	87.8
Interest, Fees on Loans/Income	65.3	60.7	63.3	64.7	65.8	64.8	65.4
Interest Paid/Operating Expense	56.6	44.9	49.7	52.5	53.4	52.0	58.7
Operating Income/Total Deposits	8.5	8.4	8.5	8.5	8.5	8.5	8.7

Source: Report of Condition, December 31, 1977, Report of Income, Calendar Year 1977, Federal Reserve Board.

* Results may not add because of rounding.

** An apparent error in the Federal Reserve computer printouts, because assets and liabilities in this column do not agree.

risk areas, where the heaviest demands might be placed on them, especially in the pre-CR crisis situation. For example, the percentage of real estate loans averages 33.5% for all banks, increasing as the asset size of banks becomes larger, except for the largest banks. Also, in the loan portfolios of all banks, commercial and industrial loans account normally for 25% of all loans. For the smallest banks, such loans account for 15%, steadily increasing with increase in asset size of banks until it is more than doubled -- 33% -- for the largest banks. Loans to individuals show less variation. For all banks, loans to individuals amount to 29% of total loans, with a maximum of 5 percentage points difference as asset size of banks varies. In the CR situation, particularly in the CR reconstitution period, a key factor concerning the banks' financial position would be the extent to which the various lendees would either default on the loans or delay scheduled payments.

The two asset and liability ratios in Table III-1 also indicate notable variations as the asset size of banks increases. The proportion of investment securities to total deposits averages 24% for all banks. All banks except the largest have essentially the same proportion -- 32% -- whereas the largest have a notably lower figure: 19%. The Net Loans/Total Deposits indicator averages 59% for all banks, ranging from 56% for the smallest banks to 63% for the largest banks. Depending on the gross loan repayment, this indicator also reflects the extent of asset management for liquidity needs. Again, these indicators would work against large banks in a CR situation, although small banks would also face significant post-CR problems because of their depositors' needs and circumstances.

As seen in Table III-1, the total deposits of individuals, partnerships, and corporations (IPC) account for 87% of all deposits. Differences among banks with varying asset sizes are relatively minimal, except for the largest banks. Since such banks account for nearly all the Eurodollars held by the banking system, any crisis would likely find them more sensitive to deposit withdrawals than the other banks.

Federal, state, and local government's share of all deposits is 11%, and the variations by bank size are minimal. However, there are variations by type of government; small banks, especially those in host areas, hold more deposits from individuals and small business than from government. These

factors would again indicate the extent of financial position in a crisis situation, since the critical determinant is the fraction of deposits subject to sudden withdrawal and hence, the creation of an unstable situation.

When examining the various capital and earnings indicators, no notable differences are apparent among banks by asset size. Generally, equity capital accounts for 9% of total deposits. Operating expenses total 85% of operating income. Interest and fees on loans represent 65% of operating income, whereas interest paid amounts to 57% of operating expenses. Operating income with respect to total deposits amounts to 8.5%. Thus, even temporary stoppage of the items of operating income in a crisis situation would greatly affect the liquidity of banks.

The information in Table III-1 has provided the basis for this general discussion of the ability of commercial banks to meet their liquidity needs in crisis situations. Additional available information for a selected number of larger banks is presented below.

3. Liquidity Position of Selected Banks

Table III-2 summarizes eight indicators of liquidity for 423 large asset-size banks. Marked variations exist depending on asset size of the banks. For all reporting banks, loans maturing within one year account for 56% of total loans exclusive of loans to individuals and real estate loans. The smaller reporting banks (i.e., $100 to $300 million in assets) have 68% of their loans maturing within one year, whereas the largest banks show 55% maturing within this period. For all reporting banks, loans to financial institutions and other similar loans account for 22.5% of the loans maturing within one year. Commercial and industrial loans maturing within one year account for 40% of all loans maturing within one year. Except for the largest asset-size banks, the percentage of short-maturity commercial and industrial loans is above the average for all reporting banks.

For all large reporting banks, investment securities maturing within one year represent 22% of the total investment securities. This indicator is 25% for the largest banks and 21% for the other banks. U.S. Treasury securities maturing within one year account for 47% of all investment securities maturing within one year. Generally, the smaller of the large reporting banks have a higher value for this indicator. During a crisis, these Treasury securities

Table III-2

INDICATORS OF LIQUIDITY FOR SELECTED BANKS

(June 30, 1978)

	Large Banks Reporting with Total Assets (millions of dollars)					
	All Banks	$100 to 300	$300 to 500	$500 to 1,000	$1,000 to 5,000	Over $5,000
Number of Banks	423	5	144	127	122	23
Indicators of Liquidity						
ST* Loans/Total Loans Excl. Indiv. & Real Estate	56.4%	67.9%	58.7%	60.9%	60.0%	54.8%
ST Loans to Financial Inst. & Others/All ST Loans	22.5	30.7	19.9	21.0	26.0	21.6
ST Loans to Com'l & Indus. Firms/All ST Loans	40.2	51.0	63.5	61.7	56.1	30.1
ST Investment Securities/Total Investment Sec.	22.4	20.9	21.6	21.2	20.3	25.2
ST U.S. Treasury Securities/ST Investment Sec.	47.4	55.7	51.5	46.1	53.6	41.8
ST U.S. Treasury Sec./Total Deposits IPC less CDs	3.2	4.1	4.0	3.5	3.5	2.6
ST Indus., Com'l, & Instit. Loans/Total Dep. IPC less CDs	23.2	28.9	17.8	19.9	22.8	25.8
Money Market Deposits & Liabilities/Total Deposits IPC	42.9	42.0	23.6	29.7	38.3	53.7

Source: Domestic Report of Condition Size Class by Consolidated Assets, Internal Computer Runs, Board of Governors, Federal Reserve System.

* ST = Short term, maturing within 1 year.

would be the first source of collateral to obtain loans from the Federal Reserve banks and thus increase liquidity. Under some planning assumptions of the Federal Reserve, any obligations of the United States could be used as collateral for loans. Indeed, under extreme emergency, the Federal Reserve at its option could advance funds on any bank assets or even without collateral.[6]

The last three indicators in Table III-2 most accurately reflect the liquidity position of the selected large banks. U.S. Treasury securities maturing within one year amount to 3% of total IPC deposits excluding CDs. The smallest percentage, 2.6%, is for the largest banks, and the largest percentage, 4.1% is for the smallest banks. Individual, commercial, and institutional loans maturing within one year represent 23% of total IPC deposits less CDs, for all reporting banks, but range from 18% (asset size between $300 and $500 million) to 29% (asset size between $100 and $300 million).

Money market deposit and liabilities -- an indicator of the ability to obtain cash through borrowing -- account for 43% of total IPC deposits. Notable variations occur among the banks reporting. The largest asset-size banks account for 54% whereas banks with asset size between $300 and $500 million have the lowest value, 24%. However, regardless of size bank, funds from money market sources may be greatly reduced in the early post-CR reconstitution period. The likely consequences of CR crisis and CR reconstitution to commercial banks are discussed subsequently.

C. Normal Operations of Savings and Loan Associations

1. Operational Management

In a crisis situation, the normal operations of savings and loan associations (S&Ls) will be affected in ways similar to those affecting commercial banks, but there will be differences because of the more restricted financial scope of S&Ls. The nature of the federal intervention required will also be different -- for example, the Federal Home Loan Bank System and the Federal National Mortgage Association will assume important roles in assisting the S&Ls to remain viable during and after the crisis.*

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* The Federal Home Loan Bank System makes loans to member institutions, mainly S&Ls, to enable them in turn to make mortgage loans or meet deposit withdrawals. In 1966 the Federal Home Loan Bank Board saved one of the largest S&Ls from collapse (reference 7).

Federal National Mortgage Association (Fanny Mae) is a government-sponsored private corporation (1968 Housing and Urban Development Act) which provides a secondary market in real estate mortgages (reference 7).

Unlike commercial banks where loans account for 53% of total assets, mortgage loans and contracts in S&Ls account for 85% of total assets -- a share that has remained relatively constant over the last decade (varying between 83% and 85%). A traditional measure -- the ratio of mortgage loans to savings deposits -- has also remained high over the recent past (almost 99% at year-end 1977), with larger S&Ls maintaining a higher ratio than smaller ones. As an indication of crisis perspective, the larger S&Ls are generally in risk areas, and the smaller, in host areas.

Savings and loan associations are not in a position to rearrange their asset structure easily. High demands for mortgage loans have generally been accompanied by high inflow of savings. When the cost of borrowed mortgage monies has been high, the demand for mortgage loans has slackened and investments in government securities have increased. On the basis of experience over the last decade, however, these shifts have not been notably large. It appears likely that a crisis relocation situation will see a significant reduction in mortgage demand and a notable increase beginning with CR reconstitution.

Like commercial banks, S&Ls are concerned with the liquidity needs for mortgage loans and savings deposits, and the methods for determining such needs are essentially the same as those used by commercial banks. For a variety of reasons (e.g., set maturities for savings accounts, longer maturities for mortgage loans, and special government regulations), significant fluctuations in liquidity needs have not been experienced by S&Ls. However, the post-CR situation might change this position because an increasingly large fraction of savings accounts are in the form of certificates that may be redeemed at any time with an interest penalty. Depositors' needs for funds in the post-CR situation could therefore substantially increase the level of certificates redeemed, increasing the liquidity problems of the S&Ls.

There is a trend toward "homogenizing" banks and S&Ls: the specified functions performed by either institution are increasingly being offered by the other.[8] As this trend continues, the need for systematically managing the liquidity needs of both types of institution will become greater.

a. Asset Management to Meet Liquidity Needs

Asset management to meet liquidity needs can also be used by S&Ls. Unlike the case of banks, money market assets (investments with

short-term maturities) are not available in sufficient amounts for the S&Ls to cover anticipated large reductions in savings deposits. Mortgage loans and contracts repayment are an important source of liquidity for S&Ls, and undoubtedly whatever degree of liquidity-needs management is undertaken by them will be obtained from this source.

b. Liability Management to Meet Liquidity Needs

Liability management to meet liquidity needs is also available to S&Ls. However, in situations such as crisis relocation, the ability to raise cash quickly through borrowing will probably be limited, as it will be for commercial banks, because of the probable disruptions of financial markets during and after crisis relocation.

c. Coordinating Asset and Liability Management

While there is a need to coordinate asset and liability management for liquidity needs, the alternatives available to S&Ls appear to be more constrained than the alternatives available to banks. Hence, crisis relocation and reconstitution may place a greater stress on S&Ls. Even though the events arising from crisis relocation move at a rapid pace, the responsiveness of bank actions appears to exceed that of S&Ls. The magnitude of the impact of crisis relocation on banks and S&Ls, and alternative responses to events, are discussed subsequently.

2. Financial Position of Savings and Loan Associations

The financial position of S&Ls may be more severely threatened by crisis relocation, compared with commercial banks, for the reasons that are now discussed.

Table III-3 summarizes the assets, liabilities, and available indicators of performance for all FSLIC-insured savings and loan associations. The number of associations is 4,065 and they have $447.9 billion in assets. Smaller associations with asset size under $50 million (55% of the total associations) have 11% of the total assets. The largest S&Ls, with assets over $250 million, constitute 8% of all associations but have 52% of the total assets. The smaller S&Ls have 12% of all savings accounts, while the largest have 51%. It is likely that crisis relocation will place a severe burden on

Table III-3

ASSETS, LIABILITIES, AND INDICATORS OF PERFORMANCE FOR FSLIC-INSURED SAVINGS AND LOAN ASSOCIATIONS
(December 31, 1977)

	Savings and Loan Associations with Total Assets (millions of dollars)						
	All S&Ls	Under $10	$10 to 25	$25 to 50	$50 to 100	$100 to 250	Over $250
Number of Associations	4,065	466	847	915	815	686	336
Total Assets							
Cash & Investment Securities	$ 41,268	$ 327	$ 1,506	$ 3,138	$ 5,105	$ 9,535	$ 21,658
Mortgage Loans & Contracts	372,434	2,233	12,045	27,890	48,364	89,712	192,190
Other Loans	10,237	72	336	731	1,253	2,315	5,528
Other Assets	23,933	144	779	1,635	3,008	6,049	12,318
Total	477,872	2,776	14,666	33,394	57,730	107,611	231,694
Total Liabilities							
Savings Accounts	377,302	2,408	12,844	29,003	49,310	91,610	192,127
Borrowed Money	26,977	92	521	1,338	2,866	5,577	16,582
Loans in Process	9,867	44	238	682	1,410	2,523	4,970
Other Liquidity	9,290	34	182	448	935	2,072	5,630
Net Worth	24,426	198	881	1,923	3,209	5,829	12,385
Total	447,872	2,776	14,666	33,394	57,730	107,611	231,694
Indicators of S&L Performance							
Asset & Liability Ratios (%)							
Investment Sec./Savings Accts	7.8%	8.7%	7.8%	7.8%	7.7%	7.7%	8.2%
Mortgage Loans/Savings Accts	98.7	92.7	93.8	96.2	98.1	97.9	100.0
Capital							
Net Worth/Savings Accts & Loans	6.5	8.2	6.9	6.6	6.5	6.4	6.4
Earnings							
Operating Exp./Operating Income	86.7	90.6	88.4	87.7	87.4	87.4	85.9
Operating Income/Savings Accts	9.0	8.4	8.6	8.7	8.8	8.9	9.1
Interest Received/Interest Paid	126.4%	131.4%	127.7%	127.4%	127.7%	126.2%	126.1%

Source: Combined Financial Statements: FSLIC-Insured S&L Associations, 1977, Federal Home Loan Bank Board.

these S&Ls if mortgage loan payments are not forthcoming during CR reconstitution. Also, prior to reconstitution and especially in the earlier phases of the CR situation, there may have been extensive withdrawals from savings accounts.

Unlike the case of commercial banks, investment securities constitute only 7.8% of savings accounts in S&Ls. Variations depending on asset size are minimal. Thus, the S&Ls will not have this type of collateral for borrowing in sufficient amounts to meet liquidity needs, in a crisis situation.

Mortgage loans and contracts relative to savings accounts constitute 99% in S&Ls. This percentage for smaller asset-size S&Ls is 93% and generally increases steadily for larger S&Ls. Net worth accounts for 6.5% of total savings, a figure that steadily decreases with asset size of the S&Ls. Again, these indicators show that in a crisis situation, S&Ls may face greater liquidity problems than banks.

D. Problems Facing Financial Institutions During CR Crisis and CR Reconstitution

Events occurring during a CR crisis would have significant consequences for the CR reconstitution period. A variety of possible scenarios could be postulated for the CR period. Therefore, the range of events described in this section is not meant to be a prediction but rather to provide a basis for identifying the financial problems that warrant the attention of planners.

1. Financial Problems in the Pre-CR Crisis Phase*

The extent and intensity of events preceding the decision to initiate crisis relocation are of the utmost importance in analyzing the impact of the consequences on financial institutions. If the crisis were to escalate over an extended period without relocation, a sizable proportion of the population** might elect to leave areas perceived to be at risk. During this period, the impact on absenteeism, productivity, and deposit withdrawals, and on the securities, commodities, and options markets could probably become severe, adversely affecting many financial institutions.

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* This section, as well as sections D.2 and D.3 which follow, is drawn from material presented in References 9 and 10.

** Current planning estimates go as high as 20% of the risk population.

The length of the pre-CR crisis phase would affect the various economic sectors differently. Individuals and businesses could be using this time to protect their interests (e.g., increase liquidity), possibly with an adverse impact on the financial institutions. If, on the other hand, the pre-CR crisis phase were short, individuals and businesses would probably be less able to take protective actions, and the impact on financial institutions could be reduced (e.g., fewer withdrawals and a better liquidity position).*

Deposit withdrawals by individuals during an extended pre-CR crisis phase could have a significant effect on the condition of banks. Such withdrawals would create additional problems for management. The ability to obtain interbank loans could be curtailed. Open-market purchases of U.S. Treasury securities by the Federal Reserve System could release reserves to member banks. However, the likely drop in security prices, including U.S. Treasury securities, coupled with selling of these securities by all holders, might limit this approach in favor of bank borrowing of required funds from Federal Reserve Banks.

A number of possible actions that the Federal Reserve might take could help relieve the pressure on banks to convert earning assets to preserve liquidity. Current regulations[11] permit the federal government to restrict cash withdrawals, transfers, and credit among other measures immediately after attack on the United States. Other proposed regulations[12] are under consideration that would allow the federal government to restrict cash withdrawals and credit in any major crisis situation.

Earning assets management would become an increasingly difficult task as the amounts withdrawn from deposits increased. As an approximation, each dollar withdrawn is covered by reserves in the amount of 15 cents. If the ratio of required reserves remains unchanged, 85 cents has to be raised through borrowing either from other banks or from the federal government, through loan calls, or through the direct conversion of earning assets. The Federal Reserve System would probably have to intervene to prevent this process from becoming a serious threat to the financial structure of the banking system.

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* Nonetheless, asset prices may adjust instantaneously to perceptions of crisis events consistent with the rationally based expectations of individuals and businesses.

Borrowing from banks would become more difficult as the crisis was prolonged. Delays in the repayment of outstanding loans would be likely. Conversion of earning assets into cash (at depressed prices) would be avoided by banks if possible. Borrowing of federal funds or borrowing at the Federal Reserve discount window would be a preferred action, provided that federal funds were available at an acceptable interest rate and the discount rate was not too high.

Even if adequate liquidity existed, banks would have to give careful attention as to which new loan commitments would be undertaken. Stringent selection criteria would probably be applied.

2. Financial Problems in the CR Initiation Phase

Consequences to financial institutions during this phase would largely be determined by preceding events. A prolonged pre-CR crisis phase could already have had significant consequences to financial institutions, allowing them to make extensive preparation for relocation. If, on the other hand, the crisis period were short, the financial institutions would not have experienced large prior adverse consequences.

After initiation of CR plans, great uncertainties would exist regarding the liquidity position of commercial banks. During this period, risk and non-risk area banks that remain open would find it difficult to carry out even minimum activities such as the cashing of checks and record keeping.

As part of the nuclear war preparedness, banks have been urged to maintain duplicate records in safe locations.[6] Most of the largest banks in risk areas have duplicate records (91% of banks having assets of $1 billion or more), but many smaller banks do not have such records or any emergency plans.

At present, plans call for closing down securities exchange operations only in case of strategic attack. Serious consideration should be given to the desirability of closing down operations of securities, commodities, and options markets for the entire period of the crisis.

3. Financial Problems in the CR Maintenance Phase

Financial activities within the risk area would probably be carried on at a greatly reduced level, whereas essential financial activities within the host area might occur at a greatly increased level. While some check

cashing might be allowed for essential purposes, most banks would have difficulty in validating checks even for their own depositors. Check clearing systems would be extremely limited or totally inoperative during this period.

Maintenance of adequate supplies of currency at banks remaining open would add to the planning problems. Distribution routes and schedules would have to be modified and means for rationing currency outlays would be required.

A basic problem of the banking institutions would be to preserve adequate liquidity against sizable and continued withdrawal of funds over an extended period of crisis. During the CR maintenance phase, inflow of funds into time and savings deposit accounts would likely be greatly reduced. Thus, in the absence of controls, banks in host and risk areas would face a situation in which withdrawals would continue to greatly exceed deposits.

Banks in either the risk area or the host area would face compounding problems in the management of earning assets. Delays in loan repayments would diminish the use of loan repayments as a source of liquidity. Uncertainty in the value of securities held, coupled with the closure of security markets, would preclude orderly conversion of securities into liquid assets.

Relocated Federal Reserve bank offices and their agent banks could continue to perform functions such as check collecting and cash disbursements to the extent possible. Also, the Federal Reserve System would continue to provide loans to operating banks through the discount window. Such loans could be secured by direct U.S. obligations valued at par or any other unencumbered assets. In the event that circumstances made the above procedures infeasible, the Federal Reserve at its option could provide unsecured loans to banks for an interim period.*

Functions performed by financial institutions other than banks would undoubtedly cease or be greatly reduced throughout the CR maintenance phase, with attendant losses and adverse financial impact on the users of such services.

4. Financial Problems in the CR Reconstitution Phase

In the immediate CR reconstitution period, banks would play a vital role as the nation's principal short-term financial intermediary. The [illegible] of most economic activity in the risk areas during the CR crisis

* "Extensions of Credit During a National Emergency," in

period* would disrupt both the production and the payment processes of the economy. Early resumption of production would depend heavily on the expectation that banks would continue their normal role by allowing withdrawals and by granting substantial short-term credit. Denials or even delays in honoring deposits or granting credit certainly would result in reduced output over the short term, and probably substantially worsen expectations over the long term.

a. Problems Facing Banks. As a short-term financial intermediary, banks can adjust their composition of loans and deposits more quickly at less risk of loss than other financial intermediaries. Because of this capacity for adjustment, the bank position during the CR reconstitution period would be heavily influenced by the extent of the disruptions occurring in the CR crisis period; by the policies implemented in both the CR crisis period and the early CR reconstitution period; and by business and consumer expectations during the reconstitution period. Deposit withdrawals, loan underpayments, and disorganization in the short-term capital market that are likely to occur in the CR crisis period might carry over into the CR reconstitution period, creating serious reconstitution problems.

These problems would be made more manageable by implementation of Federal Reserve and Treasury policies during the CR crisis to discourage demand deposit withdrawal and to improve liquidity. Such policies could be helpful in convincing the public that the government would assist banks in maintaining adequate liquidity.

These actions would be important for all banks but more so for the larger banks. Banks with large holdings of certificates of deposit and Eurodollar deposits would be particularly affected. The impact on Eurodollar deposits would be highly scenario-dependent -- that is, dependent on investors' perceptions of the relative safety of European versus American banks. U.S. banks heavily invested in bank acceptances (letters of credit)** would also be affected as shipping slowed, and with it, product delivery from overseas. In the domestic credit market, banks holding commercial paper as a close substitute to government bills would probably be relatively worse off, as

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* The "CR crisis period" comprises both the CR initiation phase and the CR maintenance phase.

** See Glossary; Appendix A.

some business payments would diminish. Payments and notes coming due during the CR maintenance period could be further delayed, causing severe strains on the credit markets, and on banks.

These CR crisis problems and policies would determine the banking system's capacity to fulfill its role during the CR reconstitution period. Prudent policies to stabilize the short-term credit markets during the pre-CR crisis period would ease the banks' liquidity problems in the CR reconstitution period. In the aftermath of crisis relocation, credit flows back into the banking system would increase over time, provided that the crisis was resolved on terms that were perceived to be favorable to the United States. However, liquidity problems could persist. During reconstitution, banks would have to meet the demands resulting from deposit accounts and other liabilities at a time when receipts on earning assets were delayed and demands for short-term credit were increasing. Banks facing continued deposit withdrawals or slowed redeposits and generally increased economic uncertainty would attend first to the liquidity problem and then to the demand for loans. Unless banks loan out deposited funds, the total money supply will shrink, affecting the total banking system and the economy's rate of recovery. Stabilization of credit markets by the Federal Reserve would help banks to avoid substantial losses on sales of assets to improve liquidity.

Whether such unusual government intervention would be necessary would depend on the potential loss facing banks if they faced selling their liquid assets at considerable discount because of increased uncertainty in general and the decreased inefficiency of all capital markets. Basically, the liquidity crunch would depend on whether the reconstitution net deposit outflow substantially exceeded the bank's liquid money-market assets. (Normally in the absence of rapid expansion or contraction, banks can rely on income and normal turnover at term-end from these assets to satisfy liquidity: substantial unexpected sales before term-end should be unnecessary except to satisfy the demand for repurchase agreements.)

Clearly, the liquidity problem would be primarily caused by the withdrawal of deposits during the CR crisis period. Banks would be affected differently by this problem of withdrawal. Those banks having a relatively larger proportion of consumer loans and demand deposits and less liquid portfolios would face greater problems. In the first phase of reconstitution,

unemployment might remain relatively high because of business start-up delays, causing workers to increase bank withdrawals to pay for goods and services. Some individuals and businesses might temporarily discontinue loan payments, exacerbating the liquidity problem. If loan repayments were delayed in part, the payments for goods and services could shift the level of normally anticipated funds among banks. Hence, to a certain degree, liquidity could become an inter-bank as well as an intra-bank problem. While the flow of funds from one bank to another would be part of the normal process of claims settlement, unexpected imbalances could exist.

During the early CR reconstitution period, a large and unpredictable level of transactions could occur. This deposit turnover in itself would not reduce the money supply; turnover would affect only ownership. However, if banks ignored loan demand and focused on liquidity demand, the money supply would shrink. It would also shrink if, as outstanding loans were repaid, banks were unable to renew loans or extend new credit. The normal process of maintaining or increasing the money supply through the mechanism of deposit creation would lose its force. If at the same time the public lost confidence in the banks' ability to meet liquidity requirements and increased its holdings of currency, the supply of money would shrink even further.

Consequently, short-run focus on liquidity management could cause a major problem during reconstitution. Hesitancy to satisfy loan demand is understandable if a bank perceives that its liquidity is at stake. Other banks might face some difficulties in discerning bad credit risks; the pre-CR crisis indicators might not be reliable. Consumers might face tighter budget constraints and might purchase different mixes of goods and services, probably a higher proportion of nondurable basic goods. Businesses might face an uncertain demand for their products. Despite the bank's difficulties in forecasting and in discerning risks, banks would have to extend credit, so that reconstitution could proceed and provide economic growth demand.

b. Problems Facing Savings and Loan Associations. Savings and loan associations cannot adjust their compositions of mortgage loans and contracts and their savings accounts as quickly as commercial banks. Savings account withdrawals and loan underpayment occurring in the CR crisis period might also carry over into the CR reconstitution period. Although governmental policies might stabilize the short-term credit market during the CR

crisis period, these actions would not have a notable impact on the S&L associations' liquidity problems. During reconstitution, S&Ls would face a particular problem regarding certificates of deposit (CDs). Individuals and businesses might correctly perceive that the liquidity problems of S&Ls were more severe than those of commercial banks. To the extent that CDs might be transferred to banks or might be invested in CDs issued by banks, the liquidity of S&Ls would worsen, although the liquidity of banks would improve. As previously seen, the money market assets of S&Ls are not at a sufficient level to cover large net savings account outflows. Any slowdown in mortgage repayments would further worsen the situation. Unlike the case of banks, the degree of liquidity problems would exceed possible inter-S&L and intra-S&L transfers of funds. More likely, funds would flow out of the associations, and economic recovery would be hampered.

Although a federal policy has been established by the Treasury Department's Emergency Banking Regulation No. 1 (to become effective immediately after attack upon the United States), there is no policy with respect to a crisis relocation situation. Emergency Banking Regulation No. 1 provides for emergency operations of all banking institutions: commercial bank, trust company, savings bank, credit union, savings and loan association, etc.[11] Such operations include restrictions on cash withdrawals and transfers of credit. If this policy with respect to attack were to be extended to include severe crisis situations, the CR crisis and reconstitution problems of S&Ls, as well as of other institutions, would be considerably relieved (see Policy section subsequently given).

E. Likely Consequences of Crisis Relocation on Financial Institutions

The events occurring during the CR crisis period would have serious consequences on the operational management of financial institutions. The ability of these institutions to recover after the crisis would depend on the following factors: their pre-crisis financial position; actions undertaken in managing their assets and liabilities during the crisis period; subsequent impacts of these actions; expectations of individuals, businesses, and financial institutions during and after the crisis period; the extent and degree to which traditional operations are restored; and many other events that are difficult to foresee. Based on the results obtained from the TEMCRIS

model, from other models relating to financial institutions,[13,14] and from the events postulated to occur during and after the CR crisis period, the likely consequences of crisis relocation on the financial positions of banks and S&Ls are presented below.

1. Likely Impacts on Banks

a. Crisis Period. The following estimates use the CR crisis scenarios described in Chapter II and specific estimates given in Chapter IV. Based on 1977 current dollars, it is tentatively estimated that events during the pre-CR crisis and CR initiation periods would result in a withdrawal of $70 billion in demand deposit and time and savings (DDTS) accounts. This estimate assumes that withdrawals by individual evacuees would be for expenses during a two-week relocation stay, assuming a pre-crisis individual expenditure rate. Also, because of disruptions in the credit markets, credit instruments would be reduced by $47 billion (assumed proportional to the reduction in DDTS), while other sources of credit funds would be reduced by $51 billion. During the CR maintenance phase, liquidity problems would have to be handled directly with the Federal Reserve banks since credit markets would have been closed.

Primary consideration in this example is given to the withdrawal of DDTS accounts. Exclusive of large certificates of deposit, all banks had $287.3 billion in demand deposits by individuals, partnerships, and corporations (IPC) and $340.3 billion in time and savings deposits by IPC at year-end 1977. Two-thirds of the withdrawal is postulated to occur in the banking system, while one-third would occur in S&Ls (these fractions are proportional to the ratio of total funds in banks to total funds in S&Ls). Under these circumstances commercial banks would face withdrawals totaling $46.7 billion, of which $17.7 billion is assumed to be withdrawals in demand deposits, and $29.0 billion, withdrawals in time and savings deposits (exclusive of large CDs).

Based on the distribution of DDTS (as shown in Table III-1), it is estimated that the larger banks (asset size $100 million or more) face a reduction in demand deposits totaling $12.5 billion and a reduction in time and savings deposits totaling $19.1 billion. These large banks have U.S. Treasury securities totaling $62.6 billion and other securities totaling

$111.6 billion. Based on the maturity distribution of securities (see Table III-2), $18.5 billion of U.S. Treasury securities mature within one year. These securities are a major source of bank liquidity, and represent 60% of the liquidity needed. From analysis of banking models,[13,14,15] it is estimated that in the crisis period, these larger banks would cover the withdrawals of demand deposits by disposing of $9.8 billion in short-maturity securities and $2.3 billion in longer-maturity securities. The withdrawals of time and savings deposits would require the disposition of $10.5 billion in short-maturity securities and $8.0 billion in longer-maturity securities. The requirement to dispose of short-maturity securities, $20.3 billion, would exceed the availability of short-maturity U.S. Treasury securities, $18.5 billion, which represent the most marketable form of securities. Hence, one alternative available would be disposal of longer-term assets -- i.e., longer-term Treasury securities. Another alternative might be for banks to seek Federal Reserve loans using such securities as collateral. Raising additional funds through issuance of CDs or other instruments of liability management appears unlikely because of disruption of markets. Also, some degree of loan call-in might occur. In sum, although the crisis problems would be great, these larger banks would be in a position to maintain solvency, with some possible exceptions.

Consistent with their relative market share, the smaller banks (asset size $10 million or less) would face a reduction of $430 million and $700 million in demand deposits and time and savings deposits, respectively. These banks have U.S. Treasury securities totaling $3,188 million, and other securities totaling $3,485 million. It is estimated that $1,215 million of U.S. Treasury securities mature within one year. Detailed model estimates[14,15] indicate that these banks would cover the withdrawal of demand deposits by disposing of $335 million in short-maturity securities and $77 million in longer-maturity securities. The withdrawals of time and savings deposits would suggest the disposition of $385 million in short-maturity securities and $294 in longer-maturity securities. The requirement to dispose of short-maturity securities, $720 million, is less than the short-maturity U.S. Treasury securities (i.e., $1,215 million) held by small banks. Indeed, the total

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*Both weekly and quarterly econometric models suggest that about 75% of demand deposit changes will be satisfied from short-term instruments. Model estimates diverge somewhat for long-term impact. See Appendix E.

requirement to dispose of short- and longer-maturity securities could be met through the availability of short-maturity U.S. Treasury securities. Although losses would be incurred in disposing of securities, the ability of smaller banks to cope with crisis relocation would exceed that of larger banks. (Obviously, individual exceptions might occur.)

b. Reconstitution Period. Although an inflow of funds to DDTS accounts can be expected to occur during the reconstitution period, the impact of events during the crisis period would continue into the reconstitution period. While the banks would dispose of liquid assets to meet their liquidity needs during the crisis period, restructuring of their investment securities can be expected to occur in the reconstitution period, as a first step toward orderly servicing of customer needs. Longer-maturity securities would be sold, and depending on the term structure of short-maturity securities, proceeds from the sale of longer-maturity securities would be reinvested in short-maturity securities. Since negative expectations in business and financial communities would begin to diminish, there might be an increased demand for loans. However, banks might be reluctant to increase availability of such loans consistent with the inflow of funds. During this period, banks might continue to borrow money from the Federal Reserve system with or without collateral, under certain conditions.*

For a variety of reasons (e.g., postponement of plans for purchasing business equipment; likely reductions in price indices), interest rates are likely to decrease during the reconstitution period, as shown later, reversing the upward trend occurring in the crisis period. Whether banks would be able to retain CDs is uncertain, depending on conditions and opportunities in the credit market. If CD funds were to flow out of the banking system, adverse impacts would continue.

Consistent with the TEMCRIS model results (Chapter IV) and assuming that the net inflow of deposits to the banking system amounts to $55 billion during the reconstitution period, about $24 billion can be expected to be invested in short-term investment securities, whereas about $12 billion can be expected to be invested in longer-term investment securities. Loans would slowly increase but banks would have to exercise care to ensure the credit worthiness of the borrower.

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* Circular No. 7 of Reference 6 provides for both "secured" and "unsecured" advances from Federal Reserve Banks to other banks.

2. Likely Impacts on Savings and Loan Associations

a. Crisis Period. As previously indicated, one-third of the postulated $70 billion withdrawal, $23.3 billion, is assumed to occur in savings accounts held by S&Ls. Based on the distribution of savings accounts in Table III-3, larger S&Ls (asset size $100 million or more) would face a reduction of $17.3 billion in savings accounts. The cash component would include items in collection as well as other elements that typically could not be used to meet the liquidity needs. Even if 25% of the cash and investment categories were investments with maturity shorter than one year, the total available, $7.8 billion, would be only about 50% of the liquidity need for the larger S&Ls. As studies have indicated, [13,15,16] a reduction of $17.3 billion in savings accounts could result in a $12.1 billion reduction in mortgage loans and contracts. This evidence suggests that large-scale disposition of short-term securities, coupled with a large reduction in outstanding mortgage loans and contracts, is likely to occur. Liquidity problems facing larger size S&Ls would be disruptive and a high degree of insolvency could occur in the absence of government assistance.

Smaller S&Ls with asset size under $25 million would face similar problems. These S&Ls face a reduction of $832 million in savings accounts. They have $1,833 million in cash and investment securities. For reasons already discussed, this element could not be fully used to cover the liquidity need. Assuming that 25% of that element represents investments with maturity less than one year, a maximum of $458 million would be available to meet the liquidity need. A reduction in savings accounts totaling $832 million could result in a $582 million reduction in mortgage loans and contracts. Thus, a large disposition of short-term securities and a large reduction in outstanding mortgage loans and contracts would be required to meet liquidity needs. The liquidity problems facing smaller S&Ls would be severe, but somewhat less disruptive than the problems facing larger S&Ls. Nevertheless, a high degree of insolvency could occur in the absence of timely government intervention.

b. Reconstitution Period. After an initial adjustment, an inflow of savings accounts can be expected during the reconstitution period, provided that individuals retained confidence in the financial position of S&Ls. Even if 80% of amounts withdrawn from savings accounts during the crisis period

were to be redeposited during the reconstitution period, the $4.7 billion reduction in savings accounts translates into a $1.7 billion reduction in mortgage loans during the first quarter of the reconstitution period, and a $2.1 billion reduction during the second quarter. It is expected that the availability of funds to individuals for home purchases would be reduced, and consequently the given investment in residential structures would decline.

There would be one overarching concern. Since S&Ls would face a higher likelihood of insolvency than banks, the flow of funds to these associations might be seriously curtailed (well below 80%). Banks would likely be the beneficiary and might find their financial position enhanced during the reconstitution period. If this situation were to occur, however, insolvency among S&Ls would be intensified.

F. Policy Implications for Financial Institutions

Although it is beyond the scope of this report to present a complete evaluation of alternative government policies for mitigating the economic consequences of crisis relocation, some policies that merit consideration are identified.

1. Policies for the Pre-CR Crisis Phase

Problems faced by financial institutions during the pre-CR crisis phase (within the context of a prolonged crisis) suggest the following policies:

- Undertake increased open-market purchasing of U.S. Government securities to improve the reserve position of the banking system.
- Undertake public information efforts to enhance orderly operations such as reduced withdrawals, avoidance of speculation, etc.
- Adjust the ratio of reserve requirements to match the rate of deposit withdrawals.
- Allow selective availability of funds at the Federal Reserve discount window, possibly at a variable discount rate. In this way, encouragement could be given to those host-area banks best prepared to meet the emergency.
- Consider restrictions on large savings deposits withdrawals including extension of waiting times prior to honoring withdrawals.

- Curtail loans for non-essential purposes and curtail credit-card cash-advance loans.

- Restrict activities of financial markets -- e.g., by curtailing the operating hours of securities, commodities, and options markets.

- Eliminate margin transactions in the securities and commodities markets, curtail options market, and possibly lengthen the time before proceeds of sales are forwarded to sellers.

- Control the flight of capital to other nations.

2. Policies for the CR Initiation Phase

In addition to the policies previously discussed, the following policies appear to be required:

- Implement the Agent Bank Plan in host areas, and relocation of Federal Reserve banks.

- Implement measures similar to Emergency Bank Regulation No. 1.

- Consider implementation of foreign exchange controls to control capital withdrawals by foreigners.

- Declare a bank holiday for 3-5 days during movement.

3. Policies for the CR-Maintenance Phase

In addition to the policies discussed under the pre-CR crisis phase and the CR-initiation phase, other suggested policies are:

- Encourage maintenance of essential banking operations in host areas.

- Develop a plan and procedures for assuring an adequate supply of cash for banks in host areas.

- Continue operation of Agent Banks in host areas, and the Federal Reserve Banks' support of operating banks in host areas.

- Implement selective price and allocation controls in host areas.

4. Policies for the CR Reconstitution Phase

The following policies and variants thereon appear to deserve careful evaluation for use during the CR reconstitution phase:

- Implement the full range of the Federal Reserve System's power for controllable increase of the money supply through use of a combination of all the conventional major instruments: bond purchases in the open market; decreases in the reserve requirements for demand and time deposits; and reductions in the discount rate.

- Weigh the desirability and attractiveness of interest rate subsidies so that financial institutions can attract new deposits including certificates of deposit.

- Extend initially the reserve settlement period to allow short-term credit markets -- especially the market for Federal funds -- to reorganize.

- Consider incentives (e.g., a tax credit for individuals who repay installment and other loans on time).

- Emphasize actions that induce an increased availability of credit funds to business, such as providing loan guarantees for business.

- Implement special tax credits for business to encourage investments in equipment and structures, and weigh other actions that enhance business expectations.

- Institute a plan for the orderly return of people to risk-area employment both in financial institutions and in business, and elect options that may shorten production start-up time of business and industry.

- Establish a clear policy to equalize the specific CR-related losses that are incurred and to help restart the economy, as needed.

Financial and other policies related to CR situations are not the domain of a single agency. Various federal agencies promulgate these policies. It is essential, however, that all policies should be carefully evaluated and that a consistent, yet flexible, set of policies should be identified for timely implementation if circumstances requiring crisis relocation were to occur.

In addition to the policies presented, financial institutions should have CR plans for conducting the following operations in the reconstitution phase:

- Check-clearing procedures.
- Over-the-counter operations in risk areas.
- Re-evaluation of banks' earnings assets.
- Security measures.
- Remedies for personnel problems (e.g., salary payments, working hours, etc.).
- Trust management.
- Other procedures, as required by peculiarities of individual banks and their circumstances.
- Billing of government for emergency services.

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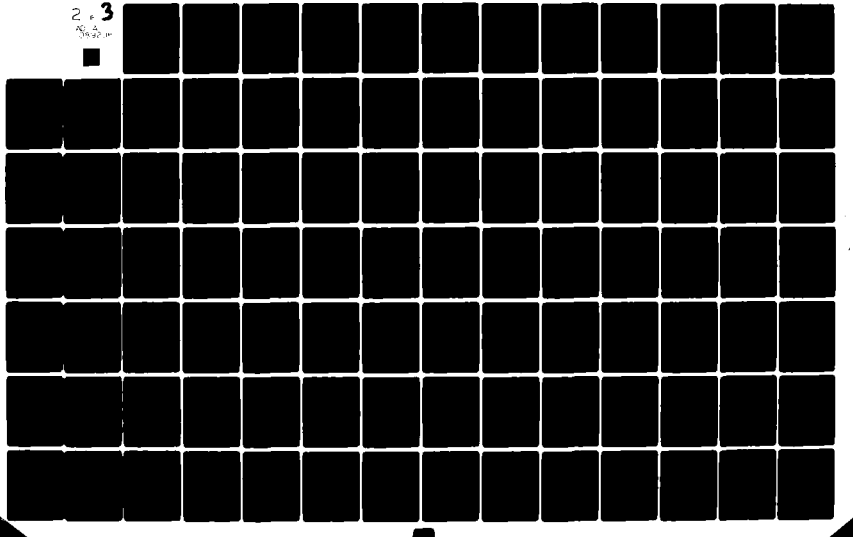

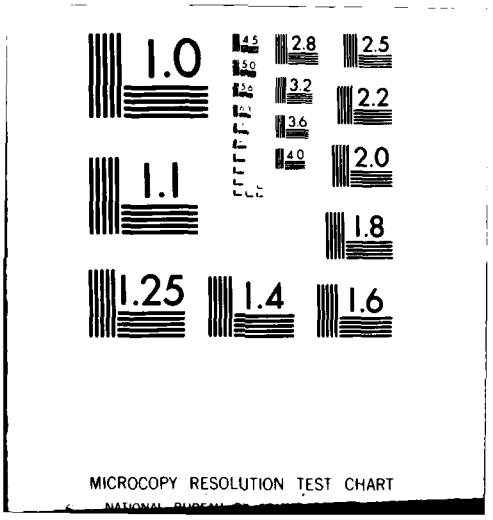
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MICROCOPY RESOLUTION TEST CHART

IV. TEMCRIS MODEL RESULTS FOR ECONOMIC IMPACT IN THE CR RECONSTITUTION PERIOD

A. Overview of TEMCRIS II

The preceding chapters have presented the likely impacts of crisis relocation on major economic sectors -- financial institutions and business -- with special emphasis on the CR reconstitution period. As part of a continuing research effort, the Center has developed and integrated an econometric model of aggregate demand (TEMCRIS II) with an industry-based input-output model (Linear Program Input-Output) to assess the potential impact of specific emergencies on the nation's economy. The integrated model has the capability of assessing a wide range of emergencies such as the relocation of people in a nuclear crisis, nationwide labor disruptions, and critical resources shortages. This model, as well as its components, provides a framework for analyzing disequilibrium conditions of the economy during and subsequent to the emergency event. In this chapter, the economic impacts of crisis relocation with particular emphasis on CR reconstitution are presented from the viewpoint of the TEMCRIS II model. Consideration of the relevant factors such as mobilization makes it desirable in future work to analyze the problems with the aid of the LP-I/O program.* These economic impacts depend not only on the events in the CR reconstitution phase but also on the events in the preceding phases: the pre-CR, CR initiation, and CR maintenance phases.

1. Structure and Data Base of Model

The TEMCRIS II model consists of 19 equations and 36 separate variables. The data base for TEMCRIS II consists of quarterly national economic data for a 13-year period (third quarter 1963 through second quarter 1976), published by the U.S. Department of Commerce and by the Federal Reserve Board. All dollar-valued variables in TEMCRIS II are expressed in terms of constant 1972 dollars.

2. Interactions in the Model

Figure IV-1 summarizes the interactions occurring in the TEMCRIS model. These interactions are discussed briefly, and a more detailed description is then presented.

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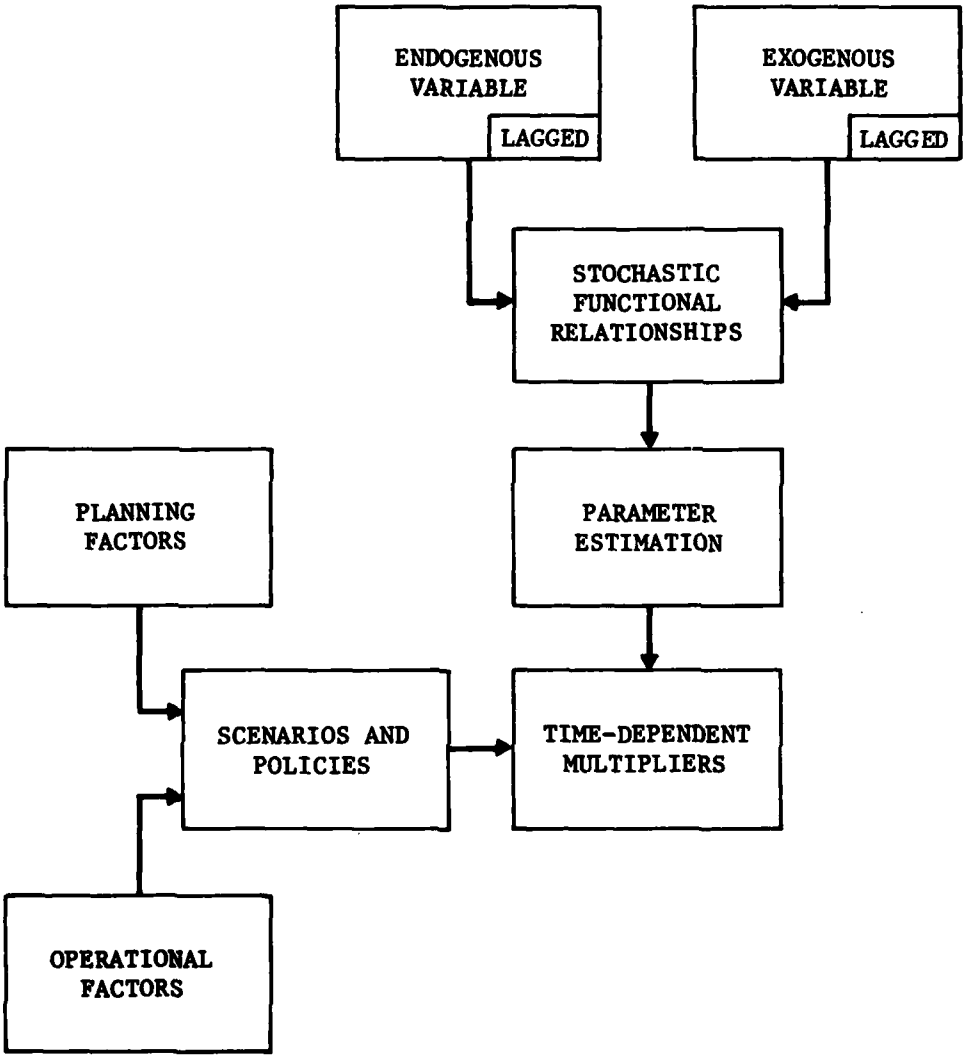
* Interactions between TEMCRIS and the Linear Program Input/Output model are described in Frank Trinkl et al., TEMCRIS LP I/O Model: An Interactive Model to Assess Policy Responses to Emergency Situations, for DCPA, Center for Planning and Research, Inc., Palo Alto, CA, January 1979.

FIGURE IV-1

SCHEMATIC OF TEMCRIS II



Specification of model:

- 19 equations implying 19 controllable endogenous variables (14 are lagged)
- 17 "noncontrollable" exogenous variables (two are lagged)
- Essentially a demand approach

The endogenous and exogenous variables have values expressed either in billions of dollars (nationally) or in some other measure such as percent. Starting with a system of relationships among the endogenous and exogenous variables and the given historical values of the variables (quarterly data), estimates of the parameters (i.e., coefficients) specifying the relationships among the variables are made. Once these estimates are in hand, planning and operational factors, as well as information characterizing the crisis scenario, directly affect the values assigned to the exogenous variables for the crisis period. In addition, the impacts induced by the crisis period are traced over time.

a. Endogenous and Exogenous Variables. The endogenous variables are dependent on both the exogenous variables and other endogenous variables. The exogenous variables impact directly on the economic system model and affect the endogenous variables, while not being affected by them. For example, consumer disposable income and consumer expenditures are considered to be endogenous variables, with disposable income affecting consumer expenditures, and vice versa. On the other hand, government expenditures are considered to be an exogenous variable, directly affecting, as an example, consumer expenditures, while not being directly affected by them.

Some values of the variables used in TEMCRIS II are influenced by the values of other variables for any quarterly time period. The values of other variables are influenced by the values of variables (lagged variables) in the preceding quarterly time period.* As indicated by the notation in the top boxes of Figure IV-1, both endogenous and exogenous variables may be "lagged." Continuing our previous example, most of the endogenous variables, such as consumer expenditures and disposable income, would be lagged; only a limited number of exogenous variables, such as government expenditures, are lagged in TEMCRIS II.

Table IV-1 presents a list of the endogenous variables used in the model, and Table IV-2, the exogenous variables. Asterisks after the symbols denote variables that also occur as lagged variables.

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* Sources of data for the different variables used in TEMCRIS are included as part of Appendix B.

Table IV-1

ENDOGENOUS VARIABLES IN THE TEMCRIS II MODEL
(All Variables in $ Billion Except as Noted)

Description of Variable	Symbol
Household Sector	
• Consumer Expenditures for Non-Durable Goods and Services	CEEG *
• Consumer Expenditures for Durable Goods	CEDG *
• Gross Investment in Residential Structures	GIRS *
• Demand for Credit Funds by Household Sector	DCFH
• Availability of Credit Funds to Household Sector	ACFH *
• Interest Rates for Households (percent)	INTH *
• Disposable Income, the total after-tax income per household from productive activity or transfer payments	DINC *
Business Sector	
• Gross Investment in Non-Residential Structures and Equipment	GISE *
• Demand for Credit Funds by Business Sector	DCFB
• Availability of Credit Funds to Business Sector	ACFB *
• Interest Rates for Business (percent)	INTB *
Government Sector	
• Demand for Credit Funds by Government (Federal, State, Local)	DCFG *
• Availability of Credit Funds to Government (Federal, State, Local)	ACFG *
• Interest Rates for Government (percent)	INTG
• Government (Federal, State, Local) Budget Surplus in Receipts Over Expenditures	GBS *
Other Variables	
• Availability of Total Funds Raised in the Credit Market	ACF
• Excess Between Demand and Availability of Total Funds in Nonfinancial Sectors in the Credit Market	DCF-ACF
• Percent Change in Prices (based on GNP Price Index, 1972 = 100)	PCHP *
• Gross National Product Gap (difference between capacity and actual gross national product)	GNPG *

* These variables also occur as lagged variables.

Table IV-2

EXOGENOUS VARIABLES IN THE TEMCRIS II MODEL

Description of Variable	Symbol
Variables Expressed as Ratio or Percent	
• Personal Savings Measure, percent of disposable personal income saved	PSM
• Business Savings Measure, ratio: (Capital Consumption Allowance + Undistributed Profits - Inventory Valuation Adjustment)/GNP	BSM
• Corporate Profitability Measure, percent change in ratio: (Manufacturing Corporations' Profits After Taxes)/Stockholders' Equity	CPM *
• Total Tax Measure, ratio: (Indirect Business Taxes + Corporate Tax Liabilities + Social Security Contributions + Personal Tax Payments)/GNP	TTM
• Labor-Force Time Lost, percent of total potential available labor-force man-hours lost by unemployment and economically caused part-time employment	LFTL *
Variables Expressed in $ Billion	
• Other Sources of Disposable Income	OSDI
• Government (Federal, State, Local) Expenditures for Goods and Services	GEGS
• Government (Federal, State, Local) Transfer of Payments to Persons	GTP
• Other (Net) Government Expenditures	OGEX
• Total Member Bank Reserves Required on Deposit with Federal Reserve Bank plus Vault Cash	TMBR
• Demand Deposit and Time and Savings Accounts	DDTS
• Credit Market Instruments	CMI
• Other Sources of Credit Market Funds	OSCF
• Gross National Product Capacity, dollar potential under conditions of "full" employment	GNPC
• Net of Exports Less Imports of Goods and Services	NEX
• Demand for Credit Funds by the Foreign Sector in the Credit Market	DCFF
• Availability of Credit Funds to the Foreign Sector of the Credit Market	ACFF

* These variables also occur as lagged variables.

b. Stochastic Functional Relationships. As shown in Figure IV-1, the next step concerns a system of stochastic equations (each equation is not an exact relationship but is subject to random disturbances) that must be simultaneously solved. Each equation reflects a postulated relationship among the variables in the economy. The equations making up the model are given below in symbolic form. Lagged forms of the variable are indicated by use of an "L" preceding the symbol. (Note that one variable, Labor Force Time Lost, LFTL, is LLFTL when lagged.) A detailed specification of each equation is included in Appendix B.

Equation 1 - Consumer Expenditures for Non-Durable Goods and Services

CEEG = f(PCHP, DINC, LCEEG, LFTL, GTP) plus a random error.

Equation 1 states that the current level of consumer expenditures for non-durable goods and services depends on current price changes, on the current level of disposable income, on recent* consumer expenditures for non-durable goods and services, on the current* extent of labor force time lost, and on the current level of government payments to persons. All other considerations affecting the current level of consumer expenditures for non-durable goods and services are included in the error term.

Equation 2 - Consumer Expenditures for Durable Goods

CEDG = f(CEEG, PCHP, DINC, LCEDG, PSM, LFTL, LLFTL) plus a random error.

Equation 2 states that the current level of consumer expenditures for durable goods depends on current expenditures for non-durable goods and services, on current price changes, on the current level of disposable income, on recent expenditures for durable goods, on the current extent of personal savings, and on the current and recent levels of labor force time lost. All other considerations affecting the current level of consumer expenditures for durable goods are included in the error term.

Equation 3 - Level of Investment in Residential Structures

GIRS = f(ACFH, INTH, LGIRS, LDINC, PSM) plus a random error.

Equation 3 states that the current level of investment in residential structures depends on the current availability of credit funds to the household sector, on the current level of interest rates for households, on the recent level of investments in residential structures, on the recent level of disposable income, and on the current extent of personal savings. All other considerations affecting the current level of investment in residential structures are included in the error term.

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* Throughout this description of the equations, "recent" indicates lagged variables, and "current," non-lagged.

Equation 4 - Level of Investment in Non-Residential Structures and Equipment

GISE = f(ACFB, INTB, LGISE, LGNPG, LCPM, TTM) plus a random error.

Equation 4 states that the current level of investments in structures and equipment other than household depends on the current availability of credit funds to the business sector, on the current level of interest rates for business, on the recent level of investments in structures and equipment other than household, on the recent level of the Gross National Product gap, on the recent corporate profitability, and on the current level of the total tax measure. All other considerations affecting the current level of investments in structures and equipment other than household are included in the error term.

Equation 5 - Level of Percentage Change in Prices

PCHP = f(GNPG, LPCHP, LGBS, LLFTL) plus a random error.

Equation 5 states that the current level of percent change in prices depends on the current level of the Gross National Product gap, on the recent level of the percent change in prices, on the recent level of the government budget surplus, and on the recent extent of labor force time lost. All other considerations affecting the current level of the percent change in prices are included in the error term.

Equation 6 - Demand for Credit Funds, Households

DCFH = f(DCFB, INTH, DINC, LDCFH, LINTH, PSM) plus a random error.

Equation 6 states that the current demand for household credit funds depends on the current demand for business credit funds, on the current level of interest rates for households, on the current level of disposable income, on the recent demand for household credit funds, on the recent level of interest rates for households, and on the current extent of personal savings. All other considerations affecting the current demand for credit funds for households are included in the error term.

Equation 7 - Demand for Credit Funds, Business

DCFB = f(DCFG, INTB, LGISE, LDCFB, LINTB, BSM, DCFF, LCPM) plus a random error.

Equation 7 states that the current demand for credit funds by business depends on the current demand for credit funds by the government, on the current levels of interest rates for business, on the recent level of investments in structures and equipment other than household, on the recent demand for business credit funds, on the recent level of interest rates for business, on the current level of the business savings measure, on the current demand for credit by the foreign sector, and on the recent corporate profitability. All other considerations affecting the current demand for credit funds by business are included in the error term.

Equation 8 - Demand for Credit Funds, Government

DCFG = f(INTG, GBS, LDCFG, LGNPG, TTM) plus a random error.

Equation 8 states that the current demand for credit by the government depends on the current level of government interest rates, on the current level of the government budget surplus, on the recent demand for credit funds by the government, on the recent value of the Gross National Product gap, and on the current level of the total tax measure. All other considerations affecting the current demand for credit by the government are included in the error term.

Equation 9 - Availability of Credit Funds, Households

ACFH = f(INTH, GNPG, LACFH, LFTL, TMBR, DDTS, OSCF) plus a random error.

Equation 9 states that the current availability of credit funds for households depends on the current level of household interest rates, on the current level of the Gross National Product gap, on the recent availability of credit funds for households, on the current extent of labor force time lost, on the current level of total member bank reserves, on the current level of demand deposit and time and savings accounts, and on the current extent of other sources of credit funds. All other considerations affecting the current availability of credit funds for households are included in the error term.

Equation 10 - Availability of Credit Funds, Business

ACFB = f(INTB, GNPG, LACFB, CPM, TMBR, DDTS, CMI, OSCF) plus a random error.

Equation 10 states that the current availability of credit funds for business depends on the current level of business interest rates, on the current level of the Gross National Product gap, on the recent availability of credit funds for business, on the current corporate profitability, on the current level of total member bank reserves, on the current level of demand deposit and time and savings accounts, on the current level of credit market instruments, and on the current extent of other sources of funds. All other considerations affecting the current availability of funds for business are included in the error term.

Equation 11 - Availability of Credit Funds, Government

ACFG = f(INTG, GNPG, LACFG, TTM, TMBR) plus a random error.

Equation 11 states that the current availability of credit funds for government depends on the current level of interest rates for government, on the current level of the Gross National Product gap, on the recent availability of credit funds for government, on the current level of the total tax measure, and on the current level of the total member bank reserves. All other considerations affecting the current availability of credit funds for government are included in the error term.

Equation 12 - Interest Rates for Households

INTH = f[PCHP, INTB, INTG, $(AFCH-DCFH)_{calc}$, LINTH, LGNPG] plus a random error.

Equation 12 states that the current level of interest rates for households depends on the current level of the percent change in prices, on the current level of interest rates for business, on the current interest rates for government, on the calculated difference between the current availability of and demand for credit funds for households, on recent interest rates for households, and on the recent level of the Gross National Product gap. All other considerations affecting the current level of interest rates for households are included in the error term.

Equation 13 - Interest Rates for Business

INTB = f[PCHP, INTH, INTG, $(ACFB-DCFB)_{calc}$, LINTB, LGNPG] plus a random error.

Equation 13 states that current interest rates for business depend on the current level of the percent change in prices, on the current level of interest rates for households, on the current level of interest rates for government, on the calculated difference between the current availability of and demand for business credit funds, on the recent level of business interest rates, and on the recent level of the Gross National Product gap. All other considerations affecting the current level of interest rates for business are included in the error term.

Equation 14 - Interest Rates for Government

INTG = f[PCHP, INTH, INTB, $(ACFG-DCFG)_{calc}$,LINTB, LGNPG] plus a random error.

Equation 14 states that the current interest rates for government depend on the current level of the percent change in prices, on the current interest rates for households, on the current interest rates for business, on the calculated difference between the current availability of and demand for government credit funds, on the recent level of interest rates for business, and on the recent level of the Gross National Product gap. All other considerations affecting the current level of interest rates for government are included in the error term.

Equations 15 to 19

The five remaining equations are algebraic identities and are introduced to complete the system of equations. These equations are shown in Appendix B and express solutions to the following variables:

Eq. 15: DCF-ACF (Excess between Demand and Availability of Total Funds in Nonfinancial Sectors in the Credit Market)

Eq. 16: ACF (Availability of Total Funds Raised in the Credit Market)

Eq. 17: GNPG (Gross National Product Gap, i.e., difference between capacity and actual gross national product)

Eq. 18: DINC (Disposable Income, after-tax income per household)

Eq. 19: GBS (Government Budget Surplus)

c. Parameter Estimation. The next step in Figure IV-1--estimation of parameters--is accomplished by simultaneous solution of the 19 equations using matrix algebra. Two matrices are used for the endogenous variables, one for the initial values and the other for the lagged values. Similar matrices are set up for the exogenous variables. Then the computer program is used to estimate the various parameter elements of the four matrices. Subsequently, an expanded computer program, correcting for serially correlated errors, produces final estimates of the various parameters.

d. Calculation of Time-Dependent Multipliers. The fourth step, as shown in Figure IV-1, concerns the calculation of time-dependent multipliers. As already mentioned, the structure of TEMCRIS II is recursive--i.e., many variables do not operate only in a given quarter but also carry over into succeeding quarters and are therefore "lagged." In a recursive equation, with lagged endogenous variables included among the exogenous variables on the right-hand side of the equation, the current-quarter change in the endogenous variable will become the next quarter's lagged endogenous variable. With such a recursive structure, the estimated coefficients no longer reflect the total impact of the change in the exogenous variables on the endogenous variables. Therefore, one must calculate a set of derived coefficients or multipliers. These multipliers are the forecasting structure of TEMCRIS II. The system as currently formulated assumes that the structural integrity of the model is maintained in future time periods.

e. Other Factors. The left-hand side of Figure IV-1 indicates Planning Factors, Operational Factors, and Scenarios and Policies, all of which can influence the values of the exogenous variables and their changes over the crisis period and its aftermath. The planning and operational factors are those associated with the emergency management on local and state levels. The scenarios

characterize the crisis environment, while policies, as considered in this report, are the directives and regulations promulgated largely by the federal government. Chapter II has discussed types of scenarios and considerations of federal policy.

These three relationships of Figure IV-1 will become clear in the following section, where we discuss the planning, operational, and policy inputs to the TEMCRIS model.

B. Specifying the Scenarios

For each scenario characterizing the crisis, values for the exogenous variables need to be defined. Once these scenario-dependent values are specified, the impact on the endogenous variables over time is calculated through the use of the TEMCRIS multipliers, as previously mentioned.* In estimating impact, primary use is made of the time-phasing of crisis events -- pre-CR crisis, CR initiation, CR maintenance, and CR reconstitution -- by quarters of the year.

1. Current Planning Assumptions

Various sources such as federal guidance, prior research work, and concepts set forth in state and local CR plans give some indications as to the structure of likely scenarios. A general framework of assumptions can be discerned:

(1) Although a crisis relocation is assumed not to occur except by Presidential order, some unofficial or spontaneous evacuation will occur in the pre-relocation period--i.e., before the order is issued. Some plans assume that at least 20% of the people in the risk area will evacuate spontaneously.

(2) The duration of the relocatees' stay in the host areas (the CR maintenance period) is indefinite, assumed to last from several days to weeks. However, most planning assumes a minimum stay time, generally two weeks.

(3) The relocation movement is expected to be accomplished as quickly as possible, but is assumed to last no longer than three days.

(4) Current state and local plans assume crisis relocation under non-attack conditions--i.e., although the crisis must be at a peak before official evacuation becomes plausible, it is assumed that nuclear attack will not occur, and that the crisis will be resolved peacefully. At this point, the hosted population will return to the risk areas.

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* The derivation of these multipliers is included in Appendix B.

(5) After the relocation movement is completed, the population in the risk areas will be at a minimum. All plans assume that essential industries will continue operating in the risk areas, and that essential workers will commute daily from the host areas to their jobs. The federal guidance and local plans also assume an undetermined number of "stay-puts" in the risk areas--people who will refuse to relocate for whatever reason. Some plans assume that the number of stay-puts may be as high as 20% of the risk-area population.

(6) Each designated host area will receive pre-assigned relocatees, the number depending on the "hosting ratio" -- i.e., the number of relocatees per host-area resident. Also, government, evacuees and residents will be involved in a range of service and emergency activities.

2. TEMCRIS Model Assumptions

These assumptions have been used, to the extent that is realistically possible, in determining values of exogenous variables for the TEMCRIS computer runs, which are subsequently shown. Assumption (1) on spontaneous evacuation during the pre-CR crisis period is reflected in the events such as labor force time lost, and credit market disorders.

Assumption (2) on the duration of CR maintenance is accommodated in the TEMCRIS model by postulating a two-week CR maintenance period. (Prior reports in this series considered CR maintenance periods of one- and four-week durations.* The economic impact of a four-week CR maintenance period was shown to be highly disruptive.)

Assumption (3), a three-day duration of relocation movement, is implicitly recognized as an event affecting the values assigned to exogenous variables, such as labor force time lost, credit variables, etc.

Assumption (4) is a requirement to assure the stability of the model equations. Assumption (5) is accommodated by modifying variables to reflect the added production resulting from continuance of essential risk-area business and industry. Other occupants of the risk areas (e.g., stay-puts) are not explicitly considered. Assumption (6) relating to the influence of host-area activities is reflected in the assumed levels of government expenditures and government transfer payments.

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* (1) Richard Laurino, Frank Trinkl et al., Economic and Industrial Aspects of Crisis Relocation: An Overview, May 1977; (2) Richard Laurino, Frank Trinkl et al., Impacts of Crisis Relocation on U.S. Economic and Industrial Activity, October 1978.

A major problem in the delineation of scenario events for the model is to differentiate between events of the crisis period (pre-CR crisis, CR initiation, and CR maintenance) and the events of the CR reconstitution period. To capture realistically the impact of the various events on the exogenous variables, careful time phasing of these events is essential. For the purposes of the analysis, the pre-CR, CR initiation (movement), and CR maintenance events are considered to happen within a single quarter, so that the impacts of CR reconstitution can be analyzed explicitly.

Current planning assumptions do not take cognizance of the events occurring in the CR reconstitution period, since most CR plans end with "return" (population returns to the risk areas). That is, the plans deal with the return movement, which is considered a simple reversal of the relocation movement, and post-crisis recovery is barely mentioned. Accordingly, this project has had to make its own assumptions regarding the CR reconstitution (recovery) period. The following discussions of variables will show how the model handles events in the CR reconstitution period, relative to the preceding period.

C. Operating the TEMCRIS Model

As an illustration of how the model operates, we choose the exogenous variable, labor force time lost (LFTL), as defined in Table IV-2, and trace its changes over time.

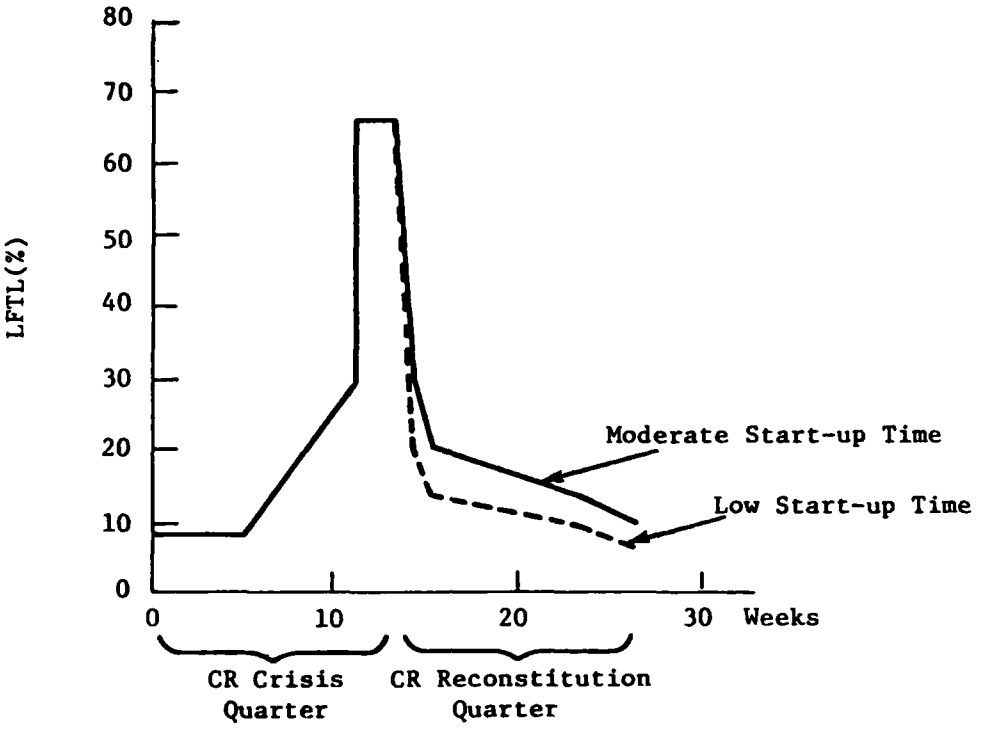
1. Crisis Events for LFTL

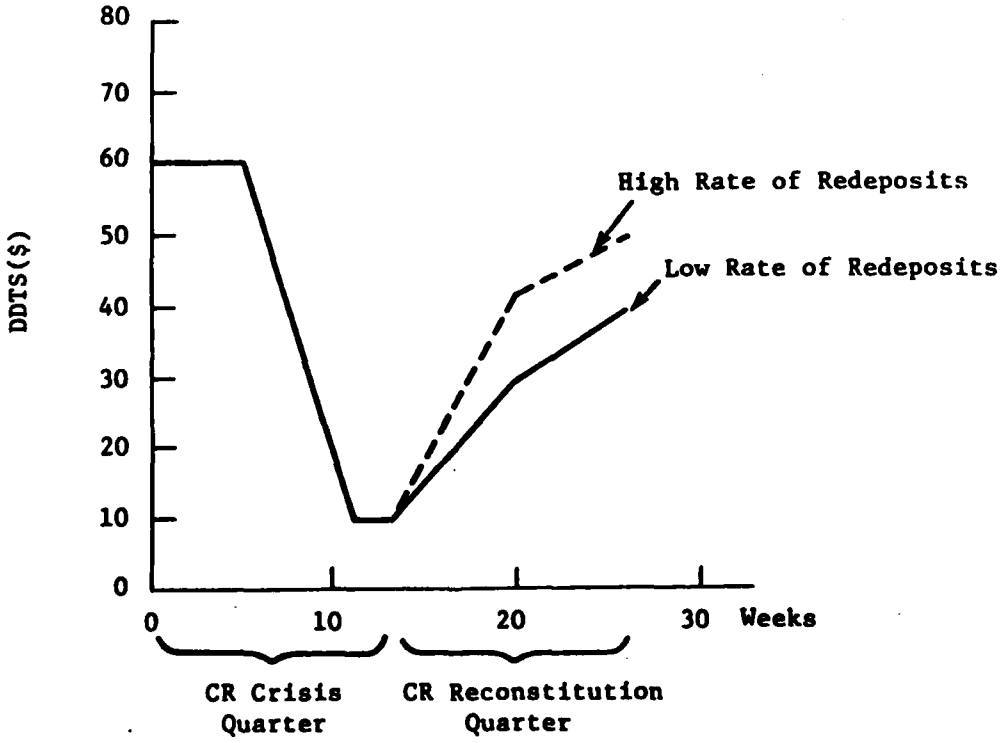
In the pre-CR crisis quarter, the crisis situation is postulated to intensify during the fifth week of the quarter. Between the fifth week and the eleventh week, the crisis deepens, and some spontaneous evacuation occurs with a proportional increase in LFTL. By the end of the eleventh week, CR plans are implemented: risk-area persons are evacuated to host areas and remain there for two weeks (CR maintenance period, twelfth and thirteenth weeks).

At the start of the next quarter (fourteenth week), the CR reconstitution period begins; persons return to the risk areas. However, because of time involved in business and industry start-up, lags occur before all people are working full time. Because of the uncertainty of events during CR reconstitution, these events are shown in Figure IV-2 under two assumptions regarding lag in

FIGURE IV-2

DETERMINATION OF CHANGES IN SELECTED EXOGENOUS VARIABLES





start-up time: Moderate and Low. The moderate lag in start-up time assumes that a 90% reduction in labor force time lost (LFTL) is achieved during the tenth week of CR reconstitution, while the low lag assumes that this reduction is achieved during the third week. On the basis of these assumptions, the average change in LFTL for the two quarters separately (crisis quarter and reconstitution quarter) is analytically determined.

2. Crisis Events for Other Exogenous Variables

Also shown in Figure IV-2 are the time-phased events for the exogenous variable, DDTS: the availability of credit funds from demand deposit and time and savings accounts (Table IV-2). As seen, the extent of availability of credit funds depends on the rate at which individuals and businesses are willing to redeposit their funds in those accounts (or the equivalent -- are willing to keep their funds in those accounts).

Two other exogenous variables -- government expenditures on goods and services (GEGS) and credit market instruments (CMI) -- are treated in an analogous time-phased manner. GEGS is assumed to increase by $16 billion between the fifth and the thirteenth weeks, primarily reflecting mobilization. In addition, a $7 billion shelter program is implemented during the early part of CR maintenance. It is also assumed that $13 billion are expended during the CR reconstitution period, again primarily reflecting mobilization. The exogenous variable, CMI, generally follows a time-phased pattern similar to that of GEGS.

Some exogenous variables were related to other exogenous variables by simple functional forms. Exogenous variables treated in this manner were: other government expenditures (OGEX) was related to GEGS; other sources of credit funds (OSCF) was related to DDTS; other sources of disposable income (OSDI) was related to OGEX; GNP capacity (GNPC) was assigned a constant that was related to normal peacetime increase in capacity; and total member bank reserves (TMBR) was related to DDTS. The exogenous variable, government transfer payments to persons (GTP), was related to the number of persons evacuated to the host areas.

The baseline values for the remaining seven exogenous variables listed in Table IV-2 were determined by examining the historically high or low values (from 1946 to 1976) associated with the respective variables.

D. Results: Impacts on Economic Variables

1. Values Characterizing Exogenous Variables

Table IV-3 summarizes the impact of the postulated crisis events on the exogenous variables, in terms of changes traced from the CR crisis quarter (CR initiation and CR maintenance periods) to and during the CR reconstitution quarter. Two post-crisis recovery situations are shown: situation A and situation B. In the absence of concerted government actions to mitigate the consequences of CR events, situation A characterizes a sluggish state of recovery based on continued but lower levels of disruptions to the national economy, while situation B characterizes a more favorable rate of recovery.

As an example of the interpretation of the results given in Table IV-3, note the negative values of more than half the variables (BSM, CPM, etc.). These negative values (relative to the non-crisis quarter) are most seriously affected in the crisis quarter, except for OSDI, other sources of disposable income, which slips even more in the reconstitution quarter. The explanation is that the crisis quarter sees shutdown or curtailment of business and financial operations: credit is down, foreign trade is down, etc. As for OSDI, the CR maintenance period sees many persons unemployed, so that there are fewer sources of income, even after reconstitution has begun.

Also worthy of note is the estimate of the crisis impact (both the crisis quarter and the reconstitution quarter) on the amount of demand deposit and time and savings accounts, DDTS. The crisis quarter sees a reduction of $19 billion nationally in these accounts. Under moderate recovery conditions (situation A) in the CR reconstitution period, a $6 billion gain is seen, and under more rapid recovery conditions (situation B), a $13 billion gain, though the level of the DDTS accounts in the crisis aftermath is still $6 billion short of what it was in the pre-crisis period.

2. Induced Impacts on Endogenous Variables

This section presents the impacts on the GNP-related endogenous variables resulting from changes associated with the exogenous variables. The impacts on the financial variables of the model are shown subsequently. CR impacts on the GNP-related variables are presented in six figures:

Table IV-3

TEMCRIS VALUES OF EXOGENOUS VARIABLES FOR DETERMINING ECONOMIC IMPACT OF CR

(All Values in $ Billion Except as Noted)

Variable*	CR Crisis Quarter	CR Reconstitution Quarter: Situation A (Moderate Recovery)	CR Reconstitution Quarter: Situation B (More Rapid Recovery)
PSM (%)	2.860	1.430	.715
BSM (ratio)	- .06	.052	.002
CPM (%)	- 2.50	- 1.70	- .85
LFTL (%)	13.60	- 8.5	- 2.36
TTM (ratio)	.006	- .004	- .003
GEGS	5.5	17.0	17.0
TMBR	- 3.26	- 2.3	- 1.05
DCFF (ACFF)	-15.2	1.0	- 2.2
DDTS	-19.2	-13.5	- 6.2
CMI	-12.8	- 5.4	4.8
OSCF	-14.1	- 6.0	5.3
GNPC	28.5	57.0	57.0
GTP	7.0	0	4.0
NEX	-15.0	- 7.5	0
OSDI	- 4.5	-14.3	- 7.0
OGEX	2.7	8.5	8.5

* The definitions of these variables are given in Table IV-2.

Figure	Variable Shown	Symbol
IV-3	Percent Change in Gross National Product Gap	GNPG
IV-4	Percent Change in Prices	PCHP
IV-5	Percent Change in Disposable Income	DINC
IV-6	Percent Change in Consumer Expenditures for Durable Goods	CEDG
IV-7	Percent Change in Gross Investment in Residential Structures	GIRS
IV-8	Percent Change in Gross Investment in Non-Residential Structures and Equipment	GISE

Each figure is divided into three bar charts, reflecting three scenarios:

1. The top chart shows the direct impact on the variable, and the induced impact over subsequent quarterly time periods.

   The crisis period is the time from CR initiation to the end of the two-week CR maintenance period (i.e., not including CR reconstitution period).

2. The middle chart shows the combined direct impact on the variable(crisis period plus CR reconstitution period), and the induced impact over subsequent quarterly time periods, for Situation A, Moderate Recovery.

   The middle chart covers all the quarters from CR initiation to 1-3/4 years of the aftermath (seven quarters). "Moderate recovery" is as defined previously.

3. The bottom chart shows the combined direct impact on the variable (crisis period plus CR reconstitution period), and the induced impact over subsequent quarterly time periods, for Situation B, More Rapid Recovery.

   The same time period as above is used, but the recovery rate is "more rapid" (more rapid recovery has been previously defined).

In each of these figures, the zero quarter is the quarter in which the crisis occurs (CR initiation and maintenance periods), while the first quarter is the quarter in which the reconstitution period begins. Also, in each of the figures, the estimated change is related to the corresponding pre-crisis value of that economic variable; for the model, we chose mid-1976 values as the baseline values. It is believed that the relative changes in the variables are representative of likely relative changes should a crisis relocation occur in the future.

Figure IV-3 shows the CR-caused change in gross national product gap (GNPG), an aggregate overall measure. When considering the variations associated with the CR crisis period only, a relatively large increase in GNP occurs in the initial quarter; however, the subsequent increases are relatively small. Further disequilibrium associated with both recovery scenarios shows continuing fluctuations in GNPG, mainly as a result of dislocations and negative business expectations associated with the crisis quarter itself. Under both recovery scenarios, the induced impact over time dampens by the sixth quarter. Translating the percentage losses into 1976 dollars indicates that the direct cost of crisis relocation totals $90 billion or greater.

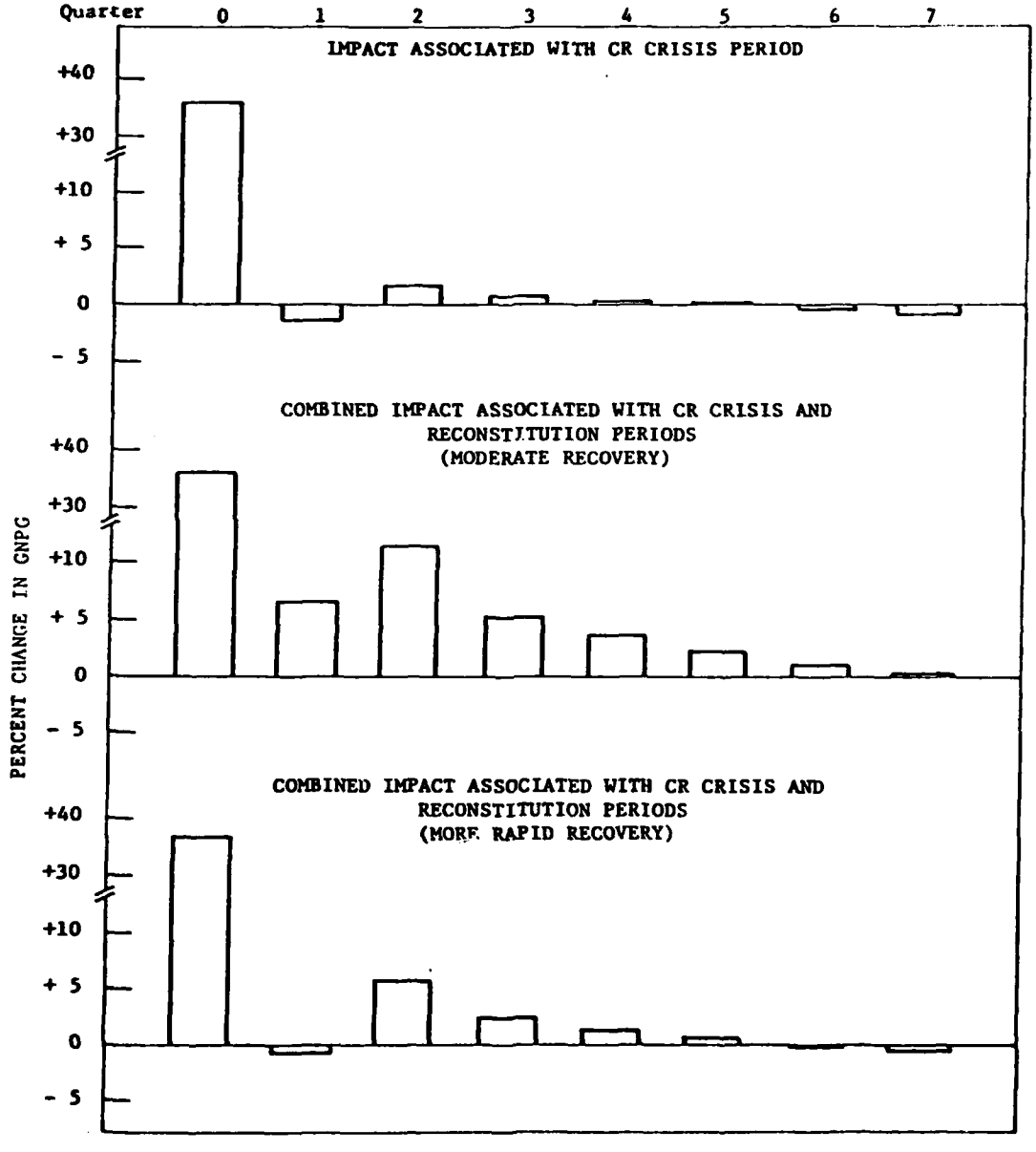
Figure IV-4 shows the percentage change in prices. For each of the three scenarios, the increase in prices is less than a percentage point in the crisis quarter (quarter 0), followed by a relatively strong deflationary pattern. Although this pattern persists through the first three quarters, it is significantly dampened by the fourth quarter. The primary reason for this pattern appears to be unfavorable expectations of both individuals and business. As seen subsequently, the demand for durable goods is lessened, and so is the amount of gross investment. It also appears that the federal government should elect policies that enhance individual and business expectations and that dispel fears, including the fear that further nuclear confrontation may occur in the near future.

Figure IV-5 summarizes the percentage change in disposable income, which is generally negative for all quarters considered. By the fifth quarter, the decrease in disposable income generally is stabilized. As disposable income recovers, price level increases can be expected. This reduction in disposable income is also reflected in weakened demand for consumer durable goods.

Figure IV-6 shows the percentage change in consumer expenditures for durable goods. As a result of the reduction in disposable income, a large reduction in expenditures for durable goods occurs in the crisis quarter. Under the moderate recovery assumption, the reduction persists until the fifth quarter, and no pent-up demand for these goods is apparent. This is not the case when considering a more rapid recovery assumption. For that case, during the initial reconstitution phase (first quarter), pent-up demand for durable goods is evident. However, after that quarter, reduction in

FIGURE IV-3

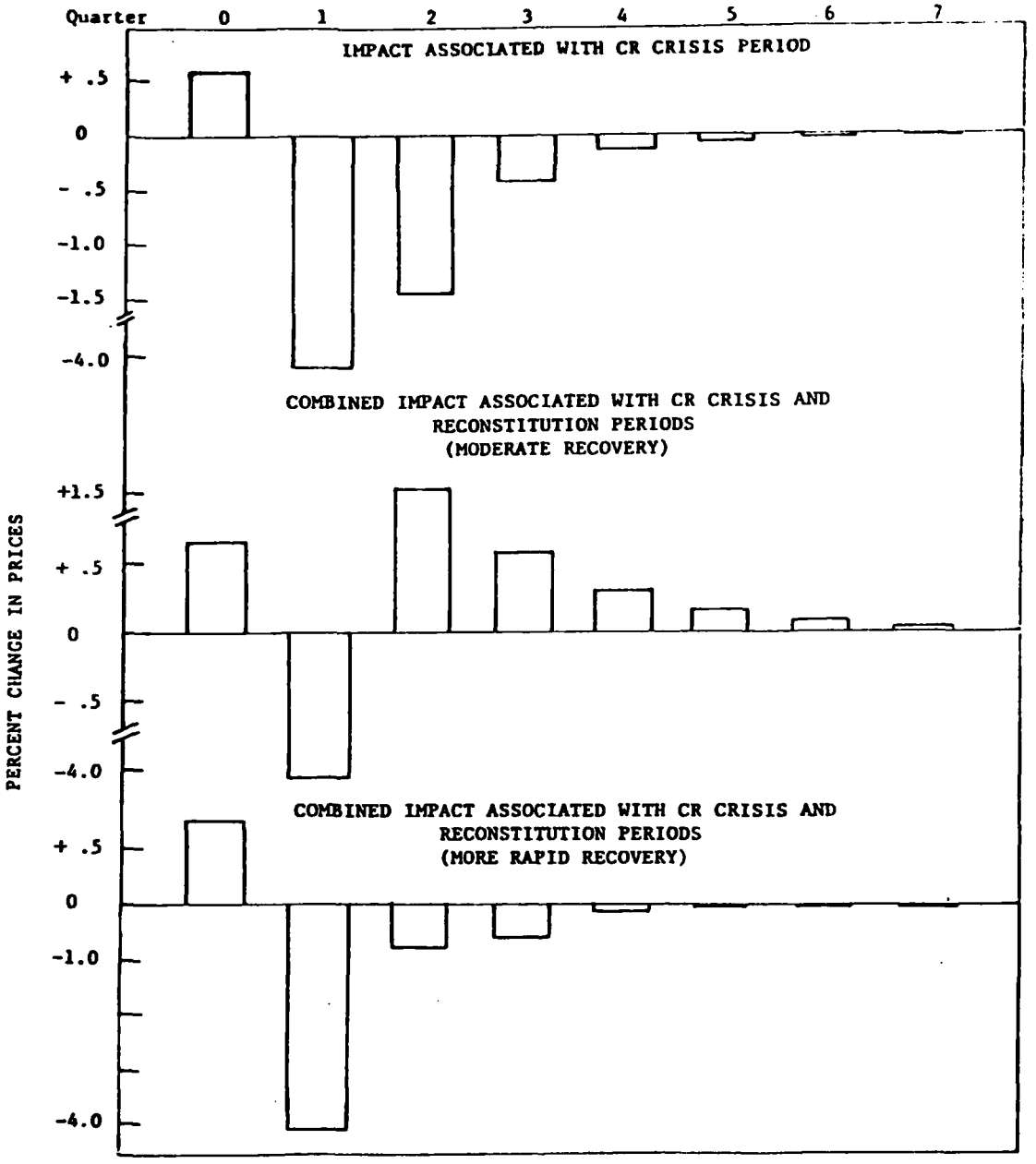
PERCENT CHANGE IN GROSS NATIONAL PRODUCT GAP (GNPG)



NOTE: Quarter 0 represents the quarter in which the crisis occurs.
Quarter 1 represents the reconstitution quarter.

FIGURE IV-4

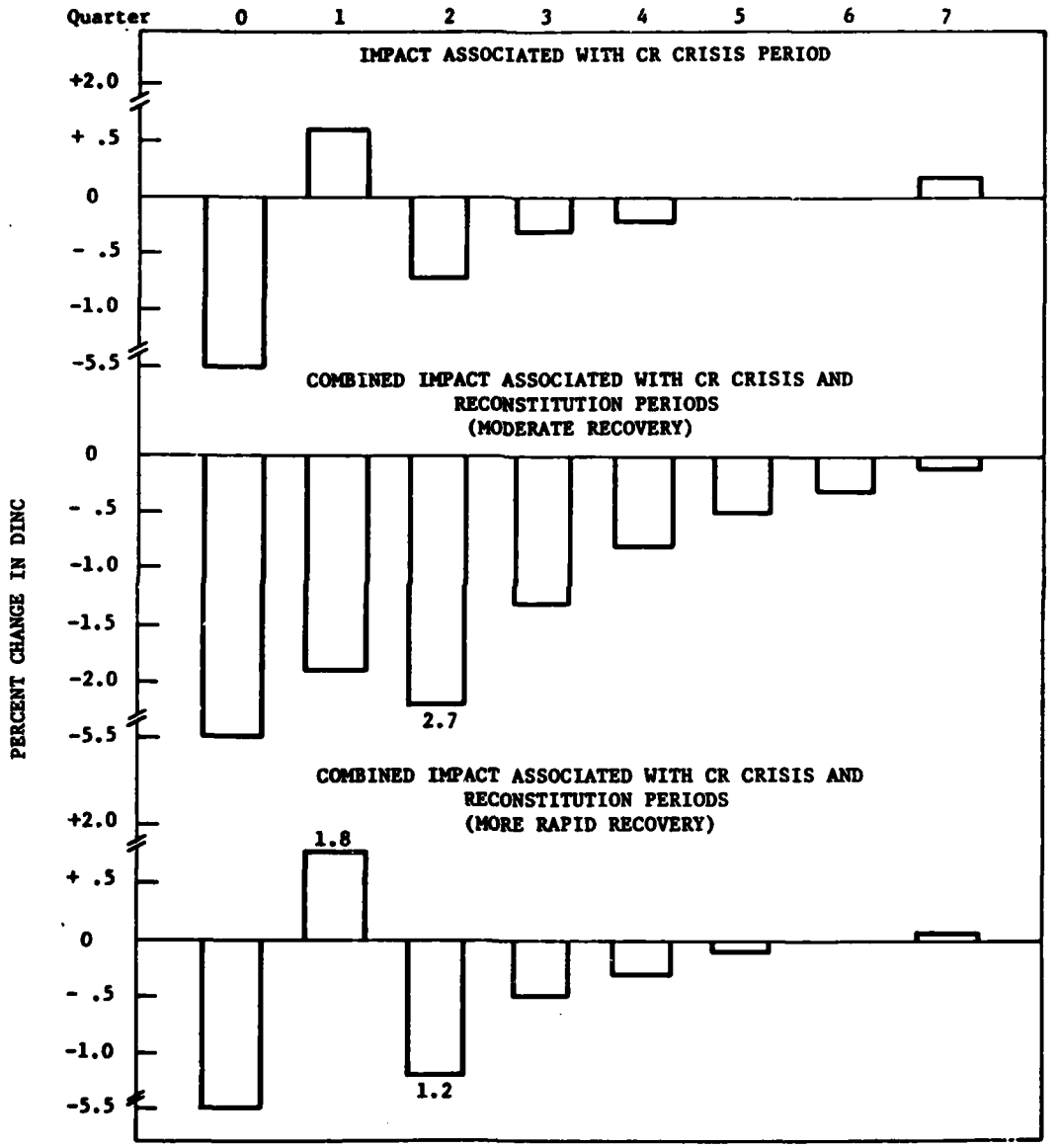
PERCENT CHANGE IN PRICES (PCHP)



NOTE: Quarter 0 represents the quarter in which the crisis occurs.
Quarter 1 represents the reconstitution quarter.

FIGURE IV-5

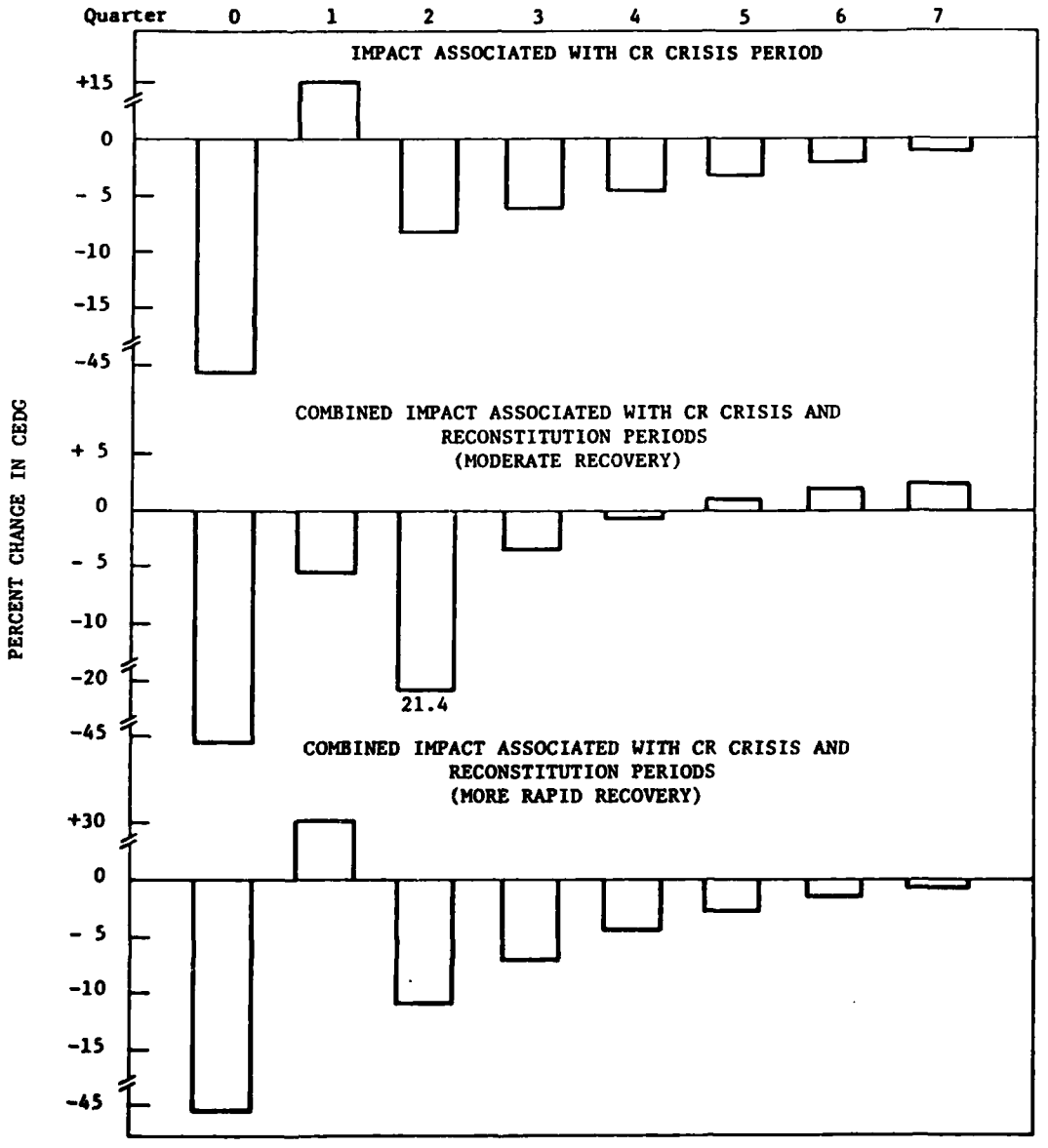
PERCENT CHANGE IN DISPOSABLE INCOME (FINC)



NOTE: Quarter 0 represents the quarter in which the crisis occurs.
Quarter 1 represents the reconstitution quarter.

FIGURE IV-6

PERCENT CHANGE IN CONSUMER EXPENDITURES
FOR DURABLE GOODS (CEDG)



NOTE: Quarter 0 represents the quarter in which crisis occurs.
Quarter 1 represents the reconstitution quarter.

durable goods purchases persists. Although not shown as a figure, consumption of essential goods and services is also slightly reduced for all of the periods considered under the moderate recovery assumption. However, the consumption of essential goods and services is slightly increased over time under the more rapid recovery assumption. Hence, depending on expectations, price changes, and the pace of reconstitution, the household sector appears to be engaging in a trade-off between essential goods and services and durable goods.

Figures IV-7 and IV-8 show the CR-caused changes in the two components of gross investment: investment in residential structures, and investment in non-residential structures and equipment. Investment in residential structures, under the moderate recovery assumption, turns favorable in the third quarter, whereas under the more rapid recovery assumption, recovery essentially occurs in the fourth quarter. Investment tends to improve faster for the moderate recovery case than for the rapid recovery case. This effect appears to be due to the investment requirements associated with the larger government mobilization efforts included in the rapid recovery case.

Contrast this situation with business gross investment in structures and equipment. Under both the moderate recovery and the more rapid recovery assumptions, business investment remains unfavorable throughout the seven quarters of reconstitution. These results imply that business expectations are more adversely affected than household expectations. Moreover, as is shown subsequently, financial institutions appear to be more reluctant to make loans to business than to households during the reconstitution period. Although the detailed reasons for these patterns are difficult to sort out, it appears that depressed profit margins, coupled with government mobilization expenditures, have an unfavorable impact on business expectations. These considerations argue that selective policies relating to business incentives may have to be considered carefully by federal policymakers.

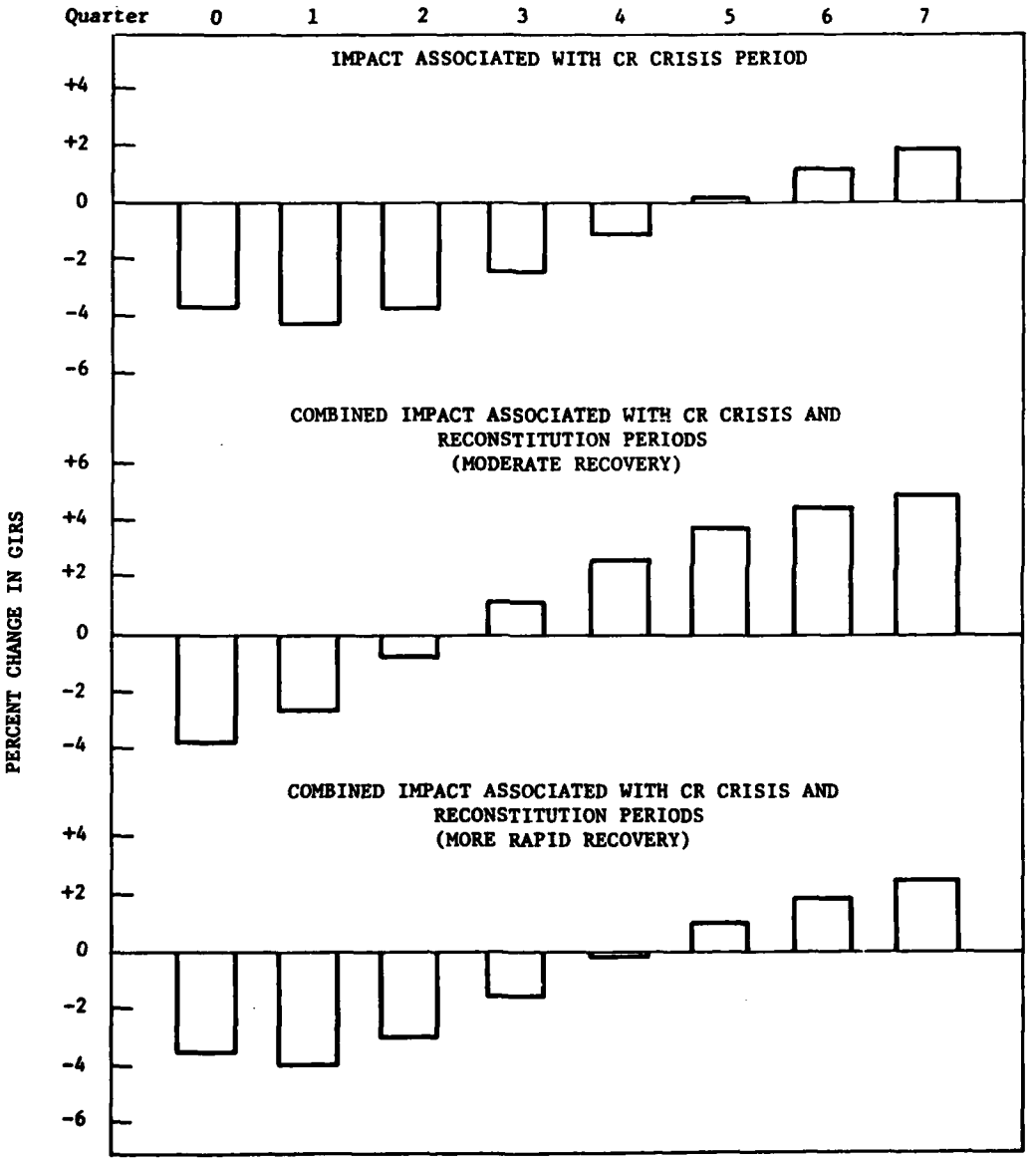
E. Conclusions on Economic Impact for GNP-Related Variables

These results, taken together, indicate that for relocation lasting two weeks:

- **Although there are significant economic losses, the nation's economy is able to withstand the shock associated with crisis relocation in times of nuclear confrontation.**

FIGURE IV-7

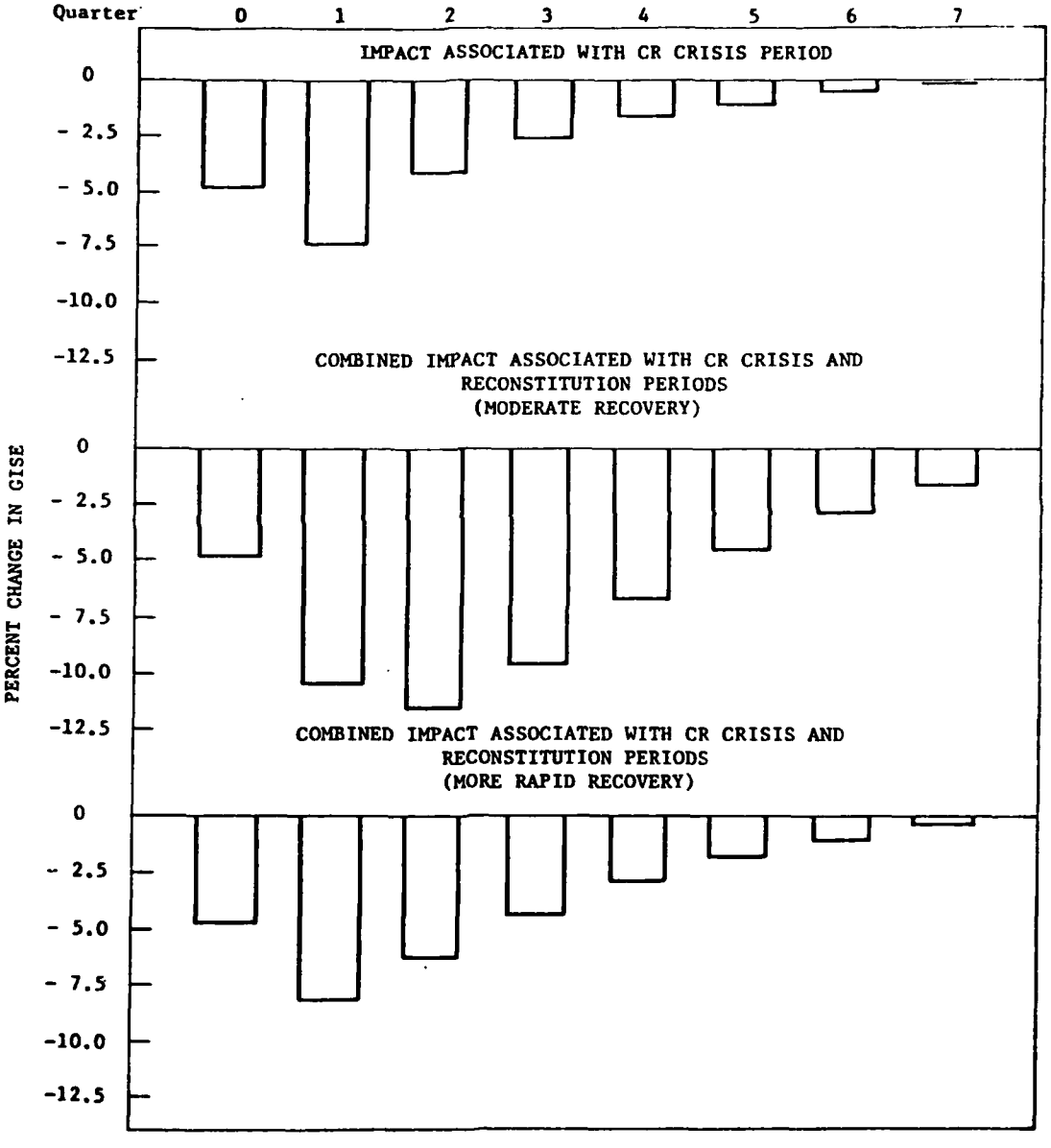
PERCENT CHANGE IN GROSS INVESTMENT
IN RESIDENTIAL STRUCTURES (GIRS)



NOTE: Quarter 0 represents the quarter in which the crisis occurs.
Quarter 1 represents the reconstitution quarter.

FIGURE IV-8

PERCENT CHANGE IN GROSS INVESTMENT IN NONRESIDENTIAL STRUCTURES AND EQUIPMENT (GISE)



NOTE: Quarter 0 represents the quarter in which the crisis occurs.
Quarter 1 represents the reconstitution quarter.

- The economic system stablizes within about one year; government policies can further reduce this time frame. The specification and evaluation of these policies remain essential tasks.

- Systematic planning is required so that appropriate reconstitution policies can be implemented in a timely but selective manner. Business incentives appear to be a critical element in determining the robustness of recovery.

- Reconstitution policies must be closely coordinated with CR crisis policies in order to avoid delays that would have further adverse effect on the nation's economy. This task becomes more critical when the CR maintenance period significantly exceeds two weeks, as shown in our initial report.*

- Monetary and fiscal policies both for the CR crisis period and for the CR reconstitution period are also of critical importance. (These considerations are developed more thoroughly in the next section.)

F. Results for Sectors of the National Economy

The preceding results were for the economy as a whole. This section presents TEMCRIS financial impact results for three sectors of the economy -- household, business, and government -- in Figures IV-9, IV-10, and IV-11, respectively. The same scenarios are used as for the preceding figures. Together with the previous results, the results in this section complete the analysis of the various CR impacts using the TEMCRIS II model.

For convenience, the variables in Figures IV-9, IV-10, and IV-11 are summarized below.

Financial Variables	Symbol
Availability of Credit Funds:	
To Households	ACFH
To Business	ACFB
To Government (Federal, State, Local)	ACFG
Demand for Credit Funds:	
By Households	DCFH
By Business	DCFB
By Government (Federal, State, Local)	DCFG
Interest Rate:	
For Households	INTH
For Business	INTB
For Government (Federal, State, Local)	INTG

* Richard Laurino, Frank Trinkl et al, Economic and Industrial Aspects of Crisis Relocation: An Overview, May 1977.

As in the previous analysis, the following figures show percentage change rather than dollar values. Also, the demand/availability variables, reflecting funds raised and supplied by specific economic sectors, represent net changes in the amount of credit, and not the total amount. Consequently, in instances where the cumulative reductions over time exceed 100% (e.g., in availability of credit funds for business, Figure IV-10), the results are interpreted as a reduction in existing credit funds, such as by calling in loans or not renewing loans.

1. Financial Impact on Households

Figure IV-9 summarizes the financial impact of crisis relocation on households. When considering the impact of the CR crisis period only, significant reductions occur in the demand for credit funds and their availability (32% and 44% respectively). In the reconstitution period, the household demand for credit funds turns positive, but the availability of funds remains negative for four quarters following the crisis quarter (quarter 0). This pattern is accompanied by a lower drift of interest rates.

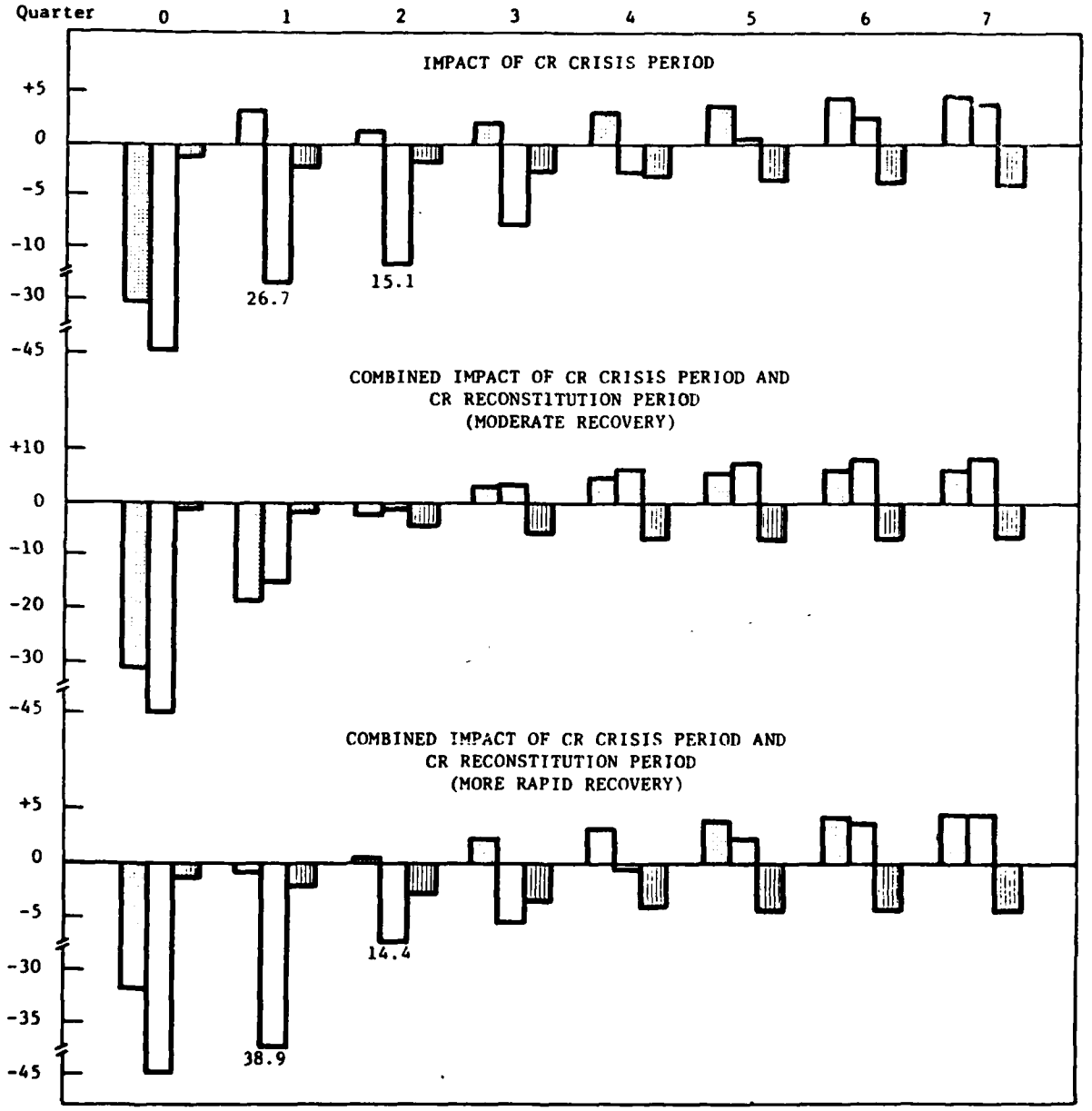
Under the assumption of moderate recovery (middle chart of Figure IV-9), household demand for credit funds remains negative for two quarters following the crisis quarter. These results match the reduced expenditures for durable goods, as shown in the previous section. The availability of credit funds to households recovers at a more rapid rate. Because of uncertainties in the reconstitution period (and the interrelationship of all interest rates), the interest rates are under a notable downward pressure.

With more rapid recovery (bottom chart of Figure IV-9), household demand for credit funds shows a significant improvement, compared to the moderate recovery case. However, the availability of credit funds to households is worsened. This result is subsequently explained by examining the availability of credit funds to business (Figure IV-10). Interest rates again show a downward pattern, though less than for the moderate recovery case, and are consistent with the pattern noted in the indicator of price changes.

For all cases, the weakness in credit fund demand/availability and the downward trend of the interest rate are consistent with weaknesses in expenditures on durable goods, investment in residential structures, amount of disposable income, and changes in prices.

FIGURE IV-9

PERCENT CHANGE IN FINANCIAL VARIABLES
ASSOCIATED WITH HOUSEHOLDS



NOTE: Quarter 0 represents the quarter in which CR crisis occurs.
Quarter 1 represents the reconsrtitution quarter.

Demand for credit funds households
Availability of credit funds households
Interest rate households

2. Financial Impact on Business

The financial impact of crisis relocation on business is shown in Figure IV-10. For the crisis quarter (quarter 0), the reduction in the availability of credit funds to business appears strikingly severe. This pattern is mainly attributable to negative expectations by the financial institutions (Chapter III), concerning the continued profitability of business. As was shown in Figure IV-8 in the preceding section, business investment in structures and equipment was also depressed. Business interest rates are more severely affected than household interest rates.

The middle bar chart of Figure IV-10, for the combined impact of the crisis quarter and the reconstitution quarters in the moderate recovery case, indicates more severe consequences. Beginning with the reconstitution quarter (quarter 1) and extending over subsequent quarters, the availability of credit funds to business is severely curtailed. Because of production start-up delays, a moderate amount of continued worker absenteeism, and a notable decline in profitability, the short-term business outlook appears pessimistic. Large reductions occur in the availability of credit funds to business. The magnitude of the reduction suggests that outstanding loans are not being extended. Interest rates relative to the pre-crisis period are sharply reduced -- reductions that are larger than those experienced in the household sector.

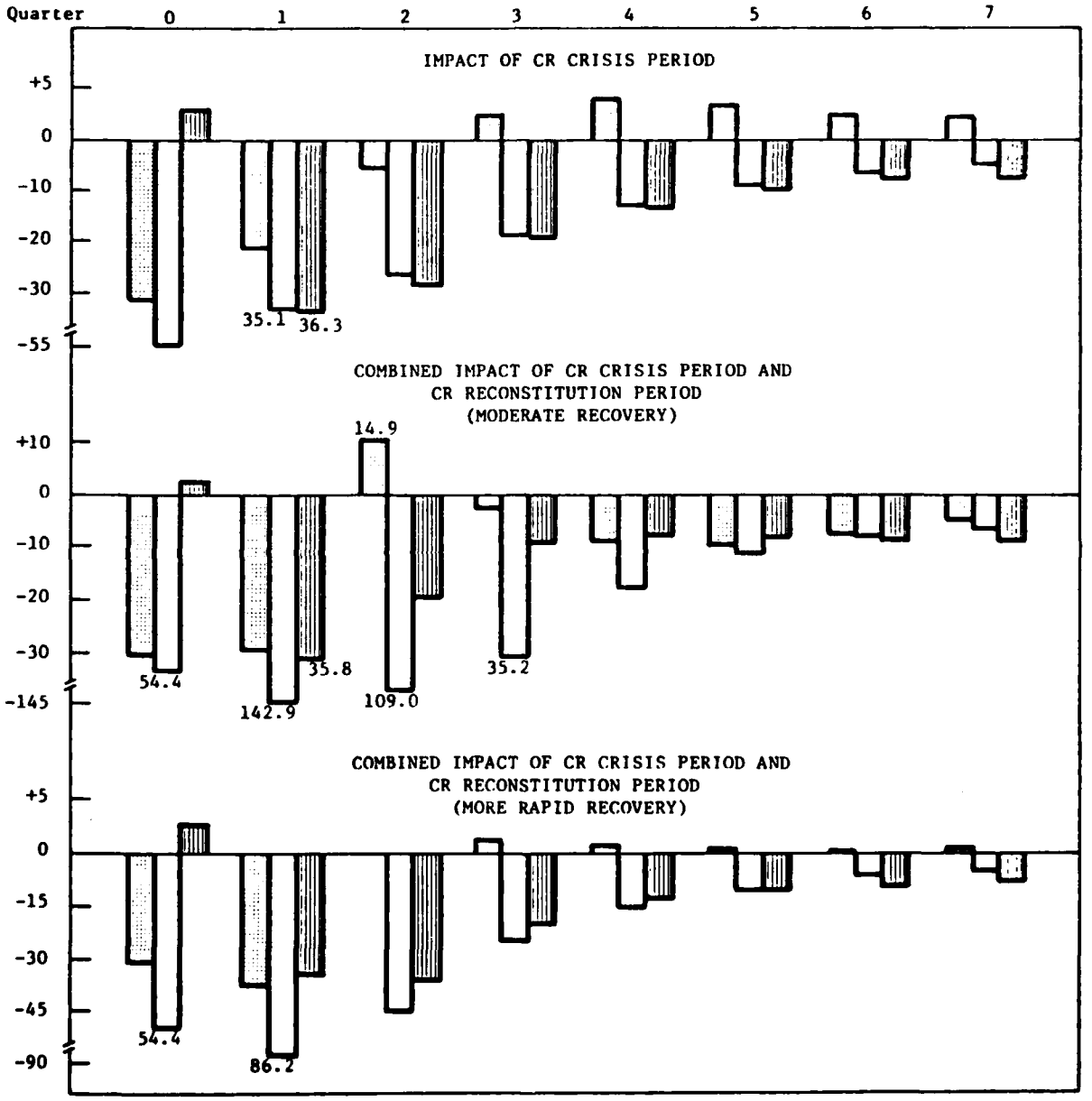
In the more rapid recovery case (bottom chart), the combined impact of the crisis quarter and reconstitution quarters shows that the consequences, while severe, are somewhat less than in the moderate recovery case, except for the interest rate pattern. The business interest rate pattern experiences more downward pressure than the household interest rate pattern. The reason is that interest rate is affected by pessimistic perceptions of the credit worthiness of business, and by expectations of future profitability.

Continuing with the more rapid recovery case, business demand for credit funds turns slightly positive during the third quarter of reconstitution, indicating that business confidence is being restored; however, in the absence of government intervention, financial institutions appear pessimistic regarding business profitability.

For the three scenarios shown in Figure IV-10, the notable decline in credit fund demand/availability and the downward trend in interest rate are

FIGURE IV-10

PERCENT CHANGE IN FINANCIAL VARIABLES
ASSOCIATED WITH BUSINESS



NOTE: Quarter 0 represents the quarter in which CR crisis occurs.
Quarter 1 represents the reconstitution quarter.

Demand for credit funds business
Availability of credit funds business
Interest rate business

consistent with weakness in consumer expenditures on durable goods, investment in residential structures, business investment in structures and equipment, business profitability, and changes in prices. Also, it appears that uncertainty as to whether future crises are likely affects businesses and financial institutions to a greater extent than it affects households.

3. Financial Impact on Government

Figure IV-11 summarizes the financial impact of crisis relocation on federal, state and local governments. Although TEMCRIS does not disaggregate the various levels of government, there is reason to believe that the results shown in Figure IV-11 are more representative of consequences occurring at the federal level. For the three scenarios considered in the figure, the demand for credit funds by government is significantly high. During the crisis quarter, expenditures for mobilization, civil defense shelters, and transfer payments account for nearly all the increase. This preponderance of federal expenditures is explained by the usual practice of financial institutions -- though they are unwilling to make loans to individuals and businesses, they are usually willing to make loans to government, especially when the downward pressure on interest rates to government is less severe than that on the business interest rate.

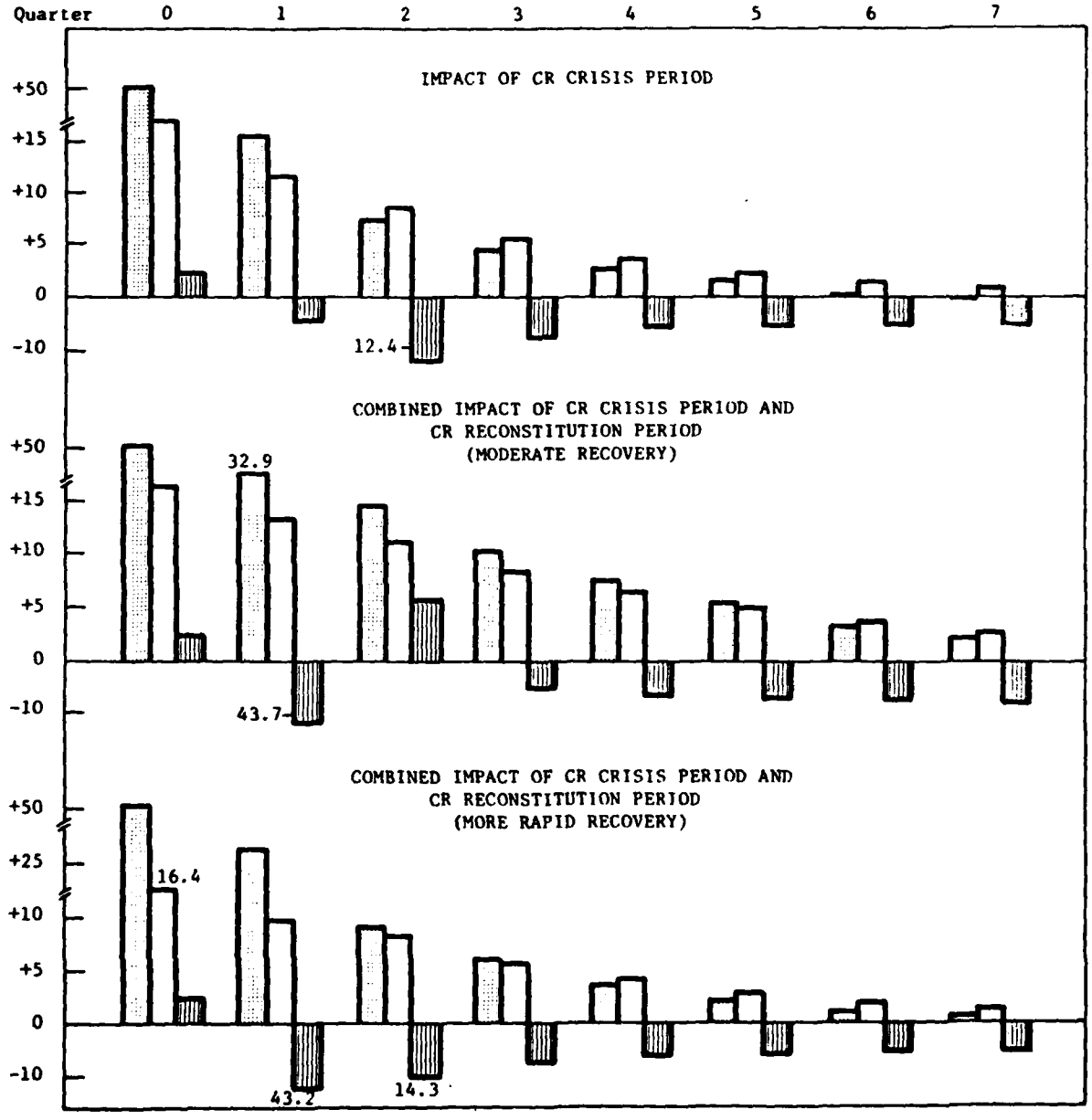
4. Additional Observations on TEMCRIS Results

It is important to understand that financial institutions, especially banks, as well as domestic and foreign credit institutions, are attempting to conduct their operations in extremely adverse conditions during the crisis quarter. Although it is postulated that the crisis is successfully resolved, the issue remains: how is this crisis perceived by individuals, businesses, financial institutions, and U.S. allies? Subsequent expectations about the economic climate will be shaped by these varying and probably mixed perceptions.

It is also clear that the overall availability of credit funds is notably reduced during the aftermath of crisis relocation, as financial institutions cope with their liquidity problems. These problems are likely to vary, depending on the type of financial institution and the circumstances of specific institutions. Timely and selective government policies would be required in order to ameliorate the adverse consequences of crisis relocation.

FIGURE IV-11

PERCENT CHANGE IN FINANCIAL VARIABLES
ASSOCIATED WITH GOVERNMENT



NOTE: Quarter 0 represents the quarter in which CR crisis occurs.
Quarter 1 represents the reconstitution quarter.

Demand for credit funds government
Availability of credit funds government
Interest rate government

In the absence of such intervention, crisis relocation would induce a relatively steep decline in economic productivity during the crisis quarter, followed by a more shallow recession that would last an additional three quarters.

V. SUGGESTED PLANNING GUIDANCE AND PLAN FORMATS

A. General Approach

In this chapter, the findings of this and previous studies of economic impacts of crisis relocation have been used to develop suggested planning guidance suitable for government, business, and financial institutions. The suggested guidance was also influenced by information from other sources, including FEMA regional planning experience; trade association and company emergency plans and experience; and postattack recovery studies as well as other studies by various government agencies such as FEMA (DCPA and FPA), the Federal Reserve System, and the Department of Treasury.

While a variety of public and private sources were used to develop guidance, official policies of government have not been established. Thus, any guidance offered in a research report must be considered to be only an agenda for action by the cognizant planning agencies. For government consideration, many of the most important policy issues are embodied in the guidance statements. This approach seems appropriate since the resolution of these issues is among the earliest planning steps that should be taken by government to permit meaningful economic planning to go forward.

To provide specific guidance for business and financial institutions, it has been necessary to make assumptions on many policy issues. The policies assumed in this report tend to be those that are compatible with traditional government approaches in major emergencies, where applicable. In particular, we have assumed that the government will adopt the policy of trying to keep the economy going to the extent possible during the crisis (i.e., prior to, during, and after). Also, we believe that it is not desirable to forgive prior obligations throughout the CR period, as proposed in some planning documents.[1*] Costs accruing during this period would be largely due to actual economic events, and would therefore fall on someone after the end of the crisis. The question then becomes the matter of degree to which public and private sectors will absorb costs.

Guidance as presented here assumes that the extreme crisis period leading to CR is resolved without a major strategic nuclear attack. The guidance statements have been reviewed, however, for consistency with postattack

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* Superscripts designate references listed at the end of this chapter.

economic operations. In fact, most of the guidance presented would definitely enhance the ability of the country to control the postattack economy, in the event the crisis ends in strategic attack. Guidance is for one CR event, not for multiple events. In a multiple case the problems of resuming the pre-CR economy require modifications and further analysis.

As part of the peaceful restoration of the economy following CR, the guidance assumes that economic units continue to bear responsibility for costs growing out of past obligations as well as for some costs incurred during the CR maintenance period (e.g., fixed business costs, purchase of non-essential goods, normal production costs of essential goods and services, etc.). Recognizing the disruption attendant to CR, most payments are assumed to be deferred to the post-CR period. Where unsustainable burdens occur, it is expected that government would take steps to alleviate the problems by a policy of direct expenditures, transfer payments, selected moratoria, loan guarantees, and other measures.

B. Guidance Related to Government Planning

1. Findings

- The crisis relocation of a large part of the U.S. population would cause direct economic losses (as measured by GNP) of about $50-60 billion through the end of the CR maintenance period. This loss, in 1978 dollars, would be roughly of the same magnitude as a military mobilization and operations cost attendant to the crisis. Nonetheless, the U.S. economy is sufficiently strong to recover rapidly (within about one year) if appropriate and timely government actions have been taken.

- The economic impact of a CR maintenance period of about two to three weeks appears to be sustainable by most economic units (e.g., individuals, businesses, etc.). However, after three weeks, a rapidly growing fraction of businesses (including financial) would face severe liquidity and solvency problems, possibly leading to a significant number of bankruptcies.

- Depending upon the crisis buildup, economic problems could start well before crisis relocation was ordered. Possible "runs" on banks, worker absenteeism, and other conditions suggest that government be prepared to initiate graduated series of controls well before the declaration of a national emergency* or a crisis relocation.

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*New legislation would probably be required.

- The crisis event can be broken down into a number of periods, with interrelated economic problems: a pre-CR period in which the crisis severity increases over a period of days or weeks; a CR initiation period of about three days starting with the formal order to relocate and ending with evacuees in place in host areas; a CR maintenance period during which most operations in the risk areas are shut down and evacuees are maintained in host areas; and a CR reconstitution period during which the evacuees return and efforts begin to bring the economy back to its pre-CR condition. The economic problems of successive periods will be either increased or decreased depending upon the success in meeting problems of preceding periods.

- The disruptions attendant to CR such as discontinuance of the mail, shutdown of most risk-area business, etc. would place many individuals in a position where they could not pay for current essentials (such as food, lodging, and support services, etc.). In addition, these disruptions would prevent most economic units from meeting prior obligations on a timely basis. This situation would raise problems related to liability under contracts and statutes of limitations, and other legal requirements.

- A slow start-up of economic activity in the CR reconstitution period might be expected because of CR losses to economic units, delays in arrival of accounts receivable, liquidity and solvency problems of individual economic units, etc. These factors would be compounded by the possible changes in economic behavior due to individual perceptions as to the favorable or unfavorable outcome of the crisis, and its effect on the future. As a result of these uncertainties, the severity of a recession, caused by the crisis relocation, could be significantly increased. However, the extent and duration of the recession would depend upon the government policies applied in the post-crisis period.

- A crisis of this severity, which involves the United States and the Soviet Union in a direct confrontation, would affect economies throughout the world. Thus, the impact of CR on the U.S. economy cannot be considered in isolation.

- Defense mobilization concurrent with and following crisis relocation could significantly change the expected economic outcome estimated for crisis relocation alone. While a notable increase in government spending that might attend mobilization has been assumed in this current study, the problem of mobilization impact has not been examined specifically, and no qualitative conclusions can be offered.

2. Guidance

- Government should attempt to minimize losses during the CR maintenance period by keeping the economy going to the fullest extent possible in non-risk areas. This policy should include maintaining or expanding essential industry production in non-risk areas and permitting non-essential business activity to continue in non-risk areas to the extent feasible within the available support resources.

- The overriding government policy during crisis relocation should be that no one is denied subsistence needs because of inability to pay.

- Prior to the crisis, government policies should be established as to whether essential services would be provided to individuals at government expense, or whether individuals or other economic units would be responsible for payment of all or part of the costs on a deferred basis.

- The nature of the economic controls to be used in CR should be developed by government well before the crisis. These controls rather than an uncontrolled cash economy would be needed to assist in the timely, efficient, and equitable distribution of essential products and services. Part of this system should include non-monetary exchange mechanisms (e.g., invoices, etc.); price, rent, and wage freezes; rationing of essential items, etc.*

- The use of cash during the CR maintenance period should be permitted as a means of facilitating some transactions and increasing the level of economic activity in non-risk areas; however, cash should not be required for essential products and services.

- The Federal Government should be prepared to guarantee business against losses due to added costs of emergency production of essential goods and services. Government should also pay full costs of emergency operations (e.g., shelter construction, relocation management, etc.).

- The Federal Government should declare a form of moratorium on obligations that fall due during the CR maintenance period -- e.g., payments of prior obligations, invocation of statutes of limitations and penalty clauses of contracts, etc. The purpose would be to defer rather than forgive payments.*

- The Federal Government should also be prepared to extend selective moratoria into the CR reconstitution period to protect specific economic sectors and economic units that have been severely endangered by the impact of CR maintenance.

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*Not currently endorsed by the Department of Treasury.

- Government should be prepared to make use of all traditional forms of emergency assistance on a nationwide basis, including emergency loans, loan guarantees, direct and indirect payments to the needy, etc. Because of the large obligation resulting from this policy, decisions should be made prior to the crisis as to the individual limits of such assistance.

- A coordinated set of actions and policies by government during and after CR is important to improve public perceptions as to the likelihood of a favorable economic climate in the CR reconstitution period.

- In the CR reconstitution period, the Federal Government should adopt monetary and fiscal policies of economic stimulation to assist in restoring aggregate demand. Applicable policy actions include: provision of credit, interest rate subsidies, rapid payment of CR obligations, timely additional transfer payments to needy economic units, and other measures.

- Government planning for CR must consider the conflicts and tradeoffs inherent in industrial mobilization policies. For example, government investment in mobilization during and after a CR crisis could reduce availability of credit funds in the private sector in the CR reconstitution period, and thus delay overall rapid recovery.

- Governments should develop strong emergency public information (EPI) programs for use prior to, during, and after crisis relocation. An important part of such information programs would be the channeling of individual actions into efforts that support the economic objectives associated with the CR option. Objectives would include: (a) in the pre-CR period, reducing premature actions (e.g., panic buying, absenteeism, etc.); (b) during the CR maintenance period, supporting essential industry efforts to maintain an adequate work force in risk areas; and (c) during the CR reconstitution period, encouraging rapid resumption of production.

C. Guidance Related to Business

1. Findings

- Business could begin to feel the impact of a crisis well before a crisis relocation is ordered. Uncertainties about the future could cause changes in demand patterns, such as an increased purchase of immediate necessities and a reduced demand for durables. A slowdown in the arrival of accounts receivable could occur during this period, causing liquidity problems for some firms. As the crisis increased in severity, growing worker absenteeism could begin to affect the efficiency of production.

- The declaration of crisis relocation will bring most business to a standstill for several days. Non-essential businesses in the risk areas might encounter difficulties in carrying out orderly shutdown procedures at this time, because of the evacuation of workers and the disruption of support services.

- Businesses engaged in essential production during the CR maintenance period will face problems in achieving desired production levels, because of limited inventories and support systems, increased absenteeism, changed distribution patterns, and other factors. In many instances, the duration of production might be limited to the days of raw materials on hand in a facility. Absenteeism could continue to hamper production in risk areas. Products and services for the population would also have to be delivered primarily to host areas instead of risk areas.

- In a given facility, products and services that are considered essential might represent only a part of the normal activities of the facility. Production of only essentials would change the product mix so as to result in added unit costs for emergency production. Other factors, such as changed distribution patterns, and delays in receipt of support services, could also contribute to increased costs of production. Thus, such production carried out under a price freeze and allocation controls could result in a financial hardship for many firms.

- Because of the disruption of business and postal service during the CR maintenance period, a stoppage would occur in most payments on pre-CR obligations. Payments for essential goods and services during CR maintenance would also largely be deferred until after resolution of the crisis. Many firms would have to modify their methods for recording exchanges during the CR maintenance period.

- Some industrial facilities will continue to function during the CR maintenance period to produce essential products and services. However, not all facilities in an essential industry will be needed to meet crisis requirements. Business with the assistance of government should examine ways of making maximum use of essential production in non-risk areas so that production and workers may be kept to a minimum in the risk areas.

- A slow start-up of business in the CR reconstitution period is likely because of mobilization requirements, changes in demand, operational problems, and uncertain perceptions about the future. Essential industry in particular will face problems of reduced inventories, reactivation of normal supply channels, accumulated maintenance problems, etc. Demand for non-essential products may be reduced because

of losses sustained by customers during CR maintenance. Business might cancel orders or delay investment decisions pending clarification of the economic situation.

- Economic losses of business could be as severe after the crisis as those during the CR maintenance period. However, provided that the CR maintenance period does not exceed about three weeks and the government acts quickly to stimulate production in the post-CR period, most businesses should be able to sustain the losses without permanent damage. Within this context, liquidity and solvency problems of the weaker firms warrant special attention from the financial community and other business, and from traditional emergency financial intervention by government.

2. Guidance

- The possible early onset of economic effects of crisis suggests that businesses should possess knowledge of crisis hazards and the fundamentals of protection. This knowledge would include: sources of reliable information; organizational responsibility for action; kinds of advice and assistance to give employees; special shutdown requirements; availability of financial and other resources; and security requirements. To ensure that such knowledge is imparted to business, government should supply simplified information and action checklists to every business establishment.

- Firms involved in emergency production should prepare emergency plans well in advance of crisis. (See section E.) Facility CR plans should be integrated with any other facility plans, to the extent possible. Government should provide assistance in the form of sample plans, technical assistance, etc.

- The jurisdictions responsible for nuclear civil protection (NCP) planning in risk areas should be encouraged to include representatives of essential businesses in their industrial planning activities. These representatives would help develop guidance that is feasible for business organizations to implement, and would coordinate their facility CR plans more closely with the risk-area jurisdictions' NCP plans. Additionally, as part of the area planning organization, the business representatives could receive valuable training and exercise experience during the pre-crisis period.

- Firms with complex operations and shutdown problems should expect to implement the preparatory stages of their plans well in advance of the order for relocation. Such steps would include: updating the plan, instructing employees, accumulating resources necessary to continue or shut down production, formulating financial plans, etc.

- Direct involvement by essential risk-area firms in employers' plans for employee relocation is recommended to reduce absenteeism in the pre-CR period and to help retain minimum staffs in risk-area production during the CR maintenance period. A firm's information, plans, and actions should demonstrate to the labor force how the firm is providing for the safety and well-being of the employees and their families prior to and during CR. This effort would include: offering families assistance in relocation; providing essential needs; protecting employees on the work site (if an essential industry); offering financial assistance; etc. The emergency information should provide the rationale as to why workers should continue to perform their duties, and what benefits will accrue to the workers and the nation.

- Essential industry should expect to produce products and services at pre-crisis frozen prices, even though unit costs might increase. Where the government has directed production, provision would be made for adjustment of prices and final settlement in the CR reconstitution period. Mutually acceptable emergency recordkeeping procedures should be established prior to the crisis.

- Prior to the crisis, essential business in non-risk areas should document current production levels and estimate maximum short-term production, together with augmented support requirements (e.g., added workers, supplies, transportation, etc.). This information should be used by regional planning groups in arriving at production goals for essential businesses in risk and non-risk areas. In particular, regional planners in concert with business should determine the degree to which risk-area essential production can be safely reduced.

- In the CR maintenance period, businesses planning an early resumption of post-CR production should maintain a responsible official or group in the host area to coordinate with local and regional governments. Such a person or group could arrange for start-up resource requirements and transportation for core groups of employees; could initiate requests for financial support; and could perform other actions to ensure early production in the CR reconstitution period. Such a coordination role would also allow local or regional agencies to contact a firm during the CR maintenance period when some emergency or other serious event concerned its facilities in the risk area.

- As part of planning prior to the crisis, firms should identify their internal funds that might be used to cover CR losses, and should also identify possible sources of outside assistance (e.g., financial community, industry, government).

- Businesses planning for an early post-crisis start-up should identify special problems such as reduced inventories, needed maintenance, start-up difficulties associated with specific industrial processes, etc. Alternate sources of supply and support should be determined.

D. Guidance Related to Financial Institutions

1. Findings

- Crisis relocation can be expected to disrupt financial systems and curtail or prevent most normal banking activities. In the absence of controls, the demands placed on the banking system would exceed capabilities and threaten the liquidity and solvency of some institutions.

- The buildup of concern during the pre-CR crisis period could cause unsustainable demands to be placed on banks well before formal government imposition of controls which are now tied to a declaration of a national emergency, or the occurrence of an attack.

- Major bank processing systems would be shut down during the CR maintenance period because they are largely located in risk areas. Systems to be shut down would include accounting systems, central bank check-clearing, regular mail systems, and electronic transfer of funds systems. Courier services, however, might be maintained.

- The traditional policy in national emergencies of "keeping the economy going" is applicable for CR in the non-risk areas. Such a policy would permit the continued functioning of non-risk area business and some supporting financial services, and would provide for more efficient utilization of available non-risk area resources.

- Many of the basic approaches that have previously been developed for emergency operations in banking would be applicable to the CR situation -- in particular, the broadened authority of the Federal Reserve, the relocation of Federal Reserve functions, the provision of emergency cash services, and the use of emergency procedures for extensions of credit. Some approaches and specifics would not apply -- e.g., initial check clearing, which would be delayed until after CR.

- The banking system would have the resources to play its proper role in support of business in the CR reconstitution period provided that the CR maintenance period did not exceed three weeks and that effective controls were maintained on withdrawals and transfers of credit.

2. Guidance

- Guidance statements made for business are also applicable to financial institutions.

- Regulations such as those in Emergency Banking Regulation No. 1 would be applicable for the CR situation.[2] Needed regulations include: restrictions on cash withdrawals and transfers, loans and other forms of credit, and savings activities; authority to change locations of operations; and relaxation of restrictions on borrowing from the Federal Reserve.

- Because of the possible rapid buildup of demands during the early part of a crisis, the Federal Reserve banking system should be prepared to phase in appropriate parts of the emergency regulations prior to CR initiation.

- Because of the level of disruption resulting from the movement of people, a "banking holiday" should be declared covering the CR initiation period (about three days). Security and commodity exchanges should remain closed throughout the CR maintenance period.*

- Well before the crisis, individual banks in concert with the Federal Reserve System should develop emergency procedures for priority activities including recordkeeping, over the counter operations, currency transfer, security, etc. These procedures should be reviewed and updated early in the crisis.

- Banking institutions in the non-risk areas should plan to continue providing priority service to depositors during the CR maintenance period. Operations might have to be limited to over the counter services such as deposits, controlled withdrawals, existing credit arrangements, etc.

- Regulations should encourage but not require risk-area banks to establish or maintain priority operations in host areas to provide minimal services to depositors. Banks electing this option should prepare plans assigning responsibilities, indicating equipment and materials to be moved off-site, making security arrangements, and establishing procedures for transmittals and receipts from the Federal Reserve or agent banks.

- Banks in risk areas should develop plans to shut down risk-area operations for the duration of the CR maintenance period. Plans should include provisions for the following: storage of records; security of the bank property; assistance to employees in relocating and sustaining themselves in the host area; a coordinator or coordinating group to maintain contact with government and the financial system; and procedures for rapid restoration of service after CR.*

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* Not currently endorsed by the Department of Treasury.

- Federal Reserve Banks or agent banks should remain operating in non-risk areas to provide essential support services such as receipt of cash items, disbursement of currency, and extension of credit.

- Banks and service centers intending to function during the CR maintenance period should investigate well in advance the feasibility of (a) implementing their account updating procedures on computers in the non-risk areas; (b) controlling disbursements without account updating; and (c) devising other procedures as necessary.

- The Federal Reserve System should develop policies for underwriting losses incurred by banks that provide essential services during the CR maintenance period.

E. Developing CR Plans for Business and Financial Institutions

The general policy of the Federal Government is that every business facility should be prepared to cope with major emergencies.[3,4] Such emergencies might include widespread area fires, flooding, terrorism, nuclear disaster, etc. Crisis and crisis relocation are only recent additions to the ongoing concern of government for the emergency preparedness of industry and business in general.

Basic approaches to planning for such emergencies have been developed by the Federal Government.[5] While specific functions and procedures for CR will differ from those for other types of emergencies, the basic approach to planning will be the same. The parts of the plan will include:

- Identification of the type of emergency and the manner in which it would affect the company or facility.

- Brief description of what the plan is supposed to accomplish.

- The authority under which the plan would be implemented (i.e., company president, facility manager, etc.).

- The basic functions to be carried out (e.g., shutdown, relocation, etc.).

- The specific procedures that would be used to perform functions (e.g., storage of records, transportation to host areas, etc.).

- The persons responsible for supervising the functions and the persons who would implement the procedures.

- Coordination requirements within the company and with outside government and business groups and agencies.

- Other basic information needed about resources in the area and the nature of the emergency.

Sample formats for developing the needed plans are given at the end of this chapter. These plans may be relatively complex or simple, depending upon the size and complexity of the business and the role it would play prior to, during, and after crisis relocation. Businesses with several facilities would require a companywide plan that specified the likely impact of the emergency on the company and the basic company policies in response to the emergency. The facility plan should be site-specific, giving the details of procedures to be invoked and identifying individuals responsible for carrying them out. The company level planning would prepare the company plan and could prepare part or all of the facility plans. However, at the time of the emergency, the responsible parties at the facility level would have to carry out most of the actions because of the degree of disruption brought on by crisis relocation. For single-facility firms, one plan would be sufficient. In the case of small or relatively simple operations, a simple checklist of required actions and assignment of responsibility might be sufficient. All financial institutions should have a written plan.

It would of course be desirable for all plans to be as simple as possible. In general, emergency procedures that are specified should be as close as possible to normal routine procedures. For instance, shutdown of a process might be a normal shutdown mode for regular maintenance. Also, when feasible, the persons responsible should be those who would regularly be engaged in these activities. Some degree of simplification can be achieved by integrating plans for CR into plans or planning documents that have been developed for other emergencies. If such other plans exist, separate CR sections will have to be prepared and included with plans as annexes or attachments.

In order to have confidence in any emergency plan, the personnel involved must receive training on their roles, and some testing of plans must be carried out. Testing could be a hindrance to ongoing business activities. Local government exercises offer an opportunity for businesses to test the general features of their plans.[3,4] Also, if procedures are quite similar to those used routinely, some confidence might be justified without testing. However, the procedures must be examined to ensure that they do not depend upon some factor not likely to be available (e.g., communications, outside services, etc.). For this reason, review of procedures by local and regional planners is advisable.

Perhaps the major problem in developing emergency plans for business is the problem of enlisting the cooperation of business in this enterprise. Business has been generally reluctant to engage in any planning for unlikely events such as a nuclear disaster. Some companies will participate in planning related to recurring local emergencies* but even this is by no means universal. For instance, difficulties have been experienced in getting banks to do serious planning to protect against loss of company data processing capability.[6] Thus, it appears that some types of motivation will have to be supplied by government.

Motivation might be enhanced by educating major business groups regarding the importance of their role in a national emergency, as well as the economic losses that might be averted by preparation. More specific government incentives might include preferential treatment in contracting, priority treatment for loans in the post-crisis period, etc. Also, one of the best motivations would be for the government itself to indicate its seriousness by planning and implementing a civil defense option that could be perceived by the layman as significantly improving the U.S. strategic posture. Cooperation with planning would also increase if businessmen were included in the development of the planning guidance.**

Business plans might also be developed, as might other civil defense plans, during a period of rapid enhancement of the U.S. defense in a period of prolonged crisis (e.g., several months to a year). For this eventuality, the government should distribute previously prepared sample plans and checklists to companies. Assistance could be provided to companies in the form of regional training meetings, and on-site assistance. To implement this approach, sample plans should be developed now with the assistance of cooperating companies in various industrial sectors. Current Regional staff levels are inadequate to provide the required services in a rapid enhancement period or to provide the operational support during a CR crisis.* Part of the required advanced planning would be the identification of sources of the required government staff support.

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* Private communication, FEMA Regional representatives in Colorado and City of Denver Emergency Planning Dept., October 1979.
** Private communication, Wayne Martin, Vice President, Federal Reserve Bank of Kansas City (Denver branch), October 1979.

Exhibits V-1 and V-2 at the end of this chapter present the suggested formats for the General Plan and the Financial Annex, respectively. A brief description of the type of information required is given for each subsection of the plan and annex, along with examples of the types of statements and data to be included. Not all of the instructions and statements need apply for every company. The basic rule would be to simplify the plan to the degree possible, so that only the larger, more complex companies would need to develop all aspects of the plan as presented in the exhibits.

The general approach in the exhibits has been to include broad statements of purpose and responsibility in the General Plan, and to consider specific detailed procedures and assignments in the annexes. In this way, assigned personnel would have to be familiar only with information in one plan annex. General information for employees can be prepared separately, based on information from the General Plan and government literature. An example of a General Plan and employee information sheets is the Mountain Bell Telephone Company plan, which was prepared by the company with the assistance of State and Regional planners.[7] Extracts from the Mountain Bell plan and employee information are presented in Appendix D.

In addition to the substance of the plan, there are other prerequisites to achieving a useful planning product. Generally these can be categorized as: (1) obtaining the support of top management, (2) organizing an effective planning group, and (3) implementing and maintaining the plan.

To achieve the needed companywide cooperation for developing a plan, the understanding and approval of top-level managers is essential. Top management should also be involved in setting the major policies as to priority functions in a crisis; financial responsibility; assistance to employees; etc. As discussed earlier, approval for the planning effort will generally be easier if top management can be convinced that the advantages to the company and the nation are commensurate with the company planning costs being assumed.

The group or individual that develops a company plan should be relatively senior with proven capabilities in other company activities. Planners should have, or be able to readily assimilate, knowledge of the functioning of major company activities. Since planning problems will arise, planners should have ready access to top management for resolution of the problems. If the company has engaged in other types of emergency planning, employees involved in such

other efforts should be represented on the planning group. This approach would be helpful in coordinating CR planning with other forms of emergency planning. Also, such planners would generally bring with them the essential capability to think of company activities in terms of emergency operations.

The plan must be implemented and maintained if it is to represent a real capability for emergency action. Implementation would include the development of the resources and capabilities called for in the plan; education of personnel regarding emergency actions; and testing and auditing of the plan or plan components. Changes in CR planning guidance and in company characteristics over time will establish a requirements for periodic review and updating of plans, especially of annexes that contain specific procedures and personnel assignments.

REFERENCES FOR CHAPTER V

1. Annex H, "Economic Stabilization," to Arizona Nuclear Civil Protection Crisis Relocation Plan, Division of Emergency Services, State of Arizona, July 1977.

2. "Emergency Banking Regulation No. 1," Dept. of Treasury, Washington, D.C.

3. Disaster Planning Guide for Business and Industry, CPG-2-5, Defense Civil Preparedness Agency, July 1978.

4. Preparedness Programs for Emergency Operations in Banking, Federal Reserve Board and Defense Civil Preparedness Agency, FG-F-3.25, 1969.

5. DCPA guidance documents, CPG-2-8 (A to F), Guide for Crisis Relocation Contingency Planning, 1978-79.

6. Electronic Data Processing Contingency Planning Seminar, Tapes, American Bankers Association, Jan. 23-24, 1979.

7. General Plan for Crisis Relocation, Colorado Springs District, Mountain Bell Telephone Co., June 1977.

Exhibit V-1

FORMAT FOR A GENERAL CR PLAN -- BUSINESS ESTABLISHMENT

I. Purpose of This Plan

(Give background on CR and its relationships to the facility's operations) Such as:

"If an international crisis should threaten to result in a nuclear attack, people living in high-risk areas (areas likely to be nuclear weapon targets) may be asked to relocate temporarily to safer (lower-risk) areas. In this event, all businesses in high-risk areas would be asked to shut down, for the duration of the crisis, those activities that are not essential for meeting the immediate needs of the population and the government.

"High-risk areas are generally considered to be metropolitan areas of 50,000 or more population, or areas near major military installations. The safer or lower-risk areas are the surrounding small towns and rural areas. These would be the host areas in the event of an emergency relocation from high-risk areas.

"The metropolitan area in which this facility is located has been designated a high-risk area. Certain activities of the company have been identified as essential for continued operation during the crisis period."

or

"This facility has been considered to be non-essential for crisis operations and will be closed during the period of crisis relocation. The Federal government and local and state governments are currently planning for the orderly relocation of people in time of international crisis. This facility plan is part of the overall planning effort for orderly shutdown of industrial activity in this metropolitan area. To that end, the purpose of this plan is: (State purpose)

- To provide for the safety of personnel and property of this facility in the event of a nuclear threat requiring relocation of the population of the urban area and shutdown of this facility.
- To provide for the safety of personnel and property and the continued emergency operation of this facility."

II. Overall Plan of Operation

(Summarize the principal actions to be taken under this plan) Such as:

" • On initiation of this plan, company and community resources will be provided to help move employee families and employees not needed for facility shutdown to designated host areas.

" • Also at this time, according to procedures contained in this plan, designated employees will shut down non-essential activities, and key workers will maintain essential activities of this facility.

" • After this step has been taken, company resources will be provided to move remaining employees to designated host-area lodgings to join their families.

" • Company and community resources will be provided for daily commuting of key workers between this facility and designated lodgings for the duration of the crisis relocation period.

" • On peaceful termination of the crisis,

- The company will assist employees and their families to return to their homes, and will assist in their maintenance until orderly economic conditions are restored.
- Designated employees will return to the facility and begin start-up operations, after which all employees will return to restore normal operations of the facility."

III. Primary Actions to be Taken

(Indicate what actions are to be taken under the plan in what order, and who is responsible for supervising each action. Detailed procedures, if any, are assigned to specific annexes of the plan.) Such as:

" • Shutdown of Facility: Routine (See Annex A for responsibilities)

All activities of this facility will be shut down as rapidly as personnel and equipment safety considerations permit.
The following activities will be shut down using routine procedures:

Activity A

Activity C

Etc."

" • Shutdown of Facility: Special

The following activities will require special procedures for shutdown:

Activity B - See Annex B

Activity D - See Annex B

Activity E - Place process on standby mode as per maintenance Schedule EE011.

The following special facility-wide requirements are to be met by all personnel and sections: (see also Annex B):

Records storage

Equipment protection

Facility physical protection

Other."

- Essential Facility Production During Relocation Period

  (If facility is designated an essential producer, the following is required.)

  "The facility will produce the following products and services during the relocation period:

  Product XY

  Product ZX

  Product YY

  Product XY process - See Annex C for changes in process and levels of production.

  Product YY process - Use current process and production levels.

  Product ___

  Other related requirements: See Supporting Activities, Section IV of this plan."

- Facility Startup After Crisis is Over

  (This section would indicate any special requirements for re-starting the facility including schedules of performance and responsible parties.) Such as:

  "Activities will be resumed in three phases as follows:

  Phase 1. General support services priority (utilities, security, maintenance)

  Phase 2. Administrative, inventory control, transportation, etc.

  Phase 3. General product and service activities.

  Special requirements (see Annex D)."

IV. Supporting Activities

(This section should include facility-wide activities in support of the primary actions or functions to be performed under the plan.) Such as:

" • Facility Security

The security supervisor will coordinate his efforts with the _____ police to provide adequate external and internal security during all phases of the crisis.

Tasks will include:

- Protection of personnel and property from external or internal threat during the crisis buildup prior to relocation. (Requirements in Annex E).
- Prevention of damage to property during the period that the plant is shut down (Requirements in Annex E).

- Protection of personnel and property during the recovery period (Requirements in Annex E)."

- Financial Operations

(This section will include statements of policy and procedures to be followed during and after crisis.) Such as:

" - Provided that employees remain at duties until CR is invoked, employees salaries will continue to accrue during the relocation period, or limited payments will be made for operations during this period (see Annex H for procedures).

- Payments during relocation period: no payments will be made during this period, or limited payments will be made for operations during this period (see Annex H for procedures).

- Funding sources for payment during the early post crisis will be as given in Annex H for accounts, or credit sources.

- Financial recordkeeping during the relocation period will be as described in Annex H.

- Costs of CR essential production will be estimated in the recovery period for settlement with government.

- Contacts with financial community during relocation and thereafter are:

  Bank of _____ Tel:_____ Address _____

  Bank of _____ Tel:_____ Address _____ "

- Personnel Activities

(This section should list the necessary personnel assignments and also services to be provided to personnel prior to, during, and immediately after CR) Such as:

"Personnel responsibilities in crisis: (personnel) are expected to continue performing their normal functions until this plan or crisis relocation is invoked.)

Personnel assignments for shutdown (see Roster Annex F).

Personnel assignments for CR production (see Roster Annex F).

Personnel assignments for post-crisis start-up (see Roster Annex F).

Assistance to personnel in relocating: This facility will provide transportation to assigned housing areas for all employees and families who remain on duty until CR initiation. (See Annex G for instructions).

Relocation sites reserved (if any).

Assistance to personnel in relocation sites."

V. Transportation

(This section should include information on transportation arrangements of the firm or other outside groups for carrying out activities of this plan.) Such as:

" • Company motor pool shall provide transportation of essential workers to chosen risk and host areas.

(See Annex I for locations and schedules for service.)"

VI. Authority and Organization for Plan Implementation

A. Plan Activation

(Indicate who will be responsible for activating the plan and what special conditions influence activation) Such as:

" • This plan will be activated immediately on the instruction of the chief executive officer of the Company or his designee. In the event of loss of communication with Company Headquarters, this plan may be activated on the order of the duly constituted local government authority."

B. Plan Implementation

(Indicate who will be responsible for supervising activities under this plan.) Such as:

"The responsibility for carrying out the actions of this plan will rest with the manager of this facility."

(State other conditions relating to exercise of authority.) Such as:

"All company personnel physically located at this facility will come under the authority of the facility manager for purposes of implementing this plan."

(Indicate here or in the annexes who is responsible for each emergency activity under the plan.) Such as:

" Activity A - Plant engineer (see Annex A)
Activity B - Comptroller (see Annex B)
Activity C - Security Supervisor (see Annex A)
Etc."

C. Coordination Requirements of This Plan

(Indicate the other groups or agency contacts within and without the company necessary for full implementation of this plan.) Such as:

" • For transportation support, contact Manager, Company Motor Pool

Telephone: _____

Address: _____

- For external security support, contact: _____Police Station

  Telephone: _____

  Address:_____ "

VII. Pre-CR Preparedness

A. Plan Maintenance

(Include statement as to how the plan will be maintained -- i.e., revised, updated, etc.) Such as:

"To be effective, this plan must be updated routinely. For this purpose, the responsible planning group of this facility will perform the following actions on an annual basis:

- Review general plan with management.
- Review annexes with responsible supervisors.
- Review plan with designated local government representatives.

Responsible persons of this facility will advise the planning group on a routine basis of any changes that would affect the procedures given in this plan."

B. Emergency Plan Training and Testing

(Include provisions for training and testing the plan and the personnel involved.) Such as:

"To ensure satisfactory performance of the activities covered by this plan, training of responsible personnel and testing of components of the plan are required. For this purpose, the planning group will periodically submit, to the chief executive officer, added plans and schedules for personnel training and plan testing. This material should include:

- Indoctrination of all employees in the principal features of the general plan.
- Training and testing related to operations control of the general plan.
- Training and testing of specific procedures that differ from routine or established procedures."

C. Increased Readiness Measures

(Include provisions for increased readiness.) Such as:

"Under some conditions, advance warning of an increasing international crisis situation might occur. In this case, it would be desirable to undertake increased readiness measures to improve the potential performance of this plan. For this purpose, the planning group will develop additional plans to:

- Increase employee indoctrination and training.

- Review and update the general plan and annexes.
- Coordinate facility actions with those of local government.
- Undertake partial implementation of plan emergency procedures, where feasible.
- Prepare to implement any new preparedness procedures recommended by local government (e.g., expedient hardening, shelter construction, etc.)."

VIII. General Information

(This section should include information on surrounding area activities as needed to complement this plan.) Such as:

- General description of CR planning for the region.
- Listing of important facilities and contacts in risk and host areas.
- Summary description of CR activities of other facilities in the firm, including alternate host-area headquarters, if any.
- Other information as required.

Exhibit V-2

FORMAT FOR A FINANCIAL OPERATIONS ANNEX TO GENERAL PLAN

1. Purpose

(State purpose of annex.)

"This annex provides information on all financial operations to be conducted by the facility during crisis relocation."

2. Responsibility

(Indicate the person having the responsibility of implementing this annex.) Such as:

"The comptroller shall be responsible for implementing the actions required under this annex."

3. Records Protection

(This section should indicate the actions to be taken to protect financial records during a period of shutdown.) Such as:

" • Except as noted in this section, all records will be stored in the routine manner used at the end of the average business week.

• On implementation of this annex, the following records will be stored in the fireproof safe in basement room _____

- Personnel time sheets
- Personnel payment records
- Current invoice file
- Facility accounting journals
- Transactions computer tapes.

• The security supervisor will be responsible for the security of the records movement and for security of the safe and the safe room when shutdown is complete.

• The following records will be removed to the alternate location in the host area:

- Duplicate copy of facility accounting journals.
- Real estate records, other records of ownership.

The Assistant Comptroller is responsible for carrying out this records movement."

4. Recordkeeping During Crisis Relocation Period

(This section indicates, for business activities continuing during CR, what records and recordkeeping procedures are to be used.) Such as:

" • Except as noted below, all recordkeeping activities of the company will be suspended.

• The following recordkeeping activities will be maintained using regular forms and procedures:

- Personnel time sheets - Activities XY, ZX, YY
- Process run records - Activity YY
- Building security records
- Emergency maintenance records
- Inventory records for Process YY.

• All records will be forwarded to business office, room ___, for storage during the crisis period."

5. Financial Transactions During CR Period

(This section should indicate the type, authority, and procedures for financial transactions during CR period.) Such as:

" • Except as noted below, all financial transactions will be suspended for the duration of the CR period.

• No cash payments will be made during CR period (risk-area facility).

• The Treasurer may make subsistence payments to essential workers on account of wages due and such other payments (not to exceed ____) for miscellaneous services (host-area facility).

• Invoices, work orders, and other instruments for services received or rendered will be in amounts and forms existing prior to CR initiation, with allowance for renegotiation of prices subject to government price and stabilization policies (essential industry).

• Any checks made will be drawn against Account ___ in the Bank of _____ (host area)."

6. Other Financial Management Activities

(This section should provide the information on financial management during and immediately after CR.) Such as:

" • All accounting, asset management, and other financial activities not otherwise mentioned will be suspended for the CR period.

• Records transaction and other items will be shelved for processing after the end of the CR period.

• Accounting formats and procedures will be modified for documenting CR activities so as to provide the following (Essential industry):

- Costs of individual activities maintained during CR
- Allocation of costs to CR activities
- Estimated unit costs of essential products and services during CR
- Estimated added costs and other losses associated with essential production during CR.

- The adequacy of funds for post-CR operations will be assessed on the assumption of ___% of normal receipts on accounts receivable for first 60 days after CR.
- Comptroller will establish agreement with following funding sources for added short-term credit:
  - Established sources
  - New sources.
- Federal and state agencies involved in providing post-CR financial assistance are:

  _____ Address _____ Tel _____

  _____ Address _____ Tel _____

- Comptroller will determine securities available for loan collateral or liquidation in post-CR period."

Appendix A

GLOSSARY OF FINANCIAL TERMS

Appendix A

GLOSSARY OF FINANCIAL TERMS*

Financial Market

Money Market, Open Market

Broadly, the money market is any demand for, and supply of, funds and credit. Technically, the money market is the "open market" for short-term funds, as contrasted to negotiated markets or personalized borrower-lender relationships. Money market instruments generally consist of Federal funds (obligations of the Federal Reserve Banks), U.S. Treasury bills, bankers acceptances, and commercial paper.

Capital Market

The capital market is the market for longer-term funds (government and municipal bonds; corporate bonds and stocks).

Credit Instruments

Paper or documents, other than currency, which evidence debt. Types of credit instruments:

Bills of Exchange	Deposits (Demand and Time)
Drafts	Letters of Credit
Acceptances	Securities
Notes	Repurchase Agreements
Commercial Paper	Money Orders
Coupons	Bonds
Certificates of Indebtedness	Stock Certificates

Following are definitions of the less obvious types. (These classes of credit instruments are often not mutually exclusive--e.g., "draft" is a special type of "bill of exchange," and "commercial paper" is a special type of "note.")

Bill of Exchange

A written order from one person (the "drawer") to another (the "drawee" or "payer") to pay a specified sum of money at a specified time (a short-term credit period such as 30 days) to a designated person (the "payee"). Because bills of exchange are drawn by the creditor (usually the seller of the goods)

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* The terms are not arranged alphabetically, but rather by subject for easier understanding.

Credit Instruments (continued)

on the debtor (the drawee—usually the purchaser of the goods), the bill is not valid until it has been "accepted" by the debtor. He accepts it by writing or stamping the word "accepted" on the face of the bill and adding the date of acceptance and his signature. At maturity, usually 30-60 days, the acceptance is presented to the drawee a second time, for payment. During the period between acceptance and maturity, the acceptance may be sold in the money market.

Bills of exchange include checks, drafts, and acceptances. See below.

Draft Vs. Bill of Exchange

These are similar, except that "draft" usually applies to foreign transactions, whereas "bill of exchange" usually applies to domestic transactions.

Acceptance

A bill of exchange described in terms of the person "accepting" the bill: trade acceptance and bankers acceptance.

Trade Acceptance

A bill of exchange drawn by the seller of the goods (the drawer) on the merchant or purchaser of the goods (the drawee).

Bankers Acceptance

Bankers acceptances are similar to trade acceptances except that the bills are drawn upon banks by the sellers of the goods. The seller usually receives authority to draw upon the bank in a "letter of credit" sent by the bank acting for the purchaser of the goods.

Letter of Credit

A formal letter that precedes the acceptance. The letter contains the terms of "acceptance credit"--i.e. the authority and provisions for acceptance of the bill of exchange that is financing the goods. The letter may also be accompanied by documents indicating title to the goods--e.g., bill of lading, invoice, etc. If the acceptance is a bankers acceptance, the bank that is to be the "accepter" of the bill is the one that draws up the letter of credit

Credit Instruments (continued)

and sends it to the seller of the goods. Usually, such a bank is acting for the purchaser of the goods. With the authorization afforded by the letter of credit, the seller of the goods can then issue his bill of exchange for acceptance by the bank.

Note

General term: promissory note. Specific type of note: U.S. Treasury note, bank note, and commercial paper.

Commercial Paper

Short-term promissory notes (usually 4 or 6 months' maturity) issued by businesses to finance needs for working capital. The notes are placed with commercial paper "dealers" (see below) who in turn sell the paper to commercial banks and other buyers.

Coupon

A statement of due interest to be cut from a bearer bond when payable and presented for payment.

Certificate of Indebtedness

A short-term coupon obligation issued by the U.S. government.

Deposits: Demand and Time

Demand Deposits

Deposits that are payable immediately or upon a notice of 29 days or less. The chief type of demand deposit is the familiar "checking account."

Time Deposits

Also called "time and savings" deposits. These are of three types: savings deposits; time certificates of deposit (CD); and time deposits, open account. The latter are deposits that are continued automatically without action by depositors.

Credit Instruments (concluded)

Certificate of Deposit (CD)

A formal receipt for funds left with a bank. The CD may be payable on demand (demand CD) or at a future date (time CD).

Negotiable Certificates of Deposit

Promises to pay, issued in denominations of $100,000 and multiples thereof, the most common being $1 million. Their maturity dates are usually from 30 days to 1 year. Although not payable until maturity, they may be sold directly to others or through brokers and dealers.

Securities

A general term applied to documents evidencing (a) ownership or creditorship in a corporation or other business organization, or (b) creditorship related to public bodies. Securities include: bonds, stocks, mortgages, notes, coupons, scrip, warrants, rights, options, etc. of every kind.

U.S. Government Securities

U.S. Treasury securities (bills, certificates, notes, bonds) with maturities of 1 year, 1 to 5 years, and over 5 years. Such maturities may be called "short term" or "longer term" maturities.

Repurchase Agreements

An agreement in which a dealer (see below) is committed to buy back securities that he has sold earlier. The repurchase agreement is for repurchase one or more days later.

Brokers and Dealers

Brokers and dealers in the money market are individuals and financial firms that trade largely in securities and commercial paper. Brokers act as agents for buyers and sellers, and receive commissions. Dealers buy and sell credit instruments for others and for their own accounts.

Eurodollars

U.S. dollars held (as by banks) outside the United States, and especially in Europe.

Financial Institutions

This report has focussed on two types of financial institutions: commercial banks, and savings and loan associations. Other types include savings banks, investment banks, insurance companies, Federal Reserve System, etc.

Appendix B

DETAILS ON THE TEMCRIS II MODEL

Contents

B.1 DATA SOURCES FOR VARIABLES IN TEMCRIS II

Endogenous Variables

1. The Survey of Current Business, January 1976, Parts I and II, and August 1976 as well as the Economic Report of the President, February 1976 and February 1977, were used as the data source (expressed in constant 1972 dollars) for:
   - Consumer Expenditures for Non-Durable Goods and Services (CEEG)
   - Consumer Expenditures for Durable Goods (CEDG)
   - Gross Investment in Residential Structures (GIRS)
     (The residential component of fixed investment: gross private domestic investment)
   - Gross Investment in Non-Residential Structures and Equipment (GISE)
     (The non-residential component of fixed investment: gross private domestic investment plus change in business inventories)
   - Percent Change in Prices (PCHP)
     (Calculated percent change in implicit price deflator for gross national product -- GNP deflator, 1972 = 100)
   - Disposable Income (DINC)
     (National income element: personal income less personal tax and non-tax payments)
   - Government Budget Surplus
     (Total government surplus or deficit -- receipts less expenditures: national income and product accounts divided by GNP deflator)
2. The Federal Reserve Bulletin, various issues, were used as data sources for:
   - Demand for Credit Funds, Households (DCFH)
     (Total funds raised, private domestic non-financial sectors, by borrowing sector: households divided by GNP deflator)

- Demand for Credit Funds, Business (DCFB)

  (Total funds raised, private domestic non-financial sectors, by borrowing sector: non-financial business divided by GNP deflator)

- Demand for Credit Funds, Government (DCFG)

  (Total funds raised, private domestic non-financial sectors, by borrowing sector: State and local governments plus U.S. Government divided by GNP deflator)

- Availability of Credit Funds, Households (ACFH)

  (Observationally equivalent to Demand for Credit Funds, Households)

- Availability of Credit Funds, Business (ACFB)

  (Observationally equivalent to Demand for Credit Funds, Business)

- Availability of Credit Funds, Government (ACFG)

  (Observationally equivalent to Demand for Credit Funds, Government)

3. The Economic Report of the President, various years, was the source of the data for:

- Interest Rate, Households (INTH)

  (Bond yields and interest rates, FHA new home mortgage yields, median month in each quarter, divided by GNP deflator)

- Interest Rate, Business (INTB)

  (Bond yield and interest rates, average rate on short-term bank loans to business, selected cities, median month in each quarter, divided by GNP deflator)

- Interest Rate, Government (INTG)

  (Bond yields and interest rates, geometric mean of 3 month Treasury bill yields and 3-5 years U.S. Government securities yields, median month in each quarter, divided by GNP deflator)

4. Variables Derived from Other Variables

   - Total Excess Demand for Credit Funds (DCF-ACF)

     (Identity relationship. See equation 15.)

   - Total Availability of Credit Funds (ACF)

     (Identity relationship. See equation 16.)

   - Gross National Product Gap (GNPG)

     (Identity relationship. See equation 17.)

Exogenous Variables

1. The Survey of Current Business, January 1976, Parts I and II and August 1976 as well as the Economic Report of the President, various years, were used as the data source (expressed in constant dollars) for:

   - Personal Savings Measure (PSM)

     (Personal savings as a percent of disposable personal income)

   - Business Savings Measure (BSM)

     (Capital consumption allowance less capital consumption adjustment, current dollars, plus undistributed profits, current dollars, divided by GNP deflator)

   - Total Tax Measure (TTM)

     (Federal government receipts plus State and local government receipts less federal grants-in-aid divided by Gross National Product)

   - Government Expenditures Goods and Services (GEGS)

     (Federal government constant dollar purchases of goods and services plus State and local government constant dollar purchases of goods and services)

- Government Transfers to Persons (GTP)

  (Federal, State, and local government transfers to persons plus net interest paid to persons and business divided by GNP deflator)

- Export Less Import (NEX)

  (Net exports for goods and services in constant dollars)

2. The Economic Report of the President, various years, was used as the data source for:

   - Labor Force Time Lost (LFTL)

     (Selected unemployment rates, aggregate hours lost by unemployed and persons on part-time for economic reasons as a percent of potentially available labor force hours, median month for each quarter)

   - Corporate Profitability Measure (CPM)

     (Relationship of profits after taxes to stockholders equity: ratio of profits after income taxes -- annual rate -- to stockholders equity, all manufacturing corporations)

3. The Federal Reserve Bulletin, various issues, was used as the data source for:

   - Total Member Bank Reserves (TMBR)

     (Median month in each quarter divided by GNP deflator)

   - Demand for Credit Funds, Foreigners (DCFF)

     (Equivalent to Availability of Credit Funds, Foreigners (ACFF)

     (Total funds raised, foreign, corporate equities plus debt instruments, divided by GNP deflator)

   - Demand Deposits and Time Savings (DDTS)

     (Total funds advanced to non-financial sectors, financed directly or indirectly by deposits, divided by GNP deflator)

- Credit Market Instrument (CMI)

  (Total funds advanced to non-financial sectors, financed directly or indirectly by U.S. government securities, private credit market instruments, corporate equity less security debt, divided by GNP deflator)

- Other Sources of Credit Market Funds (OSCF)

  (Total funds advanced to non-financial sectors, financed directly or indirectly by foreign funds, change in U.S. government cash balance, U.S. government loans, private insurance and pension reserves, and other, divided by GNP deflator)

4. Calculated Variable or Variables Derived from Other Variables

- Gross National Product Capacity (GNPC)

  (For TEMCRIS II a simple proxy was used. Conceptually, capacity is equal to optimal output per worker, in real terms, times optional employment. The optional output was estimated at $12,500 for mid 1963. This figure was increased by 1.006 for each quarter. Optional employment is taken to be the civilian labor force in each quarter times .965. In the interactive TEMCRIS/Linear Programming Input-Output model, the change in capability is determined through the LP I-O model.)

- Other (Net) Wealth Sources of Disposable Income (OSDI)

  To balance accounts, the algebraic determination of this variable is as follows:

$$OSDI = DINC - [(1-TTM-BSM)GNP] - GTP$$

- Other (Net) Government Expenditures (OGEX)

  The algebraic determination of this variable is as follows:

$$OGEX = GBS - TTM \cdot GNP + CEGS + GTP$$

B.2 VARIABLES AND CORRESPONDING COEFFICIENTS

Endogenous		Lagged Endogenous[a]		Exogenous		Lagged Exogenous[a]	
Coefficient	Variable	Coefficient	Variable	Coefficient	Variable	Coefficient	Variable
β_1	CEEG	γ_1	LCEEG	δ_1	PSM		
β_2	CEDG	γ_2	LCEDG	δ_2	BSM		
β_3	GIRS	γ_3	LGIRS	δ_3	CPM	θ_3	LCPM
β_4	GISE	γ_4	LGISE	δ_4	LFTL	θ_4	LLFTL
β_5	PCHP	γ_5	LPCHP	δ_5	TTM		
β_6	DCFH			1	GEGS		
β_7	DCFB			δ_7	TMBR		
β_8	DCFG	γ_8	LDCFG	δ_8	DCFF		
β_9	ACFH	γ_9	LACFH	1	ACFF		
β_{10}	ACFB	γ_{10}	LACFB	δ_9	DDTS		
β_{11}	ACFG	γ_{11}	LACFG	δ_{10}	CMI		
β_{12}	INTH	γ_{12}	LINTH	δ_{11}	OSCF		
β_{13}	INTB	γ_{13}	LINTB	1	GNPC		
β_{14}	INTG			δ_{13}	GTP		
β_{15}	DCF			1	NEX		
β_{16}	ACF			1	OSDI		
β_{17}	GNPG			1	OGEX		
β_{18}	DINC						
β_{19}	GBS						
β_1^*	$(DCFH - ACFH)_{calc}$						
β_2^*	$(DCFB - ACFB)_{calc}$						
β_3^*	$(DCFG - ACFG)_{calc}$						

[a]The variables designated as lagged have values of the preceding period.

B.3 MODEL EQUATIONS

The following equations define the nineteen endogenous variables used in the econometric model:

1. $CEEG = \alpha_1 + \beta_{1,5}\ PCHP + \beta_{1,18}\ DINC + \gamma_{1,1}\ LCEEG + \delta_{1,4}\ LFTL + \delta_{1,13} GTP + \varepsilon_1$

2. $CEDG = \alpha_2 + \beta_{2,1}\ CEEG + \beta_{2,5}\ PCHP + \beta_{2,18}\ DINC + \gamma_{2,2}\ LCEDG + \delta_{2,1}\ PSM + \delta_{2,4}\ LFTL + \theta_{2,4}\ LLFTL + \varepsilon_2$

3. $GIRS = \alpha_3 + \beta_{3,9}\ ACFH + \beta_{3,12}\ INTH + \gamma_{3,3}\ LGIRS + \gamma_{3,18}\ LDINC + \delta_{3,1}\ PSM + \varepsilon_3$

4. $GISE = \alpha_4 + \beta_{4,10}\ ACFB + \beta_{4,13} INTB + \gamma_{4,4}\ LGISE + \gamma_{4,17}\ LGNPG + \theta_{4,3}\ LCPM + \delta_{4,5} TTM + \varepsilon_4$

5. $PCHP = \alpha_5 + \beta_{5,17}\ GNPG + \gamma_{5,5}\ LPCHP + \gamma_{5,19}\ LGBS + \theta_{5,4} LLFTL + \varepsilon_5$

6. $DCFH = \alpha_6 + \beta_{6,7}\ DCFB + \beta_{6,12}\ INTH + \beta_{6,18}\ DINC + \gamma_{6,6} LDCFH + \gamma_{6,12}\ LINTH + \delta_{6,1}\ PSM + \varepsilon_6$

7. $DCFB = \alpha_7 + \beta_{7,8}\ DCFG + \beta_{7,13}\ INTB + \gamma_{7,4} LGISE + \gamma_{7,7}\ LDCFB + \gamma_{7,13}\ LINTB + \delta_{7,2}\ BSM + \delta_{7,8}\ DCFF + \theta_{7,3}\ LCPM + \varepsilon_7$

8. $DCFG = \alpha_8 + \beta_{8,14}\ INTG + \beta_{8,19}\ GBS + \gamma_{8,8}\ LDCFG + \gamma_{8,17} LGNPG + \delta_{8,5}\ TTM + \varepsilon_8$

9. $ACFH = \alpha_9 + \beta_{9,12}\ INTH + \beta_{9,17}\ GNPG + \gamma_{9,9}\ LACFH + \delta_{9,4}\ LFTL + \delta_{9,7}\ TMBR + + \delta_{9,9}\ DDTS + \delta_{9,11}\ OSCF + \varepsilon_9$

10. $ACFB = \alpha_{10} + \beta_{10,13}\ INTB + \beta_{10,17}\ GNPG + \gamma_{10,10}\ LACFB + \delta_{10,3}\ CPM + \delta_{10,7}\ TMBR + \delta_{10,9}\ DDTS + \delta_{10,10}\ CMI + \delta_{10,11}\ OSF.$

11. $ACFG = \alpha_{11} + \beta_{11,14}\ INTG + \beta_{11,17}\ GNPG + \gamma_{11,11}\ LACFG + \delta_{11,5}\ TTM + \delta_{11,7}\ TMBR + \varepsilon_{11}.$

12. $INTH = \alpha_{12} + \beta_{12,5}\ PCHP + \beta_{12,13}\ INTB + \beta_{12,14}\ INTG + \beta_1^{*}\ (ACFH - DCFH)_{calc} + \gamma_{12,12} LINTH + \gamma_{12,17}\ LGNPG + \varepsilon_{12}$

13. $INTB = \alpha_{13} + \beta_{13,5}\ PCHP + \beta_{13,12}\ INTH + \beta_{13,14}\ INTG + \beta_2^{*}\ (ACFB - DCFB)_{calc} + \gamma_{13,13}\ LINTB + \gamma_{13,17}\ LGNPG + \varepsilon_{13}$

14. $INTG = \alpha_{14} + \beta_{14,5}\ PCHP + \beta_{14,12}\ INTH + \beta_{14,13}\ INTB + \beta_3^{*}\ (ACFG - DCFG)_{calc} + \gamma_{14,13}\ LINTB + \gamma_{14,17}\ LGNPG + \varepsilon_{14}$

15. $DCF - ACF = DCFH + DCFB + DCFG + DCFF - DDTS - CMI - OSCF$

16. $ACF = ACFH + ACFB + ACFG + ACFF$

17. $GNPG = GNPC - CEEG - CEDG - GIRS - GISE - GEGS - NEX$

18. $DINC = (1 - TTM - BSM)\ (GNPC - GNPG) + GTP + OSDI$

19. $GBS = TTM\ (GNPC - GNPG) - GEGS - GTP - OGEX$

β^{*} coefficients are used to correspond to the fitted functions -- i.e., the differences between the respective calculated values of demand and availability of credit funds.

The last five relationships, identity equations, are necessary to complete the system. Although equations 18 and 19 are non-linear, they can be transferred into linear relationship by applying Taylor's expansion for finite differences.

For convenience in assigning values to certain exogenous variables, the following equations are used:

1. $$PSM = \alpha_1 + \omega_{1,1}\,LFTL + \omega_{1,2}\,DDTS + \omega_{1,3}\,GEGS + \omega_{1,4}\,TMBR + \omega_{1,5}\,CMI + \omega_{1,6}\,GTP + \omega_{1,7}\,OGEX + \omega_{1,8}\,NEX + \varepsilon_1$$

2. $$BSM = \alpha_2 + \omega_{2,1}\,LFTL + \omega_{2,2}\,DDTS + \omega_{2,3}\,GEGS + \omega_{2,4}\,TMBR + \omega_{2,5}\,CMI + \omega_{2,6}\,GTP + \omega_{2,7}\,OGEX + \omega_{2,8}\,NEX + \varepsilon_2$$

3. $$CPM = \alpha_3 + \omega_{3,1}\,LFTL + \omega_{3,2}\,DDTS + \omega_{3,3}\,GEGS + \omega_{3,4}\,TMBR + \omega_{3,5}\,CMI + \omega_{3,6}\,GTP + \omega_{3,7}\,OGEX + \omega_{3,8}\,NEX + \varepsilon_3$$

4. $$TTM = \alpha_4 + \omega_{4,1}\,LFTL + \omega_{4,2}\,DDTS + \omega_{4,3}\,GEGS + \omega_{4,4}\,TMBR + \omega_{4,5}\,CMI + \omega_{4,6}\,GTP + \omega_{4,7}\,OGEX + \omega_{4,8}\,NEX + \varepsilon_4$$

5. $$DCFF = \alpha_5 + \omega_{5,1}\,LFTL + \omega_{5,2}\,DDTS + \omega_{5,3}\,GEGS + \omega_{5,4}\,TMBR + \omega_{5,5}\,CMI + \omega_{5,6}\,GTP + \omega_{5,7}\,OGEX + \omega_{5,8}\,NEX + \varepsilon_5$$

B.4 DERIVATION OF ESTIMATES FOR PARAMETERS AND MULTIPLIERS

The initial system of equations can be expressed in matrix terminology. Let:

Y_t = vector of endogenous variables

Y_{t-1} = vector of lagged endogenous variables

X_t = vector of exogenous variables (including the constants)

X_{t-1} = vector of lagged exogenous variables

B = matrix of β coefficients associated with the (right-hand) endogenous variables

Γ = matrix of γ coefficients associated with the lagged endogenous variables

Δ = matrix of δ coefficients associated with the exogenous variables

Θ = matrix of β coefficients associated with the lagged exogenous variables

Ψ_t = vector of normally distributed uncorrelated error terms

The system of equations is written as:

$$Y_t = BY_t + \Gamma Y_{t-1} + \Delta X_t + \Theta X_{t-1} + \Psi_t$$

Rearranging terms (all current endogenous variables appearing on the left-hand side) gives:

$$Y_t = (I-B)^{-1}\Gamma Y_{t-1} + (I-B)^{-1}\Delta X_t + (I-B)^{-1}\Theta X_{t-1} + (I-B)^{-1}\Psi_t$$

A computer program utilizing the two-stage least squares (2SLS) method is used to estimate the various parameter elements of the matrices B, Γ, Δ, and Θ. If a system of equations exhibits first-order serially correlated errors (that is $\Psi_t = T\Psi_{t-1} + \xi_t$ where T is a matrix having values representing serially correlated errors only on the diagonal positions and Ξ_t is a vector of normally distributed uncorrelated errors), the system of equations becomes transformed. The system of equations becomes:

$$Y_t - TY_{t-1} = B(Y_t - TY_{t-1}) + \Gamma(Y_{t-1} - TY_{t-2}) + \Delta(X_t - TX_{t-1}) + \Theta(X_{t-1} - TX_{t-2}) + \Xi_t$$

An expanded computer program utilizing 2SLS correcting for first-order serially correlated errors is used to estimate the various parameter elements of the matrices B, Γ, Δ, Θ, and T.

Rearranging terms results in:

$$Y_t = (I-B)^{-1}(T(I-B) + \Gamma)Y_{t-1} - (I-B)^{-1}(T\Gamma)Y_{t-2} + (I-B)^{-1}\Delta X_t - (I-B)^{-1}(T\Delta - \Theta)X_{t-1} + (I-B)^{-1}(T\Theta)X_{t-2} + (I-B)^{-1}\Xi_t$$

If the various matrices are redefined, the system of equations is simplified as:

$$Y_t = \Gamma^* Y_{t-1} + \Gamma^{**} Y_{t-2} + \Delta^* X_t + \Delta^{**} X_{t-1} + \Delta^{***} X_{t-2} + \nabla^* \Xi_t$$

Where:

$$\Gamma^{*} = (I-B)^{-1}(T(I-B)+\Gamma)$$

$$\Gamma^{**} = -(I-B)^{-1}(T\Gamma)$$

$$\Delta^{*} = (I-B)^{-1}\Delta$$

$$\Delta^{**} = -(I-B)^{-1}(T\Delta-\Theta)$$

$$\Delta^{***} = -(I-B)^{-1}T\Theta$$

$$V^{*} = (I-B)^{-1}$$

The calculation of multipliers is obtained by successively substituting the system of equations represented by Y_{t-1}, Y_{t-2}... and tracking the matrices of X_t, X_{t-1},.... Two sets of multipliers are of interest. Impact multipliers indicate the direct consequences of a change in the exogenous variables on the endogenous variables recognizing the interdependencies specified by the system of equations. Interim multipliers trace the subsequent consequences of that change over time.

These multipliers can be expressed as:

$M(0) = \Delta^{*}$		Impact multipliers
$M(1) = G(1)J + G(0)K$		1st period interim multipliers
$M(2) = G(2)J + G(1)K$		2nd period interim multipliers
$M(3) = G(3)J + G(2)K$		3rd period interim multipliers
⋮		
$M(t) = G(t)J + G(t-1)K$		t^{th} period interim multipliers

Where $J = \Gamma^{*}\Delta^{*} + \Delta^{**}$

$K = \Gamma^{**}\Delta^{*} + \Delta^{***}$

$G(t) = \Gamma^{*}G(t-1) + \Gamma^{**}G(t-2)$

$G(0)$ = null matrix

$G(1)$ = identity matrix

As examples $G(2) = \Gamma^{*}I + \Gamma^{**}0 = \Gamma^{*}$

$$G(3) = \Gamma^{*}\Gamma^{*} + \Gamma^{**} = (\Gamma^{*})^{2} + \Gamma^{**}$$

Although total multipliers (showing the consequences of a sustained change in the exogenous variables on the endogenous variables) are not used in the analysis, their matrix structure is given by:

$$M = \sum_{t=1}^{t=\infty} M(t) + M(0)$$

$$= \sum_{t=1}^{t=\infty} G(t)J + \sum_{t=1}^{t=\infty} G(t-1)K + \Delta^{*}$$

Appendix C

TABLES SUMMARIZING CR IMPACT ON BUSINESS, FINANCIAL INSTITUTIONS, AND GOVERNMENT

Extracted from Richard Laurino, Frank Trinkl, et al., Impacts of Crisis Relocation on U.S. Economic and Industrial Activity, Center for Planning and Research, Inc., Palo Alto, California, October 1978.

Table C-1

POTENTIAL IMPACT OF CRISIS RELOCATION ON BUSINESS

Business Function	Business Response	Impact of Business Response
Pre-CR Crisis Phase		
Production and inventories	• Shutdown of production (risk areas) • Liquidation of inventories (risk areas)	• Loss of goods to economy • Disruption of distribution channels
Finance	• Deferred payment of current accounts and expenses • Cash withdrawals from banks • High sales of merchandise	• Disruption of money and capital markets • Large cash holdings • Revised price structure
Employment	• Increased absenteeism • Increased unemployment	• Loss of efficiency and production • Long term loss of purchasing power
CR-Initiation Phase	• General shutdown of all business • Freeze of assets and payments	• Loss of goods and services to economy • Distribution hiatus • Problems of security of assets
CR-Maintenance Phase		
Production and inventories	• High demands on essential and host area businesses • Shutdown of other risk area businesses	• Loss of goods and services to economy • Revised production and distribution subject to loss of controls and inefficiencies • Developing imbalances
Finance	• Suspended payments of risk area business accounts • Flow of cash and assets to host area businesses	• Disruption of current asset position of many businesses • Dissipation of liquid business assets
Employment	• Imbalanced skill requirements • High unemployment	• Loss of efficiency and production • Loss and imbalance of purchasing power
CR-Reconstitution Phase		
Production & inventories	• Need to rebuild work-in-process, distribution, and inventories	• Continued shortages of consumer goods • Imbalance of distribution
Finance	• Revision of asset values • Curtailed ability to meet current expenses • Curtailed ability to finance rebuilding of inventories	• Possible high bankruptcy rate • Inability to collect current accounts • Losses of asset value
Employment	• Slow pickup as pipelines refill • Permanent dislocations from business failures and worker relocations	• Loss of productivity and inefficiencies due to labor force imbalances • Permanent losses of purchasing power

Table C-2

POTENTIAL IMPACT OF CRISIS RELOCATION ON FINANCIAL INSTITUTIONS

Financial Function	Institutions Problems	Impact of Problems
Pre-CR Crisis Phase		
Check Clearing	• Increase in employee absenteeism • Increase in time to clear checks	• Unplanned increase in money supply
Deposit Withdrawals	• Increased withdrawals from demand, time, and savings deposits • Possible curtailment of automatic deposits	• Curtailment of new loan commitments, especially long term commitments • Difficulties in finding liquid assets to meet withdrawals • Curtailed availability of funds for interbank borrowing • Adverse effect on earnings
Earning Assets Management	• Reduced willingness to make loans • Increased delay in loan repayments • Erosion in value of securities held • Reluctance to call loans and forced disposal of securities	• Increased reliance on interbank borrowing to meet reserve requirements • Increased costs of borrowed funds • Limit to borrowing from the federal government
Other Services	• Increased delays in carrying out payroll, billing, credit card, and other functions • Increased inability to underwrite financing transactions	• Disruption of users' operations • Disruption of financing of new securities
CR-Initiation Phase	• Availability of computer check processing system • Availability of duplicate bank records • Determination of functions to be performed in risk areas • Desirability of closing down securities, commodities, and options markets • Safety of securities and facilities	• Promulgation of principles of loss equalizations • Implementation of Agent Bank plans • Unavoidable disruption of financial activities

Table C-2 (continued)

Financial Function	Institutions Problems	Impact of Problems
CR Maintenance Phase		
Check Clearing	• Control of cashing of checks in host areas • Verification of checks • Increase in time to clear checks • Acceptability of checks in host areas	• Unlikely profitability of banks • Increase in net borrowed reserves
Deposit Withdrawals	• Increased requirement for cash in host areas • Limitation on withdrawals for essential purposes • Curtailment of withdrawals by foreigners	• Implementation of measures similar to EB Reg. No. 1 • Uncertainty as to how reserves are balanced • Rationing of cash
Earning Assets Management	• Criteria for making essential short term loans • Inability to satisfy reserves through loan repayments or restructuring • Uncertain value of securities held • Curtailed ability to call loans	• Uncertain extent to which U.S. government securities can be sold • Less likelihood of continuation of interbank borrowing
Other Services	• Inability to provide payroll, billing, and other services • Control of credit card purchases • Cessation of underwriting functions	• Delay in completing transactions • Solvency of businesses and financial institutions

Table C-2 (Concluded)

Financial Function	Institutions Problems	Impact of Problems
CR-Reconstitution Phase		
Check Clearing	• Orderly removal of control on cashing of checks • Resolution of bad checks issued • Orderly transfer to centralized check clearing • Record reconciliation	• Orderly return to the usual pre-crisis level of float
Deposit Withdrawals	• Encouragement of depositors • Determination of return on new time and savings deposits	• Maintenance of bank liquidity
Earning Assets Management	• Valuation of earning assets • Orderly phase-in of purchases of governmental and other securities • Restructuring of loans • Establishment of criteria for making new loans	• Phased reconstruction of credit market • Return to profitability • Loss equalization resulting from insolvency • Phase-in of normal security operations
Other Services	• Sorting out of records • Reconstitution of system of providing essential business functions • Reconstitution of securities, commodities, and options markets • Transfer of Agent Bank functions back to Federal Reserve	• Orderly phase-in of established services

Table C-3

POTENTIAL IMPACT OF CRISIS RELOCATION ON LOCAL AND STATE GOVERNMENT

Phase	Revenue	Expenditures	Assets
Pre-CR Crisis	Reduced payments for services Reduced tax receipts Slowdown of intergovernmental payments	Crisis preparation and control costs Accelerated vendor payment demands Slowdown in payments Rise in unit cost of services	Redemption of short term securities Greater use of cash deposits Deferred loan programs
CR-Initiation	Tax revenue reduced or stopped Reduced earnings because of curtailment of services Intergovernmental payment for emergency services	Increased costs of emergency services Reduction in non-emergency expenditures Deferral of payments	Unavailability of liquid assets (risk) Loss and damage to equipment and facilities
CR-Maintenance	Reduced earnings (risk) Increased revenue (host) General delay in payments	Costs of evacuee maintenance Costs of protective measures Costs of key worker transportation Costs of host area control measures Ongoing salary and maintenance costs Continued cost of terminated operations Welfare institutional costs Debt service Other prior obligations Demands for early payment from vendors Cash flow problems (host area and state)	Controlled access to deposits Impaired market for securities Loss or damage to facilities and equipment
CR-Reconstitution	Below normal tax revenue Lower service revenue Delayed payments Reduced interest income Increased intergovernmental revenues	Increased welfare and unemployment costs Payment of accrued earnings Payment of obligations Increased maintenance costs Intergovernmental claims Deferral of new obligations	Depleted liquid assets Restrictive credit Reduced asset values Reduced tax base

Appendix D

EXTRACTS FROM "GENERAL PLAN FOR CRISIS RELOCATION," COLORADO SPRINGS DISTRICT, MOUNTAIN BELL TELEPHONE COMPANY

(June 1977)

Appendix D

I. PURPOSE OF THIS PLAN

The purpose of this plan is to establish emergency procedures and provide for the assignment of personnel to assure that the Colorado Springs District of Mountain Bell can maintain essential services through continued operations during a Crisis Relocation Emergency. It further provides for the participation of other employees in the support of any activities which will be required prior to and when this plan is implemented.

II. CRISIS RELOCATION - WHAT IS IT?

. . . . . .

All of the population will be relocated. Key workers to keep government, industry, and essential services (i.e. fire control, police, utilities, telephone services, etc.) in operation will continue to work in the risk area. These key or critical workers will be safely housed with their families in a host area in proximity to the risk area and will commute to and from work. The best heat, blast and fallout shelter available in the risk area will be assigned to the critical workers in the event a nuclear attack occurs while they are on the job.

It is planned that everyone will have departed the risk area in a period of three days (72 hours). The length of relocation will be two weeks or longer.

The host areas will provide congregate care lodging, food, medical care and other support to the relocatees.

Upon termination of the international crisis, relocatees will return home.

Should a nuclear attack occur during crisis relocation and the host areas are subjected to radioactive fallout, the relocatees and the host area residents will have fallout shelter available to them.

III. POLICY ON CIVIL DEFENSE/EMERGENCY PREPAREDNESS ACTIVITIES

. . . . . .

During Crisis Relocation, all managers will continue to function in the

management and guidance of the company. The organizational structure and reporting channels will remain the same as during normal peacetime operations.

Each manager will establish individual departmental operating procedures in support of company policy and will determine which of their employees are to be relocated or are required to remain for the continued operations of the department. The number of workers determined to be critical to continued operations will be kept to the minimum necessary to maintain austere operations with the priority of service limited to that necessary for defense and survival.

The company will issue specific instructions to each employee regarding the actions to be taken when Crisis Relocation of the risk area is ordered.

Provisions will be made for all employees to remain with their families while outside of the risk area.

All critical workers and their families will be lodged and otherwise supported at the Air Force Academy. Company vehicles will be utilized for transportation of critical workers to and from work.

While at work, critical workers will have minimal exposure to risks. In the event of nuclear attack, they will be assured of the best protective shelter in proximity to their working area or have easy access or means of getting to shelter at the Air Force Academy.

IV. GENERAL PLAN

Development of a severe international crisis will become obvious through news items, magazine articles and discussions by government officials at all levels. When this occurs, it is expected that each department manager will utilize this period for review and updating of individual department emergency plans.

Should the international situation warrant the action, the Governor of Colorado will notify local government officials and the news media that an order to commence Crisis Relocation may be issued in as little as six hours.

This "alert" will be relayed from the El Paso County Emergency Operations Center to the Company Toll Test Center where it will be passed to all company departments via the red phone system.

Upon receipt of this alert, all managers will assemble their personnel to review the department plan and the actions to be taken by each employee when Crisis Relocation is directed. (See Attachment 5.)

Those departments that have been assigned a role in maintaining the level of service established for Crisis Relocation will implement work schedules at this time. The critical employees will be informed of the schedule for relocating their families to the Air Force Academy based on the department's Crisis Relocation work schedule.

Those employees that do not have a role in maintaining continued operations will be instructed to stand-by for further information and at the same time prepare to close down their department; safeguard vital records and company property.

. . . . . .

When the order to commence Crisis Relocation is received, all managers will release those employees classed as "non-critical" so they may relocate with the general population of Colorado Springs.

Those departments designated to continue operations during Crisis Relocation will immediately initiate the work/shift schedule developed for this emergency.

District managers of departments without critical workers will report to the Area General Manager when their department has been closed down.

. . . . . .

ATTACHMENT 3

INFORMATION HANDOUT FOR RELOCATING EMPLOYEES

The primary purpose for relocation from Colorado Springs is to protect you and your family in the event a nuclear attack should occur. There is not sufficient shelter space in Colorado Springs to assure the safety of all the population, so it becomes necessary to use outlying communities where shelter is available.

You will be released from your assigned duties and expected to relocate with the general population of Colorado Springs. Special instructions are being distributed throughout the Colorado Springs area. These instructions tell you where and how you are to depart, depending in which part of the city you reside. You are to follow those instructions.

Before you depart, you are to turn in your company vehicle, if one is assigned to you, and your pager. Your supervisor will advise you when and where these are to be returned.

When you arrive at your relocation destination, and have become settled, contact the local Mountain Bell business office and register your availability and location.

When it is safe to return to Colorado Springs, your supervisor may contact you and request an early return to assist in reestablishing our total system. By being registered with the local office, you can be reached easily.

Abide by the instructions you will receive and offer your assistance to the community in which you will be relocated.

ATTACHMENT 4

INFORMATION HANDOUT FOR CRITICAL EMPLOYEES

The ability of Mountain Bell to maintain and continue our communications responsibility rests on two actions. The first is for those employees not absolutely essential to maintain limited operations who will be relocated to areas where there is protection for their survival and who will return when the crisis is over. The second is for persons like you, who will remain here and continue our service under a short term, limited operation. Every precaution is being taken to make your exposure to danger as limited as possible, and should an attack come, you will receive the best of shelter.

Your family will be housed at the Air Force Academy which is as safe as the areas to which the other employees are relocating. When you are not working, you will join them there. Food, sleeping space, medical and religious facilities are available. You will commute to and from the Academy in a company vehicle, either alone or in a car pool.

1. When you are advised by your supervisor that Crisis Relocation is being implemented, you will receive instructions of when your work shift will be established. We will not follow the normal working day but each department will establish its own work schedule. You will also be instructed as to when you can relocate and settle your family at the Academy.

2. When you report for work, you will be issued a pager if your work is outside of the building. This is in case the "attack warning" is sounded. When this occurs, you are to go at once to a designated shelter. A separate sheet will be issued which indicates designated shelter and routes dedicated to reach shelter.

3. In the event the "attack warning" is sounded, it will be issued over the Red Telephones in the building, over the paging system and over the VHF mobile radio system. The normal sources of warning, outdoor sirens, commercial broadcast stations and Weather Service radio will also be used.

4. Your supervisor will establish transportation to and from the Academy in company vehicles. Meals will not be available in Colorado Springs during working hours however, "brown bag" lunches will be available in the Academy Dining Hall. Pick one up before you leave for work. The medical facility at 308 E. Pikes Peak Avenue will be staffed should you require attention during working hours.

5. If a nuclear attack occurs on Colorado Springs, the Test Center and adjacent Auditorium will comprise the headquarters for Mountain Bell. The basement area is the safest place for protection from blast effects and radioactive fallout.

ATTACHMENT 5

MANAGERS' CHECK LIST

When Crisis Relocation is ordered, you will be notified by our established alerting system. We anticipate we will receive notification in advance of the general public in order that we can move equipment or personnel before traffic routes become congested. You should perform the following actions to insure an orderly response.

1. Meet with your department and reaffirm those who will be remaining as critical workers.
2. Explain the need for those relocating to check in at the Mountain Bell Business Office at their relocated city.
3. Designate a location for company vehicles to be parked and appoint one individual to be responsible for keys and related vehicle documents.
4. Ask for all pagers to be checked in.
5. Assign work schedules to your critical employees. Remember, we will need 24 hour coverage.
6. Designate those employees who will take the first shift. The remainder should pick up their families and relocate to the Air Force Academy.
7. Establish transportation for the critical employees by either assigning a vehicle or establishing a car pool.
8. Remind them that food must be obtained from the Academy where "brown bag" lunches are available to bring to work.

9. Review the Warning and Shelter instructions.

10. Reassure them they will be exposed to as little danger as possible, but in the event an attack does occur, shelter is available for their survival.

11. Inform them that the Company Emergency Headquarters will be in the Auditorium next to the Test Center.

12. Outline the level of service we will provide.

13. Review the current situation and the possibility, as best we know, of an attack. This will be based on the current situation.

14. Inform them of continued medical facility operation.

15. Establish procedures for refueling and servicing of company vehicles.

16. Remind those relocating they may be recalled early to facilitate recovery after crisis is over.

ATTACHMENT 7

EMPLOYEE REGISTRATION FORM

_____ _____
Date Time

_____ _____ _____
Employee Name Number Department

_____
Supervisor

_____

_____ _____
Employee's Home Address Telephone Number

Family Members

_____ _____

_____ _____

_____ _____

_____ _____

Special Medical Needs

_____

_____

Religious Preference _____

Assigned Lodging Facility _____

Assigned Dining Facility _____

Work Schedule _____ Car Pool _____

Telephone No. or Radio Call at Work _____

Comments _____

Appendix E

REVIEW OF BANK PORTFOLIO ADJUSTMENT MODELS

Appendix E

REVIEW OF BANK PORTFOLIO ADJUSTMENT MODELS*

Input-Output Model

Hester and Pierce[1] have estimated a bank "Input-Output" model with data from 1,843 call reports from the first Federal Reserve District for the period 1961-63. The median bank was small, having less than $10 million in total deposits within a size range of $2 million to over $300 million. In the First District, branch banking is common and some large banks have extensive systems. The size distribution of the banks and the mean size of the bank portfolio are shown in Tables E-1 and E-2, respectively.

Using these data, Hester and Pierce estimated a weekly deposit flow model of bank behavior which traced the flow of deposits into and out of the various standard bank asset categories. Table E-3 shows the variation in the asset categories from the first week to the 52nd week. For example, if deposits were reduced by $100,000 in the first week, the first row of coefficients in Table E-3 shows that 50.7% would come from the bank's cash assets and 26.3% from shorts (securities with maturities less than one year). By the third month (the 12-week row in Table E-3), the impact is more distributed: cash assets are smaller by 28.7% and shorts by 34.5% and both commercial and consumer loans have been reduced 12.5% and 7.6%, respectively. By this time the changes in assets seem to have stabilized. Hester and Pierce show that the effective use of cash assets depends on the efficient functioning of the banking system. In Table E-4, their estimation indicates that in the first week, 23% of cash asset withdrawals come from the category "deposits due from (other) banks."

Quarterly Econometric Model

Hendershott[2] has developed a quarterly econometric model of the entire financial system subdivided into several sectors, one of which is banking. The data are aggregated at the economy-wide level and therefore are different from the data used by Hester and Pierce which consisted of observations on individual banks. Hendershott's data cover the period 1957-71. His results, presented in Table E-5, indicate that during the first quarter, 77% of demand

---

* This appendix was prepared by Robert R. Berry.

1. Donald Hester and James Pierce, Bank Management and Portfolio Behavior, Yale University Press, New Haven, Conn., 1975.

2. Patric Hendershott, Understanding Capital Markets, Vol. 1: A Flow-of-Funds Financial Model, Lexington Books, D.C. Heath and Co., Lexington, Mass., 1977.

deposit withdrawals (or deposits) will be satisfied through short-term securities. This result is consistent with the weekly results from Hester and Pierce (week 12, Table E-3, cash plus shorts). After six months, 64% will come from shorts. Again this result is broadly consistent with Hester and Pierce -- i.e., week 24 of Table E-3, in which the coefficients on cash and shorts sum to 59% (24% and 35% respectively). Note that Hendershott's designation of shorts includes some other items which Hester and Pierce have separated out and aggregated into "other" and "commercial and industrial" categories.

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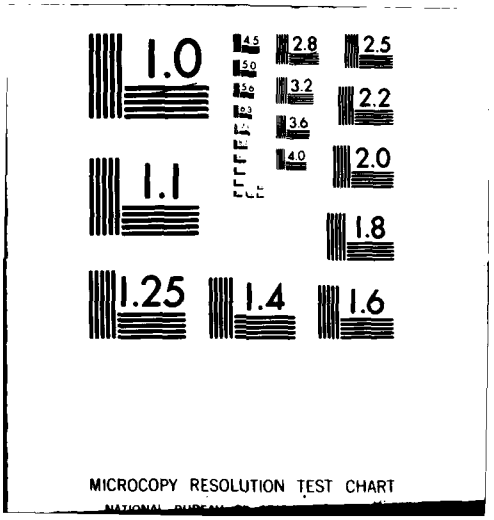
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MICROCOPY RESOLUTION TEST CHART

Table E-1

SIZE DISTRIBUTION OF SAMPLES OF BANKS

Bank Size*	Sample		
	Total	Basic	Reduced
	(number of banks)		
0-2	32	15	12
2-5	77	61	55
5-10	70	58	55
10-25	46	38	35
25-50	19	15	13
50-100	11	6	6
100-300	6	4	4
Over 300	6	4	4
Total	267**	201	184

* Bank size refers to amount of deposits (in millions of dollars) that a bank held on January 6, 1960.
** Four banks omitted as not classifiable by size.

Table E-2

PROFILE OF THE MEAN BANK PORTFOLIO IN THE REDUCED SAMPLE

Portfolio Item	Percentage of Total Assets
Assets	
Cash, balances with other banks, and cash items	16.44
Obligations of states and political subdivisions	6.77
Real estate loans (mortgage loans)	13.97
Financial Loans	1.45
Commercial and industrial loans	14.91
Consumer loans	16.47
United States government obligations (1-year maturity or less)	8.26
United States government obligations (1-5 year maturities)	9.92
United States government obligations (more than 5-year maturities)	5.42
All other assets	6.39
Total	100.00
Liabilities and capital	
Demand deposits	58.14
Time and savings deposits	28.07
All other liabilities plus capital accounts	13.79
Total	100.00

Table E-3

INPUT-OUTPUT MODEL FOR ASSET AGGREGATES:

DEMAND DEPOSIT COEFFICIENTS

(Standard Errors in Parentheses)

Demand Deposits Ending in Week:	*Cash*	*State and Local*	*Mort-gage*	*Comm. and Indust.*	*Con-sumer*	*Shorts*	*1-5s*	*Other*
1	.507*	.032	.035*	.048*	.047*	.263*	−.053	.121
	(.028)	(.020)	(.012)	(.022)	(.020)	(.043)	(.035)	
2	.305*	.012	.033*	.112*	.072*	.315*	.095*	.056
	(.039)	(.021)	(.014)	(.025)	(.022)	(.048)	(.039)	
3	.302*	.007	.039*	.106*	.057*	.263*	.122*	.104
	(.032)	(.022)	(.014)	(.026)	(.023)	(.050)	(.040)	
8	.378*	.022	.027*	.085*	.064*	.288*	.089*	.047
	(.027)	(.019)	(.012)	(.022)	(.019)	(.043)	(.034)	
12	.287*	.034*	.017	.125*	.076*	.345*	.029	.087
	(.024)	(.017)	(.011)	(.020)	(.017)	(.038)	(.031)	
16	.237*	.004	.044*	.094*	.080*	.343*	.072*	.126
	(.026)	(.018)	(.011)	(.020)	(.018)	(.040)	(.032)	
20	.202*	.039*	.034*	.151*	.076*	.342*	.137*	.019
	(.027)	(.019)	(.012)	(.021)	(.019)	(.041)	(.034)	
24	.245*	−.003	.029*	.097*	.097*	.348*	.078*	.109
	(.025)	(.018)	(.011)	(.020)	(.018)	(.039)	(.032)	
28	.225*	−.001	.061*	.125*	.123*	.308*	.056	.103
	(.025)	(.017)	(.011)	(.020)	(.017)	(.038)	(.031)	
32	.247*	.057*	.049*	.150*	.118*	.177*	.177*	.025
	(.028)	(.019)	(.012)	(.022)	(.019)	(.043)	(.034)	
36	.257*	.024	.051*	.137*	.125*	.150*	.102*	.154
	(.028)	(.019)	(.012)	(.022)	(.020)	(.043)	(.035)	
40	.265*	.042*	.060*	.129*	.140*	.237*	.032	.095
	(.026)	(.018)	(.012)	(.021)	(.018)	(.041)	(.033)	
44	.259*	.004	.078*	.129*	.157*	.105*	.131*	.137
	(.028)	(.019)	(.012)	(.022)	(.019)	(.043)	(.035)	
48	.290*	.099*	.055*	.134*	.185*	−.004	.136*	.105
	(.029)	(.020)	(.013)	(.023)	(.020)	(.045)	(.036)	
52	.298*	.091*	.069*	.141*	.179*	.003	.127*	.092
	(.029)	(.020)	(.013)	(.023)	(.020)	(.044)	(.036)	

Table E-4

INTERBANK CLAIMS: DEMAND DEPOSIT COEFFICIENTS

(Standard Errors in Parentheses)

Demand Deposits Ending in Week:	*Deposits Due from Banks*	*Total Reserves*	*Loans to Banks*
1	.232*	.237*	.090*
	(.020)	(.022)	(.015)
2	.135*	.122*	.053*
	(.022)	(.024)	(.016)
3	.154*	.157*	.071*
	(.023)	(.025)	(.017)
8	.183*	.164*	.050*
	(.020)	(.021)	(.014)
12	.145*	.129*	.029*
	(.018)	(.019)	(.013)
16	.076*	.137*	.030*
	(.019)	(.020)	(.013)
20	.099*	.079*	.040*
	(.019)	(.021)	(.014)
24	.098*	.113*	.027*
	(.018)	(.020)	(.013)
28	.104*	.117*	.016
	(.018)	(.019)	(.013)
32	.075*	.138*	.035*
	(.020)	(.021)	(.014)
36	.119*	.124*	.050*
	(.020)	(.022)	(.015)
40	.106*	.125*	.022
	(.019)	(.020)	(.014)
44	.123*	.096*	.048*
	(.020)	(.021)	(.014)
48	.096*	.151*	.027
	(.021)	(.022)	(.015)
52	.128*	.144*	.025
	(.021)	(.022)	(.015)

Table E-5

COMMERCIAL BANK PURCHASES AND ISSUES

(Standard Errors in Parentheses)

	$\Delta[DD(1-d)]$	$\Delta[DD(1-d)]_{-1}$	SAV^{*}	$\Delta[SVP(1-t)]$	$\sum_{i=2}^{4}\Delta[SVP(1-t)]_{-i}$
ΔS	.7766894	−.1367014	.8343997	.55921655	−.4211137
ΔL	.183447 (.101558)	.122440 (.108496)	.132164 (.148710)	.423785 (.115812)	.2406885
ΔMOR	.0033088 (.0152613)	.0142614 (.0168853)	.0334363 (.0222354)	.00462545 (.0137310)	.1804257
$-ISS$	.0365545 (.0788508)	—	—	.0123730 (.0606051)	—

	X	$INV - INV_A$	$\Delta[(Rcp - Rcor)T]$	R	DW	SEE
ΔS	.522385	.3905405	.00395717 (.00159253)	.608	1.27	2.00
ΔL	.194651 (.128968)	−.0493965 (.144767)	−.00395717 (.00159253)	.819	1.13	1.46
ΔMOR	—	—		.877	0.91	0.17
$-ISS$	.717039 (.097238)	−.341144 (.108937)		.633	1.96	1.27

Symbol Definitions:

Δ [DD(1-d)]	first difference of demand deposits, net of reserves
Δ [SVP(1 - t)]	first difference of time deposits, net of reserves
X	certificate of deposit categorical variable
Rcp	rate on commercial paper
Rcor	rate on corporate debt
INV	inventory investment
Δ S	first difference in shorts (less than 1 year maturity)
Δ L	first difference in longs (greater than 1 year maturity)
Δ MOR	first difference in mortgage
-ISS	controlled issues
SAV	balancing item

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KEY ECONOMIC PROBLEMS AND GUIDELINES FOR CRISIS RELOCATION
Richard Laurino, Frank Trinkl, and Francis Dresch

Center for Planning and Research, Inc., Palo Alto, California
June 1980 202 pp. Contract DCPA01-78-C-0227
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