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THE IMPACT OF ALTERNATIVE INTERNATIONAL ECONOMIC POLICIES ON U.S. DEFENSE INTERESTS ABROAD

Farid Abolfathi, et al

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13. ABSTRACT
The report describes research efforts to investigate linkages between international economic policies and their effects on U.S. defense interests abroad. Analytic tools developed to assess these linkages are: an economic model to estimate foreign economic impacts of U.S. economic policies, a framework to determine foreign responses, and a method to evaluate military-related implications of foreign responses. Each of these components is discussed in detail. Two applications of the technique illustrate their operation.

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REPORT SUMMARY

This report describes research findings for the study of "The Impact of Alternative International Economic Policies on U.S. Defense Interests Abroad." This section is a non-technical summary of important features of the research effort.

The impetus for the study derived from the recent, rapid changes in the international economy induced and caused by the adoption of a number of new international economic policies by the United States and other countries. These newer policies and the evolving international economic environment pose as yet unanswered questions about their effects on U.S. defense interests. To begin to answer these questions, this study has sought to identify international economic policies which, if adopted by the United States, could affect the operation of the international economy and induce policy responses by foreign governments that are detrimental to U.S. defense policies and defense interests. The goal of the research effort has been quantitative assessment of the impacts of such policies on U.S. defense posture.

RESEARCH OBJECTIVES

To accomplish the goal established for the project -- an empirically based model of linkages between economic and defense policies -- specific research objectives were established. These objectives have been:

- The identification of linkages between coercive international economic policies and responses of target countries by means of an historical survey of cases of economic sanctions.
- The specification of components of U.S. defense interests and military posture, and the development of quantitative indicators of such components.

- The development of an economic model to determine the nature and to estimate the magnitude of changes in foreign economies resulting from international economic policies adopted by the United States.

- The specification of a decision-analysis technique to identify likely responses of foreign governments adversely affected by U.S. policies.

ACCOMPLISHMENTS

Research efforts during the project have been directed toward achieving the above objectives. Four important accomplishments have resulted.

1. An empirical analysis of quantitative measures of U.S. interests abroad was conducted in cooperation with the Concepts Analysis Agency of the U.S. Army. Quantitative indicators developed in the analysis have been adopted by the Long-Range Forecasting Division of the U.S. Marine Corps, Quantico, Virginia.

2. A generalizable technique to assess the economic impacts of U.S. policies has been developed. The model employed during the study can be applied to wide groups of economies of differing structures.

3. The framework developed to analyze foreign responses to economic damage has successfully reduced the myriad of influences on foreign responses to a manageable set of factors. The framework can be implemented with relative ease, facilitating its use by analysts with regional or country-specific expertise but lacking experience with formal (and quantitative) decision processes.

4. The study allows the assessment of international economic influences on international alignment patterns. This capability in turn assists planning for and evaluation of force structure requirements.

In addition to these items, the study has accomplished a number of more technical objectives. A summary of these additional results is presented in an expanded, but still brief, format following a description of the linkages between U.S. economic policies and U.S. defense interests abroad.

PRECIS OF THE STUDY: HOW U.S. ECONOMIC POLICIES INFLUENCE MILITARY POSTURE

The conceptualization of interrelations involving U.S. international economic policies and U.S. defense interests is depicted by Figure 1. International economic policies adopted by the United States affect the nature and level of economic activity in foreign economies. The path of influence may be direct, or it may be through the operation of the U.S. economy. In either case, foreign economies are affected. As foreign economic repercussions are registered, foreign governments formulate policy responses. Such responses can be designed (1) to mitigate the repercussions by directly offsetting the economic impacts of the original U.S. policy, (2) to induce a modification or reversal of the U.S. action, or (3) to intentionally damage U.S. interests if the government perceives that substantial economic harm will result from the U.S. action.

Given this conceptualization, the important questions for the study can be divided into two groups. In the first group are questions concerning the nature and magnitudes of the foreign economic impacts of U.S. international economic policies. In the second group are questions relating to the influences on and structure of foreign governments' evaluations of economic harm attributable to U.S. actions and selections of policy responses.

At the inception of the project, the two groups of questions were examined to determine their respective difficulty and importance to the study, and to plot an appropriate analytic strategy. From that examination, it was decided that an analytic framework to estimate the nature and magnitude of foreign government policy responses to U.S. economic actions could not be designed without first establishing the amount of real and perceived "economic harm" attributable to a U.S. policy. Consequently, the economic analysis was initiated with the express goal of providing a detailed evaluation of foreign economic impacts.

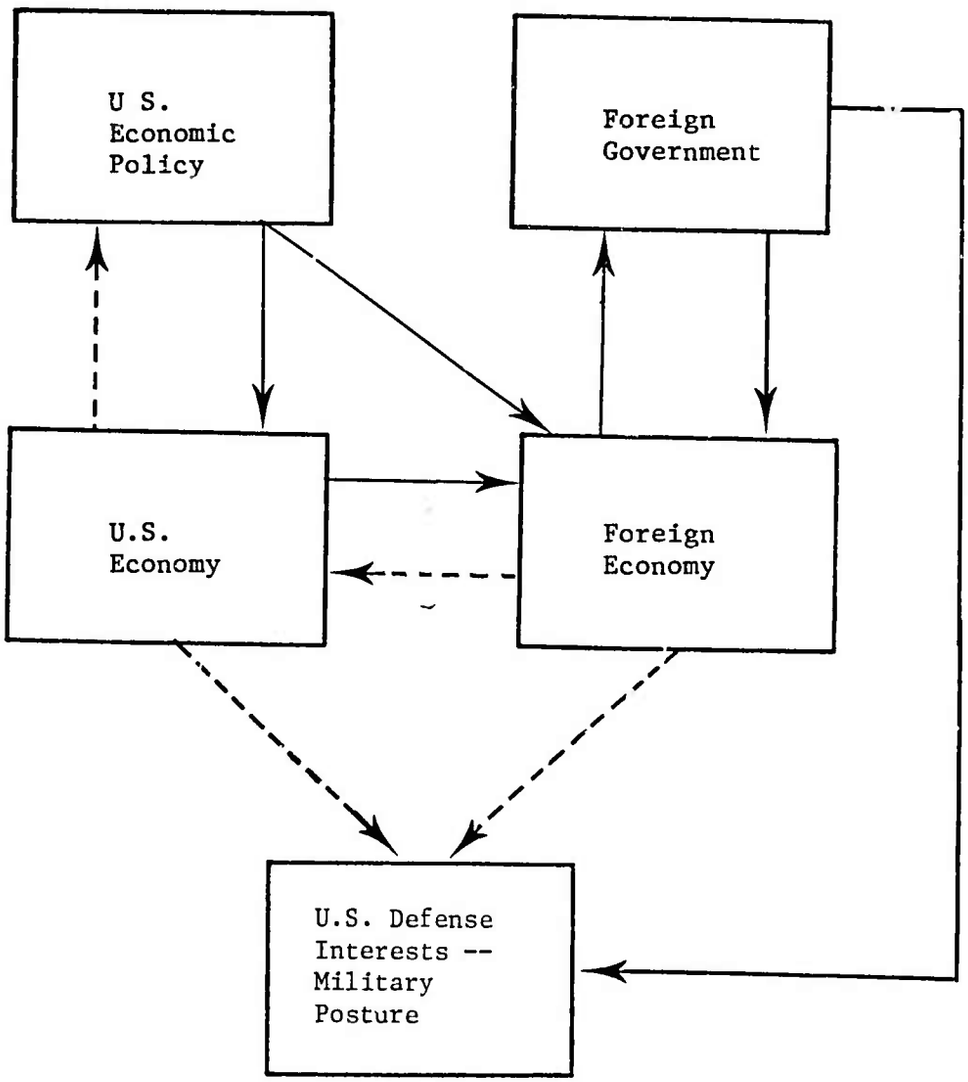


Figure 1. The Relations Among Economic Policies, Foreign Responses and U.S. Defense Interests -- Military Posture

The economic model developed for the project reports the effects of U.S. policies in terms of induced changes in employment, prices, and output within the foreign economy. The information is then used within the "political sector" of the analysis to identify likely responses to a particular U.S. action.

The analysis of foreign governmental response begins by converting the economic impacts, as reported by the economic model, to measures of economic harm. Based on recent experience, expected trends for the economic variables within the foreign economy are determined. Changes induced by U.S. policies are recorded as deviations from these trends -- the difference between expected levels of economic performance and the levels actually achieved as a result of a U.S. policy action. These deviations are the measures of "economic harm" caused by U.S. policies. Economic harm, representing actual impacts and the shortfall from expectations, is then employed to estimate the level of hostility toward the United States created by the effects of U.S. economic policies.

Next, a rank ordering of representative policy options available to the foreign government is established. The list is not required to be exhaustive but does include economic, diplomatic/political, and military-related policy options. The list is compiled through the use of consensus tools not unlike simplified Delphi techniques. Estimated levels of hostility are employed to identify categories of policy responses most likely to be selected. Finally, the range of policies in the likely classes is examined to determine implications for U.S. defense interests abroad.

In order to test the techniques developed in this study, two countries, Japan and Saudi Arabia, were selected for intensive analysis during the course of the study. Japan was selected because it has extensive economic ties with the United States and would be an excellent case for initial application of the analytic tools developed during the project. Saudi Arabia was chosen to provide an extreme test of the analytic techniques. As it is an underdeveloped country dependent upon one industry

and, except for that industry, has relatively few economic ties to the United States, the robustness of the analytic tools could be determined by comparison with the Japanese study. Although only two applications were performed during the study, the analytic tools have been designed to be applicable to a wide variety of countries. Further, they have been structured to permit their use by analysts lacking extensive quantitative skills but possessing regional or country-specific expertise.

An example can help illustrate the procedure. Suppose the United States adopts a policy to prohibit all imports from Japan. The economic impacts of the policy, as estimated by the economic model, are:

- Output -- 3.61% reduction in GNP
- Employment -- 6.55% of the labor force unemployed
- Prices -- Negligible effect, a slight decline.

The extent of economic harm is illustrated by the shortfall from the expected growth rate of the Japanese economy. As a result of the U.S. action, growth is estimated at a 4.1 percent annual rate compared to the expected rate of 8 percent. This is significant "harm." If the Japanese Government were to attempt to directly counter the effects of the U.S. action by increasing government spending, the required increase would equal 15.9 percent of the current government budget.

In order to assess the impact of potential Japanese retaliations against the United States a representative list of possible Japanese responses was compiled. This list consists of military, diplomatic, and economic actions. The evaluation of Japanese hostility toward the United States, derived from the economic harm of U.S. policy, identified the likely categories of Japanese responses as "diplomatic-economic actions" and "military-diplomatic actions." Examples of specific policies in these categories are:

- Japan demands a 20 percent reduction in the size of U.S. forces in Japan.

- Japan abrogates the U.S.-Japan Security Treaty.
- Japan makes major investments in China.
- Japan breaks relations with Israel.
- Japan recognizes Palestine Liberation Organization.
- Japan increases trade and economic aid to East Germany.
- Japan increases economic aid to North Vietnam.
- Japan increases restrictions on all industrial goods imports.
- Japan prohibits any U.S. investments in Japan.
- Japan takes actions to diversify its trade.

The policies in the middle of the list were judged to be the most likely. None of the above policies can severely damage U.S. military capability. The index of U.S. military capability, however, may also be reduced by an increase in Japanese hostility toward the United States. Thus, it is unlikely that the Japanese, in response to a U.S. ban on Japanese imports, would take actions that would seriously damage U.S. military capability in Japan and vicinity; but their increased hostility toward the United States may reduce the long-run operational capability of U.S. forces in Japan. For a more detailed discussion of this and other examples of economic policies affecting U.S. military capability, interested readers should consult Chapter VI of this report.

TASK DISCUSSIONS

Each of the explicit research tasks for the project is discussed in the following passages. Where appropriate, each discussion is divided into three sections: a statement of the research problem(s) specific to the task, a description of the methodology employed in the investigation, and a summary of results. References to guide further reading are also provided.

I. An Historical Survey of Linkages Between Coercive Economic Actions and the Responses of Target Nations

The materials pertinent to this task are the subject of Chapter II. Within that chapter, the reader is further directed to Appendixes A through F for discussions of the case studies described under Research Problem 2.

Research Problem 1. An historical survey was performed to identify likely responses to restrictive international economic policies. Particular emphasis was placed on determining military-related retaliations. Referring to Figure 1, the determinants of the right-most path between foreign governments and U.S. defense interests -- those responses directly affecting military interests -- were to be identified.

Methodology. The historical survey was accomplished by reviewing the literature of political science devoted to the analysis of situations of interstate economic conflict.

Results. The results of the survey were essentially negative. Very little evidence could be found to support the identification of direct military-related responses to international economic policies. There were several reasons for the unsuccessful outcome of the survey. The most important was a paucity of systematic examinations of international economic policies by students of international relations. Previous substantive efforts to integrate economic policies with other aspects of interstate behavior have not been satisfactory because economic policies adopted for "economic" reasons have been explicitly excluded from consideration. Compounding the problem, efforts to distinguish "normal" economic policies from economic instruments of national security policy have not produced consistent definitions. The single most important generalization is a qualified statement: for an economic policy to be an instrument of national security policy, it must have at least a perceptual impact on the target country's decision-makers. Other observations emphasize that the success or failure of coercive economic action depends crucially upon uneven economic power and upon the two nations' relative dependence on international trade.

Empirical studies of instances of interstate economic conflict have begun to appear in recent journal issues. While these studies do not all follow a similar analytic method, they do suggest a few substantive generalizations:

- Interstate economic conflict is highly escalatory. Once a pattern of punitive action and reaction sets in, increasingly restrictive economic policies are adopted by the parties involved.

- Engaging in interstate economic conflict is usually self-defeating. Except under uncommon circumstances, economic sanctions seem to be ineffective and commonly require the initiating party to accept economic costs directly created by its own policies.

- The success of economic sanctions depends on situational factors including (1) alternative trading opportunities, (2) severity of sanctions on the target, and (3) the limit of the demands of the sanctioning power.

- The response of the target country to the economic sanctions of another country can take several forms: (1) military or economic retaliation against the sanctioning power, (2) domestic economic adjustments, (3) no response, or (4) capitulation to the demands of the sanctioning power.

These studies suggest that a variety of factors influence a nation's policy response to the imposition of a sanction. However, no systematic discussion of the problem of choice of policy response was presented in the works reviewed -- the factors were never simultaneously evaluated. Finally, cross-sectional studies of interstate economic conflict have been less successful than studies that concentrate upon a particular instance of such conflict. The beginnings of analytic model development of the type required for the project are found only in particular case studies.

Although the literature survey was not as helpful as was expected, it did confirm the decision to concentrate the analysis on particular countries rather than attempt a cross-sectional treatment. (The countries chosen were Japan and Saudi Arabia.) Because the historical survey was expected

to identify patterns of responses to restrictive international economic policies, it was decided that the project would benefit from a further examination of selected historical cases of economic conflict.

Research Problem 2. The literature survey showed the necessity of case-by-case treatment to model economic conflict successfully. However, it is extremely difficult, if not impossible, to construct a detailed model of a particular situation without having at least a rudimentary understanding of the nature of the process. Six historical instances were selected for more detailed study. The identification of situational factors influencing the responses of target nations was emphasized in order to recognize historical regularities that might contain the complex model within reasonable bounds.

Methodology. The selection of particular cases of economic sanctions to be studied posed the most important methodological questions. First, it was decided that only cases occurring since 1945 would be considered. Second, to control for the importance of uneven levels of economic development, at least one case in each of the following categories was included: a developed versus a developed country; a developed versus a less developed country; and a less developed versus a less developed country. Third, a variety of relative sizes in actor and target states was sought. And finally, sanctions with differing durations were included. Six instances were selected: Iran, 1950-53; Finland, 1958; Berlin, 1948-49; Cuba, 1958-present; Rhodesia, 1965-present; and South Africa, 1947-present.

Results. The six case studies provided an appreciation of the complexity involved in the specification of important situational factors. Each case was considered independently and then a comparative evaluation of all cases was performed. While there was significant variation across the cases, it was possible to identify features to be included in the analysis of Japan and Saudi Arabia. These include the historical pattern of relations between the countries involved, the relations of both countries to "third party" countries, the pattern of prior international economic

conditions between the countries, the economic conditions within the responding country, the domestic political conditions of the responding country, and the nature of the particular restrictions initially imposed. For convenience, a table appearing in Chapter II which visually summarizes the analysis is reproduced here as Table 1.

II. Measurement of U.S. Military Posture

Chapter III of the report presents the analytic discussion for this task.

Research Problem. The development of an unambiguous definition of U.S. defense interests abroad was the first of two problems contained within this task. The second was the development of empirically based indicators of the components of U.S. defense capabilities abroad.

Methodology. The confusion that has surrounded the concept of military posture was discovered to be the result of failures to identify specific elements of the concept. Any one element of the concept may produce a different interpretation of posture than another element, even if both are applied in the same situation. Examples of the variety of ideas implied by "military posture" include: strategic standing, military strength or power, military capability, military influence, military presence and military weaknesses and threats. Additional conceptual problems have been the association of military posture with particular weapons systems and the variations of assessments of posture (under any of the previous subtopical ideas) due to changing military goals.

The important dependence of posture on goals suggested that an unambiguous identification of military posture must depend upon the set of major U.S. military objectives. Major objectives are emphasized. If the specific mechanisms employed to achieve the objectives are the basis for the identification of posture, the analysis would be returned to the assessment of inconsistencies previously discussed. The major U.S. military goals relating to other countries are not constant across countries or even

TABLE 1

Comparative Characteristics of Six Cases of Sanctions

	Finland	Iran	South Africa	Rhodesia	Cuba	Berlin
I. Relevant Background Condition						
1. Historical	X	X			X	
2. Current						
a. Geographic	X			X	X	
b. Level of Development--Self Sufficiency		X	X	X	X	X
c. Internal Political Conditions	X	X			X	X
d. International Conditions	X		X	X	X	X
e. Third Party Influences			X	X	X	X
f. Power Differential	X	X			X	X
II. Nature and Scope of Sanctions						
1. Selectivity or Completeness	S	S	C	C	C	S
2. Unilaterally Escalated	yes	no	no	yes	yes	no
3. Retaliatory(bi-or multi-laterally escalated).	no	yes	no	yes	yes	yes
4. Range (unilateral, bilateral or multilateral).	U	B	M	M	M	B
5. Rate of Implementation (gradual or abrupt).	A	G	G	G	G	A
6. Ancillary Sanctions	no	no	yes	yes	yes	no
7. Costs to Sanctioning Nation	low	low	low	high	low	low
8. Costs to Target Nation.	high	mod.	low	mod.	low	high
III. Responses of the Target Nation						
1. Resistance	X	X	X	X	X	X
2. Retaliation		X		X	X	
3. Political and/or Realignment			X	X	X	
4. Negotiation	X	X	X	X	X	X
5. Concession and Capitulation	X					
6. Violence		X			X	
7. Domestic Restructuring		X	X	X	X	X
IV. Impact of Sanction on Target Nations						
1. Domestic Political Stability						
2. Domestic Economic Stability	X	X		X	X	
3. Nationalism		X	X	X	X	
4. National Cohesion			X	X	X	X
V. Final Outcome						
1. Concession Capitulation	X					
2. Realignment				X		
3. Isolation			X			
4. No Apparent Effect		X				
5. Stalemate			X	X	X	X

geographic regions of the world and are therefore not precisely identifiable with abstract analytic efforts. However, the concept of posture related to goals becomes more tangible in specific situations recognizing environmental constraints.

Results. To identify conceptual dimensions of U.S. interests abroad, factor analysis was performed on two data sets. Political, commercial, military, and socio-cultural dimensions of U.S. interests were identified. Further, the indicators (derived from the factor analyses) of U.S. military interests tend to cluster into a few sets of theoretically meaningful structures; the clusters of military and commercial influences seem to be the more stable. The results of the factor analyses also provide indicators for empirical implementation.

III. Measuring the Effects of U.S. Economic Policies

Chapter IV presents the major discussion of research efforts for this task. An heuristic discussion of the economic model is included there. Appendix G provides a more technical statement of the model.

Research Problem. A theoretically consistent, empirically estimable economic model capable of determining the nature and magnitude of effects on other economies of alternative international economic policies must be derived. Additionally, the model should incorporate economic policy instruments the foreign government might employ in response to U.S. policies. Generally, theoretical economic models are employed to determine the qualitative effects of policies while econometric models are used to determine the magnitude of the effects. This general strategy has been partially frustrated by the economic theory of international trade. The theoretical policy recommendation to maximize world benefits from trade is to allow unrestricted trade. Yet the welfare of any one country can be increased by restricting trade. Additionally, as long as trading activities are not completely unrestricted it is difficult to determine whether further restriction of trade is harmful or beneficial in a welfare

sense. The precise evaluation depends upon the model structure used to address the question. Consequently, the evaluation of both the nature and magnitude of economic effects is best attempted in an empirical context.

Methodology. The model chosen for the study displays a mixed Leontief-Keynesian treatment as elements of input-output analysis are used to identify sectors of the economy, and the tools of aggregate demand management constitute the response options available to the policy authorities. The effects of alternative international economic policies may be traced through the structure of the economy and measured as variations in industry-specific and economy-wide prices, outputs, and employment. Similar evaluations of economic policy responses are possible. The model is designed to be empirically based; estimation is reasonably straightforward.

Results. The conclusions from the model are that U.S. economic policies that restrict U.S. imports are more damaging to foreign economies than other possible actions (for example, limiting U.S. exports). Countries that normally sell a substantial percentage of exports to the United States are more vulnerable than others. And, even though sales to the United States may be a small proportion of total exports, if such sales are concentrated in one product area the country can be vulnerable to commodity-specific U.S. import restrictions.

IV. Data Collection and Model Estimation

The activities associated with this task are well identified by its title. The data employed in the model estimations were acquired from public sources. References to the data may be found in Chapters II, VI, and VII. The construction of case-specific policy response estimates relied heavily upon an abstract framework to assess the political implications of economic damage. Chapter V presents the framework while Chapters VI and VII contain applications.

V. Interpretation of Empirical Findings

Chapters VI and VII provide interpretations of the empirical findings.

Research Problem. The essential element of this task has been to determine the overall validity of the techniques developed during the course of the project.

Results. The overall assessment of the analytic tools developed during the project is favorable. Both the economic component and the decision-analysis component appear to have general validity. It should be noted, however, that the measurement of economic impacts is accomplished with greater precision.

The measurement of economic impacts is more accurate for shorter term effects than for longer term implications. It is the judgment of the research staff that the models underestimate long-run effects. A similar judgment applies to the estimates of foreign response effects on U.S. military capability.

VI. Preparation of the Final Report

As this document constitutes the Final Report for the project, one section of the task has been completed. Efforts to disseminate the major findings of the study to interested users in the national security community are, at the time of this writing, under way.

CHAPTER I. INTRODUCTION TO THE ANALYTIC STRATEGY

This chapter presents a brief discussion of the analytic strategy that has guided research efforts during the course of the project. As subsequent chapters are devoted to particular aspects of the research problem, this discussion provides a framework for interpretation and permits the reader to maintain a consistent image of the entire work.

The study originated in concerns and uncertainties generated by recent changes in the international economy. A variety of countries have adopted new international economic policies and altered the structure of international economic relations. The concern has been that the implications of these events for U.S. defense policies are unknown. The general problem may be described as a lack of understanding of possible linkages between economic and defense policies. This study is the initial step toward developing that understanding.

The study is an investigation of the impacts of international economic policies on U.S. defense interests abroad. The intent is to focus on international economic policies which, if adopted by the United States, would adversely affect U.S. defense interests. The basic conceptualization of linkages between U.S. policies and defense interests identifies a causal sequence involving U.S. international economic policies, induced responses of foreign governments and subsequent impacts on U.S. defense interests abroad.

The sequence begins by recognizing that international economic policies adopted by the United States will affect the nature and level of economic activity in other countries. It is then assumed that governments in those countries evaluate the actual and expected magnitude of the economic effects and select a policy response. Depending upon the particular response and the nature of U.S. defense interests, the response may directly or indirectly

influence U.S. defense interests. Simple as it seems, this sequence does identify the principal research questions.

- The study must determine the nature and magnitude of the effects of alternative international economic policies available to the United States on foreign economies.

- The determinants of foreign responses must be analyzed to identify the types of economic policies likely to engender a foreign response and to identify the most likely responses of foreign governments.

- U.S. defense interests must be described to assess those elements of military posture that enable implementation of overall U.S. policy.

- The responses available to foreign governments must be examined to determine whether and how those responses are related to defense interests.

While the causal sequence identifies research problems, it is not sufficient to identify an analytic strategy that is consistent with the goal of an empirically based investigation. Further structure must be provided for possible variations within and across the items of the sequence. Consider the responses of foreign governments: some responses may directly affect U.S. defense interests, while the effects of others may be indirect. As an example of the latter type, a foreign government may alter its political relations toward the United States or adopt an economic policy unfavorable to the United States--either of which my indirectly influence U.S. defense interests, or military posture, within the country or within the country's geographic region. Furthermore, the presumption that the government responds to economic harm, caused by economic policy, does not restrict the range of motives influencing the selection of a policy response.

Introducing a range of motives influencing policy responses does not require that each policy be assigned a specific motive. In fact, it is likely that no precisely described motive can ever be identified empirically. However, to insure that this empirical difficulty does not cause the analysis to

ignore important factors, three basic intentions are specified. First, the government may choose a retaliatory response. The expected effects of U.S. economic policies may be such that a government's sole desire is to choose a response harmful to the United States. Second, a government may adopt a policy designed to persuade the United States to modify an economic policy that adversely affects its economy. And finally, the response may be protective. The government may tacitly accept the U.S. policy and seek only to minimize the adverse effects on its economy. Of course, there is substantial latitude to allow elements of any two, or even all three, of these intentions to be incorporated in the selection of any particular policy response.

U.S. defense interests may be influenced by a response fitting any one of the intention types. Obviously, a retaliatory response need not be limited to economic retaliation. U.S. defense interests may provide a convenient (and vulnerable) target for retaliation. Similarly, the foreign government may select the defense interests of the United States as the leverage point to "persuade" a policy change. Military rather than economic leverage may be chosen because the exertion of economic leverage would require adjustments within the domestic economy that are slow to develop and, once achieved, equally slow to reverse. By implication, military-related leverage is either more quickly effected or more quickly reversed, or both. Finally, a fundamentally protective policy response can be expected (in combination with the U.S. policy) to alter the pattern of activity between the United States and foreign economies. The resulting pattern of economic interaction may influence defense interests in both the short and long run.

Figure 1 conveniently depicts the basic features of the process linking international economic policy and U.S. defense posture. The analytic strategy developed for the study is designed to investigate particular patterns in the flows of influence and causation. However, the patterns of the interrelationships to be investigated do not bear a one-to-one resemblance to the patterns appropriate to separable analytic treatment. For example, work could proceed by developing an analytic framework to

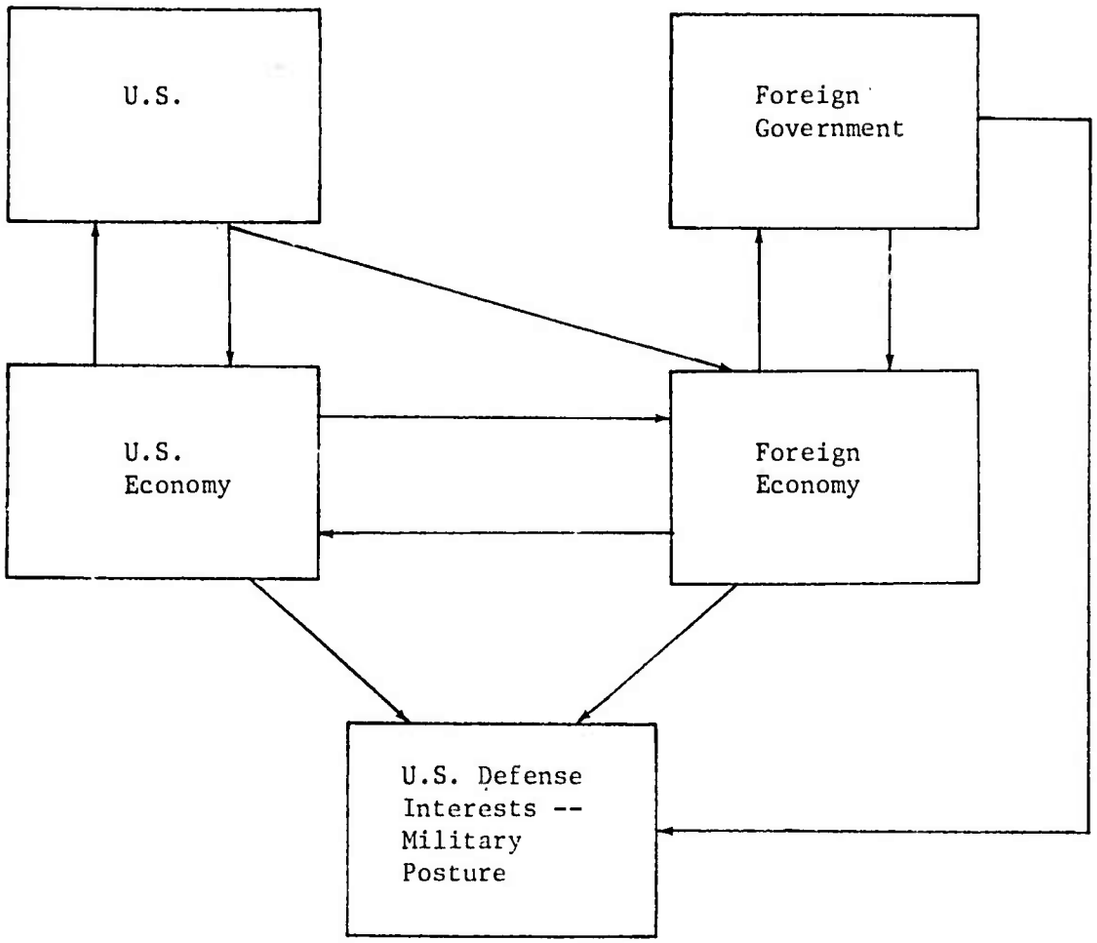


Figure 1. The Relations Among Economic Policies, Foreign Responses, and U. S. Defense Interests -- Military Posture

determine the nature of the impact on a foreign economy of alternative international economic policies. The magnitude of the effects could be determined by constructing an econometric model of the economy and estimating its parameters. But later stages of the sequence require a model capable of assessing the nature and magnitude of the effects of economic policies adopted by the foreign government as it "evaluates" policy alternatives. Generally, a model sufficient for one of these tasks is inappropriate for the other. Therefore, the economic aspects of the study are more efficiently treated simultaneously than sequentially. Similar situations exist in other portions of the study.

The structuring of analytic tasks must also recognize an inherent difficulty in any modeling process that is empirically based. It is unfortunate, but nevertheless true, that data often demand models. Crudely stated, a rough-and-ready causal sequence, developed without sufficient rigor, can lead research efforts from one "variable" to another, governed only by how well the numbers fit together. For the investigation of linkages between policies and defense interests/posture, the "problem" is more subtle, but still present. The danger is that the basic conceptualizations of economic effects and indicators of U.S. defense interests may be inextricably intertwined if jointly developed. To guard against even inadvertent lapses of this sort, the analytic efforts in these two areas have been firmly separated.

In the early stages of the project it became apparent that the complexity of the problem would preclude a strictly cross-sectional treatment. Modeling the process for all countries influenced by U.S. economic policies is simply not feasible. Consequently, two countries were selected for intensive analysis during the course of the study. The countries selected were Japan and Saudi Arabia. Japan was selected because Japan has extensive economic ties with the United States and would constitute an excellent case for initial application of the analytic tools developed during the project. Saudi Arabia was chosen to provide an extreme test of the analytic techniques. As it is an underdeveloped country dependent upon one industry and, except for that industry, has relatively few economic ties to the United States, the

robustness of the analytic tools could be determined by comparison with the Japanese study.

Although only two applications were performed during the study, the analytic tools have been designed to be applicable to a wide variety of countries. Further, they have been structured to permit their use by analysts lacking extensive quantitative skills but possessing regional or country-specific expertise.

The presentation of materials in the report follows the elements of the causal sequence previously identified. Chapters II through V provide general treatments of the analytic tools developed for the study, while Chapters VI and VII describe applications of the techniques to Japan and Saudi Arabia respectively. Chapter VIII briefly summarizes the research effort.

CHAPTER II. AN HISTORICAL SURVEY OF LINKAGES BETWEEN COERCIVE ECONOMIC ACTIONS AND THE RESPONSES OF TARGET NATIONS

An historical survey of the responses of countries to the imposition of economic restrictions constituted the first research task for the project. The survey was intended to determine the types of military-related responses often chosen as reactions to different kinds of international economic policies. The results of the research efforts have been previously discussed in the Interim Technical Report of December 1974. This chapter is a summary of the earlier report. It has been included to provide a convenient review of the findings that influenced subsequent work.

The materials of the chapter are presented in three major sections. The first section is a brief introduction to the research problem associated with the historical survey. The second section contains a discussion of studies in the literature of political science that examine interstate economic relations. Substantive contributions of the literature are summarized and empirical examinations of interstate economic conflict are reviewed. The final section is a comparative review of six case studies of the use of economic sanctions. Reports for each of the six cases, treated individually, have been included in this volume as Appendixes A through F.

INTRODUCTION

The historical survey was undertaken to determine the types of military-related policies often adopted as responses to international economic restrictions. Despite the apparent clarity of this statement of the research objective, the topic is not well defined for research efforts. A few examples may illustrate the difficulty. First, it can be argued that any response may have "military-related" characteristics in the long run. Second, it is unlikely that one type of international economic

policy will produce similar responses in a variety of circumstances. It is far more likely that responses will vary according to the goals and conditions of the target nation. And third, military-related responses can be expected to be a series of events which are themselves part of a larger process of actions and reactions between international actors. For these reasons, generalizations concerning typical military-related responses to economic policies would require numerous qualifications specifying the particular situation type, the characteristics of the contending nations, and also their goals.

Based upon these considerations, it was decided to separate the larger question into component parts. Each component is more specific, and, as a result, more analytically tractable. At the same time, each sub-question is an important element of the process of interest.

- What are the inputs that would go into the decision-making process when a nation perceives it has become the target of economic restrictions? In other words, what considerations influence a nation's response?
- What are the available instruments for response to an economic threat?
- What are the instruments that have been used? Why were they selected? Specifically, why did (or did not) the nation use military responses?

SURVEY OF THE LITERATURE

This section reviews the political science literature on conflictual economic interactions of nations. The quality and content of the literature are described and the substantive contributions of writers are evaluated. Next, recent empirical studies of economic conflict are briefly reviewed. The section concludes by summarizing these findings within the analytic framework outlined above. Particular attention is directed toward answering the questions on the basis of the literature survey.

General Features of the Literature

The political science literature treating conflictual economic interactions among nations is very poor. An examination of five major journals[1] in political science and international relations revealed that economic interactions of nation states were seldom the major topics of articles. For the 1960-74 period, only 30 articles were devoted to the topic. Furthermore, of these articles, more than half appeared in one journal, the Journal of Peace Research, an Oslo-based publication. The other journals are published in the United States. A similar lack of attention to international economic conflict is evident in international relations (or political) texts. Among the popularly used texts, only K. J. Holsti's International Politics (1967) discusses economic conflict and describes economic instruments of foreign policy. But, unfortunately, Holsti's descriptions are superficial. As an example, he fails to discuss the form of the linkage between the use of economic instruments and their impact or causes.

Nevertheless, Holsti's work is a reflection of the state of the art in political science and the attitude of the political scientists. Traditionally, political scientists have been reluctant to deal with economic interactions. Hans J. Morgenthau (1973), in his classical treatise on power, Politics Among Nations, does not deal with economic instruments of foreign policy. Klaus Knorr, another well-known political scientist, is on record as stating that for the over 100 conflict cases he had studied, economic instruments had shown little or no effectiveness.[2]

In the last few years, however, as a result of a number of events (e.g., the food and energy crises) and developments (e.g., growth of multinational corporations) a growing interest has been shown in economic issues. The

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[1] These were American Political Science Review, Journal of Conflict Resolution, Journal of Peace Research, International Studies Quarterly, and Comparative Political Studies.

[2] Klaus Knorr (1974) at Inter-University Seminar on Armed Forces and Society, Chicago, Illinois.

Arab oil embargo and production cutbacks, Iran's threats against the Netherlands, and the growing dependence of many countries on U.S. food production have clearly demonstrated that economic policies can be powerful instruments for changing the behavior of other nations. At a more general level, since the late sixties the power of multinational corporations and international financial institutions has generated a growing interest in these organizations. These developments have led to an increasing number of articles and unpublished papers on these subjects. Thus far, however, the cumulative effort has not been sufficient to create a coherent literature. Most research efforts in this area have progressed independently of each other; the net contribution, therefore, has been very small.

Substantive Contributions

Substantive contributions to our understanding of the process of economic conflict have often been limited by the need to accomplish a difficult separation--the separation of "abnormal" from "normal" economic interactions. As an example, Holsti's (1967) analysis, one of the best-known works in political science dealing with economic instruments of foreign policy, distinguishes between economic actions that have purely economic objectives (such as "normal" trade between any pair of nations) and actions that have "political" goals (such as increased influence in other states). Yet in the real world, the distinction is seldom obvious: Japanese trade with the Middle East has a mixture of political and economic motives; the motives for U.S. and Soviet trade with other countries vary from a mixture of pure politics (e.g., Soviet-Cuba, and U.S.-Vietnam trade) to more or less pure economics (e.g., U.S.-Swiss trade).

In reality, trade is seldom determined by purely economic motives. Most nations employ economic instruments to protect their strategic and "infant" industries, to protect domestic interest groups, or to prevent the depletion of their foreign exchange reserves by restricting imports. The use of these instruments is so common that they could be considered part of the normal pattern of international trade. Holsti, however, is not clear

on whether these are in fact part of his concept of "normal" economic activity. At one point he states that instruments of foreign policy can be used to increase a state's relative capabilities. But at another point he states: "Economic instruments of foreign policy are most often used for purposes of persuasion, reward, or punishment in order to influence the behavior of another state" (Holsti, 1967: 282). "Persuasion, reward, or punishment" do not seem to be part of the "normal" trade motives of nations, whereas increasing "a state's relative capabilities" is commonly the goal of nations in trading with other nations. Thus, the distinction between economic and political motives does not seem to be a useful one.

Turning from the difficult assignment of unambiguous motives, the conditions affecting the impact of economic policy instruments must be considered. For Holsti, the success of an economic instrument depends on at least two conditions:

1. The instrument must have at least a perceptual impact on the target country's decision-makers.

2. The market for the affected commodity must have oligopolistic or oligopsonistic characteristics.

All the economic instruments discussed by Holsti could be placed under the label of economic instruments of reward and punishment. Their use probably depends more on the costs and benefits of using them than on the label normally assigned to them. This is the approach used by Lerche and Said (1970) in their analysis of economic techniques of foreign policy. They divide economic instruments into persuasive and coercive categories and explicitly state that the choice and success of such techniques depend entirely on the particular situation (e.g., the degree of asymmetry in economic dependence). Lerche and Said make another generalization which is highly relevant: "...economic techniques are productive of generous amounts of resentment, resistance, and retaliation by the target state" (Lerche and Said, 1970: 85). They further note that purely economic policies are highly limited in effectiveness and that policy-makers have learned to take into account the resistance to economic coercion that is normally generated.

The works of Coplin (1971), Russett (1967), Wright (1955) and Singer (1972) represent a typical sample of treatments of economic interaction in international politics. They all view economic interaction as a source of power and dependence. However, there are some differences. Coplin emphasizes the importance of the balance of payments as a source of national strength. Russett points to the degree of relative dependence on trade as one source of a state's relative power potential. Wright emphasizes the relationship between the domestic and international economic sectors. Singer chooses to describe the nature of asymmetric economic relationships in great detail.

These studies, like those mentioned earlier, all have some basic weaknesses:

- They are too general. That is, their discussions are generally focused on describing the foreign policy behavior of states, but none has been able to make a meaningful definition of "state behavior" while maintaining the usefulness of the concept.

- Because of the generality of their discussion, they are unable to produce any useful models for analysis. Instead they all tend toward producing superficial descriptions that reflect no change in our existing knowledge.

As a consequence of these major weaknesses, the literature has not been cumulative and has not generated any path-breaking empirical studies. In fact, the recent empirical studies that have gone beyond the limitations of the traditional single case study approach have either lacked a theoretical foundation or have been based on theories from other disciplines (e.g., economics).

Empirical Studies

The results of the empirical studies surveyed here should, in most cases, be considered tentative. But, in some studies interesting results have been found. Others have used approaches worth including in this report, even though their results are, as yet, of little substantive interest.

Michael Nicholson's (1967) study of tariff wars is one of the few studies analyzing the process of interstate economic "wars." He cross-sectionally compared five nineteenth century tariff wars and derived generalizations which he used to construct a simple model of such conflicts and to compare tariff wars with other types of conflict. Some of his most interesting findings were:

- Tariff wars tend to escalate quickly through an action-reaction process in which the countries involved each raise their tariffs in order to force the other side to comply.

- After the escalatory period, the tariffs are maintained at a high level while each side tries to outlast the other.

- Tariff wars have striking similarities to violent wars and industrial strikes in that they all are viewed as temporary situations "in which the parties carry out actions with the aim of securing satisfactory permanent end positions" (Nicholson, 1967: 33).

- Tariff wars could be viewed as bargaining games which are unlike the threatening conflicts, such as arms races, in which "there is no clear-cut definition of a winner nor is there a clear-cut notion of forcing the opponent into a bargain after which the armaments can be reduced again" (Nicholson, 1967: 34).

Peter Wallensteen (1968) used 18 historical cases of economic sanctions (1933-67) to derive a number of generalizations. His major findings were:

- Economic sanctions are seldom successful. Even in cases where a "successful" outcome is observed, the cause and effect linkage is difficult to establish. However, sanction situations are more likely to result in a compromise if the goals of the sanctioning power are relatively limited.

- Economic sanctions tend to strengthen the target nations by increasing domestic popular support and contributing to a siege mentality.

- Economic sanction often means "throwing away a set of possible instruments of influence..." since, after the economic break, the state imposing the sanction will have less influence on the developments inside the target country (Wallensteen, 1968: 264-5).

- Economic sanctions often seem to be followed by a break in diplomatic relations and periods of little or no interaction between the disputing parties.[3]

Roy Licklider (1974) conducted a study that is very similar in approach to the Wallensteen study. Licklider used 20 historical cases of "resource deprivation" (1971-74) to study the effectiveness of economic sanctions. Similar to Wallensteen, he found that limited goals are likely to increase the chances of "success" of economic sanctions. He also found some relationship between the political structure of the target country and the effectiveness of sanctions; but this result was based on a very small subsample of his 20 cases. Finally, Licklider also found that in most cases economic sanctions tend to be unsuccessful.

Very recently, a number of studies have focused attention on one particular aspect of the set of conditions thought to be influential in determining the success or failure of economic sanctions. Caporaso (1974), Ezzati (1970), Choucri (1973), Howard (1972), Thomason (1974), Jackman (1973), Bobrow and Kudrle (1974), Hveem (1974), Hveem, et al. (1974), Park, et al. (1974), and Stallings (1972), among others, have tried to measure or analyze economic dependency. Among these, Thomason's work is probably the most promising because it includes most of the known dimensions of economic interdependence: (1) substitutability of export or import commodity, (2) concentration of the commodities in the export or import market, (3) concentration of exporting or importing partners, (4) impact of exports or imports on the national economy, and (5) relative dependence of each trading partner on the other partner. Thomason ignored one aspect of the dependence problem which, in some cases, is a major

[3] This seems to be inconsistent with our earlier statement about tariff wars. But a closer examination of Wallensteen's cases showed that in at least half of the cases, the two sides involved in the sanctions were in violent conflict with each other less than five years after the sanctions.

factor in economic dependence--perception of the long-term strategic value of the commodity. In the case of petroleum, this perception has at times played a major role in the history of the twentieth century. The perceived dependence of Britain on Middle East oil, for instance, was a major obstacle to British diplomacy in the 1951-53 Iranian oil crisis. Similarly, the "dependence" of Britain on its two billion dollar investment in the Union of South Africa has been a major obstacle to its foreign policy in the rest of Africa.

The complexity of the concept of dependence is clearly reflected in these studies. Even though the problem under study was restricted to the major actors in a single industry (e.g., the international oil industry), the necessary analyses were still very complex. Given the complex models required to examine dependence, a growing number of analysts have abandoned the traditional cross-sectional analytic framework and have adopted a case-study approach. The resulting studies are qualitatively different from the case studies of historians, which were little more than descriptive accounts. The new case studies usually involved building detailed models that can either analytically (e.g., Bobrow and Kudrle) or operationally (e.g., Choucri) show the degree of interdependence of two economies or the degree of dependence of one economy on a particular commodity (e.g., petroleum).

Evaluation of the Literature

This brief survey of the political science literature on interstate economic conflict can be summarized as follows. First, the literature, as it stands, is not well-developed. Specifically, it lacks good general models and has few well-accepted concepts and generalizations. Second, in recent years, in response to a series of international economic crises, a number of promising approaches have emerged. There now seems to be enough evidence to indicate that economic sanctions are too complex for cross-sectional analysis. The best analytical or empirical analyses have usually been either single-case or single-commodity approaches.

A subject that as yet has no integrated literature does not lend itself to many general conclusions. However, the best substantive generalizations that we can make about interstate economic conflict are:

- Interstate economic conflict is highly escalatory. Once a pattern of punitive action and reaction sets in, it easily runs out of control of the parties involved.

- Engaging in interstate economic conflict is usually self-defeating. Except under uncommon circumstances, economic sanctions seem to be ineffective and often lead to further costly conflicts.

- The success of economic sanctions depends on a number of situational factors which determine the impact of the sanctions on the target country. These include (1) alternative trading opportunities, (2) severity of sanctions on the target, and (3) the limit of the demands of the sanctioning power.

- The response of the target country to the economic sanctions of another country can take several forms: (1) military or economic retaliation against the sanctioning power, (2) domestic economic adjustment, (3) no response, or (4) capitulation to the demands of the sanctioning power. The literature, however, is too vague on how the target country chooses between these alternatives. This is understandable because the weight or value of these alternatives varies and depends on many situational factors.

Based on this survey several broad nonsubstantive generalizations can also be made:

- The traditional historical/qualitative approach (e.g., Holsti, 1967) has proved of little value in the analysis of interstate economic conflict.

- The comparative cross-sectional approach has also proved to be of little value because it is incapable of incorporating the numerous intervening variables that determine the pattern of interactions in interstate economic conflict.

- Case-specific and commodity-specific models have proved valuable in explaining at least some aspects of the behavior of nations in interstate economic conflict. This has been made possible by the relative ease with which it is possible to either control for, or incorporate, intervening variables in these types of models.

COMPARATIVE REVIEW: CASE STUDIES OF ECONOMIC SANCTIONS

Because the literature survey did not provide adequate guidance for the construction of a complex model of the process of interstate economic conflict, six historical instances of the use of sanctions were examined in greater detail. This section presents a comparative review of these additional investigations. Appendixes A through F report each study individually.

The analytic focus for the investigation of these particular cases was developed from the generalizations derived from the literature survey. The works consulted in the survey were generally unable to identify military-related implications associated with the policy responses of the target nations. Instead, the authors emphasized the complexity of the sanctioning process and the vital importance of situational factors influencing the responses of target nations and the outcomes of the confrontations. Consequently, the focus of the analysis of these six cases was shifted to the investigation of plausible preconditions important to the overall sanctioning process and important to the policy responses of the target nations.

These situations are designed to identify historical regularities that will allow the work for Japan and Saudi Arabia to be contained within reasonable bounds. Specifically, if the studies reveal that particular forms of sanctions typically engender an identifiable pattern of policy responses, then subsequent work can be focused on that pattern. Additionally, the studies can identify conditions or constraints that limit the range of policy options available to the responding country. Plausible

conditions of interest, or situational factors, include the historical pattern of relations between the contending parties, the relations of both parties to "third party" countries, the previous pattern of international economic conditions between the countries, the economic conditions within the responding country, and the domestic political conditions of the responding country.

Instances of economic sanctions have been studied because only such overt economic confrontations are historically identifiable. The reluctance of students of international relations to consider the "normal" economic interactions of countries and the equivocal identification of "normal" economic activity preclude case studies of ongoing international economic relations. The sanctioning process is therefore the only subject available. Investigating the sanctioning process is useful because it can provide inferences about policy instruments and situational factors that should be included in models of normal economic activity.

The instances of economic sanctions selected for investigation have all occurred since World War II. This time period was intentionally chosen. International relations and patterns of international economic activity have changed substantially even during this period. Moving the time reference backward would only make the usefulness of any study problematic. The six cases chosen are: Berlin, 1948-49; Iran, 1950-53; Finland, 1958; Cuba, 1958-present; Rhodesia, 1965-present; and South Africa, 1947-present. These six cases were not arbitrarily selected from recorded instances of sanctioning but were selected on the basis of relative levels of economic development of the parties to the sanctions and the outcomes of the sanctions.

Situations involving countries of differing degrees of economic development were selected to capture three basic patterns of dyadic conflict: developed versus less developed; less developed versus less developed; and developed versus developed. Additionally, variations in the outcome of the sanctions were emphasized. But to include an instance of successful,

unsuccessful, and indeterminate outcomes for each development category would have required nine studies. To reduce the number of studies, elimination of outcome types in each category was necessary. To compensate for possible bias introduced in the elimination process, the length of the sanctioning process had to vary across selected situations. The final selections considered all three requirements.

The actual investigation of the particular situations was guided by a relatively small number of considerations. To the extent possible each situation was assessed in terms of the following features: the background conditions relevant to the sanctioning process; the nature of the economic sanctions and the scope of their imposition; the responses of the target nation, including resistance, retaliation, political realignment, concession or capitulation; and domestic adaptation to the imposed sanctions. Similar considerations are employed in the comparative review: the background conditions which played a role in the sanction situation; the type and nature of the sanctions themselves; the reaction of the target nation to the sanctions imposed; the impact of the sanctions on the target nation; and the overall outcome of the sanctions. In addition, conclusions are drawn about the impact of economic sanctions on the military posture and capabilities of the sanctioning nation (see Table 1 at the end of the chapter).

These six characteristics are used for simplification and clarity. The classification scheme elaborated below is provided to organize information about six very complex events in international relations all having to do with the imposition of economic sanctions. Consequently, only the truly salient aspects of each issue as they pertain to the study of the impact of economic sanctions on defense capability are considered.

Relevant Background Conditions

In each study it is apparent that both historical and current conditions affected the outcome. However, in some cases the former was less important

than the latter. Neither here nor in the sections that follow is each case reviewed in detail; but each section attempts to present enough substantive material for the reader to grasp the importance of each of the conditions and to direct the analytic scheme to the remaining case studies or to others not dealt with here.

Background conditions refer to two broad categories of factors that may have an impact on sanction situations. First, there are historical conditions that underlie the relationship between the sanctioning nation and the target of the sanctions. What is the history of their political alignment? Of their economic relationship? Is, or was, one nation economically dependent on, or a major trading partner of, another nation? Did the target nation have any military importance to the sanctioning nation? Each of these questions is appropriate for evaluating the importance of historical conditions on economic sanctions.

Other background conditions concern situations within or between the nations involved in the sanctioning process. Are they geographically proximate, contiguous, or remote? What are their comparative levels of economic development (that is, is one a developed nation and the other a less developed nation?)? Are, or were, indigenous resources available in the target nation to sustain it during the sanctions? Is the target country politically stable -- is its government viewed as a legitimate spokesman for its people? What were the international conditions at the time of the sanctions? This category includes the international political and economic contexts in which the sanctions are employed, such as the Cold War, colonialism, commonwealth membership, and international economic penetration. All of these appear at one time or another in the six case studies. Finally, military (or power) considerations may play a role. In this case attention focuses on whether or not military strength determined the kind of sanctions used, their scope or comprehensiveness, their range (bilateral or multilateral), and ultimately, their success.

Historical Conditions. The historical conditions that led to Russia's sanctioning of Finland are easily recognized. The strategic importance of Finland as a buffer between Russia's northwestern flank clearly influenced the Russian decision. A Finland friendly to Western Europe to the extent that it was interested in joining the European Free Trade Association (EFTA) was not in Russia's best interest. The traditional ties between the two countries were strained by Finland's unilateral action. Thus, the Soviets acted to curtail such action.

The Cuban situation reveals another kind of history, one that has truly economic overtones. For many years, American commercial interests had been active in Cuba to such an extent that Americans controlled a major portion of the Cuban economy. Clearly, this situation was much more tolerable to the Americans than it was to the Cubans. The conflict that erupted between the Anglo-Iranian Oil Company and the Iranian Government was similar to the Cuban-U.S. situation in that a long history of penetration into a major commercial interest is evidenced. In both of these cases there was a great deal of popular resentment against foreign economic interests which worked against the sanctioning powers.

History played a smaller role in the Rhodesian and South African cases. In these two situations domestic political and social conditions were more important. However, both are former colonies. They are contiguous and have long-standing commercial linkages and cultural similarities, each of which has historical implications that have influenced decisions of the two nations to support one another in the face of multilateral economic sanctions.

Current Conditions. With regard to conditions that prevailed at the time of the imposition of sanctions, it is helpful to look at the domestic situation in the target nation and the international context during the period of sanctions. Most of the target nations in the sample were not as developed as the nations imposing the sanctions. Iran, Cuba, and Rhodesia can be cited here. South Africa and Finland were moderately more developed

than India and Russia respectively. The level of development of the actor country relative to the target country in the latter case was far less important than the relative power of the two nations. Finally, it should be mentioned that Berlin is an anomaly from the perspective of economic sanctions since it is a city and not a nation. Also, the sanctions that were employed in the Berlin crisis were Cold War tactics designed to test Allied resolve with regard to Berlin. Thus, the test was between the Russians and the Allies, not between the Russians and the Berliners.

Geographic Considerations. Geography seems to play an important part in determining the effectiveness of economic sanctions. If the two principal nations involved in the sanctions are remote from one another, the sanctions seem to lose much of their impact -- distance hinders the implementation and enforcement of the sanctions. Distance appears to have affected the outcome of sanctions against Rhodesia and South Africa (in part, forcing the gradual implementation of the sanctions) in a negative way. The contiguity of Russia and Finland no doubt enabled the Russians to keep the situation under their control. However, the proximity of Cuba to the United States failed to provide the latter with any distinct advantage. Finally, distance does not appear to have been a strong factor in the British-Iranian situation.

Level of Development -- Self-Sufficiency. A nation's level of development is important because sanctions invariably test a nation's ability to survive economically. Two factors are important determinants of economic survival in this regard. The first involves the availability of indigenous resources that can be used to ensure domestic economic viability. The second involves the extent to which the indigenous resources are in demand in the international market. Cuba's dependency on sugar exports demanded that Castro locate alternative markets for the Cuban sugar or suffer grave economic and political consequences. The ability of the world to survive without Iranian oil exacerbated the effects of the British sanctions on Iran. Rhodesia's and South Africa's mineral wealth enabled both countries to avoid major economic repercussions as a result of the sanctions.

1. Internal Political Conditions. Domestic political conditions are a critical factor in determining the success or failure of economic sanctions. The Finnish case demonstrates this as does the Iranian situation. In both cases, political instability created a climate in which domestic support for the governments in power was eroded. In contrast, the South African and Rhodesian situations exemplify the importance of relative political stability. Finally, the Berlin and Cuban situations are interesting because they demonstrate the effect that sanctions can have in increasing the cohesion of target nations. The impact of the domestic political conditions on economic sanctions appears to be mixed. It can lead to either increased political disorder or to increased cohesion within the target country.

2. International Conditions. The international context, referring to the general international political and economic climate in the international system at the time of sanctions, is likewise an important variable to be considered. Here, of course, contexts such as the Cold War become crucial. The obvious case in point in this regard is the Cuban situation which nearly erupted into a global nuclear confrontation. Other international issues such as economic penetration (Cuba, Iran), the movement toward independence and anti-colonialism (Rhodesia), and superpower politics (Berlin) are typical international contexts that mix with domestic conditions and affect decisions to employ sanctions (rather than other influence mechanisms), the nature and scope of those sanctions (the U. S. decision not to employ a naval blockade against Cuba), and the ultimate outcome of the sanctions.

3. Third Party Influences. One aspect of the international context that appears to have particular relevance to the sanctioning process is the participation of either one or more "third parties." Russia was the critical third party in the Cuban situation; South Africa is Rhodesia's crucial ally; Australia and others have been important in ensuring South Africa's survival. By contrast, Iran and Finland had no help and appear to have suffered as a result. The Berlin incident, again, is an anomaly

because it involved the Allies and Russia in a Cold War context. One might go so far as to say that there were no "third parties" willing to commit themselves to that situation. This may have contributed to the stalemate.

4. Power Differentials. The confrontation over Berlin brings us to the issue of power differentials between the actor and the target nations in a sanctioning situation. That the power of nations is relative and can manifest itself in numerous ways makes the analysis of this area difficult. However, we sense its importance when we contrast the Berlin case with that of Finland. The Finnish situation resulted in capitulation to Russia'a wishes whereas the Berlin crisis ended in a deadlock between the two superpowers. The other situations fall somewhere between these two. The massive size and power of the United States had little effect on Cuba, and the "universal" sanctions that were imposed on South Africa and Rhodesia have had only a limited effect.

The Nature and Scope of Economic Sanctions

Each of the selected case studies is particularly revealing with regard to the kind of economic sanctions employed, their scope, specific focus, timing, and the costs and benefits of their use. In this section, some of the more obvious characteristics of the sanctions imposed in the case studies reviewed earlier are identified. In this regard, the following questions were asked:

- Were the sanctions selective or complete?
- Were the sanctions unilaterally escalated?
- Were they of a retaliatory nature?
- Was their range unilateral, bilateral, multilateral?
- Was the rate of application gradual or abrupt?
- Were there ancillary sanctions that accompanied the economic sanctions, such as diplomatic or military sanctions?

- What were the costs and benefits involved for the sanctioning nation and target nation?

Again, the interrelationships between these questions and their implications must be emphasized. The intricacies of the sanctioning process become increasingly apparent as the nature and scope of the economic sanctions are described. These analytic questions serve only to direct attention to some of the critical variables that describe the sanctioning process.

Selectivity or Completeness. It appears, upon looking at the six case studies, that sanctions directed at specific, key economic sectors are more successful than embargoes or boycotts. This statement should be somewhat qualified. In most cases, sanctions began as selective attempts to influence one particular aspect of a target nation's economy in an effort to influence that nation's behavior. The economic focal point of the sanctions was often related to the particular goal, or goals, that the sanctioning nation wished to achieve. In the Iranian case, the British boycott of Iranian oil was intimately related to the goals sought. The sanctions against Rhodesia and Cuba began as selective sanctions and were escalated to complete boycotts by the sanctioning nation(s). In the Finnish case, the sanctions were highly selective. When the Soviets saw the effect of their initial sanctions on Finland they continued to apply pressure in the areas where its economy was most sensitive.

The selectivity and/or completeness of economic sanctions, therefore, may or may not force a target nation to alter its behavior. In the Finnish case, the Russians were clearly successful in obtaining the desired response. The complete boycott that the United States imposed on Cuba failed to achieve its goals and, in fact, forced Cuba to embrace the Sino-Soviet bloc instead. The ostracism of South Africa and Rhodesia has had little effect on those nations, despite its ostensible completeness. This is due in part to the general economic self-sufficiency of the two nations

and in part to the unwillingness of all nations to support the U.N. sanctions. Although the selectivity or completeness of economic sanctions is an important determinant of their success or failure, our case studies do not conform to one general pattern.

The Escalatory and/or Retaliatory Nature of Economic Sanctions. Sometimes sanctions are unilaterally imposed and escalated until the sanctioning nation achieves its ends. This is clearly what happened in the Russo-Finnish case. Pressure was increasingly applied until domestic conditions forced a change in government and the realignment of Finland. On other occasions, escalation involves the expansion of the number of sanctioning nations. The United States was eventually able to convince the members of the Organization of American States to boycott Cuba. In this case, the sanctions were at first selective, then more complete, and eventually were expanded to include more nations. The sanctions against South Africa and Rhodesia have followed a similar pattern.

The unilateral escalation of sanctions, however, seems to be the exception rather than the rule. More often, one finds that the target nation will retaliate against the interests of the sanctioning nation if it feels this is possible. In Cuba, Rhodesia, Berlin, and Iran the sanctioning process was characterized by retaliatory behavior which at each turn resulted in the imposition of more severe restrictions by both the initiator and the target nation. In some instances, the retaliation takes the form of expanding the range of the sanctions to include more nations; in other instances it takes the form of imposing complete controls where selective controls were being used (Cuba, for example); and in still others, other kinds of sanctions (military or diplomatic) may be used. Retaliation by the target nations involved nationalization, land reform, freezing of assets, monetary controls, and even violence, as in the cases of Iran and Cuba.

The Range of Economic Sanctions. The intermingling of the analytic situation characteristics has so far been unavoidable. The range of the sanctions (that is, the number of nations involved as sanctioning nations), was previously discussed in connection with the escalatory nature of sanctions. It should be readily apparent that the range of economic sanctions does vary -- from one sanctioner in the Finnish case, to the majority of nations in the Rhodesian case. It appears that the range of economic sanctions is, in part, determined by the degree of success that a single nation has in applying its initial sanctions: India sought support from the U.N. community and Britain did the same; the United States sought Latin American support of its sanctions against Cuba. It is interesting to note, however, that increasing the range of economic sanctions to include more nations has usually failed to force the target nation to capitulate.

Rate of Implementation. Social time (versus chronological time) is a highly relative phenomenon. The rate at which sanctions are applied may appear to one nation to be rather rapid while to another slow. For example, the sanctioning nation may see events unfolding at a fast pace while the target nation may interpret the situation as less abrupt. For analysis, one must view the six studies from the perspective of calendar time. Thus, the Finnish case appears to have escalated rather rapidly. That the sanctions against that nation were selective and abrupt may explain Soviet success. On the other hand, the Berlin confrontation escalated rather rapidly but resulted in a stalemate. Gradualism seems to undermine the effectiveness of economic sanctions. There are no doubt many reasons for the gradual implementation of sanctions; domestic politics in the sanctioning nation (e.g., the United States during the Cuban crisis and Britain at the beginning of the Rhodesian situation), distance (Britain-Rhodesia, but not U.S.-Cuba), international context (the Cold War), and so on. But the case studies suggest that an inability to move quickly blunts the effectiveness of sanctions.

Ancillary Sanctions. Since we are dealing here with economic sanctions, ancillary sanctions refer to sanctions that are specifically non-economic,

particularly diplomatic and military sanctions. Both forms were present in the case studies. Military sanctions, when they were employed, usually involved only troop movements, verbal threats, or shows of force. In the Cuban situation, for instance, guerrilla activity did take place with American complicity, but U.S. forces were not directly engaged. The British shifted their forces around the Mediterranean to reinforce their intentions to make their sanctions viable and to be prepared to protect British lives in Iran; but no military forces were engaged. In the Berlin crisis, U.S., British, and Russian troops were involved in enforcing certain sanction-related actions but none were actually engaged in combat. Diplomatic sanctions of two kinds appear in the case studies. The first involves severing, or downgrading, diplomatic relations in the Finnish, Cuban, Rhodesian, and South African cases. The second form involves marshalling multilateral support for sanctions, particularly in the United Nations. This form of diplomatic sanctioning occurred in the Rhodesian, South African, and Cuban cases.

Costs and Benefits of Sanctioning. In every sanctioning process there are costs and benefits to both the sanctioning nation and the target nation. The sanctioning nation must weigh the costs of imposing sanctions while the target nation must weigh the costs of either resisting the sanctions or capitulating. Since costs and benefits are inextricably linked, benefits must also be evaluated. Castro apparently decided that despite the short-run costs involved in reducing American presence in Cuba, the long-run benefits for his people and his country exceeded the costs. South Africa and Rhodesia have apparently decided that the costs of capitulating to the more or less universal sanctions against them are far greater than the costs of restructuring their economies, maintaining domestic policies, and resisting the sanctions in general. In some instances, as in the Finnish case, the costs do outweigh the benefits. The costs to the Iranian Government appear to have been overwhelmed by the nationalistic spirit that prevailed in the country at the time of the British sanctions. The fervent anti-British feeling appears to have balanced the costs and benefits -- the domestic economy was suffering but greater Iranian control

of the oil industry was an equally important issue. Weighing costs and benefits requires a complex assessment, both for the sanctioner and the target nation. For example, the British had to weigh the costs of confronting the Iranians on the nationalization of the Anglo-Iranian Oil Company and of discounting trade with Rhodesia. In the latter case, British interests appear to have suffered almost as much as Rhodesian ones. The Russians, in confronting the allies over Berlin, apparently assessed the benefits of such a confrontation incorrectly and emerged from the situation with no tangible gains.

The siege mentality that appears in target nations as a result of sanctions seems to have played an important role in all of the case studies except Finland. In each of the others, the collective will to resist invariably raised the costs to the sanctioning nation and concomitantly indicated to the leadership in the target nation that the sanctions had actually decreased the risk of resisting.

It is readily apparent that the variation in the sanctioning process makes analysis extremely difficult. The myriad of background conditions in both the sanctioning and the target nations interplay with the nature, scope, range, costs, and benefits of the sanctions themselves to produce a wide spectrum of possible outcomes. These outcomes, in addition to being influenced by background conditions and the nature of the sanctions, are partially determined by the response of the target nation to the economic sanctions.

Responses of the Target Nation

The many options available to the nation being sanctioned are in part determined by background conditions and the sanctions themselves. These analyses have identified the following actions that may be taken in response to economic sanctions: resistance, retaliation, political or economic realignment, negotiation, concession or capitulation, and domestic economic restructuring. These six activities may be pursued singly

or simultaneously. A nation may simply resist at the outset and capitulate a short time later. Their separation here is for analytic purposes only.

Resistance. In every case study, the target nation demonstrated, at least for a time, its resolve to resist the sanctions being imposed. Even Finland, which capitulated to the Russian demands shortly after the sanctions were imposed, initially resisted. The Berliners were able to withstand the various blockades which severed all traffic into their city because the United States was willing to confront the Russians and begin the airlift.

Retaliation. Perhaps the most obvious instances of retaliation by a target nation against the sanctioning nations are Cuba and Rhodesia. Both nations reacted to the sanctions by imposing their own restrictions on either facilities, finances, or other interests of the sanctioning nation. In the case of Cuba, Castro eventually gained complete control over all American commercial interests (oil facilities, land, etc.) by either nationalization or land reform. The Iranian Government also used nationalization as a way of demonstrating to the British their unwillingness to capitulate.

Political and Economic Realignment. The role of "third parties" in international sanctions is a particularly important condition which impinges on the target nation's ability to resist economic boycotts and embargoes. The Cuban situation is probably the most obvious case in point. Without the Russian market for its sugar, Cuba would have been unable to survive economically. In this instance, both political and economic reorientation occurred. In the Rhodesian case, the reorientation was mostly economic and resulted in the redirection of international economic activities toward South Africa. After the Indian sanctions were imposed against the Union of South Africa, the Union simply focused its interests on the countries that would be willing to continue their trade. Pakistan's desire to trade jute with the Union sufficed to offset much of the impact of the Indian sanctions, as did Australia's willingness to

reexport Indian products to South Africa. As a consequence, the sanctions were undermined by the economic reorientation away from traditional partners.

Negotiation. Negotiations between the sanctioning and sanctioned parties took place in every case. In some cases (Iran, Berlin, Cuba, and Rhodesia) the negotiations were intermittently interrupted. In the Iranian case, negotiations began and ended in stalemate four times. The Russians walked out of negotiations on Berlin, but eventually resumed them to no avail. Negotiations between the British and Rhodesian governments produced much the same result and ended finally with Rhodesia unilaterally declaring its independence from Great Britain. Castro's adamancy with regard to U.S. presence in Cuba eventually resulted in the termination of all negotiations and the imposition of complete sanctions.

Concession or Capitulation. Although these outcomes are no doubt the two most desired by nations who employ economic sanctions, they are the most elusive. Only in the Russian-Finnish case were the desired ends achieved by the sanctioning nation. In all other situations, some form of resistance appears to have been successful, at least to the extent that the nation on whom the sanctions were imposed was able to survive economically.

Violence. Violence and excessive nationalistic fervor frequently coincide. In the Iranian and Cuban cases, violence against British and American interests respectively occurred periodically during the sanctions. However, because of the ability of most of the sanctioned nations to resort either to effective retaliatory measures of the economic variety, or to realign politically, violence appears to be the exception rather than the rule in situations in which economic sanctions are used.

Domestic Economic Restructuring. One final response of the target nation needs to be mentioned. The above-mentioned responses are international responses in that they describe the behavior of the target nation toward the sanctioning power. Other responses may occur that pertain to the domestic conditions resulting from the imposition of sanctions. These have a common purpose -- the restructuring of the nation's economy to withstand the impact of sanctions. Restructuring involves controls on employment, rebudgeting, anti-inflation policies, and possibly complete government control of industry. The Cuban and Rhodesian cases are excellent examples of extensive economic restructuring in the face of economic sanctions. Iran was forced to restructure its entire budget to survive economically. Finland, on the other hand, because of a certain degree of domestic instability (political and economic) and because of an inflexible economic structure, was unable to counter the impact of the Russian sanctions.

Usually, resistance to sanctions involves more than one kind of response. A nation can restructure its domestic economy, realign its international economic linkages, and negotiate all at the same time. The choice as to which course it takes depends on the background conditions, the nature of the sanctions, and the domestic and international responses that the target feels it can effectively engage in after weighing the costs. Much of the decision-making as to responses to economic sanctions depends on the extent of the disruption caused in the target nation by the sanctions. The impact of the sanctions can be mitigated by distance, advance warning, or precautionary measures. The impact also varies with the complexity of conditions and processes that abound in each case, making analysis difficult.

Impact of Sanctions on the Target Nation

Here we are interested in understanding only the impact of economic sanctions on the domestic situation of the target nation. The impact is usually a function of background conditions; a nation with domestic

political turmoil may experience even greater disruption than one with relative domestic stability. Exceptions do occur. Clearly, the U.S. sanctions against Cuba had the opposite effect. We have identified four specific areas where sanctions appear to have produced changes in the domestic situation in the target nation. They are:

- Domestic political situation
- Domestic economic situation
- Nationalism
- National Cohesion

Domestic Political Situation. We are referring here to the extent of governmental stability or instability that results from the imposition of sanctions on a nation. Two of our cases, Iran and Finland, experienced varying degrees of governmental instability as a result of the sanctions imposed on them. Two nations, Rhodesia and South Africa, appear to have experienced little government instability as a result of the "universal" sanctions imposed on them, and in fact there is some evidence that their governments were strengthened. The remaining two cases, Cuba and Berlin, clearly indicate the strengthening of governmental control as a result of sanctions. The most impressive case, of course, is Cuba. U.S. sanctions contributed substantially to the solidification of national support for Castro's regime. Once the siege mentality had been cultivated, little could be done to undermine it. Efforts to use increased sanctions produced even greater solidarity.

Economic Disruption. Economic disruption appears to have resulted to a degree in each of the cases. But, in most instances (Finland being the exception) the target nation seems to have coped economically. Certain background conditions (such as the nature of the sanctions, restraint on the part of the sanctioning nation, the role of third parties and sympathetic neighbors, and the availability of indigenous resources on which to rely) can lessen the economic disruption that a nation will

experience. Even though economic sanctions are directed specifically at the economy of a target nation, the multitude of factors that influence the sanctioning process mitigate their impacts and decrease the predictability of the overall outcome.

Nationalistic Reaction and National Cohesion. These two impacts are so closely linked that it is almost impossible to consider one without the other. In all of the cases except Rhodesia and South Africa, the general reaction to the imposition of sanctions was the generation of some sense of national spirit in reaction to the pressure. Even in Finland, a certain amount of nationalism was generated in response to the Russian restrictions. At the other end of the spectrum is Cuba, whose nationalism was highly instrumental in thwarting the U.S. efforts. The two remaining cases, Rhodesia and South Africa, involve nations in which domestic social differences play a major role. In Rhodesia, for example, the brunt of the sanctions' impact was channeled by the white-dominated government to the black population. This polarized the white and black populations. Thus, the sanctions produced internal social conditions which eventually could erupt into grave violence. Rather than forcing the Rhodesian whites to recognize the black majority, the sanctions have exacerbated the racial situation in that country. A siege mentality has developed but not necessarily against the sanctioning nations. This outcome, of course, was not anticipated by the British.

Overall Outcome of Economic Sanctions

The six cases studies selected for review were chosen because they represented six significant incidents in which economic sanctions were employed. We have tried to identify several dimensions across which each study could be compared with the others. The final dimension is outcomes. Of the six cases, two have been resolved. Four (Berlin, Cuba, Rhodesia, and South Africa) continue as important international issues and are best described as stalemated.

Summary

The complexities of the economic sanctioning process are clearly illustrated in the above review. These six studies, used here as examples, reveal the presence of many varied forces at work in this ostensibly limited area of international economic relations. Not so apparent, however, is any systematic or regular pattern underlying the six cases. In fact, although we have attempted to organize our information along several dimensions that appear to make theoretical sense, the six cases appear to be more different than similar. Table 1 is an attempt to summarize the preceding discursive analysis and to allow the reader to view all of the cases simultaneously.

There is one major methodological conclusion that can be drawn from the comparative analysis of the case studies. That is, the comparative analysis has shown that the factors involved in interstate economic conflict are very complex. It is therefore impractical to construct a single model for explaining the behavior of states involved in interstate economic conflict. The strategy should be to construct case-specific models of specific situations. The cases selected for model construction in this project are Japan and Saudi Arabia. The historical case studies presented here have provided little generalization for model building but have provided another type of information which has proved of value. They have generated a great deal of background information that enables the development of some boundaries for the case-specific models.

TABLE 1

Comparative Characteristics of Six Cases of Sanctions

	Finland	Iran	South Africa	Rhodesia	Cuba	Berlin
I. Relevant Background Condition						
1. Historical	X	X			X	
2. Current						
a. Geographic	X			X	X	
b. Level of Development--Self Sufficiency		X	X	X	X	X
c. Internal Political Conditions	X	X			X	X
d. International Conditions	X		X	X	X	X
e. Third Party Influences			X	X	X	X
f. Power Differential	X	X			X	X
II. Nature and Scope of Sanctions						
1. Selectivity or Completeness	S	S	C	C	C	S
2. Unilaterally Escalated	yes	no	no	yes	yes	no
3. Retaliatory(bi-or multi-laterally escalated).	no	yes	no	yes	yes	yes
4. Range (unilateral, bilateral or multilateral).	U	B	M	M	M	B
5. Rate of Implementation (gradual or abrupt).	A	G	G	G	G	A
6. Ancillary Sanctions	no	no	yes	yes	yes	no
7. Costs to Sanctioning Nation	low	low	low	high	low	low
8. Costs to Target Nation.	high	mod.	low	mod.	low	high
III. Responses of the Target Nation						
1. Resistance	X	X	X	X	X	X
2. Retaliation		X		X	X	
3. Political and/or Realignment			X	X	X	
4. Negotiation	X	X	X	X	X	X
5. Concession and Capitulation	X					
6. Violence		X			X	
7. Domestic Restructuring		X	X	X	X	X
IV. Impact of Sanction on Target Nations						
1. Domestic Political Stability						
2. Domestic Economic Stability	X	X		X	X	
3. Nationalism		X	X	X	X	
4. National Cohesion			X	X	X	X
V. Final Outcome						
1. Concession Capitulation	X					
2. Realignment				X		
3. Isolation			X			
4. No Apparent Effect		X				
5. Stalemate			X	X	X	X

CHAPTER III. MEASUREMENT OF U.S. MILITARY POSTURE

The major purposes of this chapter are to (1) review the variety of different meanings of military posture at a conceptual level, (2) identify major U.S. defense objectives abroad, (3) develop quantitative measures or indicators of major U.S. military interests in other countries, and (4) develop a quantitative model of U.S. military capability.

More specifically, this chapter attempts to determine whether there is an identifiable dimension in the U.S. relationship with other nations that could be labeled "U.S. military posture abroad." A cross-section of U.S. ties with (or stakes and interests in) other nations will be statistically analyzed in order to determine whether there is an empirically identifiable cluster of military ties or other distinct non-military clusters of U.S. ties. However, because of the structural complexity of the problem, the linkages between U.S. military posture and its military determinants will not be specified in detail in the cross-sectional analysis. Rather, these will be done descriptively for each individual case in Chapters VI and VII.

CONCEPTUAL PROBLEMS

Military posture is a difficult concept to define and operationalize for a number of reasons. The difficulty stems from an implied comparison and the lack of a clear standard for the comparison. It is too often used as a catch-all terms in place of a wide range of other ideas:

- Strategic standing
- Military strength or power
- Military capability
- Military structure

- Military influence
- Military presence
- Military (short and long term) goals
- Military weaknesses
- Military threats
- Military alliances

Second, military posture is sometimes associated with specific military activities and weapons systems. It is possible, for instance, to relate U.S. military posture in the Atlantic Ocean to potential constraints placed upon its anti-submarine warfare (ASW) capability. Such a constraint might arise from a leftist regime gaining power in Iceland. The regime could impose restrictions on or terminate U.S. military operations in, or from, Iceland. Generally, when any specific military activity or weapons system is perceived as vital to the overall military capability of a country, it becomes associated with the word posture.

Third, the complexity of the concept of military posture is compounded by the ambiguity of its determinants. For instance, it is unclear whether the military posture of the United States in the Middle East is in part determined by Arab public opinion. This point is important because public opinion creates the environment within which governmental attitudes are formed and governmental decision latitudes are set. Furthermore, the operational capability of U.S. military forces in most regions is partially determined by the attitudes of the local governments. During the October war in the Middle East, this point was clearly illustrated by the refusal of all NATO countries, except Portugal, to grant overflight permission for U.S. airlifts to Israel. This event showed how U.S. military capability was constrained by the attitude of the European governments, which reflected the attitudes of Arab governments, which in turn reflected Arab public opinion.

The same event also illustrates a fourth difficulty in assessing the concept of military posture: the variability of the concept according to the military goals of the actors. The U.S. military forces and the NATO alliance, for instance, are certainly adequate to respond to a variety of situations. But there are limits and exceptions to this capability which vary with the goals and context of each situation. In the October war, the European countries were unwilling to support Israel or aid U.S. efforts to that end. Thus the NATO allies, which would normally complement U.S. military power, instead became a constraint on U.S. military capability. Hence, military posture (or capability) varies according to its goals and the expected environment within which these goals are to be achieved.

However, as the example of the 1973 Middle East war shows, this does not necessarily mean that military capability is <u>directly</u> affected by its goals. After all, U.S. physical capability for the airlift did not change just because the country of destination was Israel rather than another country, say Turkey. It was the European dependence on Arab oil, the implications of aiding Israel to the European governments, and European domestic politics that led them to close their airspace to the U.S. airlift, thus curtailing U.S. military capability for aiding Israel. If the object of the U.S. airlift had been any attacked country other than Israel, it is almost certain that the European powers would have been far more helpful, and hence the effective capability of the U.S. military to deal with the problem would have been greater. Therefore, the impact of military goals on military capability can be <u>indirect</u> -- through factors that act in the operational environment of military capability.

Finally, one of the often implied meanings of military posture is the assessment of military capability for achieving known military objectives. That is, given a set of military goals (X), can the existing military capability (Y) achieve them? This type of analysis usually includes an accounting of military goals, security problems, alliances,

geopolitical factors, and military hardware and manpower of a nation (and its opponent). Traditionally, in assessing a nation's military capability, such analyses included the morale of, and the popular support for, the military of the country. It did not, however, include the attitudes of governments and the public opinions of other countries. For instance, in calculating the late nineteenth century military power of Britain in the Persian Gulf, most historians ignored the constraining influence of the governmental attitude and the public opinion of Persia. These factors were clearly important and were, in fact, implicitly taken into account by many of the British decision-makers in the field who were charged with implementing the policies of the Whitehall. Today, however, most political analysts agree that U.S. military capability in the Middle East is hampered by the negative image of the United States in Arab public opinion which is created by U.S. aid to Israel. Similarly, U.S. military capability in Southern Africa is hampered by constraints placed on the U.S.-South African relationship by world public opinion which, for the most part, views South Africa as an outcast among the community of nations.

Therefore, the idea that the effectiveness of military capability is affected by world and national public opinion has gained some acceptance among analysts. But the inclusion of public opinion as a factor affecting military posture or capability has not yet been made analytically explicit. Most analysts include public opinion as a factor that affects military capability in very specific situations (such as the impact of Arab opinion on U.S. capability). But there are very few generalizations as to how the public opinion of one nation would affect the military capability of another nation.

Because of the existing confusion in the literature, a decision was made to adopt the following definitions with respect to U.S. military capability

in this analysis:

- The total military capability of the United States is directly proportional to its military hardware inventory and military manpower size.
- The effectiveness of U.S. military capability in any specific geographical area is a function of (1) the concentration of the capability in the area, (2) its distance from other centers of U.S. capability, and (3) the environmental factors which affect that capability at the regional level (e.g., Arab public opinion) as well as at the international level (e.g., Soviet attitude).
- The environmental factors affecting U.S. capability may be affected by the specific goals which the capability is to achieve.

The relationships of these assumptions to U.S. military posture are illustrated in Figure 1. Briefly, it is assumed that U.S. military posture in any region is determined by U.S. military capability in that region. But this capability may itself be constrained through its interactions with environmental factors (e.g., public opinion) which are, in turn, often affected by U.S. military objectives in that region.

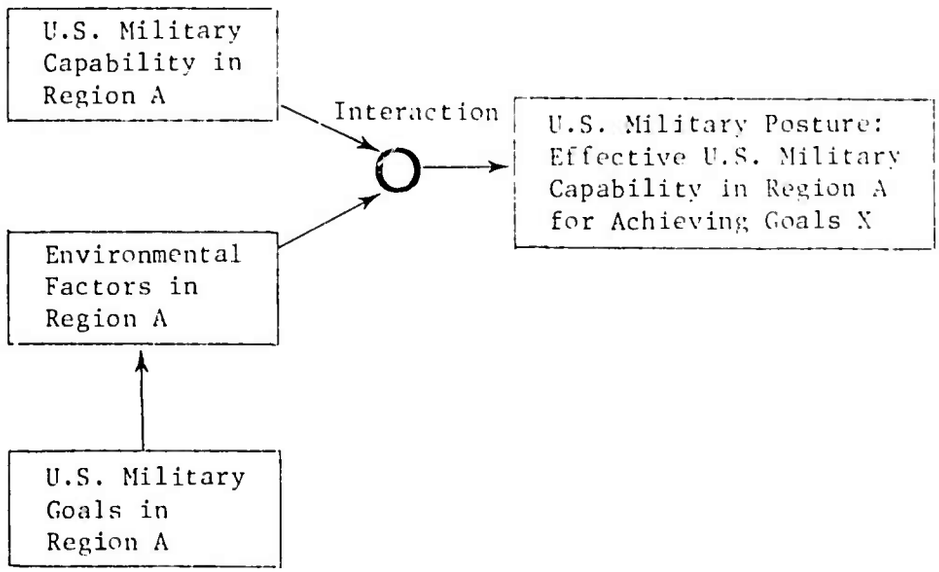


Figure 1. A Simple Model of Determinants of U.S. Military Posture Abroad

It is clear that the analysis of U.S. military posture in each region requires a consideration of U.S. goals, military capability, and environmental factors in each region. The complexity of the interactions of these factors does not allow the construction of a general model of their linkages. These linkages, however, can be analyzed on a case-by-case basis which would allow the inclusion or control of the situational factors. Chapters VI and VII include case-specific analyses of U.S. military postures in Japan and Saudi Arabia.

MAJOR U.S. MILITARY OBJECTIVES

A great deal has been written about the nature of U.S. military goals. The major generalizations that emerge from this literature are:

- Military objectives are best understood if they are viewed as the means for achieving or pursuing the more general foreign policy goals.
- National security policy goals are often ambiguous, though certain major goals are easily identifiable.
- Military policies sometimes become ends in themselves after having served their purpose in the pursuit of some former foreign policy objectives.

The main theme of these generalizations is that there are certain national goals around which a sequence of military and non-military policies evolve designed to achieve these goals. Military (and non-military) policies may in due time become goals in themselves even after their original purpose is served or is no longer relevant. For instance, the maintenance of a military base in a foreign land sometimes becomes an end in itself after the conditions which led to its establishment have disappeared.

In the case of the United States, there are a number of national goals that have obvious relevance to U.S. military goals. The most important of these are:

- The national security of the territory of the United States and U.S. overseas possessions. It is well-accepted that this is the major U.S. military goal.
- The safety of U.S. citizens and the security of U.S.-owned properties abroad.
- The protection of U.S. commercial activities on the high seas (e.g., fishing and shipping).

There are also some U.S. national goals that are of secondary importance, such as:

- The stability of governments friendly to the United States;
- Cooperation with the military allies of the United States;
- Cooperation with the governments of countries that are strategically of value to U.S. security.

There are also certain major national policies with military relevance that have a transient nature. In the nineteenth century, a major U.S. policy was to maintain an equal opportunity and "open door" for U.S. merchants in international commerce. In the more recent past, the containment of Communism and the deterrence of a Soviet nuclear first strike have been among the major U.S. military policies.

If the focus of the study shifts to a regional basis, however, such general goals and policies lose most of their analytical value. At the regional (versus the global) level there are too many intervening factors for the global strategies by themselves to explain specific U.S. policies. The U.S. policy toward Israel, for instance, cannot be explained by any of the global factors. It requires the inclusion of a number of situational

and historical factors that are seldom salient in the formation of U.S. policy toward other nations. Such factors, however, are difficult to analyze abstractly and in each case require reference to the specific situation. Consequently, a case-specific approach was adopted in this project. The cases selected for analysis are Japan and Saudi Arabia. Chapters VI and VII include brief analyses of the specific U.S. military goals in relation to these cases. These goals will then be used to analyze the military posture of the United States in Japan and Saudi Arabia and to define the relationships of these postures to the U.S. economic policy toward these countries.

INDICATORS OF U.S. MILITARY CAPABILITY/POSTURE

As explained previously, U.S. military posture as a general concept is difficult to operationalize. The concept becomes more manageable when the focus shifts to specific goals and environmental constraints in each particular situation. In other words, U.S. military posture in each country is part of a more general U.S. presence in that country. U.S. military capability in Japan, for instance, is part of the overall U.S. economic, cultural, diplomatic, and military presence in the Far East.

Therefore, in measuring U.S. military posture in any country, the analyst must consider U.S. non-military ties with each country. This type of analysis can best be done on a case-by-case basis. Such an approach would enable the analyst to account for the complex, interacting regional factors.

A case study approach, however, has a number of weaknesses. The most serious of these is the difficulty of producing generalizable statements about relationships between variables. It is therefore often very fruitful, at least initially, to examine proposed concepts or relationships through cross-sectional studies. This provides a broader view of the problem at the empirical level. In the case of the concept of military posture in particular, a cross-sectional analysis of its basic elements and dimensions should prove of value.

Cross-Sectional Analyses

This section examines two cross-sectional studies of U.S. military and non-military relationships with other nations. It also presents the results of a reanalysis of one of these studies.

CASA Study of U.S. Interests/Stakes Abroad. The Center for Advanced Studies and Analysis (CASA) has performed a cross-sectional factor analysis of U.S. interests or stakes in all non-Communist countries (CASA, 1974). The data used were generally from the period 1950-1970. Another important characteristic of the data was their strict national-dyadic nature. That is, the attributes measured by the data were in all cases limited to the direct relationships between the United States and other non-Communist countries. No indirect, triadic, or regional relationships were considered. In measuring U.S. interests in Japan, for instance, no consideration was given to the strategic significance or the regional economic role of Japan. This implies that the interests of the United States in strategically significant countries (such as Japan, Iceland, and South Africa) and in indirectly important countries (such as oil-exporting countries on whose oil the security of Western Europe and Japan depends) could not be represented in the data. Thus the relationships studied in the analysis are direct, national-dyadic relationships.

The technique applied by CASA to the data set was factor analysis. It was hoped that this technique would delineate a set of hypothesized dimensions of U.S. stakes abroad: political, commercial, military, and socio-cultural. In addition, the analysis included a set of variables that were normed (generally by dividing by population of each country). These variables were to represent the "visibility" of the U.S. presence in other countries. They were also subdivided into political, commercial, military, and socio-cultural categories.

The factor analysis of the data led CASA to conclude that there are six dimensions to "the various manifestations of U.S. involvement abroad."

These dimensions represent:

- International commerce
- Foreign assistance
- U.S. political-military activity
- U.S. political-military visibility
- Visibility of U.S. residents and military hardware
- U.S. trade penetration

These empirically derived dimensions, however, do not fit the original conceptual dimensions (which were hypothesized to be political, commercial, military, and socio-cultural). There are two possible reasons for this discrepancy between the conceptually hypothesized and the empirically derived dimensions:

- First, it is possible that the hypothesized concepts cannot be empirically separated through cross-sectional analysis. In fact, the measurable indicators of the dimensions may be statistically multicolinear to the exrent that the dimensions cannot possibly be separated by nonexperimental techniques.
- Second, the selection of indicators for the hypothesized dimensions may have been improper. For instance, if data availability was used as one of the criteria for the selection of indicators, then the resulting dimensions would be severely distorted in favor of those dimensions that have the largest number of measurable indicators.

The CASA analysis, in fact, suffers from both of these problems. The data employed in the study exhibit multicolinearity to a degree sufficient to confound the separation of dimensions. Furthermore, the indicators used to represent different dimensions are obviously unbalanced (those dimensions that have the largest number of measurable indicators tend to be the strongest). It should also be noted that the statistical multicolinearity of the indicators produced a highly unstable factor structure (the

structure of its dimensions could vary from sample to sample by sampling variability alone).

A Reanalysis of CASA Data. In order to eliminate or reduce some of the problems encountered in the CASA study, the data were reexamined and the selection of the indicators was done on a more systematic basis. A number of factor analyses were performed on the data set in order to test the stability of the factor structure in the absence of specific indicators that were deliberately omitted from each analysis.

Three criteria were used for the elimination of variables. These were:

- Conceptual Relevance. Variables, whose conceptual relevance to the dimensions of U.S. stakes or interests was dubious, were eliminated. This led to the wholesale exclusion of all indicators of U.S. "visibility."
- Statistical Relevance. Variables that had zero or near-zero loadings in the CASA study were eliminated.
- Noncolinearity. In order to reduce the structural instability of the factor matrices (i.e., prevent the determinant of the covariance matrix from approaching zero) the number of highly colinear variables was substantially reduced by dropping some variables.

The result of the factor analysis, as shown in Table 1, is a far more stable factor structure with factors that are quite distinct. (For a description of the variables see Table 2.) The factors can be broken down into distinct diplomatic, foreign assistance, commercial, and military dimensions. This finding has greater correspondence with the original theoretically derived dimensions of the CASA study, namely, diplomatic, commercial, military, and socio-cultural dimensions.

TABLE 1

The Varimax Rotated Orthogonal Factor
Structure of the U.S. Interests/Stakes Abroad

Variables	Factor Loadings Factor 1	Factor 2	Factor 3	Factor 4
CULT MON	.90			
CULT PEO	.67			-.62
STATE DE	.80			
USIA STR	.89			
AID		.92		
AID STRG		.95		
DEF ASST		.95		
INVESTMT			-.97	
U.S. EXPT			-.96	
U.S. RESID			-.96	
MIL SALE				-.89
TOTL MIL				-.86
% Variance Explained	24	24	24	18

Note: 1. All commonalities were greater than .90.
2. Factor loadings less than .50 are not reported.

In this reanalysis the military dimension seems to be dominated by the other dimensions. This result is largely an artifact, however, which was caused by the elimination of all except two of the indicators of military influence. This elimination was necessary because of the presence of severe multicolinearity among the indicators. It is worth noting that in numerous analyses it was found that the military factor was the most stable among all the factors, even when the number of variables loading on it was small.

Comparison of CASA Data Set with an Independently Collected Set. In order to check the CASA list of variables for representativeness of the totality of U.S. interests abroad, the results of the original CASA

Table 2

Explanation of CASA Variables Used in Table 1

	Variable	Explanation
1.	U.S. EXPT	Total annual dollar values of U.S. exports abroad
2.	INVESTMT	Total dollar book value of U.S. privately owned or controlled direct investments
3.	U.S. RESID	Total number of U.S. nationals residing abroad
4.	STATE DE	Total number of U.S. and foreign nationals employed by U.S. embassies abroad
5.	USIA STR	Total number of U.S. and foreign nationals employed by USIA abroad
6.	TOTL MIL	Total number of uniformed U.S. military personnel abroad
7.	MIL SALE	Annual delivered dollar value of military equipment transferred under Military Sales Program and Commercial Sales Program
8.	DEF ASST	Annual delivered dollar value under Military Assistance (and excess stock) programs plus annual programmed value of equipment and service transferred under Defense Assistance Services and other programs and loans
9.	AID	Dollar value of AID projects (deliveries)
10.	AID STRG	Number of AID personnel
11.	CULT MON	Dollar value of U.S. cultural and educational exchange programs
12.	CULT PEO	Number of people exchanged in U.S. cultural exchange programs

Note: Further detail about these variables can be found in CASA (1974).

factor analysis were compared with the results of a similar study but with an independently collected data set.[1]

Abolfathi (1974), in a study of U.S. and Soviet ties with other countries, used indicators of U.S. ties that are very similar to indicators of U.S. interests/stakes used in the CASA study. There are, however, some notable differences between the two data sets. Abolfathi's study includes a number of variables not included in the CASA study such as U.S. hotels, number of U.S. multinational corporations, and U.S. police aid to other countries. On the other hand, the CASA study has certain variables, such as immigration and investment, that are not present in Abolfathi's analysis. Also, the Abolfathi study includes all nations whereas CASA excluded Communist countries.

The result of a principal component factor analysis with varimax orthogonal rotation in Abolfathi's study showed great resemblance to the result obtained by the CASA study. That is, it was found that the major "dimensions" of the structure (in terms of the percentage of total variance explained) are military and commercial ties. In addition, in the case of the CASA study, a "U.S. trade penetration" and several mixed factors were found; but these factors did not explain much of the total variance.

In addition to analyzing U.S. ties, Abolfathi analyzed the Soviet ties with other countries. Interestingly, the factor structure that emerged for the Soviet analysis is essentially the same as that found for the United States, that is, a structure largely dominated by military and commercial ties. This finding supports the assertion of some analysts that the structural patterns of ties, interests, or presence of the two superpowers with other countries are very similar. In both cases military ties seem to be very strong but their relative strength is difficult to determine due to the presence of extreme multicolinearity among the indicators of military ties.

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[1] Abolfathi's data generally covered the period about 1969-1971 and consisted largely of annual aggregates.

Conclusions. Methodological and conceptual problems do not allow many definitive conclusions based on the empirical findings. The following points, however, can be made with confidence:

- The indicators of the U.S. (or Soviet) military interests tend to group empirically into a few sets that have theoretically meaningful structures.
- Among these clusters, military and commercial clusters (or dimensions) seem to be the most stable.

One implication of these findings is that there are independent dimensions to the U.S. presence (influence or stake) in other countries which differ from the purely military presence. Furthermore, at least two of these, the commercial and military dimensions, are very strong. This implies that U.S. interests in other countries can to some degree be separated into military and non-military issue areas.

At the beginning of this chapter, however, it was argued that the U.S. military posture abroad is determined by both military and non-military relationships of the United States with other nations. Hence, a cross-sectional analysis cannot be employed to determine completely the complex interrelationships (peculiar to particular situations) of the linkages among military and non-military influences on posture. To guide the evaluations of economically induced effects on military posture, a general, conceptual model of military capability is required.

A GENERAL MODEL OF MILITARY CAPABILITY

A general framework, or model, to describe military capability is developed in the following passages. The model is first presented in a comparatively simple form and then made more complex by relaxing some of its assumptions.

To begin, the reader is reminded of the previously discussed ambiguities surrounding the notion of military posture and of the assumptions

adopted in order to discuss military capability. Those previous assumptions are the basis for the model in its simplest form. For convenience, they are repeated here as assumption sets S1 through S3.

S1: The total military capability of the United States is directly proportional to its military hardware inventory and military manpower size.

S2: The effectiveness of U.S. military capability in any specific geographical area is a function of (1) the concentration of the capability in the area; (2) its distance from other centers of U.S. capability; and (3) the environmental factors which affect that capability at the regional level (for example, Arab public opinion) as well as at the international level (for example, Soviet attitude).

S3: The environmental factors affecting U.S. capability may be affected by the specific goals which the capability is to achieve. (Refer back to Figure 1.)

Employing only S1, total military capability is the simple sum of individual capabilities, or:

$$C_t = \sum_{i=1}^{N} C_i, \qquad (1)$$

where C_t = total U.S. military capability; C_i = U.S. military capability at location L_i; and a location (L_i) is the hypothetical center of each area of individual military capability. The identification of each C_i may follow a variety of standards provided each such standard isolates analytically distinct units of military capability. For example, each C_i might represent individual military bases, or different functions performed at one base, or alternatively, collections of bases, a fleet or even a semi-permanent naval flotilla or squandron.

Each of S1 through S3 is properly labeled an assumption set. The task now is to examine these sets to determine particular assumptions required or implied by each of them. For S1 to be a viable assumption, three

specific assumptions must hold:

A1: The same mix of forces exists at all L_i's.

A2: Weapons technology is fixed.

A3: Military capabilities (C_i's) are independent of (1) distance of military capability from its object(s) and (2) environmental factors.

It is important to note the force of these three points. A1 implies that the additivity of the C_i's is valid. In other words, the C_i's do not complement each other. Analytic effort to identify the C_i's must recognize this requirement. A3 requires that capabilities be independent of environmental factors, a requirement that invalidates S3. This inconsistency is treated by introducing environmental factors directly into the assessment of capability. However, before moving to that specification, a few additional remarks about A1-A3 are in order. What must be addressed is the completeness with which S1 treats military capability.

Even if we accept the validity of A1-A3, S1 does not adequately describe military capability. There are still different "styles" of military presence. The pre-World War II British style of exercising military power was more in line with a gun-boat diplomacy and a tendency to "show the flag" than is post-war U.S. military power. Similarly, the Soviet naval power may be expected to be far more effective in a short or defensive war than in a more protracted, offensive engagement. Differences in styles are in part deliberate and in part due to divergent traditions and histories.

Because the concern here is only with U.S. military capability, the task is simpler. However, variations of the "style" problem remain. U.S. military capability is multipurpose; U.S. military and national security policy goals do change. To resolve or at least to recognize

these points, two further assumptions are required:

A4: At a given time, U.S. military goals consist of the same "mix" at all locations L_i.

A5: U.S. military goals remain constant over time.

The implications of A5 are obvious and do not require comment. However, A5 has been intentionally separated from A4. A "constant mix of goals" is an assumption serving a substantially different intent. It requires that the nation has essentially the same set of goals at all locations. Together with similar operations conditions and force structures (implied by A1-A3), A4 allows comparability of specific C_i's.

The concept of capability as presented thus far is analytically useful, but far too simple. Substantive usefulness can be increased by relaxing some of the more drastic assumptions. Consider the previous requirement that military capability be independent of the distance to its object(s). This is certainly far different from the reality of projecting military capability. The Soviet lack of effective forward military bases in most regions of the globe is clearly disadvantageous to Soviet capability to influence events at places far from the Soviet Union. Similarly, the U.S. capability for capturing Persian Gulf oilfields is affected by the distance between locations of U.S. military capability and the Persian Gulf (for example, the distances of the Seventh Fleet, the Sixth Fleet, and distances of U.S. bases in the Mediterranean, Indian Ocean, and Pacific from the target).

The influence of distance can be incorporated within the discussion of capability but only with some changes. We must now discuss the U.S. ability to <u>project</u> military capability to a particular point or area. Target locations, L_j, must be identified. These L_j's are not equivalent to the L_i's representing the location of capabilities although there is no prohibition that the two sets be mutually exclusive. If d_{ij} is the distance from a location L_i to a target L_j, then

the U.S. capability at L_j as <u>projected</u> from L_i is given by:

$$C_{ij} = \begin{cases} \frac{C_i}{d_{ij}} & \text{for } i \neq j \\ C_i & \text{for } i = j \text{ (or when } d_{ij} = 0). \end{cases}$$

Generalizing to all locations, total U.S. capability at a particular target is:

$$C_{tj} = \sum_{i=1}^{N} C_{ij} = \sum_{i=1}^{N} \frac{C_i}{d_{ij}} \quad . \tag{2}$$

We may also consider the projective capability of a particular base:

$$C_{it} = \sum_{j=1}^{M} C_{ij} = \sum_{j=1}^{M} \frac{C_i}{d_{ij}} \quad .$$

The initial distance assumption was a part of the set S2. A second component of that same set, and an inconsistency previously mentioned, concerns the relation of environmental conditions to military capability. The previous assumption of independence is very difficult to relax for two reasons. First, environmental conditions generally consist of a complex set of intangible and interacting concepts that are not easy to analyze. Second, a major part of environmental conditions consists of public opinion and governmental attitudes that vary from issue to issue in a highly unpredictable manner.

It is not within the resources of this project to deal with all environmental factors. Only public opinion and governmental attitude will be integrated into the military capability model. But, it is worthwhile to emphasize that in addition to these psychological variables, the environment within which military capability is projected also consists of many sociological and physical factors, some of which can constrain the effectiveness of the resulting capability.

In an earlier discussion of the role of public opinion and governmental attitudes, it was pointed out that U.S. military goals determine the degree to which foreign opinion and attitudes affect U.S. military capability. In the Middle East, if the U.S. goal is to project its capability on behalf of Israel during an Arab-Israeli war, it is likely that it would be met by negative public opinion in the south and southeast Mediterranean and by uncooperative or reluctant governments throughout the region -- even among the NATO member countries. On the other hand, if the U.S. goals are to send troops to police a U.N. or U.S.-Soviet cease-fire line on the Sinai front, then public and governmental attitudes in the region would be far more friendly. Thus, the hostility of public opinion and governmental attitude of the foreign nations where U.S. military capabilities are located inversely affect U.S. power. In other words, U.S. military capability (C_i) at location L_j for projection to location L_j is inversely related to the hostility of the nation at L_i, or

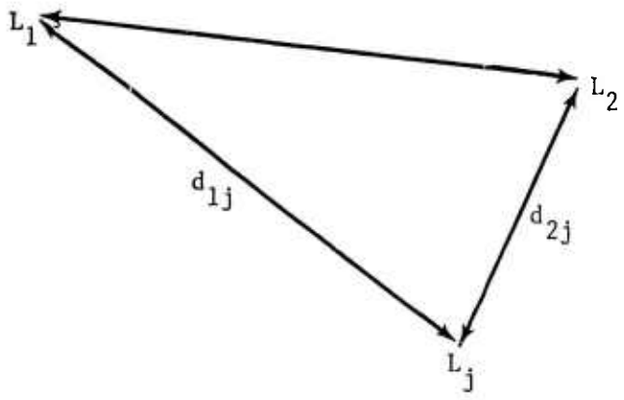
$$C_{ij} = \frac{C_i}{d_{ij} h_{ij}} \quad .$$

where h_{ij} incorporates the hostility engendered by the projection of capability to L_j.

Equation (2) now becomes:

$$C_{tj} = \sum_{i=1}^{N} \frac{C_i}{d_{ij} h_{ij}} \quad . \qquad (3)$$

This version of the total capability model can now be illustrated by means of the simple example shown in Figure 2. In this example, there are only two locations (L_1 and L_2) from which capability can be projected to the target (L_j). For purposes of the example we assume the first location has one-eighth as much capability as the second, twice the distance to the target, and one-fourth as much hostility (toward the use of C_1 in L_j). By employing these facts in equation 3, one obtains the total projected capability at location L_j.



For L_1: $C_1 = 2C$, $d_{1j} = 4d$, $h_{1j} = 2h$

$$C_{1j} = \frac{2C}{(4d)(2h)} = \frac{C}{4dh}$$

For L_2: $C_2 = 16C$, $d_{2j} = 2d$, $h_{2j} = 8h$

$$C_{2j} = \frac{16C}{(2d)(8h)} = \frac{C}{dh}$$

$$C_{tj} = C_{1j} + C_{2j}$$

$$= \frac{C}{4dh} + \frac{C}{dh}$$

$$= \frac{5}{4}\frac{C}{dh}$$

$$= (1.25)\frac{C}{dh}$$

Figure 2. An Example of Projection of Capability from Two Locations.

$$C_{tj} = 1.25 \frac{C}{hd} .$$

Also note that:

$$C_{1j} = \frac{1}{4} \frac{C}{hd}$$

and

$$C_{2j} = \frac{C}{hd} .$$

Thus, C_{ij} is one-fourth of C_{2j}. This implies that the projected capabilities at location L_j are much weaker than at locations L_1 and L_2.[2]

As has been demonstrated, one can use equation 3 to measure roughly the effectiveness of U.S. military capability as long as assumptions A1, A2, A4, and A5 are approximately true. But even if these assumptions were not true, equation 3 would still have analytical value. For instance, some of its properties are:

1. If there are many bases in many locations, then those at any single location become insignificant.[3]

2. If the hostility of a foreign government and population toward the use of a capability on their soil increases, the usefulness of the capability decreases.

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[2] Note that if h_{ij} or d_{ij} approached zero, C_{ij} would approach infinity. This is an unreasonable characteristic for equation 3 to possess. There are, however, other variations of this equation which do not have such undesirable characteristics. An example is:

$$C_{ij} = \frac{C_i}{(h_{ij} + 1)^2 (d_{ij} + 1)^2} .$$

[3] This is a controversial point with respect to U.S. military capability. Most experts contend, for instance, that there is no such thing as a vital foreign military base. But there is also a significant number of experts who argue that certain bases, such as the Guantanamo in Cuba, are "vital" to the overall U.S. military capability.

3. The farther a military base is from its potential target, the less effective it is in projecting its capability to the target.[4]

As a final reminder, it should be emphasized that this theoretic construction is a highly simplified representation of military capability. Nonetheless, it is a useful tool in the analysis of specific situations. Chapters VI and VII employ equation 3 to analyze U.S. military capability

[4] Note that this chapter has essentially ignored the deterrence capability of military power and has only analyzed direct military capability. One justification for this is that the deterrence capability of military forces is generally regarded as closely correlated with actual military capability. There may, however, be a time-lag involved here. For instance, it often takes a war to demonstrate the increased capability of a new major power.

CHAPTER IV: MEASURING THE EFFECTS OF U. S. ECONOMIC POLICIES

This chapter discusses research efforts devoted to the measurement of foreign economic effects caused by international economic policies available to the United States. The discussion is presented in four major sections. The first section introduces elements of the research problem and discusses the economic variables that have been selected to measure economic impacts. The second section surveys types of economic models and describes the model developed for the project. The third section reviews the costs, benefits and motives for international trade. The fourth section discusses international economic policies available to the United States.

INTRODUCTION TO THE RESEARCH PROBLEM

The economic section of the project develops a generalizable technique to evaluate changes in foreign economies induced by U.S. international economic policies. The principal constraint on technique development has been the need to generate a parsimonious representation of economic linkages. In other words, the nature of economic effects must be represented in a comparatively small number of indicators. If this constraint is not recognized, it is quite possible to develop a technique producing more information than can be adequately integrated within a representation of foreign governmental decision-making.

Recognizing the need for limited numbers of accurate indicators of economic effects, research efforts were first directed toward selecting indicators and then toward developing a method to represent the indicators. The selection of indicators was guided by both economic and political science considerations. Fortunately, the requirements of the two disciplines were not inconsistent.

The economic requirement is simply stated. The selected indicators must be consistent with economic theory. The interpretation of "consistent" is that measured effects should be related to non-transitory (or even ephemeral) changes in the nature and level of economic activity in a foreign economy. The political science requirement is related to the decision-analysis problem. The indicators must capture changes in economic variables that are monitored by and important to governments.

The variables chosen to represent induced changes in foreign economies are employment, output, and prices. Each of these is an important measure of economic performance; each is monitored by governments. Most governments are concerned that their respective economies achieve and maintain full employment, rising levels of output, and reasonable price stability. These three items were established as economic goals for the United States by the Employment Act of 1946. While other countries may lack legislation explicitly positing these goals, the goals themselves apply to virtually all countries.

Variations in the general goals are quite possible. One country may establish the desired growth rate for output at 4 percent per year and another at 8 percent per year. One country may focus its economic attention on its ability to expand exports and another on the prices of imported products. In each case, however, variations in the three major variables do reflect more specific changes.

Exceptions to the validity of these goals should be noted. The first such exception is by now familiar to most persons. A country whose economy is dominated by the production of one commodity (e.g., petroleum) is more likely to concentrate its attention on the performance of that industry. As a result, the aggregate measures of employment and output may not fully represent the political significance of changes occurring within the industry. Given this exception, there are two possible approaches to dealing with it. The first is to attempt to produce an

economic model capable of registering industry-specific changes. The second is to modify the decision-analysis framework of the government in question to make it more responsive to economic policies directly affecting the industry. Elements of both approaches have been incorporated in the study.

The second difficulty associated with the specification of employment, output and prices as the indicators of economic impacts concerns the last variable in the list, prices. There are two interrelated problems within the heading "difficulty." These are the treatment of prices within economic theory and the significance of price changes to governments.

The economics discipline is most comfortable discussing changes in relative prices. That is, the movements of all prices but one compared to that one have been the general focus of micro-economic theory for quite some time. Substantial progress beyond Samuelson (1947) and Hicks (1939) has been achieved, but certainly the elements of the analysis have been widely available since those dates. The treatment of general price <u>levels</u> as opposed to relative price changes is not as well understood. The general belief of most economists is that monetary influences establish the level of prices. Beyond that basic statement, opinions begin to diverge.

The most useful (for purposes of this study) conceptualization of price levels emphasizes the importance of expectations in the formation of prices and wage demands and the interactions of the two phenomena. The boldest possible statement derived from this approach is that the price level observed in the economy is determined by the price level expected by individuals in the economy.[1] The force of the argument is that if

[1] This is, of course, a rather dramatic statement. Morley (1971) provides a more balanced presentation of the hypothesis at an introductory level. For a view quite different from the one contained in Morley, Patinkin (1965) is technical but presents the <u>theory</u> popularly associated in the United States with Milton Friedman (1956).

changes in the international economy induce persons to expect domestic price increases, then domestic price increases will occur. Additionally, the theory argues that an economy can operate at a number of different price levels or even at any number of rates of inflation. Naturally, only one at a time prevails, but there is no mystical identification of a "proper" price level or "proper" rate of inflation for any economy.

Given the "economic price problem," the decision of the research staff was to focus analytic efforts on the identification of relative price changes. As will be explained in a later section of this chapter, a method to compute changes in price levels in addition to relative price movements has been incorporated in the economic model. However, the method employs only one of many mechanisms operating to affect the general price level.

The "political price problem" is very similar to the economic problem. A brief survey of inflation rates in a variety of countries over time suggests that any one country can experience (and probably has experienced) different inflation rates. The problem is that because a person's expectations tend to be fulfilled (at least about prices), it becomes very difficult to assess the points at which expectations are not matched by events. In other words, changes in rates of inflation may represent occasions of unfulfilled expectations, and hence political pressure for governmental action. Or, the changes themselves may have been anticipated and cause no significant disruption in the economy, and hence little if any pressure is placed on governments to act.

As a result of both the economic and political arguments, the a priori opinion of the research staff was that changes in employment and production would be relatively more important than changes in price levels as indicators of economic impacts and as causes for responses by foreign governments. The anticipation has been confirmed during the project.

Having identified the indicators of economic impacts, the next issue is the development of an economic model to register changes in employment, production and prices.

THE ECONOMIC MODEL

To select the form of the economic model used for the project, the first task was to review the types of models currently available. Next, the most appropriate type of model was chosen. Finally, particular aspects of the model were specified and developed to adapt the model type to the requirements of the study.

Survey of Model Structures

The available models treating international economic phenomena may be divided into two types. The two model types represent two different but complementary analytic approaches. The convenient, extant labels for the two approaches are microeconomic and macroeconomic analysis.

Macroeconomic analysis, largely Keynesian[2] in approach, is concerned not so much with the details of trade but instead with the manner in which trade affects the level of economic activity within the economy. The analysis dispenses with all notions of identifiable product types in order to concentrate (in simpler versions) on the motives for product purchases according to final use. The economy is imagined to produce one commodity (or a fixed bundle of commodities) that can be used for consumption, investment, public sector, or export purposes. The advantage of the Keynesian conceptualization is the ability to treat effectively situations involving unemployment. The popularized economic policy problem, demand management, is the problem, within a Keynesian conception, of maintaining that level of aggregate demand just sufficient

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[2] Keynesian in this context refers to the analysis of spending and the problem of effective demand. Supply contraints can be introduced in the manner of Harrod (1939) or Domar (1947) or Pasinetti (1974).

to maintain full employment. The usual tools available to the policy authorities are fiscal policy (public sector purchases and taxation) and monetary policy. The introduction of trade presents another problem for the policy authorities -- the achievement of balance of payments equilibrium. The joint problems, internal and external balance, are then addressed to determine which policy tool can be used most effectively to treat which problem. Additional policy instruments, such as tariffs, border tax adjustment schemes, exchange rates and quotas, can be introduced into the analysis. However, because product types are not identified, these tools apply to all imports or all exports uniformly.

Microeconomic analysis explicitly identifies different commodities. In addition, microeconomic theory is more concerned with explanations of the behavior of particular actors in the economic system, e.g., consumers and producers. As a result, microeconomics is the appropriate technique to investigate the effects of changes in excise taxes on particular goods. Similarly, microeconomic theory is quite useful to study the effects of tariffs or quotas placed on particular commodities.

The traditional explanation that macroeconomic analysis treats "aggregates" in the economy while microeconomic analysis does not is somewhat misleading. The tendency is to assume that "macro" simply avoids the tedious detail of microeconomic theory by "aggregating" the microanalytic subsystems of the economy. Differentiation of the two analytic schemes requires a more complex argument. Within the context of international economics, a microeconomic analysis is one that examines a trading economy by specifying the particular commodities produced and traded by the economy. Presumably, micro-techniques are chosen to study those features of an economy that can be treated only by identifying commodity classes. The macro-analytic strategy is differentiated from the micro strategy not so much by the level of aggregation as by the type of abstraction involved. Both schemes can result in highly aggregated models, but the rules of aggregation are quite different.

To illustrate the differences, consider an economy consisting of three basic types of industries: import-competing industries, export industries, and industries that do not produce internationally traded goods. An analysis that attempts to explain why any given industry is an export rather than an import-competing industry employs a microeconomic model. Another microeconomic issue would be the differential effects within and across the industry groups in response to changing conditions in the international economy. However, if there is reason to believe that changes within the industry groups are likely to be less important than shifts between the first two, jointly considered, and the last, then a macroeconomic strategy is useful. By lumping together the first two types, preserving only the distinction between the "foreign sector" and non-traded goods, the analytic focus is shifted to identifiable uses of the goods produced by the economy. Commonly identified uses are consumption, investment, public sector purchases, imports and exports, that is, the familiar "aggregates" of macroeconomic theory.

A Microeconomic Model of Trade. As previously stated, microanalytic techniques are appropriate for attempts to explain the commodity composition of a country's trade. The most exhaustively analyzed theory purporting to explain patterns of trade, the Heckscher-Ohlin theory, is a highly aggregated, microeconomic theory. The basic model employed in the Heckscher-Ohlin thesis[3] is also used to formally prove propositions concerning the benefits to be derived from international trade.

A simple description of the theory is accomplished by restricting attention to a very stylized world made up of only two countries, two commodities, and two non-produced factors of production. The theory argues that a country's export commodity is that commodity whose production uses intensively (compared to the other commodity) the country's

[3] The basic work is by Ohlin (1933). Bhaghwati (1964) provides a convenient survey of more recent contributions. Chacholiades (1973) has written a systematic introduction to the modern pure theory of international trade.

relatively abundant (compared to the other country) factor. A somewhat technical set of sufficient conditions for the theorem are: complete international immobility of the factors of production, free trade, no transport costs, perfect markets, identical production functions for any one commodity across countries, linearly homogeneous production functions exhibiting diminishing marginal productivity, no factor intensity reversals, and identical consumption preferences across countries.

The conditions required for the theory are stringent. Further, empirical implementation of the model is currently impossible. What has been done is to conduct two types of tests of the model. One of these tests is primarily theoretic. By relaxing the assumptions of the model and the simple two-of-everything world, the "robustness" of the theory has been investigated. The idea is to determine whether the conclusions of the model are "destroyed," modified, or left unchanged under different conditions. Augmenting the theoretic investigation, empirical research has sought to determine whether the crucial assumptions of the model are in fact valid.

A second test of the model attempts to empirically assess the validity of the theory rather than the validity of its assumptions. The major investigation of this sort (Leontief, 1956, 1953) suggested that the Heckscher-Ohlin theorem does not forecast the commodity structure of U.S. exports. The theory has, however, adequately accounted for the commodity structure of other countries' trade. Continuing empirical investigations have produced the important conclusion that "it is necessary to discard simple, single-factor (e.g., capital per worker) trade theories in favor of multi-factor trade models" (Baldwin, 1971).

Investigations of the Heckscher-Ohlin theory suggest several points that are important to the assessment of impacts of international economic policies. First, because the simple form of the model has not held up well under empirical analysis, the model adopted for the project must

identify multiple inputs to production processes. Second, because the complete structure of the theory requires an extremely detailed empirical specification, the adopted model should be designed to "skip over" the requirements of the theory, logically stated, yet capture "enough" of the structure to guide testing of estimated versions. Third, to the extent possible, the adopted model should not preclude a structure consistent with alternative trade theories. And finally, the most fruitful approach to selecting a model might well be one that takes the commodity structure of trade as given and seeks to explain only changes in trade.

Macroeconomic Trade Models. Macroeconomic analyses of international economic questions abstract from considerations of the commodity structure of trade. Instead, the focus is directed toward the influence of trade on the level of economic activity and the influence of the level of economic activity on trade. Although macroeconomic models are traditionally employed to investigate a rather broad set of questions, the common feature of the issues is an explicit policy orientation. It is assumed that the basic goals of economic policy-makers are full employment, stable prices, and avoidance of "problems" with the balance of payments. The policy tools generally used to achieve these goals are monetary policy, fiscal policy, and policies directly affecting the external sector of the economy. This last group includes exchange rate programs, tariffs, quotas, tax adjustments occurring at the country's borders, and so forth.

While it would seem to be the case that macro-models are able to capture directly the issues being studied here -- international economic policies -- there are substantial limitations. First, the most readily analyzed macroeconomic models abstract from prices. The models require substantial modifications to include prices, modifications that require conditions reminiscent of micro-models to be theoretically complete. Even when these modifications are introduced, the range of prices that can be examined is limited. Specifically, the models identify only one

price, a price level, representing all commodities.[4] Price levels in different countries can be treated, but prices for different commodities cannot. The implication for international considerations is severe. Rarely are tariffs applied uniformly to all imports; yet that is the only case a macro-model can consider.

Additional limitations can be listed, but the essence of all such issues has been stated -- particular commodities are not identified. In some respects, "limitations" is not an entirely appropriate characterization. Macro-theory was not developed to answer commodity-specific questions. The contribution of macro-theory is the ability to explain the general pattern of economic phenomena. The forte of macro-modeling related to international issues concerns the interdependence of trading economies. The "aggregated" approach dramatically illustrates the influences of "domestic" economic policy on international economic forces and the influence of those factors on other economies. (And, of course, macro-models generally do not utilize the assumption of full employment found in most microeconomic treatments.)

The Preferred Model Type

The preferred model type is one that includes elements of both micro-economic and macroeconomic approaches to the study of economic activity. Ideally, the model should recognize classes of commodities and maintain the policy orientation of macroeconomic constructions. Of course, one may wish for more, but classes of commodities seems to be a reasonable compromise between a precise commodity specification and a macroeconomic, one-good world. With respect to macroeconomic capabilities, the emphasis should be placed on fiscal policy representation (government expenditure and taxation) rather than monetary influences.

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[4] Baldwin (1970, Appendix A) presents a model that is a reasonable representation of this class of models.

The arguments for including fiscal policy instruments in the model are straightforward. Because the structure of the study (recall the "causal sequence" of Chapter 1) presumes that foreign governments respond to unfavorable economic impacts, and because a possible response can be the use of domestically oriented economic policies to offset such impacts, providing fiscal instruments within the model is virtually a requirement of the study. This is especially true because fiscal policy tools can be "shaped" to counter specific impacts. For example, if an economy experiences lagging export sales of a particular product, say X, specific policies such as government purchases of the commodity, direct subsidies to the industry, or lower indirect tax[5] rates can be used to offset the decline in international sales. On the other hand, a general economic slowdown can be attacked by increasing government spending or lowering income tax rates.

The alternate set of macroeconomic policy instruments, the tools of monetary policy, have not been included in the model developed for the project. As monetary policy is an important influence on economic activity, the exclusion deserves comment. As mentioned previously, the "function" of the money supply in economic models is to establish a level of prices. However, the function can only be accomplished if demands for money are also included in the model. And, if monetary policy is to be included, an alternate asset (a store of value other than money) must also be included in the model. These two additional requirements can be specified but only with substantial effort. The net gain is a more accurate mechanism to establish a general level for prices, but the price paid for the gain is substantial. First, an accurate specification of a financial sector for an economic model is a non-trivial undertaking. Second, and more importantly, variations in existing financial institutions across countries are the rule rather than the exception. A general specification of monetary influences is possible only at a fairly

[5] An indirect tax is a tax on a commodity. It is "indirect" in that it is not a "direct" tax on income.

abstract, theoretic level. Each contemplated empirical application of the model would require a detailed examination of financial institutions for the country involved, a less abstract theoretic representation of the monetary mechanisms peculiar to the economy, and finally, an empirically implementable counterpart to the case-specific theory. In short, the generality of the model would be sacrificed. The decision to exclude monetary phenomena resulted from these considerations.

The desirability of maintaining a microeconomic orientation for the model can be briefly stated. The traditional tools of international economic policy are commodity specific. There have been exceptions in the sense that one policy statment may affect broad groups of commodities. The 10 percent tariff surcharge adopted by the United States is an example. More commonly, a tariff is quite specific -- a rate for rubber-soled footwear is an example. Maintaining an identification of separate commodities permits a more precise evaluation of the impacts caused by specific policies.

The theoretical construction which has been selected as the model type for use in the project is the input-output analysis developed by Leontief (1951). In many respects, the contribution of input-output analysis to the understanding of economic phenomena may be summarized by saying the technique emphasizes the simultaneity of production requirements. The representation of the interrelations of production within an economy is dramatically conveyed by an input-output table. However, the theoretic requirements necessary for the construction of an input-output table are quite stringent.

The Input-Output Conceptualization. The fundamental contribution of Leontief is twofold -- at once providing a unique view of economic processes and developing the empirical realization of that view. The conceptualization is best described using illustrations. Imagine that a product requires two additional products as inputs in its production.

To provide an identification system, call these three products A, B, and C. Further, suppose that to produce B, inputs of A and C are necessary. Leontief's contribution was the recognition that A is indirectly required to produce itself. Similarly, the amount of C necessary to produce A includes the C used directly to produce A and the C used to produce B, which in turn is used to produce A. The verbal tracing of the complete requirements to produce A is tedious (and conceptually, never ending). Leontief proposed and proved that the analysis can be accomplished without reference to indirect input requirements. The statement of the conceptualization is quite simple and requires only that direct input requirements be known.

Let the commodities produced by the economy be of an arbitrary number, say n. Arrange the commodities, measured as quantities of each commodity, in a vector denoted $\underline{x}$. Because each commodity can be directly used in the production of any other commodity, let a_{ij} represent the amount of the i^{th} commodity directly needed to produce one unit of the j^{th} commodity. The collection of a_{ij}'s for the entire economy is called the set of direct input coefficients. Place these coefficients in a matrix, denoted A, such that the subscript "i" (the first) identifies a row of the matrix and "j" represents the column. With this preparation, the basic question can be addressed: How much of each commodity must be produced to realize a desired net output, net of all direct and indirect input requirements?

The answer to the question is easily derived. Consider the product $A\underline{x}$. The result is a statement of the total amount of each of the goods used directly to produce themselves and all other goods. Let $\underline{x}$ be the total amounts produced, the answer to the question. The quantities $\underline{x} - A\underline{x}$ are the amounts "left over" after meeting all input requirements. Then calling the "net outputs" $\underline{c}$, the following equation holds:

$$\underline{x} - A\underline{x} = \underline{c}$$

Straightforward operations in matrix algebra produce:

$$(I - A)\,\underline{x} = \underline{c}$$

$$\underline{x} = (I - A)^{-1}\,(I - A)\,\underline{x} = (I - A)^{-1}\,\underline{c}$$

The elements of the matrix $(I - A)^{-1}$ are the total direct and indirect input requirements for the entire economy. Two further points should be noted: there is no theoretic requirement that the a_{ij}'s be constant -- substitution of inputs in response to changing relative prices is allowed -- and the a_{ij}'s are expressed in quantity terms.

Empirical Input-Output Considerations. The last-mentioned point is the deviling aspect of empirical implementation of input-output analysis. Measurement of the value of inputs purchased by one industry from another is difficult, but trivial, compared to the measurement of quantities of inputs purchased. The second part of Leontief's contribution was the resolution of this empirical problem. If the direct input requirements in quantity terms are assumed to be constant, then each a_{ij} may be measured as the ratio of the value of purchases by the j^{th} industry from the i^{th} industry to the value of total production of the j^{th} industry.

The assumption of stable, or constant, direct input coefficients, expressed in quantity terms, does provide the necessary step for empirical estimation, but not without drawbacks. Having constructed an A matrix, it may be used to trace the repercussions throughout the economy of a change in any one price provided all quantities are held constant. Similarly, a drop in the total output of one industry can be traced through the entire economy to determine the total output loss provided all prices are held constant. In neither case can the joint assessment of quantity and price changes be accomplished. A sequential analysis -- first price and then quantity -- is frustrated because each step in the sequence requires the original position as a starting point.

Most applications of input-output analysis have accepted the assumption of fixed production coefficients. Some comfort has been provided by the Samuelson non-substitution theorem (1951) which identifies a theoretical explanation for no substitution in the general Leontief model (with one primary input) even if it were possible.

Project-Oriented Evaluation of Input-Output Analysis. The important limitations of input-output analysis for the requirements of the project should be kept in mind during the subsequent discussion of the model as developed for the project. Consequently, they are repeated. (1) The assumption of stable direct input coefficients prohibits an evaluation of substitution in production induced by changes in relative prices. (2) The inability of the technique to consider simultaneous changes in outputs and relative prices means that a complete analysis of the impacts of international economic policies is not practical.

The benefits of the technique, however, are substantial. Classes of commodities are explicitly incorporated. Service sector activity can also be introduced. The previous discussion set the number of commodities or industries at "n." In practice, n can be as large or small as available resources and data permit.

The analysis is also capable of treating elements of fiscal policy. The net outputs vector, $\underline{c}$, can be easily separated into different uses of those outputs. An example specification is:

$$\underline{c} = \underline{G} + \underline{I} + \underline{C} + \underline{X} - \underline{M},$$

where the vectors on the right-hand side of the equation are, from the left, government spending, gross investment, consumption, exports and imports.

The Adopted Model - An Intuitive Description

The modifications to input-output analysis that have been applied to develop the general form of the model for the study are described in this section. Additionally, a brief, and hopefully succinct, explanation of "how the model works" is presented.[6]

Modifications. Two major modifications of input-output analysis are used to adapt the technique to the requirements of the project. The first of these is an alternate specification of production relations to permit substitution. The second is the development of a consumer sector for the model to incorporate consumption-spending decisions within the analysis.

An alternate specification of production relations that is consistent with input-output analysis was first offered by Klein (1952-53) in an article entitled "On the Interpretation of Professor Leontief's System." To enable its application, Leontief had expressed the input-output model in value terms after assuming that there was no possibility of physical substitution among inputs. Samuelson provided a theoretic condition, peculiar to the input-output model, which transformed Leontief's assumption to a conclusion. Klein followed a drastically different strategy. Rather than emphasize quantities of inputs, he examined the value of input purchases. The goal was to show how the ratios of input values to output values could remain constant while the input coefficients, in quantity terms, are free to change in response to changes in relative prices induced by changes in final demand. Production functions of the Cobb-Douglas form are sufficient but not necessary conditions for the desired result.

A few remarks about Cobb-Douglas production functions may help the

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[6] A more formal statement of the model is presented in Appendix G of this report.

reader appreciate Klein's interpretation. First, the function is homogeneous of degree one in inputs. A simple example of the form is:

$$Q = Ax_1^a x_2^{1-a} \quad , \quad 0 < a < 1,$$

where Q represents output, x_1 and x_2 are inputs, and A is an efficiency parameter. Homogeneity of degree one means that if the amounts of each input are changed (doubled) then output changes in the same proportion (doubled). If production is described by a function of this form, and if input prices remain constant,[7] then efficient productive behavior is exactly the same as the behavior described by constant input coefficients. In the case of constant coefficients, an attempt to double output requires a doubling of all input quantities. The same is true for the Cobb-Douglas specification.

If the requirement of constant input prices is relaxed, the two descriptions of production behavior are quite different. The efficient combination of inputs in the constant coefficient case does not change in response to changing relative prices of the inputs. The physical requirements of production are exact -- a specified amount of each input per unit of output. As a result, changing relative input prices will change the ratios of values of input purchases to the value of output. The Cobb-Douglas form, however, does permit substitution. As the price of one input increases relative to the price of the other, the amount of the first input used in production decreases while the amount of the second increases -- the second input is substituted for the first. As the substitution occurs, output is unchanged. The significant feature of the substitution is the effect on the values of input purchases. The dollar value of expenditures for each input remains constant. Let

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[7] Strictly, there is no requirement that input prices remain constant. Instead, the ratio of input prices must remain constant. In this case, the prices of x_1 and x_2 are required to change proportionately.

the original expenditures be $y_1 = p_1x_1$ and $y_2 = p_2x_2$. If the price of the first input increases to p_1^* and the second decreases to p_2^*, then the quantities of each input will change such that $y_1 = p_1^*x_1^*$ and $y_2 = p_2^*x_2^*$. This means that the value ratios of input purchases to output sales are constant even though quantities are free to change.

The second major modification to the input output framework relates consumption expenditures to wages and profits to permit an endogenous description of consumer behavior. The advantages of the specification are the incorporation of a "multiplier" in the model and the inclusion of another fiscal policy instrument, income taxes.

As its name suggests, the "multiplier" posits that changes in GNP are multiples of changes in exogenous spending. Changes in government spending and exports are important influences in the model.[8] A "tax multiplier" applies to changes in income tax collections to produce GNP changes. The tax multiplier is included because disposable income is a determinant of consumer behavior and an income tax rate related disposable income to personal income.

"How the Model Works". For persons unfamiliar with the conception of general equilibrium as it is used by economists, a mental picture of the way the model operates can be difficult to acquire. Consequently, an explanation appealing to the reader's intuition is offered.

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[8] To provide a simplified example, let Y = income, C = consumption and G be government spending. Assume consumers and the government are the only actors in the economy, or $Y = C + G$. Also assume that consumers' spending is determined by income, and for simplificity, let the relation be linear: $C = a + bY$, with b greater than zero and less than one. Substitute the consumption equation into the income equation and collect terms, $(1 - b)Y = a + G$. Solving yields $Y = \left[1/(1 - b)\right](a + G)$. The terms in the square brackets is the multiplier; it is greater than 1. It can be used to compute the changes in income generated by changes in government spending by simple multiplication.

The first step to use the model is a calculation of the values of all variables at the equilibrium point. The equilibrium point is that set of prices and quantities that equate all supplies and demands in the model.

There are three different types of demands in the model: producers' demands for intermediate inputs, consumers' demands and exogenous final demands. The exogenous final demands are investment spending for plant and equipment, government spending for goods and services used in the government's activities, and demands originating in other countries or export demands. These are not explained within the model, hence they are exogenous to its operation. Each of these demands is disaggregated by commodities. To keep this discussion simple, assume there are five industries in the model, each of which produces one commodity. Thus the exogenous demands are set for each of the five commodities, e.g., government spending as it is parceled out among the industries. These demands are expressed in monetary values.

Producers' demands for intermediate goods are endogenous to the model. To determine these demands in their general form requires a bit of algebraic manipulation. What is done is to begin with technical production functions relating output to quantities of inputs. Then, the quantities of inputs demanded by producers are written as functions of the prices of the inputs and the price of output. During the same exercise, supply functions are developed to relate the quantitiy of each industry's output to the price of the output and the prices of inputs. And finally, profits for each industry are similarly expressed.

Consumption demands are written as functions of income and prices of the commodities. At this point, all demand functions in the model have been expressed to depend on prices. Supply functions also depend on prices. However, prices are not the only influence on consumer spending. To close the system, the sum of profits from each industry and wages paid to labor (each a function of prices alone) are substituted in the

consumer demand equations to replace the income terms. After this substitution, all demands and all supplies depend upon prices. All other endogenous variables influencing the quantities demanded and supplied have been removed from the equations by substitution.

Taking the five supply functions and equating them to the sum of all demand functions for each of the five goods allows the calculation of a set of prices that satisfies the equilibrium conditions. Having solved for the prices, the quantities demanded and supplied for each good can be determined and analysis of the model can begin.

Analytic efforts are necessary to answer the question of interest to the study. The problem is to determine what happens to prices, employment and output (of each good) as the exogenous components of demand are changed. It is one problem rather than three because once the price changes are known, the new prices are substituted into the supply functions to compute outputs and into the labor demand functions to compute employment. The computation of price changes is developed using elementary calculus. The answer from the exercise is a table depicting the percentage change in each price caused by a one unit change in final demand. The table would have five rows and five columns. If the demand for the third good changed, the third column of the table would contain the percentage change in <u>each</u> price.

The figures in the table are expressed as changes <u>per unit</u> change in the final demands. The unit can be any convenient value, say millions of dollars. The changes estimated to result from a change in demand of a different magnitude are computed by multiplication. Similar tables relate changes in employment to changes in demand and changes in output to changes in demand.

The model is a general equilibrium model because all adjustments within the economy are captured in the entries of the tables. To illustrate, suppose the export demand for good #1 is reduced. The producers of the

good will reduce their production because the decline in demand reduces the price of their product. At the same time, they reduce their demands for the other goods (goods that they use as inputs). Similarly the demand for labor is lowered. As other producers are confronted with falling prices for their own products (caused by lower input demands of the first industry), other outputs are reduced. The consumption sector tends to reduce demands because falling prices have reduced wages and profits (income), but tends to increase quantities demanded of any good whose price has fallen relatively more than other prices in the system. After all adjustments, the economy achieves a new equilibrium described by a new set of prices. The entries in the price table reflect the new prices as percentage increases in the original prices.

Evaluation of the Model

The final evaluation of the economic model recognizes economic phenomena that are well represented and other that are not. The following comments are based upon the judgments of the research staff, judgments that have been formed during the model development stages and after two applications.

First, the model does quite well when applied to a developed country. Such countries commonly publish input-output tables and the results of consumer surveys. Model estimation for these countries is fairly easy. Other countries must be divided into two groups, "upper tier" and "lower tier" developing nations. For the former, estimation is more involved than for developed countries but still possible. Many countries in this group have highly aggregated input-output tables. Experience suggests that production relations are quite similar within the group. This permits an available table to be applied to many economies with minor modification. These countries also compile consumption surveys. Countries in the "lower tier" are much more difficult to represent within the framework of the model. An application generally requires extensive efforts to construct the required data from a variety of sources. To minimize error, highly aggregated industries are recommended.

Aspects of production interdependence are captured by the model. For most countries, this must be regarded as a marked benefit of the technique. The exceptions to this generally favorable appraisal are applications of the model to economies dominated by one industry (petroleum is an example). The model implicitly assumes that the dominant industry is fully integrated into the economy as a whole. In fact, such integration is rarely observed. It is far more common for the dominant industry to be "modern" and quite divorced from other sectors of economic activity. In effect the model may produce overestimates of "spillover" effects between the modern industry and the rest of the economy.

Finally, the model estimates short-run or one year impacts quite well. Longer term implications are not well traced out. To be able to more accurately estimate such effects, the investment sector could be made endogenous. To do so, however, would be a non-trivial extension as it would require an elaborate capacity utilization-profit expectations determination of investment spending. The gain could be expected to take the form of estimates of larger swings in domestic economic activity induced by changes in the international economy.

COSTS AND BENEFITS OF INTERNATIONAL TRADE

This section reviews the theory of international trade on a non-technical level. Hopefully, it will provide an appreciation of theoretical factors that influenced the specification of the economic model.

Students of economics have long sought to provide an explanation of international trade. As the range of questions that an "acceptable" trade theory "should" be able to answer has increased, so has the complexity of the formal statement of the theory. This review of the conceptual problems that have stimulated most, if not all, analyses of international trade is intended to provide an intuitive understanding of the conceptualizations of economics, not an itemized discussion of particular theories.

Such a review is useful because the specific questions, and the sophisticated theoretic models necessary to resolve them, have all derived from attempts to answer one question: "To what extent should a country participate in international trade?"

Autarky or Trade

In its simplest form, the question of participation in trade was viewed as an either/or proposition. Trade either was to be allowed or it was not. The first proposed answers to the policy question favored participation in trade, and additionally, favored free trade. The "analytic device" buttressing the answer came essentially from Adam Smith. The argument is easily stated in two parts. (1) Total output in the economy is increased as the division of labor is extended. If the division of labor is spatially extended across national boundaries, then total world production can be increased. Hence, nations should participate in trade. (2) The beneficial effects of unfettered market forces, Smith's "invisible hand," could best be realized if governments removed themselves from trade. Hence, free trade should become governmental policy.

It is important to reemphasize the two points of the argument. First, trade allows increased world production. In modern parlance, potential real income for the world can be increased through trade. Second, free trade is to be preferred to restricted trade because the unfettered operation of market forces will result in the "most beneficial" distribution of the additional production. Actually, another argument in favor of free trade was also present. Governmental interference in trade would frustrate the potential division of labor and limit the potential gain in world production. The conclusion was that free trade is the preferred policy to maximize world production and to achieve the most beneficial distribution of the fruits of increased production.

Attacks on the free trade policy were numerous. Selecting any one as the most important is difficult. It is not difficult, however, to select the

most influential for economic analysis of trade questions. While the argument itself is seldom discussed except in very abstract terms, the counter argument has become famous in its own right and survives today as one plausible explanation of international trade. The Ricardian theory of comparative advantage is a masterful, abstract construction. In essence, Ricardo was able to show that a country would benefit from trade even if it were the most efficient producer of every commodity in the world. The argument he answered was of the form: "Why should a country purchase a commodity from abroad when that commodity can be more cheaply produced at home?" In effect, the argument constituted an attack on two fronts. First, it contained a general questioning of whether trade can increase world production; and second, it questioned whether or not free trade would benefit every country.

Ricardo's answer to the challenge was first to suppose world production conditions cannot be increased by trade alone. If he could show that the benefits of trade did not depend upon increased world production capabilities, then the trade argument would be reinforced if in fact production capabilities could be so increased. The Ricardian emphasis on relative costs of production compared across countries was sufficient for the argument. In a simple, two-country and two-commodity world, each country can benefit by trade compared to the autarkic situation -- benefit in the sense that both countries can have more of both commodities. Further, each country must benefit from trade or it will not trade.

Trade or Free Trade -- Verse One

The implications of Ricardo's analysis for economic theorists were profound. Note that the two parts of the earlier arguments over trade had been separated. "Whether to trade?" was answered. The question to be resolved concerned free versus fettered trade. For the purposes of this exposition the detailed argument, replete with assumptions and conditions, in favor of free trade is unnecessary. Yet is is important to capture the spirit or tenor of the reasoning; hence a paraphrase is provided.

Having established the argument that trade could benefit every country, economists had also discovered the logical possibility that trade could harm any given country. The problem, then, is to insure that participation in trade results in benefit, not harm. Because the presumptions of market analysis insure that each person participating in the market is never made worse off for his participation, the "natural" recommendation was for government not to attempt any centralized decision-making effort concerning trade. Each individual could determine for himself whether he benefitted from purchasing foreign compared to domestically produced goods and whether he could benefit from selling the product of his efforts in foreign compared to domestic markets. If governments were to intervene in markets, be they domestic or international, then government would be interfering with the decisions of individuals. Since individual market decisions provide protection from "harm through trade," government might well induce conditions leading to a harmful trading pattern. Hence the conclusion, free trade is preferable to no trade and to limited or fettered trade.

Trade or Free Trade -- Verse Two

The argument that free trade provided protection from harmful trade implied that a country would never be worse off than it would be under autarky. The analysis did admit that "never be worse off" could take a variety of forms. Consider a country that does not trade and has a known level of economic welfare. If that country now participates in trade, the protection provided by a free trade policy does not insure that the country will attain a higher level of economic welfare than before. Further, there is no presumption that the failure to attain a higher welfare level implies the country will cease trading. In fact, the presumption in this case is that the country is indifferent between trading and autarky. As trade has been introduced and currently exists, trade will continue even though the country realizes no benefits.

The Ricardian theory had conclusively demonstrated that "benefits" are created from trade. If, for conceptual purposes, one considers a two-country world in which one of the countries has realized no trade benefits, then the other must have "captured" all the benefits. The policy question may be stated in any number of ways but the simplest is: "What policy may the government follow to ensure that the country captures the largest portion (including possibly all) of the benefit created by trade?" The response of economic theory followed a line of reasoning much like that discussed earlier. It concluded that a country could not improve upon the distribution of trade benefits that would result from a policy of free trade. It was thought that the argument had been conclusively settled. Free trade had been shown, this time definitively, to be superior to a policy of restricted trade.

Trade or Free Trade -- Verse Three

Depending upon the source one reads, the economics profession was guilty either of a cover-up or an oversight because the argument that no policy could improve upon the welfare position of free trade contained a logical flaw. It is indeed possible to follow a policy other than free trade and improve economic welfare. A heuristic explanation of the possibility that a country can "do better" than the free trade situation is not difficult to grasp. Loosely stated, the free trade argument overlooked the possibility that a country may be able to exert something like "monopoly influence" in its international economic relations. More accurately, if a country can alter the terms of trade[9] in its favor, then it <u>can</u> improve upon the free trade situation. To insure that the allusion to "monopoly" is not misleading it must be added that actual monopoly is not required. It is only necessary that the country not be small compared to world markets. Neither is attention restricted to world markets for a country's exports as leverage may be gained in import commodity markets as well.

[9] "Terms of trade" refers to the price of exports relative to the price of imports. An improvement in the terms of trade would mean an increase in the relative price of exports (or, equivalently, a decrease in the relative price of imports).

The particular policy instrument that can be employed to influence the terms of trade depends in part on the conditions established for the analytic investigation. Generally, the classic commercial policy instrument, the tariff, is chosen as an example. The attention devoted to tariffs is not as limiting as it might seem. If results may be derived for tariffs and other policy instruments can be shown to be formally equivalent to tariffs, then there is no loss of generality. Lerner's famous demonstration (1936) of the symmetry between tariffs and export taxes -- for every export tax, there is a tariff which will create exactly the same position in production, consumption, and the terms of trade -- is one equivalence investigation. Bhagwati's work on quotas (1965) is another. The latter work also shows that computing the equivalent tariff may well be an arduous task.

The ability of one country to increase its economic welfare is not without limits. Raising (or imposing) a tariff on imports can raise welfare, but it is possible to go too far. In other words, there is an optimum tariff rate that maximizes welfare. Deviations in either direction from the optimum rate reduce the country's welfare below the maximum attainable. And, imposing a high tariff rate (beyond the optimum) may reduce welfare below the free trade level. In the extreme, a sufficiently high tariff rate can be prohibitive to trade, returning the country to autarky and the associated welfare level. Additionally, the imposition of a tariff on imports carries with it no guarantee against retaliation. With retaliation, the country may well be at a lower welfare level than if a free trade policy had been followed (Johnson, 1953-4).

The "final" argument in favor of free trade changes the focus of the analysis. If world welfare, rather than the welfare of one country, is used as the reference criterion, free trade is the preferred policy. The introduction of a tariff by a country able to influence its terms of trade does not just <u>redistribute</u> the benefits of trade away from its trading partner(s) toward itself. Total benefits accruing to the world are reduced. Put another way, tariffs are an inefficient device to redistribute world

income. Two factors contribute to the reduction in world welfare resulting from a tariff. The world's production levels are reduced so that a smaller bundle of commodities is generated. And given the smaller bundle of commodities available, the tariff-induced distribution of the commodities between countries does not maximize the welfare of either country (assuming, for convenience, only two countries). There is at least one other distribution that would be preferred by both countries to the tariff-induced distribution. This distribution would allow the "losing" country (losing because the other has employed a tariff) to increase its welfare while simultaneously bribing the "winning" country such that both countries are better off. The combination of both production and distribution effects of tariff-ridden trade is the basis for the current argument favoring the policy of free trade.

Even though the world policy argument favors free trade, there are some serious questions concerning the analysis of situations involving at least one preexisting trade distortion (e.g., a tariff). The general theory of second-best does not allow any broad statements to the effect that the introduction of an additional trade-distorting policy will reduce welfare. The force of the argument is generally directed toward efforts to reduce impediments to trade. Removing any one impediment does not guarantee that either world welfare or the welfare of any given country will increase. Efforts to reduce all obstacles to trade, such as the "Kennedy round" negotiations, are defended by the plausible (if not analytically rigorous) argument that the closer the world is to free trade, the better off are all countries, and the closer to free trade, the more likely is free trade to be actually achieved.

Trade and Domestic Issues

In addition to the treatment of a trading economy taken as a whole, it is possible to examine the distribution of trade benefits within the economy. (Historically, the within and between country questions were pursued simultaneously.) For analytical purposes, the interrelation of

trade and the domestic economy may be presented in two parts. One part concerns the identification of economic interest groups who gain from or are harmed by trade. The second part represents the study of the differential impact on domestic economic groups as the country deviates from a policy of free trade.

At a very simple level, the identification of economic interest groups who benefit from trade may be accomplished by dividing trade into its component activities, importing and exporting. A country will import commodities if foreign-produced goods are cheaper than similar products produced domestically. (The special case in which a given product cannot be produced domestically may be treated by presuming the price of the nonexistent domestic product to be indefinitely high.) Given a level of money income, persons within the economy will achieve a higher consumption level, in real terms, by being able to buy imports. Acting as producers, persons in the economy will export if higher prices will be paid by foreign consumers than by domestic consumers of their product. This basic identification of consuming-importing and producing-exporting interests remains valid throughout the literature of trade analysis.

Nevertheless, two additional points destroy the neatness of the argument. First, consider the domestic consumers of the export product. Prior to or in the absence of trade, the domestic price of the product is lower than the price with trade. In truth, what was being consumed at home is now being shipped abroad. The analytic problem is to compare the two consumption effects of trade: a lower price for imported products, implying increased real income; and a higher price for exported products, implying decreased real income.

Next, consider the producers of the product competing with imports. Imports are selling at a price lower than the price of their products. Simply put, import-competing producers are losing income. The analytic problem is again a comparison -- which is the stronger effect, the income lost to imports or the income gained by export producers? The answer to

these questions is contained within the answer to the general trade question. The sum of consumption and production effects of trade is favorable. In general, it is not possible to state categorically that either effect, considered separately, represents a net benefit or a net cost to the economy. Particular conditions may be specified to insure that the effects of either are zero. Similarly, it is possible to create situations in which the "benefits from importing" exactly offset the "costs of exporting." The interesting feature of such a situation is that although the "economy" achieves the same level of economic welfare, the impact is not uniform across members of the economy.

Particular features of the non-uniform effects of trade are frequently examined by considering the effects within the country of an autonomous change in the terms of trade. The analysis of the effects of a tariff uses substantially the same analytic model, adding only the assumption that the government redistributes the tariff proceeds to the members of the economy.[10] Beginning from a free trade position, suppose a tarrif is introduced. In the standard case, the domestic price of imports rises.[11] Producers of import-competing products will experience an increased demand for their products, and will reap the benefits of that increase, including sales and profits. Also, the same producers will be able to pay higher prices for the inputs needed in their production processes. In particular, workers associated with import-competing industries will benefit from the "protection" afforded by the tariff. Within the context of the Heckscher-Ohlin trade theory, Stolper and Samuelson (1941) were able to demonstrate that if labor is used intensively in the production of the import-competing product, the real wage paid to all workers will rise.

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[10] Another possible assumption is that the government uses the proceeds to purchase commodities directly. Although this does introduce a complication that can be tedious to resolve, there is no significant "surprise" introduced by the complication.

[11] The implication of the "standard" case is a non-trivial requirement. The possibility of a reduced domestic price of imports following the imposition of a tariff was first explored by Metzler (1949). For a discussion of conditions which make the Metzler paradox less likely, see Jones (1974).

However, the Stolper-Samuelson theorem requires an elaborate specification of economic conditions within the country. To determine the importance of this set of conditions, theorists have examined the implications of relaxing any one of the set of assumptions. The most important general result, for this project, is that even though trade-distorting devices (policy tools) do redistribute income within the country, and as such can be used by governments to "help" interest groups, the same degree of help can be provided by domestic policy instruments (sometimes a combination is necessary) at less cost to other members of the economy. This generalization is an example of the problems induced by the theory of second best. One market distortion, a tariff, is not as good in a welfare sense as two distortions, a tax and a subsidy.

Implications of the Review for the Study

This brief discussion was designed to illustrate a few of the important economic conceptualizations pertinent to the study. As we are concerned with measuring the nature and magnitude of the impact of U.S. international economic policies on foreign economies, it is possible to employ the general theoretical results to guide the application of the model. Distortions to free trade will generally reduce the level of economic welfare in the foreign country. The distribution of the welfare loss, however, cannot be assumed to be uniform within the country. In order to assess the impacts on particular interest groups, those groups must be separately identified.

There are also implications for the manner in which foreign countries respond to U.S. economic policy. The most important suggestion is that there is no requirement for the foreign government to limit the consideration of economic responses to international economic policies. It can easily be the case that the welfare of the country and of each interest group can be better "protected" from the impacts of U.S. international economic policies by domestic economic responses rather than international ones.

INTERNATIONAL ECONOMIC POLICIES

To assist the organization of the discussion in this section, international economic policies are divided into two groups: international financial policy actions and policies affecting the international exchange of goods and services. Each of these two classes of policies is discussed in terms of the economic disruption they may create in foreign economies. International financial actions are considered first.

Given the events since the summer of 1971, the impact of international financial policies on foreign economies is a debatable issue. However, some aspects of the influence of international finance on individual economies can be clarified if the issue of international reserves is separated from other implications.

The formal suspension of gold exchange by the United States has had little or no impact on levels of economic activity. Prior to the summer of 1971, a two-tier gold market existed and served to isolate private gold markets from the official, governments-only, market. Governments had previously agreed to establish Special Drawing Rights at the International Monetary Fund, and these instruments, a "bookkeeping currency," have served admirably as international reserves.

Other U.S. financial actions of the same period have affected international trade. Of importance here is the U.S. devaluation. But before describing the effects of devaluation in general, a firm appreciation of the differences between floating and pegged exchange rates is necessary.

The principal mechanism relating international economic policies to harmful foreign disruptions is a restriction of the foreign country's ability to export to the U.S. market. If the international economy operates under a system of pegged exchange rates (another description is "fixed but changeable"), lowering the foreign currency price of domestic currency will increase the domestic currency price of all imported goods.

The effects of this will be to stimulate domestic production as consumers switch to the now less expensive domestic products. Employment and production in foreign countries will decline as sales to the United States diminish. Under a system of floating exchange rates, there is no comparable policy. The relative prices of all currencies, the world's exchange rates, are established by supply and demand influences. All trade will follow the theoretic dictum of comparative advantage. There is no one policy in a floating exchange rate system that can be employed to boost domestic production at the expense of production in other countries. Devaluations are ruled out by definition. Attempts to establish a general tariff rate in a multiple commodity world will be fully offset by exchange rate adjustments (in this case, the foreign currency price of domestic currency will rise). Consequently, for a country to be harmed by a U.S. move to institute freely floating exchange rates, that country must have established an aggressive export policy based on an undervalued currency. And now that Japan has floated the yen, there are no industrial countries following such a policy. The only countries using the policy are less developed countries. Many do have undervalued currencies if only the current account is considered. But these countries' capital account positions (net inflows) affect their overall balance such that it shows a net deficit, implying an overvalued currency.

With the understanding that the discussion is hereafter restricted to the case of a fixed exchange rate system, policies affecting international trade can be evaluated. Two basic types of policies in this group can be identified, policies affecting U.S. exports and policies affecting U.S. imports.

The general group of policies that stimulate exports are of comparatively small concern for this project. Any U.S. policy that subsidizes exports can be easily offset by a foreign government by establishing countervailing duties. Further, because the United States and its major trading partners are signatories to the General Agreements on Tariffs and Trade (Contracting Parties: 1969), the use of such subsidy policies has been forsworn, and the right to invoke compensating duties has been established.

Policies limiting exports are also of minor importance to the study. A policy limiting exports is of greatest benefit to U.S. consumers. At the same time, such policies harm producers of the affected products as U.S. prices will decline (or at least not rise as rapidly as they would in the absence of the policy). To be practical, past experience suggests that producer interests, including labor in the industry, are capable of more rapid and more effective persuasion to block export restrictions than consumers are able to muster in their support. The international effects of export restrictions are only significant if the United States is a major participant in the world market for the product. Other countries that produce the product will gain as world prices rise. The countries harmed are net importers of the product. The economic model can be employed to assess the effects of world price increases, caused by U.S. export restrictions, on a consuming nation. Experience with the model suggests that these effects are much smaller than those caused by U.S. import restrictions.

The type of economic policy most likely to induce disruptions in foreign economies is a restriction on U.S. imports. Any move by the United States to interfere with another country's ability to export involves a loss to the foreign country. The loss of U.S. sales directly reduces production and output abroad. To the extent the exporting nation cannot alter its production system to other products or sell in its own domestic market, a loss is sustained. The economic model has been designed to estimate the magnitude of these losses by measuring changes in employment and output.

The effect on the domestic prices of other countries as a result of U.S. import restrictions can be varied. Under the marginal productivity theory of income distribution used in the model, such prices will decline. The decline does tend to increase consumer expenditures and mitigate the negative effects to some extent. A theory of the firm that employs cost-plus or mark-up pricing rules would produce the opposite effect as prices would increase and consumer purchases of the product would decline along with

declining export sales. While it is not possible to establish a magnitude, it is possible to state that if in fact a mark-up pricing system is employed in the foreign economy, the economic model underestimates the foreign economic losses.

A U.S. policy limiting imports causes greater harm to the exporting country if access to U.S. markets had been established prior to the imposition of restrictions. Once a country has begun production of a commodity intended for export, having already committed the necessary capital, allocated labor, and arranged marketing services, a U.S. restriction involves an immediate economic loss. It should be noted that the extent of prior access can be difficult to determine. Sales to the United States in any one year may be well under the reasonably expected volume of sales in following years. An analyst using the economic model can use simple extrapolation to estimate future sales and calculate employment and output changes as deviations from expected future levels.

The "classic" international economic policies restricting imports are tariffs and quotas. From Bhagwati (1965), it is clear that the effects of these two policies are equivalent in the sense that for every quota there exists a tariff that will cause the same changes in prices, imports, domestic production, and so forth. Furthermore, virtually any policy restricting imports operates in a manner analogous to these two. The operation of quotas is direct -- a quantitative restriction limits imports. Tariffs also limit imports but do so through price effects. A U.S. tariff increases the domestic price of the foreign product. Not only are U.S. producers protected by the tariff and encouraged to increase production, the higher price of the foreign product induces consumers to switch purchases to the relatively less expensive domestic product. At the same time, higher prices reduce total consumer purchases of the item. Both effects reduce U.S. imports and reduce foreign employment and production "sustained" by U.S. consumers.

The variety of policies that may be conceptually "reduced to a tariff" (or reduced to a quota) is extensive. To cover one point immediately, the label "voluntary" applied to a quota should not be regarded as voiding the nature of the quota. The effects are precisely the same as mandatory quotas. The stimuli for foreign agreement to these voluntary restraints have been explicit or implicit suggestions that a failure to observe them would bring forth mandatory U.S. quotas.

To illustrate the similar operational effects (despite procedural differences) of other policies, a discussion of prior deposits is offered. Although this policy has not been employed by the United States, it is commonly used by other countries. Prior deposits for imports are a policy tool that can be invoked in a legitimate attempt to gather information about future effects on the balance of payments. Such deposits in fact raise prices of imported products as importers tender payment to the government in advance of receipt of the product. The stipulated prepayment may be a flat sum per shipment (encouraging larger orders), or in the usual case, may be based on the value of the shipment. As it is commonly the case that uncontrolled payments are lagged to allow payment from sales receipts, prior deposits can substantially disrupt the import system. And, to the extent that interest (possibly zero) paid on the deposits is below an alternative return, the final sales prices of imports are increased -- the tariff mechanism.

Import-restricting policies (other than tariffs and quotas) that are employed by the United States can be described as nontariff barriers to trade. Some of the policies in this group are followed for purposes other than the restriction of imports. Others are explicitly designed to favor U.S. produced goods and services. An example of the latter is the Buy America Policy that not only gives preference to U.S. producers in the direct sale of products to the government but also serves as a subsidy to those same producers as they compete in world markets. Richardson (1972) may be consulted for a detailed discussion.

Other non-tariff barriers to trade include regulations affecting taxation adjustments for exports and imports, customs valuation procedures, labeling standards, administrative practices related to imports and country-of-origin marking requirements. These policies are surveyed in Nontariff Distortions of International Trade (Baldwin, 1972). A recent United States Tariff Commission study (1974) surveys the international uses and effects of these policies by compiling extensive records of complaints registered by affected business interests.

The final set of policies to be considered are those relating to foreign investment. In one sense, the importance of capital flows can be tied to exchange rate effects that in turn influence commodity prices. If floating exchange rates prevail, outward flows of U.S. capital will depress the foreign currency price of domestic currency, boost U.S. exports and reduce U.S. imports. Otherwise, the effects of capital flows are not well understood. The current controversy over multinational corporations is indicative of the lack of knowledge that prevails.

To summarize, the economic policies causing the most foreign economic disruption are those restricting U.S. imports. Foreign countries shipping significant proportions of their total exports to the United States are therefore the most vulnerable. Countries that do not export a large volume of their total production to the United States but whose exports to the United States are concentrated in one product group are also vulnerable to economic harm if a restriction is applied to limit U.S. imports of that commodity group.

CHAPTER V. CONCEPTUAL ANALYSIS OF FOREIGN RESPONSES TO ECONOMIC DAMAGE

This chapter discusses the methodology developed during the study to identify foreign responses to economic damage. The chapter is divided into two parts. The first part presents a framework for the analysis of economic sanctions. The materials presented are drawn from the information previously reported in Chapter II (the historical survey and the six case studies of economic sanctions). The second part presents the actual method employed in Chapters VI and VII to identify responses to Japan and Saudi Arabia. This second section is presented here to provide a brief statement of the method unencumbered by the details of a particular application.

A FRAMEWORK TO GUIDE THE ANALYSIS OF ECONOMIC SANCTIONS

As discussed in Chapter II, the striking feature of the comparative analysis of interstate economic conflict is the proliferation of situational differences among even six specific situations. While ongoing analytic efforts have been aided significantly by the identification of particular circumstances that should be incorporated within a more complex treatment, an organizing framework is required to facilitate the implementation of the many details.

The most useful conceptualization for the analysis of situations of economic sanctioning is to imagine that both the target and sanctioning country face a basic problem of constrained maximization. Each attempts to consider the available policy options in light of the expected benefits and costs deriving from each option. The specific features of any given situation are then interpreted as relating to the benefits or to the costs, or, as constraints on the choices actually available to each country.

The benefits accruing to the country following the adoption of any particular policy are not necessarily the benefits the country considers.

The country's perception of the benefits to be derived from (or expected from) any particular policy may well be dependent upon the country's perception of the other country's motives. Given the perception that a hostile act is directed toward it, a country will generally attempt to retaliate. The reaction may be motivated by a perceived need for revenge, perhaps to satisfy public emotion. At other times it is merely a demonstration of nationhood, or sovereignty, of the country -- a behavior that is expected of all truly independent countries and is perceived as necessary for deterring further sanctions. A third reason for the action may be to force the sanctioning power to withdraw its sanction.

Thus, the motive behind a retaliatory response to an economic sanction can be based on (1) emotions and revenge, (2) national prestige and sovereignty, or (3) forcing the removal of the sanctions. These in general could be viewed as the desired "benefits" of the response to economic sanctions.

Any action, however, has costs and may involve risks. Hostile responses to economic sanctions involve the cost of undertaking them and the risk of receiving further sanctions. A rational actor is expected to choose the strategy which either maximizes total benefits or minimizes total costs and risks, and has marginal benefits greater than marginal costs. The direct cost of responding to economic sanctions is relatively easy to calculate, whereas the indirect costs of responding, the risk of provoking further sanctions, and the expected benefits of responding to sanctions are far more difficult to enumerate.

These points can be illustrated by an example. Assume one country (A) imposes sanctions on another country (B) which will have an operating cost of C_a for the sanctioning power (A) and will have a damage value of C_b (per month) on the target B. As long as B makes no response and A maintains its sanctions, B will pay the price C_b and A will pay a cost, C_a. Now suppose the purpose of A's sanctions is not merely to force a cost of C_b on B but to force the latter to agree to a demand (D). If the

compliance of B to demand D entails a cost of C_d, then B has at least two choices:

- Pay the cost C_d of complying with A's demand so that the sanction will be lifted.
- Ignore A's demands and bear the cost C_b inflicted by the sanctions.

These two alternatives do not usually exhaust the options of the target country. There is generally a third option, retaliation:

- Ignore A's demands, bear the cost C_b, and retaliate at a cost of R_b.

If it is assumed that the purpose of B's retaliation is simply to force a cost R_a on the opponent A so that the latter would lift its sanctions, then the implication is that B willingly undergoes a cost R_b in order to make A pay an additional cost R_a for its sanctions. After B's retaliation, the new cost of sanctions to the sanctioning power becomes $C_a + R_a$, and the new cost of retaliation to B is $C_b + R_b$.

The process does not stop here. By retaliating, B risks further sanctions from A. If additional sanctions impose a further cost C_b' on B and a further sacrifice C_a' to A, then the total cost of noncompliance to B becomes $C_b + R_b + C_b'$. The total cost to A of continuing the sanctions will be $C_a + R_a + C_a'$. But A does not have to continue the sanctions. After each response by B, A has at least three distinct choices:

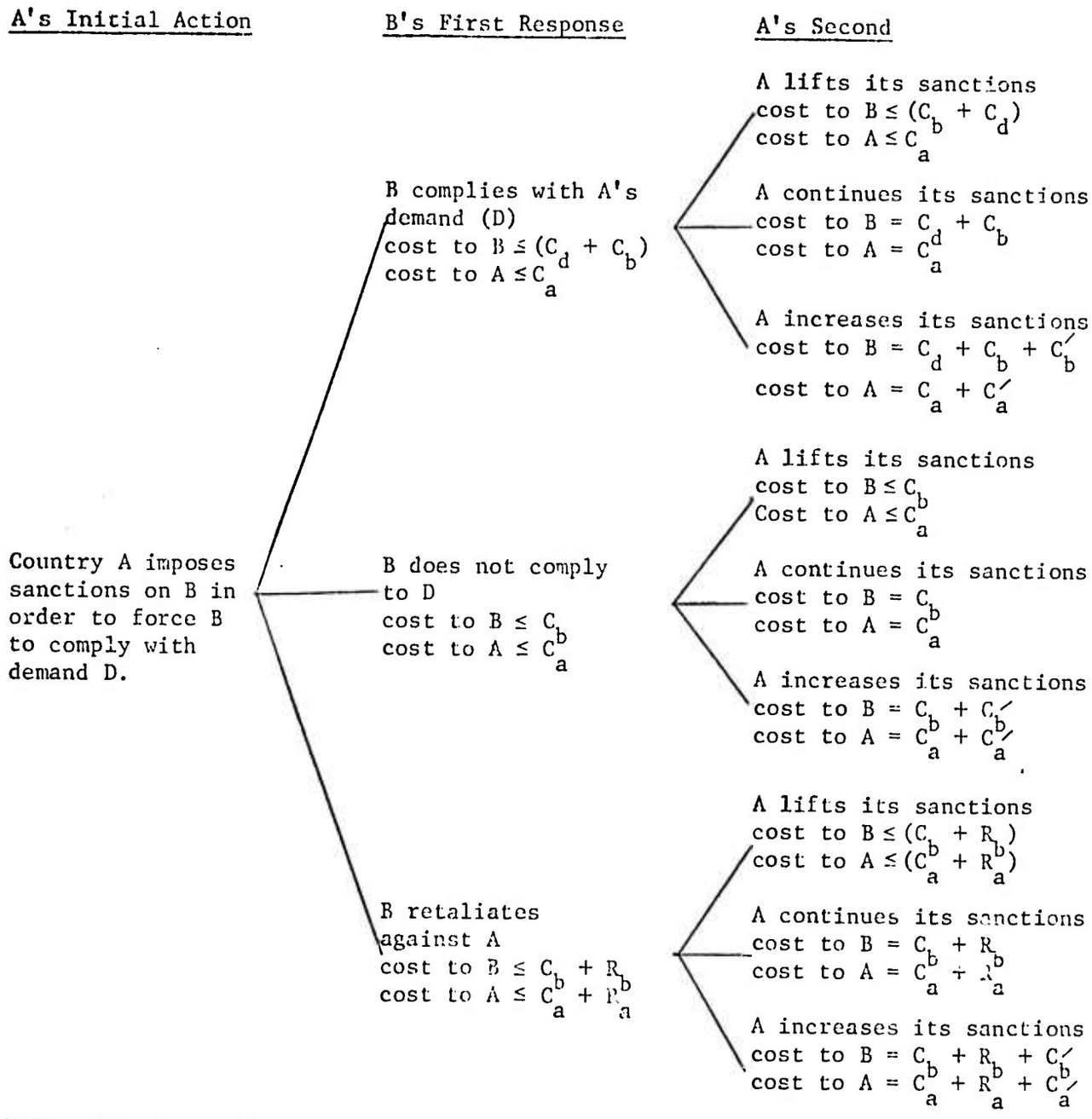
- Lift the sanctions and spare their operations cost C_a.
- Continue the sanctions and pay the price C_a plus retaliation cost R_a.
- Increase the sanctions and pay a total price of $C_a + R_a + C_a'$.

The choice of any option by A or B depends on (1) the costs inflicted by both parties on each other and (2) their expectations of each other's future behavior. For each country the decision involves three considerations:

- The immediate costs of various alternatives.
- The most likely responses of the opponent to each of the alternatives.
- The expected costs of each of the opponent's alternatives.

Figure 1 illustrates the options and the costs associated with the choice of each option for A and B in a three-stage interaction process. At the inception of the sanctioning process, country A must undertake a very complex evaluation. First, it must consider the costs, independent of sanctions, of B not behaving in accordance with the contemplated demand, D. Similarly, the benefits to A generated by B's compliance to the demand D must be considered. Having accomplished this initial computation, the possibilities facing A are depicted in the figure. For each action that A may undertake, three possible responses have been shown for country B. And, in turn, A is shown to have three counter responses associated with each of the options available to B. As presented in the figure, the multiple outcomes have different costs. Though the figure appears to be complex, it has already been substantially simplified. For example, there can be any number of distinct retaliatory responses available to B that have not been separately identified.

In reality, the evaluation of costs and benefits goes well beyond the requirements of identifying particular policy responses within any given category. Additional complexity is introducted by distortions resulting from poor information and different preference schedules of the actors. These distortions often result in misperceptions and uncertainty about the behavior of opponents. For instance, poor information may result in overestimating the amount of damage that can be inflicted on the target



NOTE: The inequalities are used to show what happens when an action (such as a sanction or a retaliation) is not continued for a full period.

Figure 1. A Simple Pattern of Action and Reaction in Interstate Economic Conflict.

country. This frequently happens in the real world. The U.S. embargoes against Japan in the 1930's and against Cuba in the 1960's are examples of this type of overestimation.

Misperception of the behavior of other countries may also lead to erroneous policy choices. British misperception of the Iranian response to the oil crisis of 1951 was based on British ignorance of the strength of Iranian public opinion. The value of nationalization as an act of national pride was sufficiently important for Iranians to justify a substantial loss of economic well-being. Thus, overestimation of the impact of sanctions on an opponent and uncertainty or misperception of the opponent's expected behavior leads to distortion of the simple model of Figure 1 and may result in choices by the parties involved which do not fit the simple model presented here. (See Chapter II and Appendixes A through F.)

Additional assumptions which can be incorporated within the basic conceptualization are:

A1: As the cost of sanctions to the target country increases, the tendency to retaliate increases. This is justifiable if the need for revenge is assumed to be correlated with the damage from the sanctions.

A2: The greater the power of the sanctioning power relative to the target country, the lower the likelihood of retaliation. This is because the "hopelessness" of retaliation increases with power discrepancy of the rivals.

A3: The higher the existing hostility levels between the sanctioning country and the target country, the higher the probability of retaliation. It is expected that existing hostility aggravates conflict situations.

A4: The higher the price of compliance with the demands of the sanctioning country for the target country, the more likely the retaliation of the target country. In other words, unreasonable demands make compliance of the target less probable.

A5: The greater the relative capability of the sanctioning power for increasing the sanctions (escalating), the less likely the retaliation by the target nation.

This framework will be employed in the evaluation of potential responses of Japan and Saudi Arabia to the international economic policies of the United States. As earlier stated, the advantage of the framework is the facility with which constraints on the choice of responses may be incorporated. Further, because the framework makes very explicit the simplifying assumptions and the method of introducing constraints on the behavior of governments, it facilitates the application of the model to other cases and permits generalizations without detailed application by systematically investigating the importance of each assumption.

DETERMINATION OF RESPONSES TO ECONOMIC ACTIONS

The difficulties associated with an analysis of the decision-making process for conflictual economic situations become apparent as one realizes that the example of the previous section is a highly simplified, abstract representation of the decision problem. In reality, each actor in the conflict must anticipate future actions and strategies of the opponent. Unfortunately for the decision-maker, there is no reason for the number of possible actions available to the opponent to be bounded. Nor is there a known limit to the number of iterations (into the future) of the process that should be considered for any one choice of a policy response. Given this set of conditions surrounding the problem to be studied, it seems reasonably clear that no useful analytic technique can exhaustively consider all possibilities. The problem is to choose an analytic tool that aids our understanding of the process, and to realize that different approaches provide information about different aspects of the problem.

The approach adopted for the study is first to consider economic variables that register changes in the economy induced by foreign economic policies and at the same time are politically important. Three aggregate economic variables that have substantial political significance are employment, the growth rate of the economy, and inflation. Most countries attempt to achieve a low rate of unemployment, at least a moderate rate of economic growth, and stable price levels. These three aspects of economic

performance are commonly employed by economists to monitor economic activity. In fact, the performance of governments in the area of economics is generally measured by the same variables. Few political regimes can survive protracted periods of unemployment and recession. The ability of governments to remain in power during inflationary periods varies considerably, but one may confidently assert that governments are more "comfortable" if the economy has moderate rates of price increases.[1]

Having selected these three variables as politically most important, the next task is to relate changes in these variables to the responses of the target nation. To do this, a variable called "anger" (or the hostility caused by changes in th economic variables) was selected as an intermediary variable between the economic variables and the responses of the target nation.[2] In other words, in order to determine the likely retaliation of any nation to changes in the economic variables, hostility of the target nation toward the actor nation was used as the linkage.

This has been a useful strategy because changes in the economic variables can be related to concepts such as expectations and deprivation. Each of these concepts is widely treated in different aspects of the available social science literature.[3] Drawing upon developments in this literature,

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[1] These three variables are not necessarily always the most salient. In fact, as will be explained in Chapter VII, in the case of Saudi Arabia changes in these variables are generally trivial. In an economy that employs a large number of foreign workers, high unemployment may not be politically significant. GNP growth rates in economies where 90 percent of the GNP is related to oil export revenues are deceptive. Furthermore, the inflation rate in an economy where many goods and services are free may have a different interpretation. Nevertheless, these three variables are politically important. The reader is merely cautioned not to apply U.S. interpretations for all countries.

[2] The terms anger and hostility are used interchangeably throughout this report.

[3] Most of this literature can be found under "status inconsistency," "frustration-aggression," and "cognitive dissonance" in psychology, and "deprivation" in political science as well as psychology. See Gurr (1970), Hibbs (1973), Alschuler (1973), Galtung (1964), and Geschwender (1967).

particularly the concept of relative deprivation, the intermediary variable, anger, defines the degree of hostility resulting from changes in the economic variables. The presumption is that if country A undertakes economic measures against country B, then these actions create hostility toward the actor nation (A), and influence B's retaliation. The simplest statement describing this linkage is that as hostility (H_{BA} denotes hostility of B toward A) increases, R_{BA} (the retaliation of B directed to A) is more severe.[4] There is no simple method for defining this relationship with greater precision. Therefore, an ad hoc method consisting of judgmental assignment of probabilities for each set of outcomes was used. The procedure selected requires that the relation between economic variables and anger be developed. Having developed the relation, it may then be used to assign probabilities to different policy options available to the target country.

Defining the Relationship Between Economic Variables and Anger

The relationships between anger and changes in the three major economic variables consist of the degree of anger that would result from economic deprivation caused by unemployment, recession, or inflation.[5] "Deprivation" was itself conceptualized as the degree of hardship or dissatisfaction resulting from changes in the economic variables. In order to define

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[4] This relationship can be defined as

$$R_{BA} = f(H_{BA})$$

where f is a monotonically increasing function. An example of such a function would be:

$$R_{BA} = \alpha \cdot H_{BA} + e, \quad \alpha > 0$$

where e is an error term with a standard normal distribution.

[5] Since no satisfactory method was found for combining the anger caused by these three variables, the highest value was selected. As it happens, in all examples that were used, anger due to unemployment had the highest value and anger due to inflation had the lowest.

the relationship between anger and changes in the economic variables, two other considerations are taken into account. First, the point at which the changes in the economic variables begin to threaten the values of the society are identified by examining the historical literature.[6] Second, the points at which anger variables become relatively insensitive to changes in the economic variables are derived. The range between the first and second point on the economic variables is called the sensitive range. The first point is called the sensitive point and the second the saturation point.

Figure 2 is an example of an anger curve derived for the United States. Note that its sensitive point is at approximately 4 percent unemployment, near the "normal" U.S. unemployment rate. The saturation point is about 20 percent unemployment. This means that if unemployment is increased beyond 20 percent it would no longer significantly increase the level of anger. Finally, the sensitive range is between 4 and 20 percent unemployment levels.

Procedures similar to the above are employed in Chapter VI to define the relationship between all three economic variables (unemployment, recession, and inflation) and anger for Japan.[7] In dealing with the case of Saudi Arabia (Chapter VII), however, it was found that unemployment, recession, and inflation were not meaningful or relevant. In fact, in the exceptional case of Saudi Arabia the purchasing power of governmental oil revenues ("petrodollars") is a far more important variable. The exceptional nature

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[6] For instance, it was found that the Japanese unemployment rate has generally been below 1 percent for the last few decades. The Japanese tend to prefer a fast growth economy to a low inflation economy. This does not mean, however, that a high growth philosophy is still popular in Japan. Pollution and energy problems have put severe constraints on Japanese growth. Nevertheless, Japan probably will not slow down its economic growth unless forced to by external pressures (see Stunkel, 1975 and the Economist, 1975).

[7] It should be noted that these relationships were defined for the specific case where the Japanese blame the United States for the changes in the economic variables.

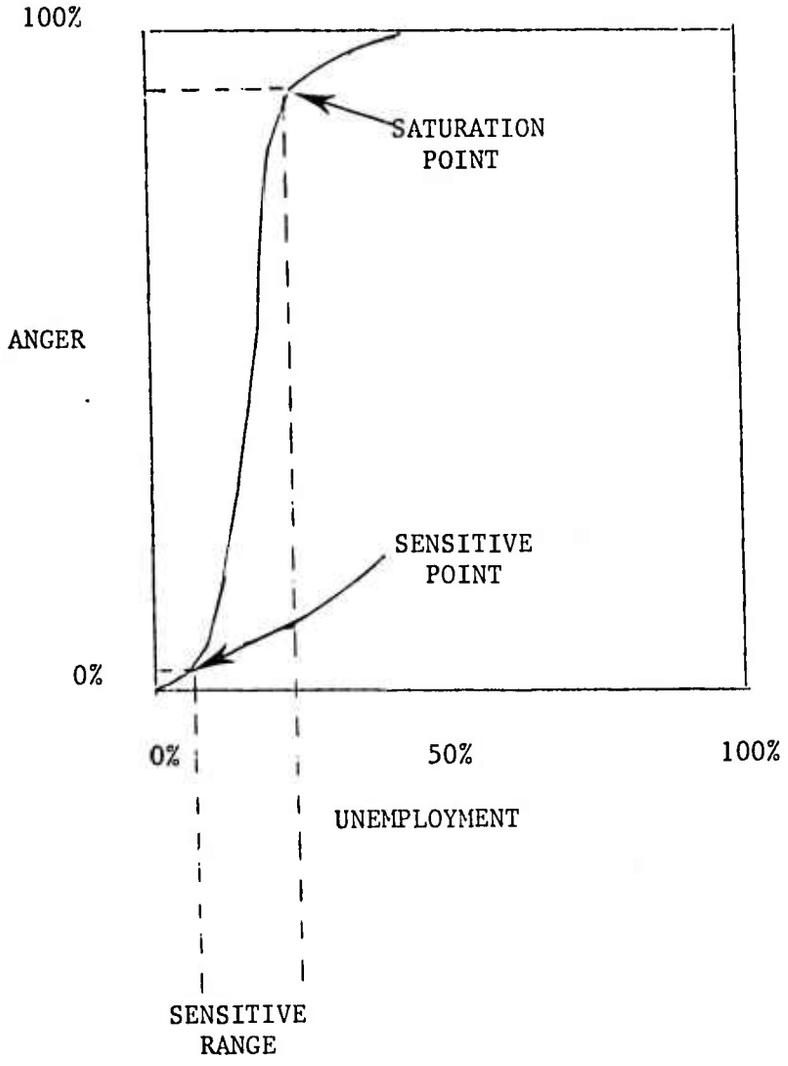


Figure 2. Relationship Between Unemployment and Anger for the United States

of the Saudi case does not reduce the generalizability of the methodological tools developed here.[8] First, it can still be maintained that unemployment, recession, and inflation are the economic variables that most concern decision-makers in most countries. Furthermore, the methodology underlying the relationship between these economic variables and anger is such that it can easily be adapted to exceptional cases, such as Saudi Arabia. This is demonstrated in Chapter VII, where the reduction in the purchasing power of Saudi petrodollars is related to anger through essentially the same procedures as those used for Japan in Chapter VI.

Assigning Probabilities to Retaliations

Assigning probabilities to sets of potential retaliatory actions of the target country is the final step in the analysis of the responses to U.S. economic actions.[9] The procedure here is first to compile a representative list of all possible retaliatory options of the target country. The degree of specificity of actions in such a list depends completely on the objectives and resources of the analyst. The range of options contained in the list can vary from the most extreme (for example, a military attack) to the most passive. It is not necessary to include all possible options in such a list. All that is required is a representative sample.

The next step is to assign judgmental probabilities to various options. This is accomplished in two stages. First, probabilities are assigned to groups of options. Then, subgroups within each of these groups are assigned a separate set of probabilities. Since in the two sets of probabilities the outcomes are independent events, the probabilities of final outcomes can be obtained by multiplying the probabilities that lie along each path of possible options.

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[8] Saudi Arabia is almost a unique case. It is one of the few countries in the world where the GNP is 90 percent tied to one single industry -- petroleum.

[9] The basic reference in the literature of judgmental probability assignment is Von Neumann and Morgenstern (1964). A convenient teaching presentation of similar material is Luce and Raiffa (1967).

Figure 3 illustrates a simple example in which the target country has only six options. These options are divided into three groups represented by nodes B, C, and D in the network of possible paths. The probability of selecting paths B, C, or D largely depends on the level of anger resulting from the impact of A's action on B's economy. For the purposes of the present example, the appropriate probabilities are assumed to be 0.1, 0.7, and 0.2 respectively.

A second set of probabilities is then assigned to the subgroups of options within each larger group. These probabilities are based on the contextual information available to the analyst. For instance, a total embargo of trade against country B may cause 6 percent unemployment. Normally this may lead to, say, 20 percent anger. But there are a number of contextual variables that may increase or decrease the significance of the event.[10] For instance, if country A is a long-standing enemy of B, the reaction of the latter would not be the same as if A was a normally friendly country (see assumption A_3). Similarly, if A is able to muster a good argument for its actions, such as the need to protect a domestic industry against widespread unemployment, then B's reaction would probably be less severe.[11] The second set of probabilities is based on these types of contextual influences. In Figure 3, the probabilities are shown for each branch extending from the three earlier nodes. The probabilities of final outcomes (or responses) are calculated by multiplying all the probabilities found on each path as one moves from left to right. Therefore, the probability of response E would be 0.03 and the probability of response I would be 0.16.[12]

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[10] Assumptions A_2 through A_5 define some of the relevant contextual variables. But these assumptions do not exhaust all important contextual situations.

[11] This situation emphasizes the importance of the legitimacy of the action. An action may be viewed as legitimate under certain circumstances but not so at other times.

[12] Probability of E = 0.1 x 0.3 = .03 and probability of I = 0.2 x 0.8 = 0.16.

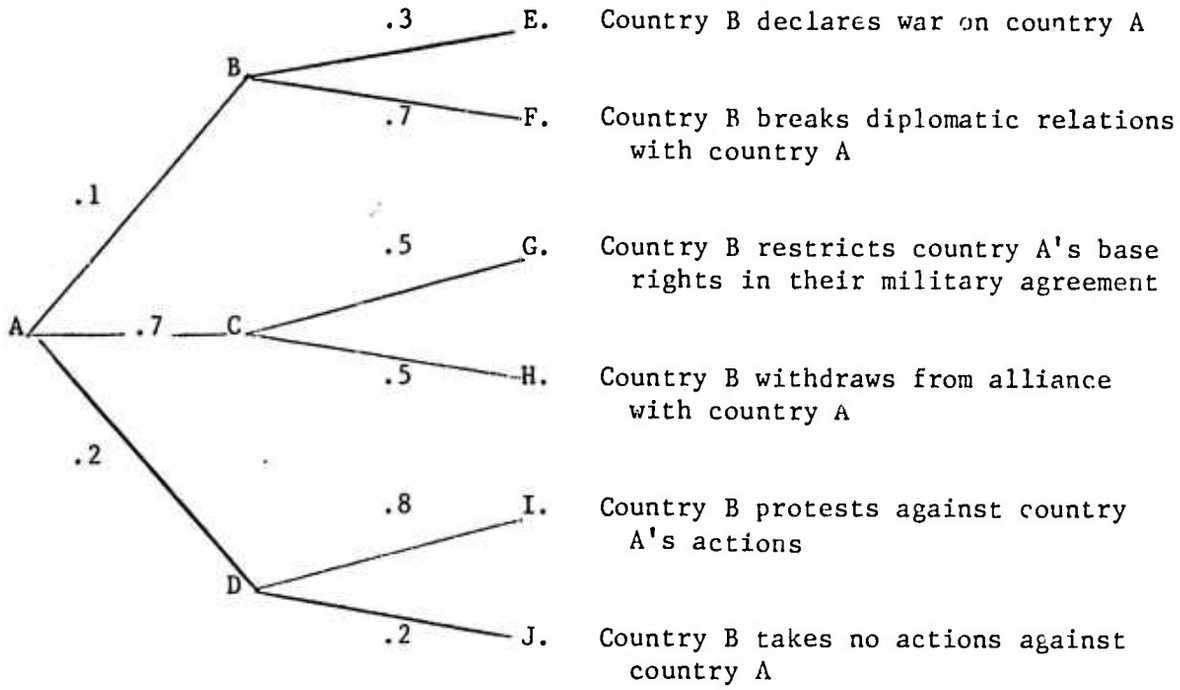


Figure 3. Network of Retaliatory Options of Country B Against Country A

The above example illustrating the basic steps in the assignment of probabilities to responses has been intentionally divorced from a country-specific setting. The intent has been to provide a "bare" statement, removed from the nuances appropriate to an application of the basic technique. Two applications are discussed in Chapters VI and VII, for Japan and Saudi Arabia respectively. The procedures proved to be readily applicable to Japan. The Saudi Arabian case was more difficult. The difficulty can be attributed to the importance of long-term development goals to the Saudi Government. The estimates from the economic model show no short-run economic harm attributable to U.S. international economic policies. And because the model was not designed to investigate longer term dynamic processes, information relating U.S. policies to Saudi economic development is not available. Nevertheless, the Saudi application does illustrate the application of the probability technique.

CHAPTER VI. CASE STUDY OF JAPAN

This chapter presents the application of the analytic method developed in previous chapters to Japan. Every effort has been made to describe the work in non-technical language. At appropriate points, interested readers are referred to other sections of the report for more detailed discussions

The criteria by which Japan was selected for investigation are varied. Some of the more significant influences can, however, be briefly reviewed. First, Japan is an important trading partner of the United States. Hence, the international economic policy positions adopted by the United States affect Japan. Second, the nature of the trade relationship between the two countries is not symmetrical. The asymmetry may be described in several ways: trade activity as a proportion of total economic activity is higher for Japan than for the United States; the United States is the single most important export market for Japan; and the United States supplies Japan with a substantial portion of its foodstuffs. These points suggest that the United States can inflict substantially more economic harm to Japan than Japan can cause the United States.

The above two points suggest the third, and perhaps most important reason to study Japan. Because the trade relationship is important to Japan and because Japan is more vulnerable to economic harm than it can inflict, it is more likely that Japan would choose something other than a purely economic policy response to a change in U.S. international economic policies. Two extensions of the reasoning buttressing this argument should be noted. First, having been harmed by a U.S. policy change, Japan must consider very carefully the amount of harm the United States could inflict with further policy changes. A Japanese policy response that would inflict some economic damage to the United States may well invite further damage in subsequent U.S. actions. Thus, if Japan chooses to respond directly to the United States, a non-economic response is more likely. Past experience tends to

substantiate this point. The 10 percent surcharge imposed by the United States did not evoke a conflictual economic response from Japan. Instead, diplomatic protests were lodged. Thus, without equivalent economic leverage against the United States, Japan may choose to employ non-economic leverage in an attempt to influence U.S. policy. Alternately, Japan may attempt more fundamental changes in the orientation of its trading activity to reduce the economic leverage held by the United States. In either case, the result would be a change in the relations of the United States and Japan, a change that can be expected to alter the structure of their economic, political, and military ties.

This chapter is organized according to the actual sequence of the analytic investigation except when background or descriptive information is given. These sections of descriptive information provide introductions to the analytic discussions. Thus the reader is introduced to the application of the economic model to Japan by a brief discussion of important features of the Japanese economy.

BACKGROUND INFORMATION: THE JAPANESE ECONOMY

As an introduction to the results of the economic model as applied to Japan, this section is designed to acquaint the reader with important features of the Japanese economy. It is not an elaborate discussion of Japanese economic conditions. The materials presented are restricted, for the most part, to post-1960 developments and are arranged in two major areas--general features of the Japanese economy and Japanese international trade. Readers who wish to acquire more information yet not be required to read extensively may consult editions of the OECD Economic Surveys devoted to annual reviews of Japan.

The single most striking feature of the Japanese economy is the growth rate that has been achieved throughout the post-WWII period. During the 1950's the phenomenal expansion of the economy was largely attributed to post-war rehabilitation. It was commonly believed that the high rate of growth would

growth would be reduced to rates common among industrialized countries once the economy had recovered from the immediate post-war slack. But this did not occur. During the 1960's, economic growth remained high, particularly in comparison to other industrialized countries. Real per capita GNP increased at a 10 percent annual rate compared to approximately 3 percent and 4 percent for the United States and Germany respectively.

The remarkable growth record of the Japanese economy has been attributed to three major factors. These are the economic dualism that has characterized the structure of the economy, the exceptionally high levels of investment spending throughout the period, and the continued expansion of exports.

Dualism in the Economy

In essence, the concept of economic dualism refers to the simultaneous presence of two different economic structures within the economy. One of these sectors, often labeled "agricultural or traditional," exhibits comparatively low productivity while the other, the "modern-urban-industrial" sector, displays much higher rates of labor productivity as a result of more advanced technological capabilities.[1] Provided the modern sector can begin the growth process, the economy can expand rapidly as labor is shifted from less productive areas of the economy. Such shifts have contributed to the expansion of the Japanese economy and did so well into the 1960's. The magnitude of these shifts in labor allocation is illustrated by the rise in non-agricultural employment. From 74 percent of total employment in 1963, the share of non-agricultural employment rose to approximately 85 percent in 1973.

Current projections must be viewed with caution, however, particularly in light of earlier estimates; the relative importance of the labor shift as a contributor to growth is now declining. Adjustments within the industrial sector will of course continue and movements within the service sectors and from manufacturing to services can also be expected.

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[1] Variations and extensions of "dualistic structures" that include more specific components of the phenomenon are possible. Kelly, et al. (1972) provide an examination of many of these with reference to Meiji, Japan.

Investment Spending

The share of investment spending in the Japanese GDP has been substantially higher than similar ratios for other developed countries. Table 1 compares the GDP's of a limited set of countries. The ability of the economy to benefit from moving from a dualistic structure is increased by such high rates of capital spending. As firms have continued to develop new plants and equipment, profit rates have remained high.

TABLE 1

Gross Fixed Investment
as Percentage of GDP, Current Prices

Countries	Gross Fixed Investment as % of GDP (1963-1973 Average)
Japan	33.4
Germany	25.3
France	24.9
United States	16.9

Sources: OECD, National Accounts (1960-1971), OECD, Main Economic Indicators, various issues

In many respects, investment spending has been successful because Japan has been able to borrow technology from abroad and to some extent avoid the costs associated with research and development programs. More recently, however, receipts and royalties paid for Japanese patents have begun to rise. Japanese industry has shifted toward engineering-oriented product lines.

In addition to the stimulus for investment deriving from past investment, Japan has also benefited from very high rates of saving. It is virtually impossible to establish causality--one doesn't know whether high investment causes high saving or the reverse--but the availability of personal savings channeled through financial markets has certainly permitted further business investment. It is important to note that the economic policies of the period have encouraged productive investment and have ensured that savings will be made available to industry.

The range of Japanese industrial policies has been extensive.[2] Current policy is often implemented through consultive relations of business and government. As a result, Japanese policy positions are extremely flexible and capable of adjusting to changing objectives and conditions. Through the late 1960's, policy has been directed primarily toward promoting basic industry to achieve maximum feasible economic independence, developing technologically advanced industries to permit exports with high rates of value added, and modernizing and rationalizing traditional industrial sectors such as textiles. As a result of comparatively recent events, both domestic and international, these policy goals have been somewhat modified.

Domestic considerations that have modified policy are in part closely related to international events. However, one "purely" domestic concern of recent years has been to develop social infrastructure and to reduce regional problems within Japan. Authorities have also been concerned with promoting the modernization and adaptive ability for traditional sectors and smaller firms. This concern has derived from the realization that these two groups are vulnerable to changes in the international economy.

International events have also influenced Japanese industrial policy. Because Japan is extremely vulnerable to changes in prices and supplies of raw materials, industries less dependent on such materials have received emphasis. Optical and precision instruments, electronics, and data processing activities are examples. At the same time, the Ministry for International Trade and Industry (MITI) has begun to promote activities which are potentially capable of providing stable, long-term resource supplies. Oil exploration activity on Japan's continental shelf and foreign investment or cooperative exploration agreements are examples.

Japanese Trade and Trade Policy

Together with investment, Japanese exports have led the growth performance of the economy. The annual rate of increase of 19 percent for Japanese

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[2] For a more detailed discussion of industrial policy, see OECD (1972).

exports is double the growth rate for world trade as a whole. Explanations for this remarkable record emphasize three points. First, the economy's overall growth record has made it comparatively easy to direct manufacturing production to export sales. Second, the industrial policy emphasizing technology has allowed exports to be more diversified and to be able to service sophisticated, expanding markets abroad. And finally, the increases in labor productivity induced by investment and the removal of dualism have strengthened the competitive position of Japanese products in world markets.

Table 2 illustrates the changing composition of Japanese exports over a 10-year period. As imports are also covered in the table, the different commodity structures of Japanese exports and imports are clear. Table 3 presents information about the geographic distribution of Japanese trade. The United States is the single most important market for Japanese exports. The United States and Southeast Asian markets together account for over 50 percent of foreign sales.

Japanese imports have increased over the period but have not kept pace with the growth of exports. As a result, Japan's balance of payments has moved from a deficit to a strong surplus position. By the end of 1970, other countries, particularly the United States, viewed the growing trade surplus of Japan as a source of major disequilibrium in the international monetary system. The remarkable balance of payments position that Japan has achieved is explainable by the remarkable record of economic growth and by Japanese trade policy.

The principal objective of Japanese trade policy has been to promote the growth of domestic industry and to avoid balance of payments problems in order to minimize the use of deflationary policies in periods of payments deficits. In early years, the principal policy activity was characterized by explicit governmental intervention--imports were controlled directly and exports were vigorously promoted. At the same time, every effort was made to insure that the yen was consistently undervalued. As the economy grew and as world trade liberalization began to be pursued by all major countries,

TABLE 2

Commodity Structure of Japanese Trade
by Percentage Shares, 1962 and 1972

COMMODITY	%, 1962	%, 1972
EXPORTS		
Ships	4.8	8.4
Motor Vehicles	2.9	13.3
Consumer Electronics	4.6	7.9
Scientific Equipment and Office Machines	2.7	4.4
Other Engineering Products	13.6	19.8
Iron and Steel	10.8	12.6
Chemicals	5.3	6.2
Textiles and Products	25.6	10.2
Foodstuffs and Crude Materials	8.8	3.3
Other Manufactures	20.9	13.9
IMPORTS		
Engineering Products	14.4	11.0
Chemicals	5.3	4.9
Non-Ferous Metals	4.2	4.7
Textiles and Clothing	0.4	2.3
Other Manufactures	1.5	6.0
Petroleum and Coal	18.4	23.6
Metal Ores and Scrap	12.6	10.6
Wood	5.6	7.4
Textile Materials	13.1	5.7
Foodstuffs	13.1	15.4
Other Crude Materials	11.4	8.4

Source: OECD, Trade Statistics, Series B, Japan Statistical Yearbook 1973/74, 1972.

TABLE 3

Japanese Trade by Area, 1962-1972

Trading Region	Imports % Share		Exports % Share	
	1962	1972	1962	1972
United States	32.1	24.9	28.5	30.9
Latin America	8.5	6.0	7.2	6.9
Canada	4.5	4.9	2.6	3.9
S.E. Asia	17.2	17.8	29.8	22.1
Australia	7.7	9.4	2.8	2.5
China	0.8	0.8	2.1	2.1
Soviet Union	2.6	2.5	3.0	1.8
Middle East	10.7	14.9	4.1	4.1
Africa	1.4	2.9	4.6	5.5
European Economic Community	9.0	8.4	10.2	11.5
Other	3.8	4.0	2.5	3.6

Source: OECD, Foreign Trade Statistics, Series A
Japan Statistical Yearbook, 1973/4, 1972

Japan adopted a general program for trade and exchange liberalization. Table 4 shows the achievements in import control reductions since the program was adopted in 1960.

Other important policy actions adopted by Japan have occurred since the closing of the U.S. gold window in the summer of 1971. Three rounds of "emergency international policy programs" have been announced. These may be broadly characterized as actions to restore a balance in Japan's international position. They have included revaluation of the yen, restrictions on imports, and liberalization of capital outflows. The first program was announced in June 1971. It was followed in October by the agreement with the United States to control exports of non-cotton textiles. In December, the Smithsonian Agreement resulted in a 16.88 percent revaluation of the yen vis-a-vis the U.S. dollar.

The second round of emergency programs was announced in May 1972, and followed by the third round in October of the same year. In February 1973, the yen was floated and quickly appreciated by approximately 15 percent of

the previous dollar value. With the floating exchange rate it became unnecessary to pursue the previously established export control measures. They were dropped in September 1973.

TABLE 4

Import Liberalization Actions for Japan

Year	% of Imports Liberalized	No. of Items Liberalized	No. of Items Under Quantitative Restriction
1960	42	---	---
1961	70	---	492
1962	88	268	222
1963	92	69	155
1964	93	32	123
1965	93	1	122
1966	93	---	124
1967	93	0	124
1968	93	3	121
1969	93	3	118
1970	94	28	90
1971	95	50	40
1972	97	7	33
1973	97	2	31

Source: MITI, White Paper on Foreign Trade of Japan

U.S. - Japanese Trade Relations

In many respects Japanese trade relations with the United States have been the major focus for recent policy positions. The frictions between the two countries can be separated into two important classes: the general trade imbalance between the two countries and issues peculiar to particular sectors of economic activity.

Prior to 1965, the trade balance between Japan and the United States consistently resulted in Japanese deficits. Since that time, the balance has been increasingly favorable to Japan. The United States viewed the U.S.-Japanese balance as a major cause of the overall U.S. position that culminated in the August 1971 U.S. actions to impose the import surcharge and to seek a revaluation of the yen. Bilateral negotiations produced specific measures to

correct the imbalance. Among these were "emergency" imports of grain and aircraft and the purchase of U.S. Government bonds. Following the floating of the yen, the size of the trade balance dropped to approximately $1 billion, one-quarter of the amount for 1971 and 1972.

In addition to frictions arising from the general trade balance, U.S.-Japanese trade relations have also been influenced by sector-specific differences. Generally speaking, these differences can be traced to the different structures of the two economies. In conjunction with concerns over unemployment and the general balance of payments position, protectionist movements within the United States have periodically surfaced to promote controls on imports. For purposes of this review, actions affecting steel and textiles are presented as examples.

Differences between the United States and Japan concerning textiles have a long history. The differences were first thought to be resolved in 1962 with the signing of the Long-Term Arrangement Regarding International Trade in Cotton Textiles. The major provisions of the agreement[3] established "voluntary" restraints on the magnitude of Japanese exports and on the annual rate of increase of such exports. But because the agreement also authorized mandatory quotas if the voluntary restraints were not observed, the voluntary nature of the agreement is questionable. Baldwin (1970) cites estimates of the magnitude of lost exports by Japan to the U.S.--$110 million in 1964. In 1971, Japan "voluntarily" extended similar restrictions to the export of non-cotton textiles to U.S. markets.

A similar, voluntary agreement affects Japanese exports of steel to the United States. In the fall of 1968, bills to establish specific quotas affecting 40 industries were introduced in the U.S. Congress. Although none of these bills was passed and signed, Japanese and European steel industries did act as a result of the pressures for quotas within the United States. They agreed to limit the annual rate of increase of steel exports

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[3] See Patterson (1966) for a detailed discussion

to the United States to 5 percent of the previous year's level. It does seem clear that these voluntary restrictions have been adopted because the threat of mandatory controls has been credible.

The Japanese position regarding these voluntary restrictions of exports is to consider them fully equivalent to direct import restrictions by the United States. The ability of Japan to resist these restraints has been reduced by Japanese policies restricting imports. However, the general policy of trade liberalization is continuing and can be expected to affect "bargaining positions" in the future. For the present, and in addition to steel and textiles, Japan voluntarily restricts exports of such products as bicycles, tiles, metal tableware (flatware), and baseball equipment.

Japanese Policy on Capital Flows

To complete this review of the Japanese economy, highlights of Japanese policy regarding international capital flows are summarized. The general evaluation of Japanese policy in this area must label it restrictive. The focus here is on policy rather than detailed discussions of actual transactions. To a large degree, the difficult problem of data acquisition has required this approach. Bryant and Hendershott (1970) provide an empirical study of U.S.-Japanese financial relations. Also, Japan Statistical Yearbook (various years) may be consulted for aggregated data.

Capital Outflows. In the early 1960's Japan severly restricted outward capital movements. Although the Government endorsed the objective of unrestricted capital flows, provisions of membership agreements in the Organization for Economic Cooperation and Development and in the International Monetary Fund were invoked to restrict fully outward direct investment.

The government justified these restrictions on two counts. At that time, Japan's concern was to accumulate gold and foreign exchange reserves for protection against balance of payments difficulties. And second, there was concern that the domestic investment programs might not be realized if

foreign investment were permitted. Combining these two points, Japan sought to insure that Japanese foreign investment did not operate to produce products that might compete against Japanese exports.

In 1969, investments in amounts less than U.S. $200,000 were permitted. In 1970 the limit was raised to $1 million. In 1971 the limit was removed. The remaining restrictions apply largely to financial institutions. In effect, these residual prohibitions insure that domestic financial regulations are not avoided by foreign operations of domestic businesses.

Outward portfolio investment has undergone a series of restrictions and liberalizations. The restrictions have usually been in response to balance of payments problems. The 1964 restrictions were attributable to this concern and the 1974 "instructions" to banks and securities dealers can be similarly explained. The liberalizations that have been established are such that Japanese residents may not directly own foreign securities. Instead, institutions may purchase foreign securities and then sell special shares to Japanese citizens. The net result is a "mutual fund" operation.

Capital Inflows. The Japanese Government has been extremely reluctant to permit inflows of capital. Despite five different efforts to reduce restrictions (1967, 1969, 1970, 1971, and 1973), control remains substantial. Both the value of capital inflows and the sectors that can accept such inflows are regulated. Agriculture, forestry, fisheries, and oil are industries entirely banned to foreign investors. Mining and large-scale retail trade are limited to 50 percent foreign equity ownership. Other specific product lines are also closed to investment from abroad--data processing is an example.

In practice, foreign investment is permitted only after a case-by-case review. In 1965, $44 million of foreign investment was authorized. By 1972 the corresponding figure was $160 million. Although very complex rules cover the foreign purchase of equity shares in Japanese firms, $4.3 billion were permitted in 1972.

APPLICATION OF THE ECONOMIC MODEL TO JAPAN

This section discusses the results obtained by applying the modified input-output model to the Japanese economy. The presentation here is intentionally kept as non-technical as possible. Interested readers are invited to consult Appendix G for a theoretic statement of the model and are reminded that an intuitive discussion of "how the model works" appears in Chapter 4.

One remark about general equilibrium analysis may be helpful. In the results presented below, all adjustments within the economy have been "allowed to happen" before the final changes are noted. An example removed from the model can illustrate the mechanism. Suppose a very high tax is placed on gasoline for private automobiles. Some persons will purchase less gasoline, others will purchase fewer appliances, still others will purchase bicycles. All such changes are considered. The only limitation is that past behavior must suggest that the changes occur within one year. Changes requiring more than one year are not included.

Introductory Remarks

The Japanese input-output table for 1965 forms the basis of the application. Since the inception of the project, the 1970 table has become available. But supporting data needed to implement the 1970 version were released too late to base the study on the more recent material. While there have been changes in the Japanese economy, comparison of the 1965 and 1970 tables suggests that structural changes have not been sufficient to invalidate the current model.[4]

The original 1965 input-output table separately identifies 56 sectors or industries within the economy. Because supporting data are not available at the same level of disaggregation, it was necessary to reduce the number of industries. The industries selected for the model are listed in Table 5.

[4] A convenient source for the full input-output tables for 1965 and 1970 is Japan Statistical Yearbook, 1972 and 1973/74 editions respectively.

TABLE 5

Industries in the Japanese Model

1. Agriculture
2. Forestry
3. Coal and Crude Petroleum
4. Metal and Non-metal Mining
5. Food
6. Textiles
7. Lumber and Furniture
8. Pulp and Paper
9. Printing and Publishing
10. Leather and Leather Products
11. Rubber Products
12. Chemicals
13. Coal and Petroleum Products
14. Ceramics
15. Primary Metals
16. Fabricated Metals
17. Machinery
18. Electrical Machinery
19. Transport Equipment
20. Other Manufacturing
21. Construction
22. Utilities
23. Trade
24. Transport and Communications
25. Services
26. Unallocated
27. Public Administration

After aggregating, the input-output table is as shown in Table 6. The table is presented in transactions form. Each entry represents the purchases by the column industry from the row industry. For convenience, columns (and rows) showing subtotals are included. Industry 27, Public Administration, requires some explanation. The industry does not purchase inputs from other industries (the 27th column contains zeros), nor does it sell its output to other industries (the 27th row contains zeros). It is included to capture the labor hired for governmental functions. Government purchases of goods and services are treated as components of final demand, even if they are required to "produce" public administration.

The other entry requiring comment is the 28th industry. To facilitate estimation of the model, some imports were labeled "non-competitive." These are imports of commodities which are, for the most part, not produced by the Japanese economy. Simply regard this industry as an "artifical" or "dummy" entry introduced for accounting convenience.

Major Results

The important results of the economic section are presented in three tables showing the effects on prices, employment, and output induced by changes in

TABLE 6

Aggregated Japanese Input-Output Table
1965

	INDUSTRY	1	2	3
1.	AGRICULTURE	244625	656	0
2.	FORESTRY	2826	300053	5445
3.	COAL & CRUDE PETROLEUM	42	150	2774
4.	METAL & NON-METAL MINING	650	34	40
5.	FOODSTUFFS	307251	1413	0
6.	TEXTILES	52668	1913	577
7.	LUMBER & FURNITURE	6145	574	1360
8.	PULP & PAPER	7817	286	884
9.	PRINTING & PUBLISHING	394	251	3114
10.	LEATHER & PRODUCTS	0	16	0
11.	RUBBER PRODUCTS	2913	44	674
12.	CHEMICALS	213421	2629	3657
13.	COAL & PETROLEUM PRODUCTS	62488	7689	694
14.	CERAMICS	8272	91	105
15.	PRIMARY METALS	27	161	3714
16.	FABRICATED METALS	9040	1020	1818
17.	MACHINERY (EXCEPT ELEC.)	17438	10583	4550
18.	ELECTRICAL MACHINERY	950	240	1497
19.	TRANSPORT EQUIPMENT	19861	4388	929
20.	OTHER MANUFACTURING	12187	249	818
21.	CONSTRUCTION	25224	1153	3395
22.	UTILITIES	8561	266	14465
23.	TRADE (WHOLESALE & RETAIL)	75174	4971	3695
24.	TRANSPORT & COMMUNICATIONS	43331	23304	4831
25.	SERVICES	64036	9431	5323
26.	UNALLOCATED	90895	1136	7428
27.	PUBLIC ADMINISTRATION	0	0	0
28.	NON-COMPETITIVE IMPORTS	0	0	0
29.	SUB-TOTAL (1-28)	1276236	372701	71787
30.	BUSINESS CONSUMPTION	11507	9489	8974
31.	WAGES	222491	155953	87386
32.	OPERATING SURPLUS	2040732	257671	12681
33.	DEPRECIATION	325073	30586	25889
34.	TAXES	59203	10733	5399
35.	(LESS) SUBSIDIES	-25379	-581	-4676
36.	GROSS VALUE ADDED (30-35)	2633627	463851	135653
37.	TOTAL OUTPUT	3909863	836552	207440
38.	GROSS DOMESTIC PRODUCTION	2622120	454362	126679

NOTE: Units are millions of yen.

TABLE 6 (Continued)

	4	5	6	7	8
1.	1	2451472	84207	3	5311
2.	2095	2131	1852	561228	37816
3.	853	2651	1339	16	5717
4.	2021	10577	60	0	3910
5.	0	688150	8852	2485	1633
6.	879	3829	1361043	21345	5901
7.	1082	24808	16046	219110	45349
8.	1511	60395	26694	12027	519760
9.	972	14924	10591	2213	73319
10.	0	0	28400	67	21
11.	1063	1190	11391	2068	516
12.	5543	192932	405426	39672	34735
13.	35352	27987	12838	10550	12483
14.	14	57702	83	3707	1002
15.	649	4378	2507	24908	78
16.	2396	61208	14977	41815	1943
17.	5016	16508	17516	7001	5727
18.	4101	947	4204	83	0
19.	6815	6186	1786	2720	327
20.	418	27118	12586	14988	1033
21.	3039	11681	7121	5188	2521
22.	9100	29834	35217	14108	45484
23.	20558	212253	170566	79745	37432
24.	9859	114958	87887	36894	40346
25.	9407	91245	74349	33335	41309
26.	14539	146130	18293	6002	28156
27.	0	0	0	0	0
28.	0	0	290264	0	0
29.	137282	4261194	2706095	1141218	958389
30.	11300	74902	49708	26491	21392
31.	96518	377041	512104	235836	125258
32.	66397	338282	197029	95774	81056
33.	62980	99998	100920	49009	75619
34.	9226	749968	26622	14870	12551
35.	-570	-162329	0	0	0
36.	245851	1477862	886383	421980	315876
37.	383133	5739056	3592478	1563198	1268205
38.	234551	1402960	836675	395489	294484

TABLE 6 (Continued)

	9	10	11	12	13
1.	8	1202	9	126977	1
2.	0	153	0	3606	5023
3.	0	0	898	18267	541352
4.	0	219	228	47110	-512
5.	13	27115	0	39045	329
6.	5676	8186	53415	4829	225
7.	2215	64	959	6775	2837
8.	200957	154	6221	124834	3758
9.	39270	57	574	9658	1855
10.	365	16042	0	289	0
11.	839	1538	23090	3170	0
12.	22945	1722	59489	886921	10184
13.	295	247	4207	117763	30368
14.	35	38	1777	15132	288
15.	4251	1	2156	19410	120
16.	206	3264	7351	22565	5553
17.	6853	79	3920	26705	7771
18.	2025	90	0	16001	3646
19.	349	519	529	3279	428
20.	5795	4223	8437	24670	3370
21.	3035	785	770	14622	3040
22.	5459	560	7103	95925	4786
23.	29411	4979	16643	103049	8351
24.	37508	1509	9212	86946	34887
25.	25087	2045	13741	167457	23320
26.	23757	3301	11251	79917	18310
27.	0	0	0	0	0
28.	0	0	33349	0	0
29.	416354	78092	265329	2064922	709290
30.	49419	862	12301	72307	21323
31.	204030	15437	63794	269556	41054
32.	128126	5275	37655	336068	150552
33.	23880	2136	17059	253359	50789
34.	6296	723	3486	23278	307550
35.	0	0	0	-2760	-1188
36.	411751	24433	134295	951808	570080
37.	828105	102525	399624	3016730	1279370
38.	362332	23571	121994	879501	548757

TABLE 6 (Continued)

	14	15	16	17	18
1.	238	17	8	7628	635
2.	1155	479	140	0	0
3.	7165	3787	527	506	785
4.	94306	360632	0	1001	46
5.	116	16	0	14	0
6.	5899	1807	4075	14082	9586
7.	11012	11033	8900	21086	24729
8.	29352	4451	5583	23879	25625
9.	4776	3735	6931	10798	12254
10.	0	0	48	5606	269
11.	19	2903	5916	18499	8001
12.	17319	23588	10888	22229	39252
13.	57211	208847	14665	17882	17805
14.	93167	34519	8208	16572	30071
15.	18572	2777306	376117	405055	390918
16.	3670	6870	91096	53797	32768
17.	16659	46670	6111	664672	47914
18.	2270	12622	1928	160325	534869
19.	3384	9135	2671	7724	2310
20.	1199	875	3886	33845	63272
21.	5869	9647	4525	7470	6503
22.	39314	126821	14122	30064	16790
23.	37881	140824	65377	110818	92083
24.	47737	112788	39289	98632	63112
25.	39630	66894	30710	111252	112156
26.	30113	75979	50398	66042	21574
27.	0	0	0	0	0
28.	0	0	0	0	0
29.	568033	4042245	752119	1909478	1553327
30.	26530	35138	33826	64705	46582
31.	194676	312353	358547	669023	377609
32.	151742	275197	252307	442284	273048
33.	75123	187390	44134	124063	83305
34.	7753	19598	7938	47050	44593
35.	0	0	0	0	0
36.	455824	829676	696752	1347125	825137
37.	1023857	4871921	1448871	3256603	2378464
38.	429294	794538	662926	1282420	778555

TABLE 6 (Continued)

	19	20	21	22	23
1.	-1595	27412	4036	0	14
2.	0	1298	12014	0	3
3.	592	18	75	97527	0
4.	0	3893	210023	-474	0
5.	0	3974	0	0	2763
6.	11496	17321	66824	692	9473
7.	32305	40093	690053	1507	23584
8.	6090	38185	22140	962	50415
9.	7809	2917	19551	3312	41777
10.	1331	5051	0	0	200
11.	145271	500	4506	0	0
12.	31687	191364	43757	395	267
13.	10664	9235	87857	69563	119644
14.	19728	6903	595339	1246	6344
15.	339659	24064	338262	0	42
16.	58860	17744	565238	1221	36640
17.	284191	4404	164370	6936	9132
18.	80424	772	287045	32389	0
19.	699327	403	33823	2091	113754
20.	39000	56987	63528	511	9781
21.	8901	1364	6005	39477	58543
22.	25284	8500	28836	12113	62305
23.	123134	49888	414850	7641	137207
24.	66038	26806	283090	31351	311526
25.	78357	21483	139226	31301	529100
26.	13302	13952	87930	36256	1241
27.	0	0	0	0	0
28.	0	0	0	0	0
29.	2081855	574531	4168370	376017	1523755
30.	36339	27336	224805	30099	308790
31.	544203	135835	1461409	147768	1700528
32.	297411	85728	584625	202432	1872878
33.	142437	41919	146149	264653	255908
34.	58611	18206	54697	130472	281320
35.	0	0	0	-1741	-3892
36.	1079001	309024	2471685	773683	4415532
37.	3160856	883555	6640063	1149700	5939287
38.	1042662	281688	2246880	743584	4106742

TABLE 6 (Continued)

	24	25	26	27	Sub-Total
1.	12	1012	95269	0	3372771
2.	0	5024	1460	0	943801
3.	7989	3888	1674	0	698592
4.	0	0	750	0	734514
5.	0	1833	269	0	1085211
6.	19607	14255	64998	0	1760594
7.	6253	39400	15439	0	1252718
8.	7714	23088	49019	0	1251801
9.	16650	258693	4433	0	550828
10.	242	2	595	0	58544
11.	1781	9937	12775	0	258604
12.	852	264543	26579	0	2551996
13.	192432	57185	13071	0	1199022
14.	256	11941	14064	0	926604
15.	35	3690	37627	0	4773707
16.	4367	18416	23449	0	1087292
17.	15926	62730	21714	0	1481096
18.	3377	17316	45524	0	1212645
19.	321024	11407	6216	0	1261385
20.	1854	56739	18984	0	466353
21.	26644	315492	462	0	572476
22.	43517	108881	18446	0	805861
23.	78545	165731	47728	0	2238534
24.	304983	260930	68915	0	2247169
25.	85999	500402	103436	0	2410031
26.	14332	187622	-138	0	1047718
27.	0	0	0	0	0
28.	0	0	0	0	0
29.	1154391	2400157	692752	0	36249867
30.	95825	341216	210335	86114	1939615
31.	1510822	2981096	-7	1029489	13829809
32.	293110	3141281	124702	136868	11880911
33.	631577	966611	-6	26770	4107330
34.	52273	286171	16104	0	2254691
35.	-14081	-13759	234	0	-230722
36.	2569526	7702616	351362	1281241	33781634
37.	3723917	10102773	1044114	1281241	70031501
38.	2473701	7361400	141027	1193127	31842019

TABLE 6 (Continued)

	Bus. Cons.	Consumption	Government	Investment	Inventory
1.	95024	1011083	1	52179	93298
2.	1558	41243	373	0	13530
3.	0	12658	2151	0	14787
4.	0	2109	0	0	5586
5.	697123	4029861	0	0	160871
6.	53748	1268935	12021	24298	50179
7.	24632	173736	5185	69731	9585
8.	7369	-4298	6537	0	19188
9.	8963	236567	31336	0	429
10.	0	37042	707	0	1657
11.	1680	65392	2963	0	6446
12.	53258	291078	14232	0	76509
13.	52	132540	39216	0	2579
14.	5591	3918	307	0	17375
15.	0	-5852	-1075	-158906	-3128
16.	12114	142426	14981	83838	11912
17.	3150	258850	10148	1372727	-4288
18.	16175	273622	33420	619243	-1084
19.	0	231846	65563	1161790	30538
20.	12180	234458	7465	31614	11947
21.	0	0	15837	6051750	0
22.	0	386451	14757	0	0
23.	280287	2819209	34324	399013	37391
24.	26917	945629	97976	55808	14628
25.	639794	5562578	1493273	0	0
26.	0	0	34258	0	0
27.	0	0	1281241	0	0
28.	0	0	0	0	0
29.	1939615	18091081	3217197	9763085	569935
30.	0	0	0	0	0
31.	0	0	0	0	0
32.	0	0	0	0	0
33.	0	0	0	0	0
34.	0	0	0	0	0
35.	0	0	0	0	0
36.	0	0	0	0	0
37.	1939615	18091081	3217197	9763085	569935
38.	0	0	0	0	0

TABLE 6 (Continued)

	Exports	Imports	Customs	Production	G.D.E.**
1.	70904	-434512	-27272	3909863	442068
2.	3466	-167345	-74	836552	-108807
3.	253	-474332	-46659	207440	-491152
4.	2113	-359611	-1578	383133	-351381
5.	90364	-253519	-70855	5739056	3956722
6.	457487	-30271	-4513	3592478	1778136
7.	44585	-16807	-167	1563198	285848
8.	23697	-34480	-1609	1268205	9035
9.	6843	-6834	-27	828105	268314
10.	9170	-3845	-750	102525	43981
11.	66663	-1903	-321	399624	139340
12.	233441	-184486	-19298	3016730	411476
13.	42616	-126800	-9855	1279370	80296
14.	77077	-6151	-864	1023857	91662
15.	494793	-222264	-5354	4871921	98214
16.	106445	-8984	-1154	1448871	349465
17.	311209	-157931	-18358	3256603	1772357
18.	295042	-64113	-6486	2378464	1149644
19.	467417	-53352	-4331	3160856	1899471
20.	147961	-24386	-4037	883555	405022
21,	0	0	0	6640063	6067587
22.	2631	0	0	1149700	343839
23.	185479	-54950	0	5939887	3420466
24.	221949	113841	0	3723917	1449831
25.	24383	-27000	-286	10102773	7052948
26.	45426	-81510	-1778	1044114	-3604
27.	0	0	0	1281241	1281241
28.	0	-323613	0	0	0
29.	3431415	-3005158	-225536	70031501	31842019
	0	0	0	1939615	0
30.	0	0	0	13829809	0
31.	0	0	0	11880911	0
32.	0	0	0	4107330	0
33.	0	0	0	2254691	0
34.	0	0	0	-230722	0
35.	0	0	0	33781634	0
36.	3431415	-3005158	-225536	103813135	0
37.	0	0	0	0	0
38.					

**Gross Domestic Expenditure

final demand. The steps involved in the estimation of the model are omitted from this discussion. An intuitive, non-technical discussion of the model has been previously presented in Chapter IV and may be consulted again if desired.

Price Effects. Recall that the first important set of information generated by the model concerns price changes resulting from changes in final demand. Table 7 presents the complete specification of these induced price effects.

To read the table, first note that the scale of the entries has been adjusted to reflect the percentage change in prices resulting from a 100 billion yen change in demand. To determine effects, first find the appropriate column for the industry whose product is directly affected. If the demand for foodstuffs has changed, then column 5 contains the relevant information. Reading down the column, each entry shows the percentage price change for the industries as rows in the table. For example, the entry in column 5, row 5 shows a 0.91 percent increase in the price of foodstuffs resulting from a 100 billion yen increase in the demand for foodstuffs. Column 5, row 1 shows that the price of agricultural products increases 0.89 percent as a result of the same change in demand. Similarly, column 5, row 13 shows that the price of petroleum products rises by 0.37 percent as a result of the incease in demand for foodstuffs.

It is perhaps worthwhile to repeat an intuitive explanation for the changes in the prices of all goods when only one good's demand is assumed to change. Because the model captures the interrelations of industries, changing one demand is traced through the economy as that industry increases its purchases of production inputs. At the same time, the changing profits and wages affect consumers' incomes and induce increases in consumption spending. The figures in the table represent the final result of considering all these repercussions.

TABLE 7. Percentage Price Changes Caused by 100 Billion Yen Increase in Final Demands

	INDUSTRY	1	2	3	4	5	6	7	8	9
1.	AGRICULTURE	1.58	.53	.16	.16	.89	.36	.42	.44	.39
2.	FORESTRY	.53	14.94	.60	.39	.50	.52	7.67	2.29	1.13
3.	COAL & CRUDE PETROLEUM	.15	.60	1.70	.12	.14	.17	.39	.36	.26
4.	METAL & NON-METAL MINING	.14	.38	.12	3.91	.15	.16	.29	.28	.23
5.	FOODSTUFFS	1.12	.64	.20	.20	.91	.37	.50	.56	.47
6.	TEXTILES	.38	.54	.19	.18	.30	1.16	.43	.51	.44
7.	LUMBER & FURNITURE	.38	7.73	.39	.30	.36	.39	4.67	1.39	.76
8.	PULP & PAPER	.48	2.43	.40	.31	.47	.52	1.50	6.05	2.55
9.	PRINTING & PUBLISHING	.39	1.18	.28	.25	.37	.43	.83	2.54	5.22
10.	LEATHER & PRODUCTS	.60	.85	.20	.19	.50	.44	.59	.54	.43
11.	RUBBER PRODUCTS	.31	.50	.20	.19	.26	.47	.41	.46	.40
12.	CHEMICALS	.68	1.02	.37	.41	.57	.82	.83	1.13	.85
13.	COAL & PETROLEUM PRODUCTS	.41	.94	1.07	.27	.37	.40	.70	.68	.55
14.	CERAMICS	.30	.78	.34	.62	.32	.30	.59	.70	.51
15.	PRIMARY METALS	.32	.72	.36	.82	.31	.35	.64	.59	.52
16.	FABRICATED METALS	.28	.68	.26	.46	.28	.30	.60	.50	.44
17.	MACHINERY (EXCEPT ELEC.)	.30	.67	.26	.42	.27	.32	.55	.55	.50
18.	ELECTRICAL MACHINERY	.33	.76	.28	.42	.30	.35	.61	.62	.53
19.	TRANSPORT EQUIPMENT	.28	.67	.23	.34	.26	.31	.53	.51	.44
20.	OTHER MANUFACTURING	.49	1.28	.29	.33	.42	.49	.92	1.00	.71
21.	CONSTRUCTION	.28	1.64	.26	.41	.26	.29	1.08	.63	.47
22.	UTILITIES	.49	.58	.80	.41	.46	.58	.61	1.17	.81
23.	TRADE (WHOLESALE & RETAIL)	.24	.48	.16	.14	.24	.27	.42	.47	.45
24.	TRANSPORT & COMMUNICATIONS	.39	.63	.30	.25	.38	.39	.57	.62	.63
25.	SERVICES	.46	.72	.22	.22	.39	.38	.59	.60	.70
26.	UNALLOCATED	.41	.67	.26	.30	.37	.46	.55	.67	.57

Note: Instructions for reading this table are found in the text.

TABLE 7. (Continued)

	INDUSTRY	10	11	12	13	14	15	16	17	18
1.	AGRICULTURE	.52	.31	.57	.33	.34	.33	.33	.34	.36
2.	FORESTRY	.80	.49	.82	.70	.82	.70	.74	.68	.77
3.	COAL & CRUDE PETROLEUM	.17	.18	.29	.77	.32	.30	.24	.24	.25
4.	METAL & NON-METAL MINING	.17	.18	.33	.21	.61	.72	.43	.37	.38
5.	FOODSTUFFS	.55	.34	.61	.39	.45	.39	.41	.38	.41
6.	TEXTILES	.43	.48	.75	.34	.34	.36	.35	.35	.38
7.	LUMBER & FURNITURE	.53	.38	.64	.52	.59	.60	.62	.52	.59
8.	PULP & PAPER	.54	.48	.99	.57	.77	.60	.58	.59	.67
9.	PRINTING & PUBLISHING	.42	.41	.71	.43	.56	.53	.51	.53	.56
10.	LEATHER & PRODUCTS	4.36	.36	.59	.37	.39	.40	.49	.37	.40
11.	RUBBER PRODUCTS	.35	7.65	.66	.40	.40	.42	.40	.45	.52
12.	CHEMICALS	.64	.74	2.78	.70	.66	.65	.61	.59	.69
13.	COAL & PETROLEUM PRODUCTS	.43	.47	.70	4.30	.73	.85	.66	.61	.66
14.	CERAMICS	.34	.37	.51	.61	5.01	.69	.55	.51	.63
15.	PRIMARY METALS	.39	.42	.56	.81	.75	2.77	1.46	1.23	1.20
16.	FABRICATED METALS	.42	.36	.46	.55	.56	1.43	3.41	.79	.77
17.	MACHINERY (EXCEPT ELEC.)	.34	.45	.48	.54	.56	1.29	.85	2.23	.84
18.	ELECTRICAL MACHINERY	.36	.51	.57	.57	.67	1.21	.82	.82	2.82
19.	TRANSPORT EQUIPMENT	.32	1.04	.48	.47	.52	.97	.70	.90	.75
20.	OTHER MANUFACTURING	.66	.52	1.16	.55	.55	.67	.58	.57	.71
21.	CONSTRUCTION	.33	.35	.46	.52	.94	.82	.82	.58	.68
22.	UTILITIES	.53	.60	.88	.72	.98	.96	.78	.76	.94
23.	TRADE (WHOLESALE & RETAIL)	.30	.28	.32	.32	.35	.34	.35	.33	.36
24.	TRANSPORT & COMMUNICATIONS	.41	.46	.53	.68	.61	.60	.56	.57	.60
25.	SERVICES	.40	.39	.50	.37	.49	.48	.49	.50	.53
26.	UNALLOCATED	.40	.52	.65	.57	.55	.66	.60	.57	.65

Note: Instructions for reading this table are found in the text.

TABLE 7. (Continued)

	INDUSTRY	19	20	21	22	23	24	25	26
1.	AGRICULTURE	.32	.46	.34	.39	.31	.35	.27	.40
2.	FORESTRY	.69	1.19	1.70	.42	.56	.58	.50	.61
3.	COAL & CRUDE PETROLEUM	.22	.25	.26	.71	.17	.26	.15	.21
4.	METAL & NON-METAL MINING	.30	.29	.40	.35	.15	.23	.14	.25
5.	FOODSTUFFS	.37	.51	.41	.49	.39	.45	.32	.46
6.	TEXTILES	.35	.48	.36	.53	.33	.39	.27	.44
7.	LUMBER & FURNITURE	.53	.83	1.12	.45	.45	.50	.38	.47
8.	PULP & PAPER	.56	.97	.73	1.13	.57	.63	.47	.65
9.	PRINTING & PUBLISHING	.49	.67	.56	.71	.52	.62	.52	.54
10.	LEATHER & PRODUCTS	.35	.66	.40	.48	.36	.40	.27	.40
11.	RUBBER PRODUCTS	1.02	.49	.39	.53	.32	.44	.27	.47
12.	CHEMICALS	.60	1.22	.63	.97	.49	.63	.45	.71
13.	COAL & PETROLEUM PRODUCTS	.55	.62	.65	.82	.45	.79	.35	.62
14.	CERAMICS	.49	.47	.95	.86	.36	.55	.31	.47
15.	PRIMARY METALS	.96	.63	.88	.93	.40	.60	.34	.62
16.	FABRICATED METALS	.66	.49	.84	.66	.35	.49	.29	.51
17.	MACHINERY (EXCEPT ELEC.)	.89	.53	.63	.68	.36	.54	.33	.52
18.	ELECTRICAL MACHINERY	.74	.66	.73	.83	.40	.56	.35	.59
19.	TRANSPORT EQUIPMENT	1.88	.50	.55	.64	.37	.58	.30	.50
20.	OTHER MANUFACTURING	.56	4.76	.63	.72	.45	.56	.40	.65
21.	CONSTRUCTION	.51	.52	1.08	.56	.37	.51	.30	.44
22.	UTILITIES	.73	.75	.71	7.43	.53	.73	.50	.64
23.	TRADE (WHOLESALE & RETAIL)	.35	.36	.38	.37	1.19	.39	.30	.32
24.	TRANSPORT & COMMUNICATIONS	.62	.54	.60	.65	.48	2.34	.41	.65
25.	SERVICES	.48	.53	.52	.58	.51	.54	1.20	.54
26.	UNALLOCATED	.56	.66	.53	.62	.39	.70	.42	1.12

Note: Instructions for reading this table are found in the text.

Table 7 shows the price changes for a 100 billion yen increase in final demand. If the change to be investigated is not of the same magnitude, all that is required is a proportionality adjustment, that is, if the change is 10 billion yen, simply take one-tenth the value of the entries in the table. In other words, the assumptions of the model assume a linear relation between the reported entries in Table 7 and changes of other magnitudes. Consequently, an analysis of reductions in final demand requires only a change in the algebraic sign of the entries and the appropriate proportionality adjustment.

Table 7 can also be employed in situations involving simultaneous changes in the demand for several (or all) industries. The final changes in such a case are the algebraic sum of the changes when treated as if they had happened individually.

Employment Effects. The second major set of information generated by the model is related to changes in employment caused by changes in final demands. Table 8 presents the employment changes in a format analogous to Table 7's presentation of prices.

The figures in Table 8 represent changes in millions of man-hours worked per year as a result of a 100 billion yen increase in demand. The table is read just as before. The additional information provided in the last three rows of the table is for the reader's convenience. The row labeled "Total" is the sum of the column entries. It represents the sum of all employment changes in the economy. The next row, "Industrial" is the sum of employment changes excluding Agriculture and Fisheries. Both rows show sums in millions of man-hours per year. The final row converts the "Total" man-hour changes to percentages of the labor force.

The conversion from millions of man-hours per year to labor force percentages is accomplished by adjusting for the average number of hours worked in each industry. For readers familiar with the Japanese employment system, it is further noted that average hours for "regular" workers were used in

TABLE 8. Employment Changes in Millions of Man-Hours per Year per 100 Billion Yen Changes in Final Demands

	INDUSTRY	1	2	3	4	5	6	7	8	9
1.	AGRICULTURE	1567.7	285.0	91.6	93.3	836.6	255.4	248.1	266.4	263.8
2.	FORESTRY	10.9	316.9	12.1	7.9	10.3	10.3	162.2	47.8	23.1
3.	COAL & CRUDE PETROLEUM	1.9	12.3	189.1	6.5	8.5	9.9	11.5	19.0	12.7
4.	METAL & NON-METAL MINING	3.8	7.9	2.5	179.4	4.1	4.2	7.0	6.7	5.4
5.	FOODSTUFFS	40.3	31.6	10.1	10.1	126.1	21.6	27.2	26.9	28.6
6.	TEXTILES	51.6	60.2	20.1	20.5	40.5	427.1	53.1	51.5	50.7
7.	LUMBER & FURNITURE	12.9	57.1	8.9	10.1	12.8	13.3	350.9	33.9	21.6
8.	PULP & PAPER	7.8	10.8	4.0	4.0	8.6	9.3	10.3	107.3	73.3
9.	PRINTING & PUBLISHING	8.9	14.1	5.4	4.9	8.1	9.3	13.5	28.8	164.6
10.	LEATHER & PRODUCTS	1.4	1.8	.5	.6	1.2	4.4	1.5	1.3	1.4
11.	RUBBER PRODUCTS	2.7	4.2	1.4	1.7	2.3	3.1	3.7	3.2	3.2
12.	CHEMICALS	16.3	13.4	5.1	5.7	13.8	24.9	14.2	15.9	15.9
13.	COAL & PETROLEUM PRODUCTS	1.0	1.4	.6	.6	1.0	1.0	1.3	1.3	1.1
14.	CERAMICS	6.1	15.9	3.9	5.6	8.2	5.3	12.2	9.2	7.6
15.	PRIMARY METALS	6.8	15.9	5.8	7.3	6.6	7.3	15.7	10.9	10.2
16.	FABRICATED METALS	9.0	22.3	6.1	8.3	10.0	9.6	23.4	13.9	11.6
17.	MACHINERY (EXCEPT ELEC.)	12.2	23.3	9.7	12.7	10.7	12.6	19.5	18.9	18.5
18.	ELECTRICAL MACHINERY	9.0	19.0	6.8	9.3	8.1	9.2	15.8	14.4	13.1
19.	TRANSPORT EQUIPMENT	8.6	16.8	5.7	7.3	7.8	8.2	14.1	12.6	11.8
20.	OTHER MANUFACTURING	8.4	14.2	4.0	4.6	7.6	7.4	12.5	10.6	9.9
21.	CONSTRUCTION	25.6	112.4	20.7	32.4	24.0	25.3	77.3	48.6	38.4
22.	UTILITIES	4.5	2.9	4.9	3.6	4.2	5.5	4.4	11.3	7.3
23.	TRADE (WHOLESALE & RETAIL)	94.3	142.2	48.6	52.2	4.7	111.8	149.5	145.1	146.0
24.	TRANSPORT & COMMUNICATIONS	45.2	61.8	22.6	26.0	43.7	43.2	61.2	64.8	69.0
25.	SERVICES	172.0	207.3	66.5	67.5	144.2	130.7	183.5	162.6	185.2
26.	UNALLOCATED	.0	.0	.0	.0	.0	.0	.0	.0	.0
27.	PUBLIC ADMINISTRATION	.0	.0	.0	.0	.0	.0	.0	.0	.0
	TOTAL	2135.7	1470.4	556.8	581.9	1453.4	1170.1	1492.6	1232.9	1294.1
	INDUSTRIAL	557.1	868.5	453.1	480.8	606.5	904.4	1082.3	918.8	1007.2
	TOTAL AS % LABOR FORCE	.0213	.0154	.0056	.0006	.0144	.0116	.0144	.0122	.0179

Note: Instructions for reading this table are found in the text.

TABLE 8. (Continued)

	INDUSTRY	10	11	12	13	14	15	16	17	18
1.	AGRICULTURE	487.3	195.7	307.7	155.3	211.1	199.2	216.1	222.0	230.4
2.	FORESTRY	16.5	9.6	16.4	13.0	16.5	13.7	14.5	13.4	15.3
3.	COAL & CRUDE PETROLEUM	10.2	11.4	17.7	76.2	23.3	17.4	13.4	12.6	13.8
4.	METAL & NON-METAL MINING	4.6	4.9	10.1	4.3	23.5	27.9	14.9	12.3	12.4
5.	FOODSTUFFS	59.4	19.7	28.0	17.0	23.3	21.6	23.7	23.7	25.0
6.	TEXTILES	73.8	95.8	53.7	32.2	43.6	43.2	46.0	47.8	52.0
7.	LUMBER & FURNITURE	15.4	13.2	21.5	14.3	22.5	20.4	21.8	20.1	23.4
8.	PULP & PAPER	9.3	8.2	19.6	6.3	14.7	8.6	8.7	9.6	11.4
9.	PRINTING & PUBLISHING	9.0	8.6	11.1	7.2	11.6	11.2	11.5	12.5	12.2
10.	LEATHER & PRODUCTS	283.7	1.4	1.3	.9	1.2	1.3	1.3	2.4	1.6
11.	RUBBER PRODUCTS	3.4	188.7	3.3	2.5	3.3	4.3	4.3	5.7	6.8
12.	CHEMICALS	16.8	21.2	103.5	8.6	11.8	11.1	11.3	11.6	14.4
13.	COAL & PETROLEUM PRODUCTS	1.1	1.2	1.7	15.9	1.9	2.3	1.7	1.5	1.7
14.	CERAMICS	7.4	8.2	9.0	7.1	257.2	14.6	12.7	11.6	16.2
15.	PRIMARY METALS	9.2	9.3	10.6	9.5	14.9	107.8	52.0	41.9	39.3
16.	FABRICATED METALS	22.1	9.5	13.1	11.0	15.2	18.6	309.6	19.7	18.3
17.	MACHINERY (EXCEPT ELEC.)	12.5	17.0	16.5	16.1	19.2	35.0	26.1	215.4	32.4
18.	ELECTRICAL MACHINERY	9.7	11.8	13.4	11.8	16.5	23.5	18.7	22.2	100.9
19.	TRANSPORT EQUIPMENT	8.8	18.4	11.4	10.2	13.5	19.3	15.4	18.8	17.1
20.	OTHER MANUFACTURING	10.2	10.7	10.9	7.2	8.9	9.8	9.5	11.5	18.3
21.	CONSTRUCTION	30.0	28.4	37.8	38.7	69.6	60.7	61.3	45.0	52.2
22.	UTILITIES	4.9	5.4	8.3	4.2	8.8	8.3	6.6	6.5	7.3
23.	TRADE (WHOLESALE & RETAIL)	138.5	114.6	119.0	81.0	139.2	128.5	134.0	130.6	145.9
24.	TRANSPORT & COMMUNICATIONS	46.4	44.0	55.6	39.8	67.9	58.8	58.5	59.6	68.1
25.	SERVICES	142.9	128.6	143.1	103.4	156.6	149.5	159.0	165.2	176.2
26.	UNALLOCATED	.0	.0	.0	.0	.0	.0	.0	.0	.0
27.	PUBLIC ADMINISTRATION	.0	.0	.0	.0	.0	.0	.0	.0	.0
	TOTAL	1387.1	985.7	1044.3	693.5	1195.7	1016.5	125.7	1143.3	1210.6
	INDUSTRIAL	933.3	780.5	720.3	525.2	968.1	803.7	1022.1	907.9	962.0
	TOTAL AS % LABOR FORCE	.0139	.0097	.0132	.0085	.0118	.0100	.0124	.0113	.0120

Note: Instructions for reading this table are found in the text.

TABLE 8. (Continued)

	INDUSTRY	19	20	21	22	23	24	25	26	27
1.	AGRICULTURE	212.4	198.8	224.2	227.7	208.7	222.7	191.2	291.8	124.2
2.	FORESTRY	13.7	14.3	35.3	7.8	11.3	11.3	10.0	12.1	4.4
3.	COAL & CRUDE PETROLEUM	11.9	13.5	13.7	40.1	9.0	15.6	7.6	12.4	3.2
4.	METAL & NON-METAL MINING	9.8	8.5	13.7	5.8	3.6	4.9	3.4	6.8	1.4
5.	FOODSTUFFS	22.9	27.7	24.3	25.6	23.9	24.8	21.5	30.4	13.9
6.	TEXTILES	50.8	50.0	50.5	46.6	37.2	47.6	36.2	79.6	21.6
7.	LUMBER & FURNITURE	21.3	34.1	62.8	17.0	16.5	16.1	13.5	16.7	5.7
8.	PULP & PAPER	9.0	20.6	10.3	7.8	9.9	8.0	8.0	12.0	3.1
9.	PRINTING & PUBLISHING	11.0	12.1	11.9	9.9	13.3	11.7	16.0	10.6	5.3
10.	LEATHER & PRODUCTS	1.6	3.7	1.4	1.2	.9	1.2	1.0	1.8	.6
11.	RUBBER PRODUCTS	20.3	3.3	4.1	3.5	2.6	4.5	2.5	5.5	1.2
12.	CHEMICALS	12.8	37.2	12.2	10.4	8.6	10.0	8.4	16.3	4.3
13.	COAL & PETROLEUM PRODUCTS	1.4	1.5	1.7	1.2	1.1	2.0	.8	1.5	.5
14.	CERAMICS	11.6	9.0	35.3	10.1	5.9	7.9	6.0	10.3	2.1
15.	PRIMARY METALS	31.2	15.9	26.4	13.1	7.8	11.1	7.0	15.1	2.9
16.	FABRICATED METALS	18.8	14.2	42.1	13.2	10.6	12.1	8.8	15.9	3.6
17.	MACHINERY (EXCEPT ELEC.)	56.6	18.0	26.1	21.3	13.5	19.7	12.8	20.5	5.5
18.	ELECTRICAL MACHINERY	25.2	14.6	25.9	24.0	10.2	14.1	9.2	18.0	4.6
19.	TRANSPORT EQUIPMENT	183.0	12.2	16.2	13.6	11.8	24.3	8.2	16.0	3.9
20.	OTHER MANUFACTURING	11.8	190.7	12.8	9.0	7.4	8.8	6.8	15.2	3.8
21.	CONSTRUCTION	40.8	41.8	297.0	52.2	38.3	41.6	32.2	35.5	10.1
22.	UTILITIES	6.4	6.8	5.8	85.2	4.5	5.5	4.6	5.4	1.9
23.	TRADE (WHOLESALE & RETAIL)	136.2	142.2	156.8	104.0	712.7	119.3	99.4	123.7	54.4
24.	TRANSPORT & COMMUNICATIONS	57.4	58.4	67.8	55.5	53.7	337.6	44.7	72.5	20.8
25.	SERVICES	168.2	166.4	170.2	151.8	136.8	166.1	522.8	190.9	88.7
26.	UNALLOCATED	.0	.0	.0	.0	.0	.0	.0	.0	.0
27.	PUBLIC ADMINISTRATION	.0	.0	.0	.0	.0	.0	.0	.0	342.7
	TOTAL	1141.2	1325.3	1348.4	957.4	1405.1	114.3	1082.4	1036.5	734.2
	INDUSTRIAL	905.0	1002.1	1089.0	772.0	1185.2	914.3	881.2	732.7	505.6
	TOTAL AS % LABOR FORCE	.0113	.0301	.0133	.0095	.0139	.0113	.0107	.0102	.0072

Note: Instructions for reading this table are found in the text.

the conversion. While this does tend to understate slightly the percentage of the labor force affected, the error is not large. Additionally, the assumptions of the model do not distinguish regular from temporary workers in the Japanese sense. As a result, the changes in employment do tend to overstate actual changes. However, the reported figures do seem to represent the sum of actual unemployment and disguised unemployment (underemployment) that characterize the Japanese economy during periods of relative decline in final demands.

As before, the entries in the table require adjustment if the hypothesized demand change is not 100 billion yen, or if it is a decrease rather than an increase. Simultaneous changes in several demands may be analyzed by taking the sum of the changes separately considered.

Production Effects. The changes in output generated by changes in final demand are reported in a different format than the price and employment changes. In this case, Table 9 shows "multipliers" for a unit change in final demand. If the demand for a particular industry's output increases by say 93.4 billion yen, then multiply the table entry for that industry by 93.4 billion. The resulting figure is the total change in GNP in billions of yen.

The additional entries in the table represent the multipliers that are appropriate for differing components of final demand. For example, the Government Spending entry is calculated from the 1972 pattern of government expenditures. It should be used if the effects of a change in government spending are to be analyzed and if the 1972 pattern (i.e., commodity composition) of spending is expected to hold for the contemplated change. If the pattern is not expected to hold, the individual industry multipliers are the appropriate figures.

Using the Results

With the information presented in Tables 7-9, effects on the Japanese economy resulting from changes in the international economic policies of the

TABLE 9

GNP Multipliers

Industry	GNP Multipliers*
1. Agriculture	1.119
2. Forestry	0.897
3. Coal and Crude Petroleum	0.508
4. Metal and Non-Metal Mining	0.512
5. Foodstuffs	1.155
6. Textiles	0.921
7. Lumber and Furniture	1.069
8. Pulp and Paper	1.038
9. Printing and Publishing	1.209
10. Leather and Products	1.162
11. Rubber Products	0.951
12. Chemicals	0.952
13. Coal and Petroleum Products	0.699
14. Ceramics	1.124
15. Primary Metals	0.986
16. Fabricated Metals	1.206
17. Machinery (except Elec.)	1.207
18. Electrical Machinery	1.283
19. Transport Equipment	1.245
20. Other Manufacturing	1.167
21. Construction	1.294
22. Utilities	0.899
23. Trade (Wholesale and Retail)	1.385
24. Transport and Communications	1.196
25. Services	1.207
26. Unallocated	1.043
Government Spending	1.194
Investment Spending	1.277
Export Sales	1.121

Note: Each entry shows the change in GNP caused by a one unit change in final demand, for example, if the change is 100 billion yen, then GNP change is 100 multiplied by the table entry and the answer is in billions of yen.

United States can be estimated. All that is required is to identify the particular industries affected and compute the changes in employment, prices, and GNP.

Later in this chapter, three specific examples of potential U.S. policies are examined. Each of these applications of the model has been derived from the above information. The three examples considered are: a ban by the United States on imports of motor vehicles from Japan; a ban by the United States on all imports from Japan; and an actual policy, the imposition of a 10 percent tariff surcharge on imports. For the case of a boycott by the United States of motor vehicle purchases from Japan, the beginning information was the 1972 volume of such exports. After converting this figure to 1965 prices, the total changes are taken from the tables. The example of a total boycott by the United States was constructed similarly. The 1972 figures for the commodity composition of exports to the United States comprised the beginning set of information.

The analysis of the 10 percent surcharge required one further step. The value-weighted, average U.S. tariff rate for commodity groups was taken from the United States Tariff Commission (1974) and used to compute the price changes induced by the surcharge. Estimates of U.S. import elasticities reported by Richardson (1974, 1973) were employed to estimate the changes in demand for U.S. imports from Japan. Tables 7-9 then provide the estimates of changes within the Japanese economy.

U.S. PRESENCE IN JAPAN AND VICINITY

The section briefly reviews the ties between the United States and Japan. It is intended to identify conditions of the two countries' relations that are important to the assessment of likely policy responses to harmful economic policies.

U.S. economic, cultural, and military interests in Japan have been substantial since the end of World War II. Post-war aid to Japan (more than $2 billion) was instrumental in moving the Japanese economy out of its war-related economic recession. Between 1953 and 1970, Japan received an additional $3 billion from the United States.[5] In the 1960's, however, as a consequence of Japan's economic maturity, U.S. aid was reduced to negligible amounts. By that time, U.S.-Japanese trade was growing rapidly and was the dominant factor in the economic relations of the two countries. By 1970, Japanese trade with the United States constituted about one-third of Japanese exports and imports (about $6 billion for each country). This was less than 10 percent of total U.S. trade, but is a large figure by world trade standards.[6]

Reciprocal foreign investment has also become important in recent years. In 1972, total U.S. investments in Japan were approximately $3 billion. Japanese investments in the United States were about $1.3 billion by 1973. The latter, however, has been expanding rapidly in response to the Japanese perception of an increasing American tendency toward trade protectionism.[7]

Cultural differences between Japan and the United States are significant. These differences are particularly conspicuous in the areas of religion, classical arts, institutions, and personal habits. Yet Japan is one of the Asian countries that has been extremely friendly toward the United States. For instance, until 1972 Japan did not recognize China (PRC). Nor did it significantly increase its trade with China. Japan did not act earlier because it did not want to pursue a foreign policy that would greatly deviate

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5 As of 1972 Japan had payed back about one-fourth of the nearly $5 billion total aid it had received between 1946 and 1972 (AID, 1972).

6 By the late 1960's and early 70's U.S.-Japanese trade was continuing its remarkable growth, but was also creating tension between the two countries (JIIA, 1973: 69-70).

7 Japan has been particularly apprehensive that such U.S. actions as the 1972 import surcharge on automobiles and the earlier restriction of textile imports, which were directed against Japan more than any other nation, may become more frequent (JIIA, 1973: 69-70).

from that of the United States. Furthermore, during the 1960's the Japanese Government did not oppose the Vietnam policy of the United States despite the increasing unpopularity of the policy in Japan.[8]

It is often noted that the United States and Japan have had a special relationship. This relationship has its origin in the socio-political engineering of the Supreme Commander for Allied Powers (SCAP) during the post-war occupation period. The Japanese Government, constitution, parties, military forces, labor unions, industry, banks, and many other organizations were either reformed or restructured by SCAP. Additionally, the long occupation period and the basing of large numbers of U.S. troops in Japan long after the occupation period was over complemented other interactions of American and Japanese cultures.

In short, Japan and the United States have very strong economic, political, military, and cultural ties, that are rooted in historical interaction and in present relations. What is certain is that the stakes involved in these ties, though not a matter of survival, are perceived by both sides to be extremely important.

U.S. Military Presence. The United States has maintained considerable numbers of troops and bases on Japanese soil since World War II. Until the outbreak of the Korean war, the United States was responsible for all security problems of Japan. But with the conflict in Korea straining U.S. forces in the Pacific, SCAP decided to shift to the Japanese an increasing amount of the responsibility for the defense of their country. Over time, Japanese military forces have grown from a lightly armed 75,000 man National Police Reserve in 1950 to a well-armed force of more than 250,000 regular military personnel.

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[8] This discussion of Japanese foreign policy is largely based on the following sources: Scalpino (1972), Kim (1974), Ellingworth (1972), Wohlstetter (1973), Pond (1973), CACI (1974), Chung (1975), Murthy (1973), Buck (1973), Sestak (1974), Emerson (1971), Clapp and Halperin (1974), and Emerson and Humphrys (1973).

Paralleling the growth of Japanese military forces, the United States has reduced its military forces in Japan from in excess of 500,000 men during the occupation to less than 50,000 in the 1970's.[9] The reduction in the number of U.S. military bases has been even more dramatic. In 1950 there were nearly 3,000 U.S. bases in Japan.[10] By the late sixties there were only about 130 U.S. bases left in Japan.

Another point to be noted is the Japanese contribution to U.S. military efforts. Japan was a very valuable staging area for U.S. forces during the Korean war. It also served as the major logistical center for the U.S. war effort in Vietnam. Of course the United States has major bases in other areas of the region--in Thailand, the Philippines, South Korea, and Guam. The bases on Japan, however, are advantageous because they are located in a country that has highly skilled manpower and a modern industrial base. These attributes, while not as important in a nuclear conflict scenario, become increasingly significant during a gradually escalating war such as Vietnam.[11]

Under the Nixon (or Guam) doctrine, it is expected that the U.S. military role in Asia in the future will be far more limited than in the previous two and a half decades. The United States is expected at least to reduce its direct military involvement in the affairs of countries on the Asian mainland. Events following the 1973 Vietnam cease-fire accord tend to

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[9] As of 1973, there were over 90,000 Americans in Japan. Most of these were servicemen and their dependents but there were also many U.S. civilians living in Japan. The only foreign country with a larger number of U.S. citizens was Germany (194,055). (See U.S. News and World Report, November 12, 1973.)

[10] Part of the reason for the large number of bases was the U.S. desire to maintain a visible U.S. presence throughout the country.

[11] On the other hand, in a slowly escalating conflict, the United States would have time to train local manpower and transport its logistic requirements from bases in less developed countries such as the Philippines and Thailand.

confirm this trend. The United States is not likely to become involved in future wars on the Asian mainland[12] (Sestak, 1974).

Recently, the United States has shifted its attention to a new military-diplomatic problem which may increasingly draw upon U.S. military resources in the Pacific--the security of Middle Eastern oil.[13] The October 1973 war in the Middle East and the subsequent oil embargo clearly demonstrated the importance of the Persian Gulf oil to Western countries and Japan. Furthermore, for some time the Soviet Union has maintained a flotilla of ships in the Indian Ocean. Presently, and perhaps in the foreseeable future, the United States would probably use contingents of its Seventh Fleet from time to time to meet any potential Soviet or local threat to the Persian Gulf oil fields.[14]

Therefore, even though the U.S. military role in South and Southeast Asia may have diminished under the Nixon doctrine, the increasing strategic importance of the Persian Gulf oil fields has created a new function for the U.S. military capability in the Pacific.

THE IMPACT OF POTENTIAL JAPANESE ACTIONS ON U.S. MILITARY CAPABILITY IN JAPAN AND VICINITY

This section draws upon the information previously presented in order to assess the "anger" resulting from economic damage, to discuss likely Japanese policy responses, and to describe the impacts on U.S. military capability.

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12 The Japanese bases could continue to be useful for U.S. strategic forces such as long-range bombers and nuclear submarines. But the Japanese nuclear "allergy" makes this a highly unlikely prospect.

13 Since the U.S. military presence in the Persian Gulf is relatively minor and the closure of the Suez Canal and Soviet Mediterranean flotilla make the use of the Sixth Fleet impractical, the Seventh Fleet is the logical choice for meeting any threat to the Persian Gulf oil fields.

14 This would be particularly true in situations requiring psychological demonstrations of military force, such as crisis periods.

There are two general ways that the Japanese can affect U.S. military capability in Japan. First U.S. actions may create enough hostility to induce the Japanese to take direct action against U.S. military forces. A possible action is the restriction of base rights. Second, the hostility of Japan toward certain U.S. economic actions may create within Japan an environment that would make the exercise of U.S. military capability very difficult.[15]

Table 10 shows the range of possible actions that the Japanese may take in retaliation to harmful U.S. actions. The actions are ordered from low impact (lower half of the table) to high impact (upper half). Some of the options listed in this table are actions that directly affect the components of U.S. military capability (the C of equation 3, Chapter III). The ordering of actions has been imposed because it is assumed that as the hostility of the Japanese toward the United States increases, the likelihood of the Japanese using an action with a higher impact increases.

Figure 1 schematically presents the sequence of analytical steps required to determine Japanese anger toward the United States. Figure 2 displays the relationships between Japanese hostility (or anger toward the United States) and three economic variables (unemployment, economic growth, and inflation rate). The shapes of these relationships are based on the theoretical concept of "relative deprivation." The positions of the curves representing these relationships are based on the historical experience of Japan and the expectations of the Japanese. For instance, it was found that in the post-war period, the Japanese have successfully maintained low rates of unemployment. Their average GNP growth rate has been about 10 percent for more than two decades. Finally, although Japan has tried to maintain a low inflation rate, the Japanese have shown a greater toleration for inflation than most Western countries.

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[15] A country where there are frequent anti-American demonstrations and riots, for instance, certainly would be less preferable to one that has a friendly population.

TABLE 10

Potential Japanese Retaliations in
Response to Harmful U.S. Economic Actions

Japan attacks the United States.
Japan declares war on the United States
Japan demands withdrawal of all U.S. forces from the Pacific.

Japan demands withdrawal of all U.S. forces from bases in Japan.
Japan places a total embargo on trade with the United States.
Japan demands the withdrawal of U.N. forces from Korea.
Japan breaks diplomatic relations with the United States.

Japan agrees to give military aid to China.
Japan agrees to give military aid to North Korea.
Japan agrees to give military aid to Arab countries.
Japan agrees to help the Soviet Union build a more advanced electronic/computer industry.

Japan severely restricts the number of takeoffs/landings of U.S. aircraft in Japan.
Japan announces plans for building strategic nuclear submarine force.
Japan announces plans for building a nuclear ASW system.
Japan announces plans for building an ABM system.
Japan renounces the Nuclear Nonproliferation Treaty.

Japan demands a 20 percent reduction in the size of U.S. forces in Japan.
Japan abrogates the U.S.-Japan Security Treaty.

Japan recognizes the "PRGV" (Viet Cong).
Japan makes major investments in China.
Japan makes huge investments in Siberian oil and gas.
Japan breaks relations with Israel.

Japan recognizes Palestine Liberation Organization.
Japan increases economic aid to People's Republic of China.
Japan increases economic aid to Mongolia.
Japan increases trade and economic aid to East Germany.
Japan increases economic aid to North Korea.
Japan increases economic aid to North Vietnam.

Japan increases restriction on all industrial goods imports.
Japan prohibits any U.S. investments in Japan.
Japan restricts all foreign investments.

Japan protests against U.S. economic measures.
Japan takes actions to diversify its trade.
Japan takes no measures against the United States (takes purely domestic actions.)

Japan takes no action in response to U.S. measures.

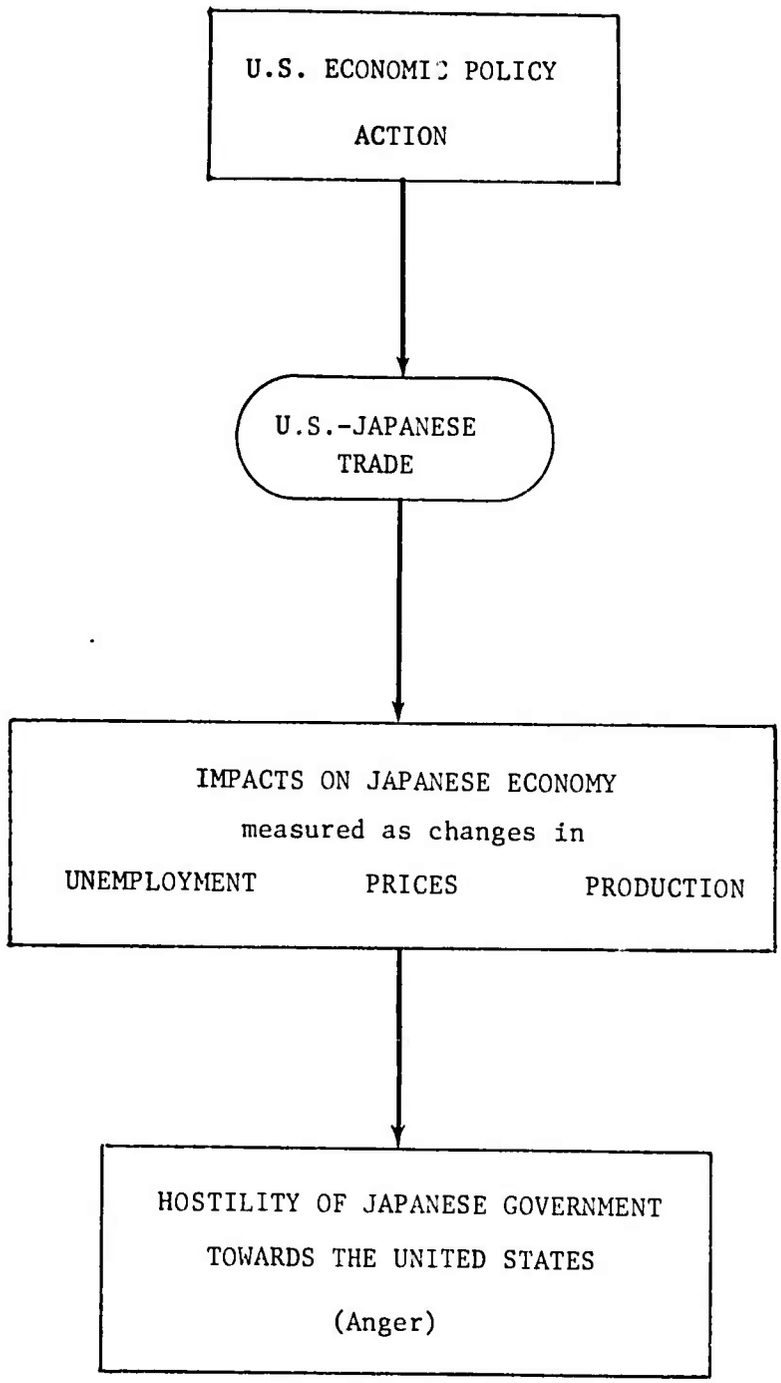


Figure 1. Analytical Sequence for the Determination of Japanese Hostility Toward the United States

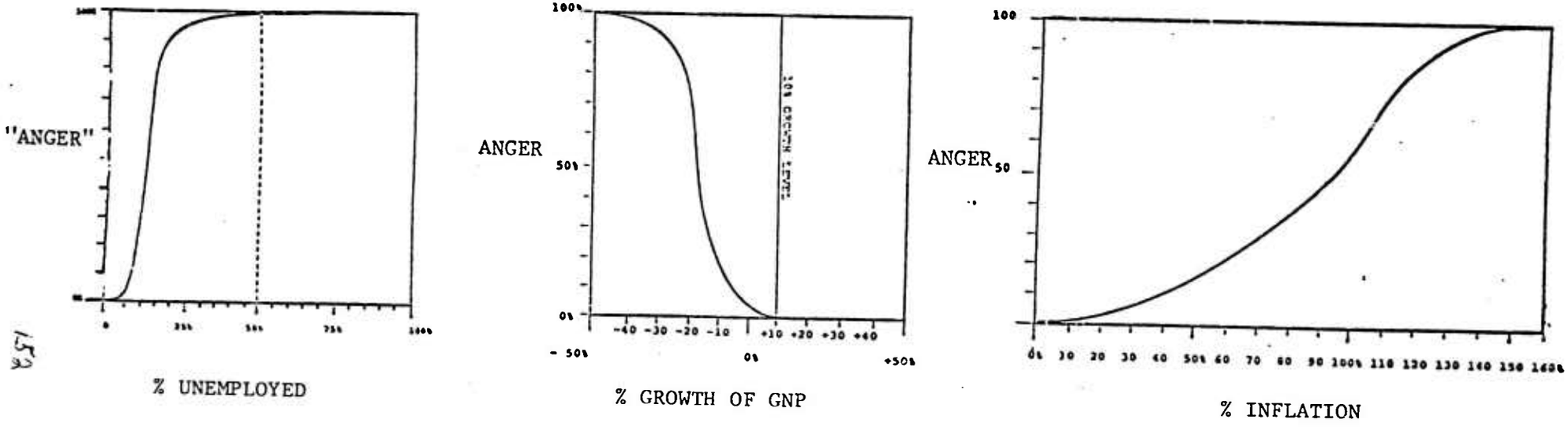


Figure 2. The Relationship Between Unemployment, Economic Growth, and Inflation Rates and Japanese Anger Toward the United States

Military Capability

Employing equation 3 of Chapter III, the potential U.S. military capability in Japan that can be projected to target x can be described as

$$C_{Jx} = \frac{C_J}{h_{Jx} d_{Jx}}$$

and the subscript identifications are: J = Japan; x = target (for example, Vietnam).[13]

U.S. military capabilities in Guam (G), Thailand (T), Korea (K), the Philippines (P), and the Seventh Fleet (S) can also be expressed in similar form. Then, assuming additivity of capabilities, the total capability of the United States at target x becomes

$$C_{Tx} = C_{Jx} + C_{Gx} + C_{Tx} + C_{Kx} + C_{Px} + C_{Sx},$$

or

$$C_{Tx} = \frac{C_J}{h_{Jx} d_{Jx}} + \frac{C_G}{h_{Gx} d_{Gx}} + \frac{C_T}{h_{Tx} d_{Tx}} + \frac{C_K}{h_{Kx} d_{Kx}} + \frac{C_P}{h_{Px} d_{Px}} + \frac{C_S}{h_{Sx} d_{Sx}}$$ [17]

From this equation it is clear that the importance of U.S. military capability projected to a target does not depend solely upon capability (C), hostility (h), and distances to potential targets (d) of capability within Japan. Rather, the significance of C_{Jx} depends on the effectiveness of U.S. capabilities at other locations, capabilities determined by a different set of hostilities and distances at other locations (that is, C_{Gx}, C_{Tx}, C_{Kx},

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16 Then, according to notations in Chapter III, h_{Jx} = hostility of the Japanese toward the use of capability C at target (x), distance of the target (x) from Japan, and C_J = total aggregate of U.S. capability in Japan.

17 Note that if the additivity condition did not hold, it is possible to have $C_{Jx} \cup C_{Gx} > C_{Jx} + C_{Gx}$. This implies that C_J and C_G may act as complements to have to each other in such a way that their combined capability would be greater than the sum of their separate capabilities.

C_{Px}, and C_{Sx}).[18] In reality, it is not expected that the loss of U.S. capability in Japan (C_J) would greatly affect total U.S. capability in, say, Southeast Asia because the sum of U.S. capabilities in Guam, Thailand, Korea, the Philippines, and the Seventh Fleet is relatively large.[19]

Examples of U.S. Economic Action

In this section the impact of three examples of U.S. economic policies on U.S. military capability will be examined on the basis of models developed in previous chapters. The three policies and their economic impacts are described in Table 11. The impact of each policy on the economy was estimated from the economic models that were described above in greater detail.

Policy I involves a total ban on all U.S. imports from Japan. The fact that such a ban involves nearly a total break in economic relations of the two nations probably has far greater political significance than the purely economic consequences, which nevertheless are severe enough to lead to at least 6.55 percent additional unemployment and 3.61 percent decline in GNP. In fact, the effort required by the Japanese Government to avoid such a decline involves a large amount of additional expenditure, equal to 16 percent of the current budget. Assuming a conservative expectation of economic growth (an annual growth rate of 8 percent), the U.S. policy would reduce growth to 4.1 percent. This means that in order to achieve the previously

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[18] In other words, since

$$C_{Tx} = C_{Jx} + C_{Gx} + C_{Tx} + C_{Kx} + C_{Px} + C_{Sx},$$

the significance of C_{Jx} depends on the magnitude of

$$\frac{C_{Jx}}{C_{Tx}} = \frac{C_{Jx}}{C_{Jx} + C_{Gx} + C_{Tx} + C_{Kx} + C_{Px} + C_{Sx}}.$$

[19] This means that $\frac{C_{Jx}}{C_{Tx}}$ is small. Obviously this result is to some degree an artifact of the additivity assumption. In reality, the Seventh Fleet, for instance, relies heavily on Japan for home porting. The additivity assumption, however, does not allow for this.

TABLE 11

Examples of Economic Policy Impacts

Policy I: U.S. ban on imports from Japan

6.55% unemployment
3.61% decline in GNP

Japanese government action to avoid GNP decline requires additional spending equal to 15.9% of current budget.

Assuming an expected growth rate of 8% per year.

- U.S. action would reduce growth to 4.1%
- To completely offset the U.S. action, to achieve an 8% growth rate, government spending, investment and remaining exports must expand at 10.06% rate.

Policy II: U.S. ban on motor vehicle imports from Japan

1.19% unemployment
0.53% decline in GNP

Policy III: U.S. imposes 10% surcharge on tariffs

0.25% unemployment
0.14% decline in GNP

expected annual growth rate of 8 percent, government spending, investment, and remaining exports must expand by at least 10 percent in one year.[20]

Policy II is far less severe. It involves a total ban on imports of Japanese motor vehicles to the United States. Such a policy could be in response to balance of payment or unemployment problems in the United States. According to the economic model of Japan, this policy would result in at least 1.2 percent unemployment and 0.53 percent decline in GNP. The final example, policy III, involves the imposition of a 10 percent surcharge on import tariffs of goods from Japan. The consequences of this action include at least 0.25 percent unemployment and a 0.14 percent drop in GNP.

Assessment of Anger and Responses

Figure 3 displays the impact of unemployment rates caused by policies I and II on Japanese anger (or hostility) toward the United States.[21] It is evident that neither policy, not even a total U.S. embargo on imports from Japan, creates enough anger by itself to lead to major retaliations by Japan.[22] As implied earlier, however, the impact of contextual factors may exacerbate the U.S.-Japanese conflict and escalate the conflict to such an extent that in their future policies, the Japanese would tend to select more severe retaliations (or may appear to overract).

Figure 4 shows the judgmental probabilities assigned to the two sets of branches that indicate the Japanese retaliatory options. As was explained earlier, the probabilities for the first set of branches are determined

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20 For reasons explained in Chapter IV and at the beginning of this chapter the present economic models probably underestimate the economic impact of harmful U.S. policies.

21 The impact of policy III on anger was found to be negligible. It was therefore not displayed in Figure 3.

22 Keep in mind, however, that these could be underestimates (see also footnote 20).

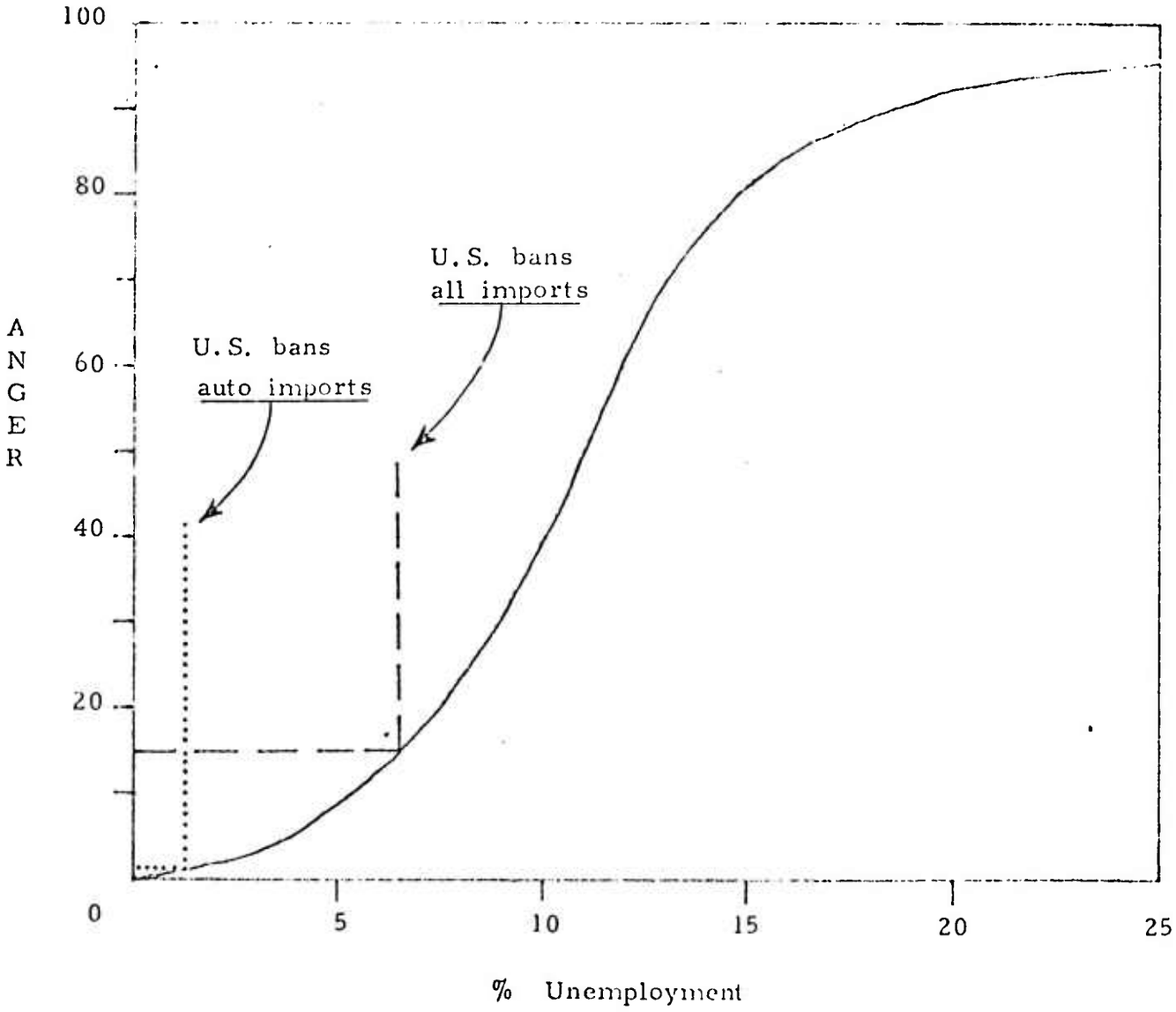


Figure 3. The Impact of Specific U.S. Actions on Japanese Hostility Toward the United States

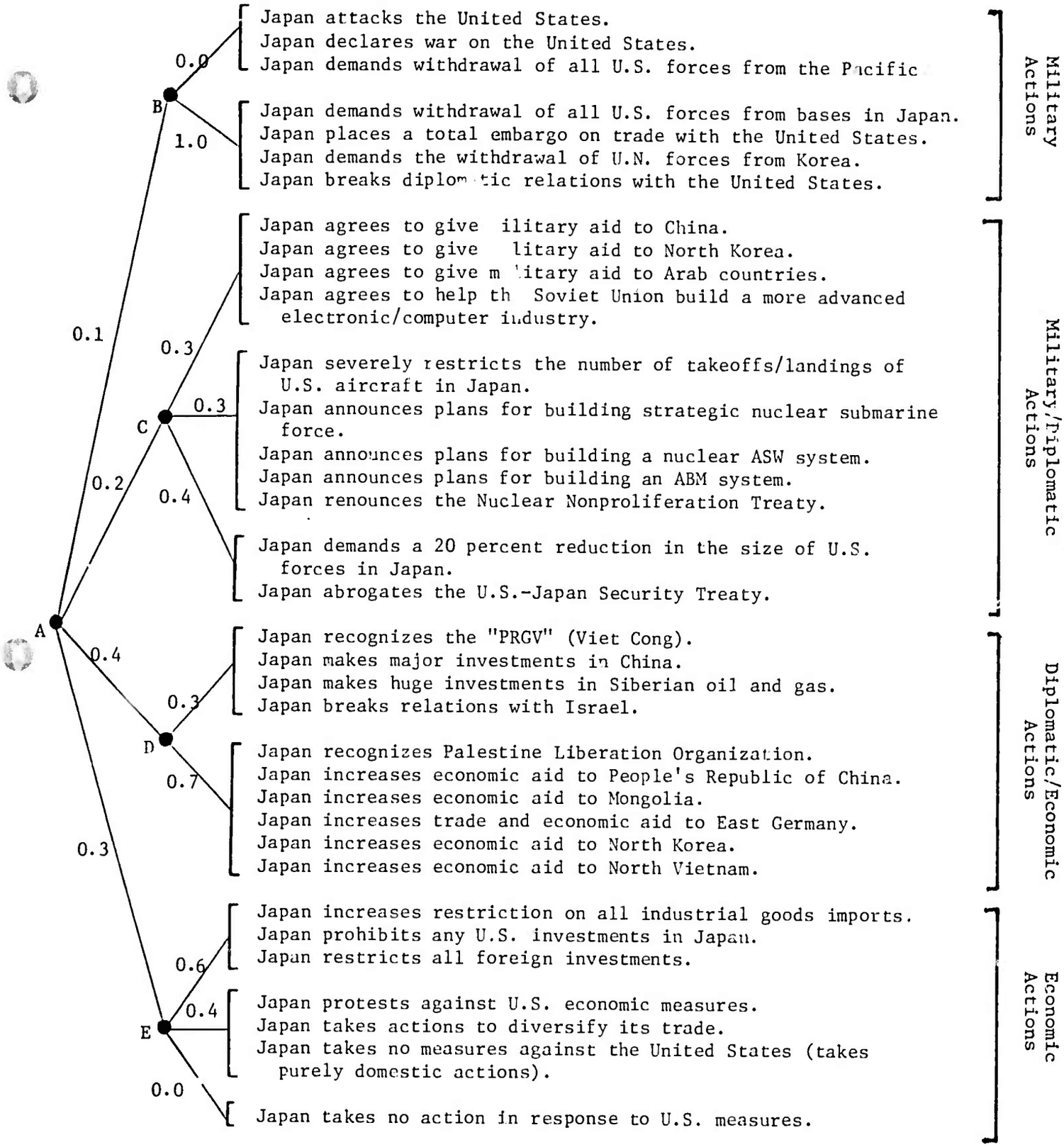


Figure 4. Judgmental Probabilities of Potential Japanese Responses to a Total U.S. Embargo on Japanese Exports to the United States

according to the level of hostility (h).[23] The probabilities for the secondary branches are based on such contextual variables as the previous level of conflict, legitimacy of U.S. action, power balance, and so forth.[24] The assigned probabilities indicate that the most probable types of retaliation in response to a U.S. embargo on Japanese imports are those that are in nature diplomatic/economic. Military responses, on the other hand, are the least likely. More specifically, retaliations that are most likely to be taken involve an increase in Japanese ties with Communist countries and groups unfriendly to the United States (for example, Palestine Liberation Organization).[25] In addition, Japan is likely to take certain purely economic actions such as increasing its trade with countries other than the United States (diversification) and may engage in protectionist policies to improve its balance of payments position.[26]

With the above analyses in mind, it can now be asked whether any of the likely retaliations seriously affect U.S. military capability in Japan and the vicinity? Total U.S. military capability in Japan and the vicinity was described by the following equation[27]

$$C_{Tx} = \frac{C_J}{h_{Jx}d_{Jx}} + \frac{C_G}{h_{Gx}d_{Gx}} + \frac{C_T}{h_{Tx}d_{Tx}} + \frac{C_P}{h_{Px}d_{Px}} + \frac{C_K}{h_{Kx}d_{Kx}} + \frac{C_S}{h_{Sx}d_{Sx}}$$

Among the above terms only $C_J/h_{Jx}d_{Jx}$ would be affected by Japanese actions or behavior. Direct Japanese retaliations may reduce U.S. capability in Japan (C_J). The most probable retaliations, among those listed in Figure 4,

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23 The greater the hostility, the greater the retaliation judgmentally assigned to it, or $R_{JU} = F(h_{JU})$, where U = U.S.

24 Assumptions A_2 through A_5, Chapter V, relate contextual factors to retaliations.

25 Refer to branch D on Figure 4.

26 Protectionism, however, may not be a wise policy since Japan would be more vulnerable in such a game than almost any other nation. Protectionist policies are among those in branch E in Figure 4.

27 This equation was described in the previous section and its derivation was presented in Chapter III.

are not of direct relevance to U.S. military capability in Japan (C_J). None of the most likely actions would affect U.S. bases, troop strength, or other military facilities.[28] The likely Japanese retaliation may damage U.S. diplomatic and commercial activities in Southeast and East Asia and somewhat strengthen the prestige of the regional Communist regimes. The latter development may in turn increase the long run prospects of more hostile actions against the United States in the region, but such events cannot directly affect the physical components of U.S. capability (C_J) in the short run.[29]

The above agreement does not mean, however, that the operational capability of U.S. military power would be unaffected. By definition, U.S. capability to project power is reduced whenever the hostility of governments and people of the region where the U.S. forces are located is increased. Therefore if, as shown in Figure 3, Japanese hostility (or anger) toward the United States is increased by 15 percent, then U.S. capability in Japan (C_{Jx}) would be reduced by 14 percent.[30] Furthermore, actions by Japan such as the recognition of the Provisional Revolutionary Government of South Vietnam (Viet Cong), in addition to increasing U.S.-Japanese tensions, may encourage anti-U.S. behavior in other countries within the region. This, in turn,

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[28] The reasons for the subdued nature of Japanese retaliation are many. Some of these were discussed as contextual factors. It is worth adding that the U.S.-Japanese Mutual Security Treaty is itself a powerful restraining force on the present Japanese Government, which is run by the Liberal Democratic Party (LDP). If, however, a new government consisting of Socialists and Communists was able to come to power, it would be unlikely that the present restraints, such as the Mutual Security Treaty, would be as salient as they are with the LDP in power.

[29] That is, hostility (h) may escalate but no action is taken directly to reduce U.S. capability (c).

[30] Assume that the hostility was orginally unity. Then the new hostility level would be $h_{Jx} = (1+ 0.15)\ h$

$$\text{and } C_{Jx} = \frac{C_J}{1.15\ h\ d_{Jx}}$$

$$\text{or } C_{Jx} = 0.86\ \frac{C_J}{h\ d_{Jx}}$$

could increase the probability of future actions against U.S. military capability in other countries. The implication of this argument is that any anti-U.S. action by any country in any region would reduce U.S. capability in that region, even though, as in this example (Policy I), the actions may not have a direct, short-term impact on U.S. capability.

Figure 5 displays the probabilities for various Japanese retaliations in response to U.S. policy II, a total ban on imports of Japanese motor vehicles. The most likely Japanese responses are economic. Purely military responses are listed as unlikely (zero probability) and diplomatic responses generally have a low or moderate likelihood. In this case, therefore, neither hostility (h_{Jx}) nor the components of capability (C_J) would be significantly affected by the economic impact of U.S. policy. In fact, hostility would increase by only a few percentage points (see Figure 3), and Japanese actions that would directly affect U.S. military capability are highly unlikely (see Figure 5). But, as in the case of Policy I, these statements should be qualified by the fact that any anti-U.S. behavior by Japan, no matter how insignificant it may appear at the time, may increase the probability of future harm to U.S. capability.[31]

Figure 6 displays the probabilities for various Japanese retaliations in response to U.S. policy III, a 10 percent tariff surcharge on Japanese imports. Since the overall impact of this policy on the Japanese economy was found to be almost negligible, its impact on Japanese hostility (h) was found to be insignificant.[32] Consequently, the probabilities assigned to potential military responses by Japan are all less than 0.04 and in most cases are near zero. The most probable Japanese responses to policy III are domestic-economic in nature. This is reasonable since Japan can adjust its economy, admittedly with some costs, to the dislocations caused by

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[31] This argument is essentially similar to assumptions A_3 and A_4 in Chapter V.

[32] Hostility or anger (h) resulting from policy III was so small that it could not be displayed in Figure 3.

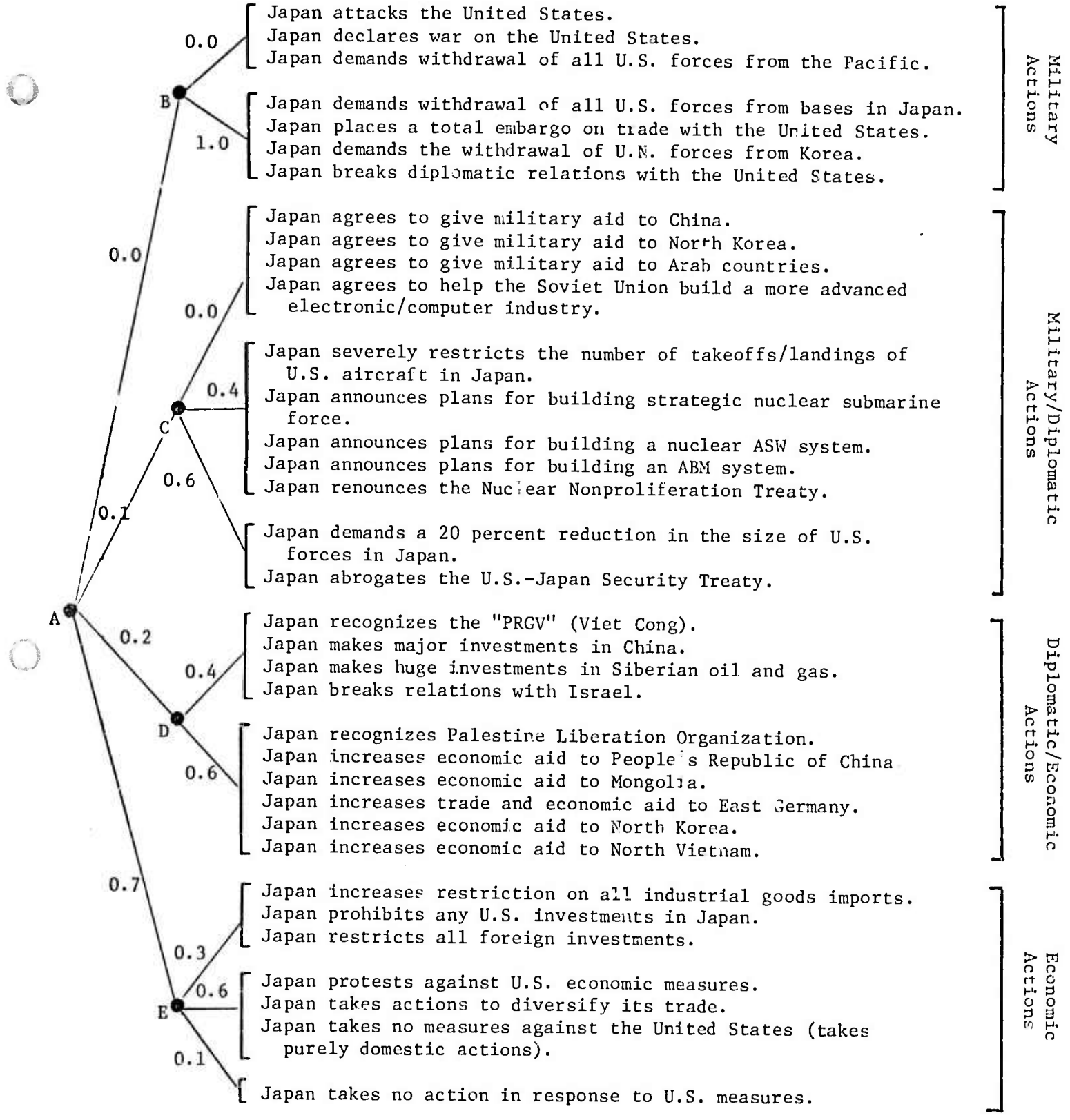


Figure 5. Judgmental Probabilities of Potential Japanese Responses to a U.S. Embargo on Imports of Japanese Motor Vehicles into the United States

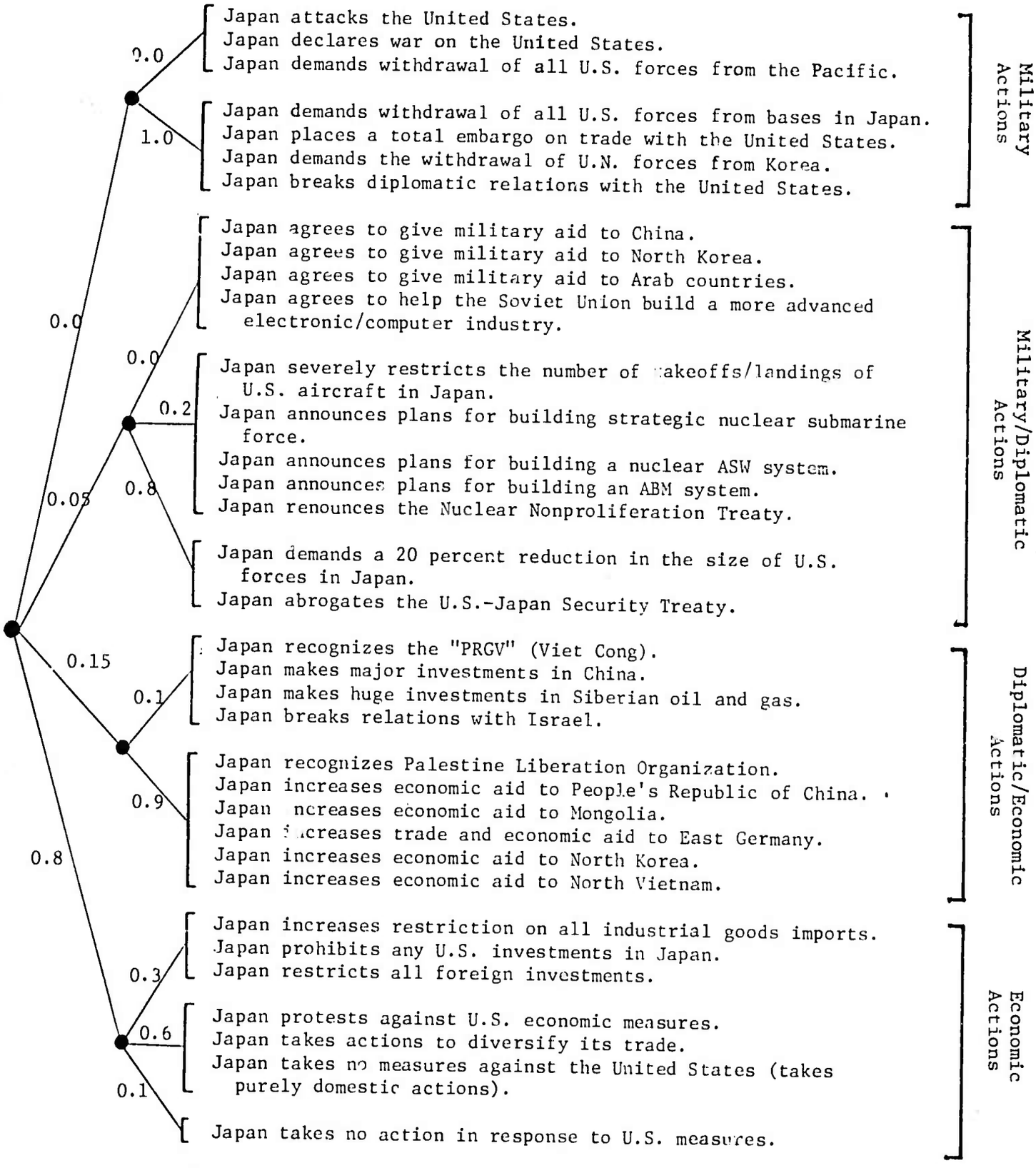


Figure 6. Judgmental Probabilities of Potential Japanese Responses to a 10% Surcharge Tax on Japanese Exports to the United States

U.S. policy. The Japanese would, therefore, have little reason to take actions that would risk jeopardizing their generally cordial relations with the United States.[33]

SUMMARY

This chapter has demonstrated the applicability of the methodological tools developed in previous chapters to U.S.-Japanese relations. Japan was selected because it is in an area where the United States has had a great many interests in the post-World War II period and the complexity of U.S-Japanese economic ties provides a good test for the methodology.

The high dependence of Japan on the United States for its exports and imports makes Japan highly sensitive to any U.S. restriction of trade. On the other hand, the asymmetric nature of this dependence and the military weakness of Japan indicate that Japan would be highly restrained in retaliating against harmful U.S. economic actions.

It was found also that the extent of economic harm the United States can create in Japan is limited. Even an extreme policy by the United States, such as a total ban on imports from Japan, causes only 6.55 percent unemployment. Other U.S. policies, such as a ban on the import of motor vehicles and a 10 percent surcharge on tariffs of Japanese imports, cause much less harm--only 1.19 and 0.25 percent unemployment respectively.

Therefore, since the Japanese tendency for retaliation is highly restrained and only extreme (and hence unlikely) U.S. policies can cause significant damage to its economy, it is highly improbable that the Japanese would take actions that could directly harm U.S. military capability. The tools developed in this study, however, explicitly show that even unexpressed Japanese hostility may harm U.S. military capability.

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[33] See assumptions A_2 through A_5 in Chapter V.

Hostility by itself does not reduce U.S. physical capability. But by creating a difficult environment, it reduces the operational U.S. military capability. Thus, it is likely that harmful U.S. economic actions, in the long run, would create such a hostile environment in Japan that U.S. military capability currently located in Japan would have to be moved to another location. Such an event by itself would not severely damage overall U.S. capability in East and Southeast Asia. But, given the fact that Japan is a friendly U.S. ally and a democracy with a powerful industrial base, any tension in U.S.-Japanese relations is bound to have a negative long-run impact on the overall prestige of the United States.

CHAPTER VII. CASE STUDY OF SAUDI ARABIA

This chapter discusses the application of analytic tools developed in previous chapters to Saudi Arabia. The selection of Saudi Arabia as one of the two countries to be studied was influenced by several considerations. A discussion of these precedes other portions of the analysis.

SELECTION OF SAUDI ARABIA

Most of the considerations leading to the selection of Saudi Arabia can be reduced to two general statements. The first emphasizes the recent and important influences of petroleum-exporting economies on the functions of the international economy. Because resource-exporting countries have dramatically altered the international economic environment, an attempt to apply the techniques of the project to one such country could contribute to our understanding of these recent events as they affect U.S. defense interests abroad.

The second general reason for including Saudi Arabia is related to the generality of the analytic techniques. In the judgment of the research staff, an analysis of Saudi Arabia would test the applicability of the techniques to a less developed economy that does not have extensive economic ties to the United States. Given recent publicity devoted to emphasizing the existence of economic ties, a few remarks justifying the last sentence are in order.

The previous chapter discussed the economic ties between Japan and the United States. The United States purchases a wide range of Japanese products and total U.S. purchases are a significant portion of total Japanese exports. The same cannot be said of Saudi Arabia. First,

nearly all of Saudi Arabia's exports are from one sector -- petroleum. Within that sector, crude petroleum dominates other products. Non-oil exports are only a limited number of agricultural products. To illustrate the magnitude of exports, in 1971 total exports were valued at SAR17,304 million (Saudi Arabian Riyals); non-oil exports have consistently averaged SAR7 million.

Given the single-product concentration of Saudi Arabian exports, it is nevertheless possible for the United States to purchase a major portion of exports. Table 1 shows the geographic distribution of Saudi Arabian exports for 1971 and 1972. The data reported for the two years

TABLE 1

Geographic Distribution of Saudi Arabian Exports
(millions of Saudi Arabian Riyals)

	1971	1972*
United States	589.5	772.0
Western Europe	8,386.1	12,003.4
Middle East	805.7	751.7
Africa	758.9	687.7
South America	973.9	1,207.0
Japan	2,783.1	3,500.1
Others	3,005.5	3,840.4

* Figures for 1972 are oil exports only. The 1971 data report total exports.

Source: Central Statistics Department, Saudi Arabian Statistics.

are intentionally different -- the 1971 figures represent total exports while only petroleum exports are reported for 1972. In neither case is the United States a major purchaser. Japan is, in fact, the largest single export market. Several countries in Western Europe purchased in excess of SAR2 billion of oil alone in 1972. As a result, the United States is well down on the list of trading partners ranked by value of purchases.

The comparatively small proportion of exports to the United States suggests that the economic damage that can be inflicted on Saudi Arabia by U.S. international economic policies is small. It is important to recognize that the basic mechanism creating economic damage is a reduction in final demands for the country's export products. As the United States does not control a significant proportion of final sales, the expectation has been that the economic damage that can be measured by the model is small. Hence an application to Saudi Arabia constitutes a most severe test of the analytic techniques.

Before describing the results of the Saudi Arabian study, a brief digression to explain the reporting system for Saudi Arabian statistics is needed. Most data are reported for the Moslem calendar rather than the Gregorian. The exceptions are government budgetary items, which are fiscal years on the Moslem calendar, and a few petroleum-related statistics reported on the Gregorian system. All data in this chapter have been converted to Gregorian dates. As it has been necessary to convert monthly data on the Moslem calendar to Gregorian years, there is some error. Table 2 provides a year-based concordance between the two calendars.

TABLE 2

The Moslem Calendar Related to the Gregorian System

Moslem Year	Gregorian Date at the End of Moslem Year
1383	May 11, 1964
1384	April 30, 1965
1385	April 20, 1966
1386	April 10, 1967
1387	March 29, 1968
1388	March 18, 1969
1389	March 8, 1970
1390	February 25, 1971
1391	February 15, 1972
1392	February 4, 1973
1393	January 24, 1974

Note: Persons consulting Saudi Arabian statistics should also recognize the Moslem fiscal year. The fiscal year begins at the seventh year. Generally, fiscal years are clearly identified, for example, 1392/93.

THE SAUDI ARABIAN ECONOMY

The Saudi Arabian economy is substantially the petroleum industry. In 1972, the petroleum sector share in gross domestic product approached two-thirds. Because many discussions of the petroleum industry are available, other features of the economy are treated here. The Hitti and Abed (1974) article is recommended to readers as a concise discussion of materials beyond the scope of the current treatment.

One of the more important, modern industries in Saudi Arabia is petrochemicals. The government agency Petromin, responsible for oil and minerals, has led efforts to develop the sector. Four refineries provide current domestic supplies of refined petroleum. Construction is underway at two additional sites to increase the capacity of refining activities. It is expected that the current pattern of use, 50 percent export, 10 percent domestic use and the remainder devoted to oil production and transportation, will not change significantly in the future. Efforts have also been directed toward developing domestic capacity for fertilizer production but only one plant has been constructed to date.

Other "industrial" activity in Saudi Arabia is limited. A 1968 survey indicated that 30,000 workers were employed in manufacturing operations. It also reported the average number of employees per firm at 3.3, indicating small-scale activity. Judging by the experiences of other countries, such small-scale activity represents non-modern production techniques and comparatively low rates of labor productivity. The judgment appears valid as a 1970 survey of 294 larger enterprises revealed that chemical plants and three refineries accounted for 54 percent of the total capital value of firms in the survey.

Agriculture absorbs the largest proportion of the labor force in Saudi Arabia. Roughly two-thirds of the population and one-half of the labor force are so employed (Hitti and Abed, 1974: 268). This apparent contradiction can be easily explained. Because the labor force is necessarily

smaller than the population, the expectation is for the magnitudes of the above shares to be reversed -- a larger percentage of the labor force in agriculture than the corresponding percentage for population. The reported figures indicate a phenomenon common to many less developed countries: a substantial number of persons are classified as being active in agricultural pursuits even though they are not involved in markets, that is, subsistence agriculture is extensive.

Extensive employment data similar to the type reported for developed countries is not available. The best available records are from a 1965 survey conducted by the Central Statistics Department. They report a labor force of approximately one million persons, 46 percent in agriculture, 2.5 percent in mining (including petroleum), 4 percent in manufacturing, 10 percent in construction, and the remainder (37.5 percent) in the service sector of the economy. In recent years, employment in public sector activities and wholesale and retail trade has been growing. Whether this increase has been at the expense of employment in other sectors cannot be determined because the growing amount of foreign labor in the economy and the movements of persons from subsistence to market activities do not allow accurate estimates.

In real terms, the Saudi Arabian economy has grown at rather high annual rates in the recent past. Gross domestic product growth rates have been approximately 15 percent while gross national product has expanded more slowly at 12 percent per year. The difference between the two is indicative of the importance of the petroleum sector and the oil company earnings that have been repatriated.[1]

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[1] For readers unfamiliar with GDP and more accustomed to GNP, the difference between the two is primarily the treatment of income produced in the country but not controlled by "residents" of the country. GDP counts the value of production occurring within the country. GNP adjusts the GDP figure by subtracting the repatriated earnings of non-residents and adding the income of "residents" that originates in other countries.

Despite the substantial volume of repatriated earnings, the Saudi Arabian balance of payments has generally been favorable since the early 1960's. Only in 1968 and 1969 were deficits incurred. The general magnitude of the surplus has been SDR 100 million (Special Drawing Rights, see International Financial Statistics of the International Monetary Fund). Since 1971 and the increase in oil prices, the surplus has grown dramatically even though imports have also increased.

Saudi Arabian imports are predominantly foodstuffs, machinery, and transportation equipment. These items were approximately 62 percent of total imports of SAR4708 million in 1972. The suppliers of the country's imports are largely West European countries. Percentage shares, again for 1972, were 29 percent from West Europe, 22 percent from other Middle East countries, 20 percent from the United States, 14 percent from Japan, and the remainder from other areas.

The official international reserves of Saudi Arabia's central bank, the Saudi Arabian Monetary Agency (S.A.M.A.), have also increased as oil prices have increased. The bulk of reserves are held in the form of foreign exchange (95%). The S.A.M.A. has no externally owned assets. The external liabilities of the country are attributable to the commercial banking system. Since 1970 the foreign assets of commercial banks have expanded rapidly. This phenomenon indicates that the supply of investment funds exceeds available investment opportunities in the domestic economy. The international economic policies of the Saudi Arabian Government are quite distinct from the pattern commonly found among developing countries. The possession of petroleum resources is, of course, the explanation for the difference.

The history of Saudi policies affecting the petroleum industry, including recent price positions, is concisely discussed by Hitti and Abed (1974). Other international economic policies do deserve mention here. Since 1960 there have been no restrictions on imports of goods and services

nor on international financial transactions. Exchange transactions for current and capital account purposes can be conducted in any currency[2] by both residents and non-residents.

APPLICATION OF THE ECONOMIC MODEL TO SAUDI ARABIA

Application of the economic model to the Saudi Arabian economy proved to be difficult and the results somewhat inconclusive. Two principal difficulties were associated with the research effort: the fact that the Saudi Arabian economy is dominated by the petroleum industry, and the non-existence of economic data of the sort readily available to developed countries and generally available for "upper tier" developing nations.

The importance of the petroleum industry to the Saudi Arabian economy is difficult to exaggerate. And as a result, other aspects of economic activity in the economy approach unimportance by comparison. The available evidence suggests that manufacturing activity is either of a petrochemical nature or operates at quite small scales of production. The significant industry, as judged by employment, is agriculture, but subsistence crops and herding remove large portions of the population from interaction with the market economy and necessarily from effects produced by changes in the international economy. Service industries are expanding but are concentrated in wholesale and retail trades and government (public sector) employment.

Given the importance of the petroleum industry to the Saudi Arabian economy, that industry is the principal point of vulnerability to economic damage inflicted by international economic policies. But because

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[2] This statement is correct in that there are no economically based restrictions on the use of other currencies. However, on political grounds, Saudi Arabia restricts interactions with Israel, South Africa, and Rhodesia. As an element of Saudi Arabian foreign policy, the use of these countries' currencies is prohibited.

the U.S. share of oil exports is not large, the United States, acting alone, can cause little disruption.

The second research problem, the unavailability of economic data for the country, further complicated the implementation of the economic model. The data employed in the study were acquired from a variety of public sources. International data were found in various publications of the United Nations and the International Monetary Fund. Domestic data were almost exclusively limited to that published in the annual reports of the Central Department of Statistics and the Saudi Arabian Monetary Agency.

The major impediment to a facile application of the economic model derived from the model's design. The model was developed to exploit information accompanying input-output tables. Saudi Arabia has not published an input-output table for its economy. Consequently the data necessary to generate the empirical form of the model were pieced together from fragmentary sources. Checks for consistency were performed by requiring accounting balances in a manner similar to that described in Spulber and Moayed-Dadkhah (1975). The work was guided by assuming that the technological relations of production in Saudi Arabia are "similar" to those of more developed countries. The assumption is somewhat tenuous, but it does allow research efforts to be guided by highly aggregated input-output tables for other countries.

Evaluation of Results

The application of the model shows the Saudi Arabian economy to be basically impervious to changes in U.S. international economic policies. In many respects, the general result is in line with recent experiences. Yet, on the other hand, it may well be that an accurate representation of the impacts on the economy has not been achieved. Given this difficulty, each sector of the model is discussed separately. The sectors

are: agriculture, construction, petroleum, manufacturing, and services. It should be emphasized that the following discussions center on examinations of the effects of restrictions placed on the ability to import products. Except for the petroleum sectors, such restrictions are the only ones remotely harmful to the economy -- non-oil exports are extremely small.

Agriculture. As previously discussed, a substantial portion of agricultural activity is at the subsistence level. The exported crops are primarily dates and onions. As a result of these two points, the agricultural sector is not affected by international factors. Limited export volume means other countries, the United States in particular, are not "responsible" for employing Saudi Arabian labor to any appreciable degree; the presence of subsistence activity suggests that movement between market and non-market activity is readily accomplished. With the exception of some government-operated facilities, agriculture can be characterized as "selling the surplus when possible."

Further, because Saudi Arabia does import foodstuffs, the domestic agriculture sector would actually benefit from higher world prices induced by a U.S. limitation on agricultural exports. Recognizing the actuality of Saudi Arabia's foreign exchange reserves, import purchases of higher priced foodstuffs could easily be heavily subsidized by the government.

Construction. Saudi Arabian development programs do purchase extensively from this sector. But, with the exception of cement, almost all material inputs are imported. As a result, the inter-industry ramifications of a change in the demand for construction activity are non-existent. Because the bulk of this sector's functions are associated with government spending programs, demand is as the government chooses it to be. Fluctuations in private sector demands for the industry's output generated by exogenous changes in other industries of the economy are unimportant.

Manufacturing. As previously mentioned, Saudi Arabia imports machinery and transportation equipment. The model shows that a ban on the export of these commodities by other countries would induce a substantial increase in employment, from approximately 4 percent to nearly 6.5 percent of the labor force. Recognizing that the scale of enterprises in Saudi Arabia is quite small, it seems unlikely that the manufacturing sector could effectively replace these imports. Consequently, the induced effects on other sectors are smaller than one might reasonably expect. (The effects on other sectors were estimated at a 4 percent reduction in outputs.)

Other products of the manufacturing sector are petroleum products, cement, and limited quantities of iron ingots. Only refined petroleum products are exported and even then on a small scale and concentrated in the provision of fuels for tankers transporting crude petroleum. Light manufacturing activity is concentrated in food and beverage processing. A restriction on the sale (by other countries) of inputs to these activities would generate some changes. The estimates are a reduction in gross-domestic-product-evaluated output of 0.759 times the reduction in import values. The change is attributable to the output lost in processing the items and in the service sector (wholesale and retail trade).

Services. Effects on the service sector of the economy are limited to those discussed in the immediately preceding paragraph. Although approximately 37 percent of the labor force is in the service sector, the substantial proportion of that amount is attributable to public services and traditional personal services. Public service employment is of course directly controlled by the government. Demands for traditional personal services remain stable. Any changes that do occur are attributable primarily to wholesale and retail trade.

Petroleum. Because the economy is petroleum based, international economic policies that limit exports of crude petroleum can damage the

economy. For all intents and purposes, a complete boycott of Saudi Arabian crude would decimate the economy. Although employment does not register extreme changes in the petroleum sector, total employment drops by approximately 50 percent. Output in the economy drops by nearly 80 percent. But, it cannot be overemphasized that these estimates must be viewed with extreme caution and a firm recognition of the implications of the assumptions required to produce them.

The assumption required to generate the results is simply not realistic. Casual observation would suggest that countries importing crude petroleum would be affected long before disaster struck the Saudi Arabian economy. Estimates from the model suggest that the economy would remain unaffected until petroleum earnings dropped by approximately one-third. Even then, a further reduction in earnings to roughly one-half of current levels causes only minimal economic displacement in the short run. Additional comments about longer term effects are presented later in this chapter.

Summation

A final evaluation of the economic model must hold it suspect for the Saudi Arabian application. For Japan, the model produced a wealth of information, but it is not well-suited for application to a country which has achieved a very low level of development. Without the petroleum sector, Saudi Arabia fits that classification. With the petroleum industry, the model emphasizes the short-term impacts but cannot directly examine two important economic areas -- the long-run implications of changing conditions in the international economy, and the important role of substantial foreign exchange reserves if employed to "cushion" any short-term impacts.

The remaining sections of the chapter treat the political components of the analytic techniques and comment on other economic policies than those that can be examined by the model.

U.S. PRESENCE IN THE ARABIAN PENINSULA AND VICINITY

The United States has long-standing interests in the Arabian Peninsula. U.S. military presence in the Arabian Peninsula, however, is currently very small. There are less than 1,000 U.S. military advisors in Saudi Arabia. The United States has no military bases on the peninsula, but has small bases on Bahrain (in the Persian Gulf) and Diego Garcia (in the Indian Ocean).[3] In fact, the nearest major centers of U.S. military capability are the Sixth Fleet (Mediterranean), air bases in Thailand, and the Seventh Fleet (Pacific). The latter, however, from time to time sends small- and medium-sized squandrons into the Indian Ocean (Burrell and Cottrell, 1972).

In spite of the rather small size of the direct U.S. military presence in the Arabian Peninsula, the U.S. military ties with the region are very strong. The United States is the major supplier of weapons and military advisors to Saudi Arabia, Iran, Pakistan, and Kuwait. The United States also takes part in some joint military exercises of Central Treaty Organization (CENTO) countries. Furthermore, even though the United States may have no major formal military treaty with Saudi Arabia, Kuwait, Oman, or the United Arab Emirates, the official policy is that it will not tolerate any external threat to these countries.

The U.S. economic interests and traditional relationships with a number of countries in this region are very strong. U.S. concern for these ties was demonstrated in the early 1960's when, in response to Egyptian air attacks on Saudi border villages during the Yemenese civil war, the United States sent a number of fighters to Saudi Arabia to take part in joint "exercises." The result of this action was a sharp reduction in

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[3] Officially the United States has no military presence in Oman, Qatar, United Arab Emirates (UAE), and Kuwait. But the British have as many as 1,000 advisors in these countries. The Soviet Union has some advisors in South Yemen (and perhaps some in North Yemen). Many of the British and U.S. advisors in the region are "civilian" but continue to be officially or unofficially supervised by their governments.

Egyptian air attacks. More recently, the United States began a policy of sending elements of the Seventh Fleet into the Indian Ocean and Persian Gulf on a more frequent basis.

U.S. economic interests in the Persian Gulf include about $3 billion investment in the regional oil operations,[4] a large annual trade which rose by 60 percent in 1974 alone,[5] and over 40,000 U.S. citizens working in the region. Also, despite major cultural differences, the United States has had a number of important and expanding cultural ties with some of the countries in the region. A large number of the elite in the region has had its higher education in the United States. There is generally a greater preference for U.S. products, techniques, and methods in the region than for those of Europe, Japan, or Communist countries.[6] The major factors that make the Arabian Peninsula and the Persian Gulf important, however, are not purely economic, cultural, or military. They are also strategic and can be summarized as follows:

1. The viability of the economies of all major U.S. allies particularly Japan and European countries, depends on the supply of oil from the Arabian Peninsula-Persian Gulf region.

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[4] It should be noted that the present wave of "nationalizations" in the Gulf countries is mostly in name rather than substance. The U.S. companies continue their previous role, albeit less conspicuously, as service contractors.

[5] U.S. export agreements with the Persian Gulf probably totaled well above $10 billion in 1974. But the annual figure is difficult to calculate due to the multi-year nature of some agreements and the huge foreign aid outlay of some oil exporters. This trade will probably rise to about $25 billion by 1980.

[6] This is true, particularly among the middle and upper classes. This trend, however, is somewhat resisted among the conservative religious groups. But the resistance is weakening in even Saudi Arabia, where the conservative Whahhabis have been a major obstacle to modernization.

2. The only region in the world capable of expanding its oil production to meet the projected demands of the United States as well as other countries is the Arabian-Peninsula-Persian Gulf region.[7]

In short, the United States has major stakes in the Arabian Peninsula and vicinity. Its primary regional military goals therefore are the protection of these interests. U.S. military capability within the region is relatively small, but there are major concentrations of U.S. military capability in the Pacific, Thailand, and the Mediterranean that can respond to threats against U.S. interests. In addition, the United States has formal and informal military ties with countries in the region that add to the overall U.S. military capability.

U.S. ECONOMIC CAPABILITY FOR HURTING SAUDI ARABIA

The economic models developed for Saudi Arabia indicate that there are few economic measures that the United States can take that would affect Saudi Arabia. Specifically, the Saudi economic model indicates that there is no U.S. trade policy that would significantly hurt the Saudi economy. This statement, however, needs two qualifications:

1. The Saudi economic model cannot directly analyze the impact of embargoes of strategic U.S. exports, such as oil drilling equipment, on Saudi Arabia.

2. The model cannot directly analyze the impact of U.S. manipulations of its international financial instruments (for example, devaluations, restrictions of foreign investment in the United States, and the ability to control IMF and GATT policies) on Saudi Arabia.

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[7] In 1974 the annual increase in world oil production fell to below 1 percent. The 1975 figure may also be around 1 percent because of economic recessions in the industrial countries and a relatively mild winter in Europe and North America. The consumption rates, however, are expected to increase sharply after 1975.

Embargo on Drilling Equipment

The impact of a U.S. embargo of exports on oil drilling equipment is likely in two situations. First, it is possible that the United States may find such an embargo necessary due to shortages of equipment at home. Such a shortage actually happened in 1974 as a result of the increase in oil exploration and extraction activities that followed the 1973 October war. The U.S. Government, however, did not place any restrictions on exports of drilling equipment for several reasons:

1. The oil companies operating in the Middle East were (and are) mostly American and annually contribute about $2 billion to the U.S. balance of payments. Any embargo on exports of drilling equipment would have hurt these companies' profit margin and in addition would have risked retaliation by foreign oil-exporting countries against these companies and other U.S. interests.

2. Before the oil embargo, U.S. oil companies were expanding their foreign operations in order to fill a gap created by fast rising petroleum consumption and gradually declining domestic oil production in the United States. It was generally believed that these foreign expansion programs were in the long-run interest of the United States and should not be interfered with because of the shortage of drilling equipment, which was considered to be only a short-term problem.

3. Because of the Arab oil production cutbacks and the embargoes against the United States, the Netherlands, South Africa, and Portugal between October 1973 and June 1974, there was a general reduction in oil industry operations in the Arab countries while an increased pace of production in countries that were not taking part in the Arab cutbacks and embargoes. This meant that the foreign countries that were really in need of U.S. equipment at that time were precisely those that were not participating in the oil boycott. Any U.S. embargo on drilling equipment, therefore, would have hurt these friendly nations and would have left the boycotting Arab countries untouched.

A second situation in which the United States may attempt to embargo drilling equipment would be in response or retaliation to actions of specific oil-exporting countries that were perceived to be harmful to U.S. interests. In such a situation the United States may embargo export of oil equipment to the specific countries involved in the dispute and thus not hurt friendly or neutral countries. The 1973 Arab oil embargo provided an opportunity for the United States to place selective embargoes on exports of drilling equipment to the Arab countries that had boycotted the United States. There were many reasons, however, for not following such a policy. They included some of the reasons listed above that dictated against a policy of general embargo on drilling equipment, though two other considerations were also important.

1. A selective embargo on the boycotting nations would have compromised the system by which certain Arab countries were secretly shipping oil to the United States while publicly continuing to support the Arab boycott.

2. The oil boycott was seen by many as a policy that was forced on otherwise generally pro-U.S. Arab countries. In fact, throughout the Arab boycott period, both the United States and most Arab governments were trying to prevent the escalation of the conflict. A U.S. embargo on exports of U.S. drilling equipment would probably have only angered the Arab countries without changing their policy. The net effect would have been to strengthen the relative strength of radical anti-U.S. elements in the Middle East.

It, therefore, appears that an embargo on drilling equipment would be an ineffective persuasive policy. It has little economic impact on Saudi Arabia and may endanger the stability of pro-U.S. regimes because of its political significance which would play into the hands of anti-U.S. interests. Furthermore, the experience of other countries, such as Iraq, has shown that it is possible for an oil-exporting nation to switch from Western technology to Soviet technology in developing and operating oil fields. In short, a U.S. embargo of exports of drilling equipment to Saudi Arabia, whether used as either a purely economic or coercive policy,

would be self-defeating. The United States has been aware of these facts and is, therefore, unlikely to employ such an instrument. Thus, the inability of the Saudi economic model to consider adequately the impact of such a policy is not a significant problem.[8]

Other Trade Policies

In addition to limiting shipments of drilling equipment to Saudi Arabia, the United States could unilaterally restrict sales of other commodities. A U.S. embargo on exports of food to Arab countries has recently been mentioned as a possible strategic trade instrument. The economic damage such a policy would cause in Saudi Arabia is negligible. There are too many food exporters that could easily supply the relatively small (by world standards) Saudi demand for food imports. Any increase in world food prices resulting from the U.S. action would be unimportant in light of the enormous stock of Saudi Arabian foreign exchange reserves.

Suggestions for multilateral action against oil exporters have also been made. One such policy involves the International Energy Agency as a forum for developing coordinated actions by oil-consuming countries against OPEC members. While a policy reducing purchases of Saudi petroleum might induce reductions in posted prices of crude oil, the economic model suggests that no short-term damage would be created until Saudi oil revenues had been decreased by approximately one-third. The long-term development prospects of the Saudi economy may be affected by smaller reductions in oil revenues, but the techniques of this study have not been designed for long-range forecasting and are not appropriate for such an investigation.

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[8] Another policy that could affect purchasing power is a system of floating exchange rates. However, a revision of the exchange rate system cannot be accomplished by unilateral U.S. action.

Manipulations of International Financial Markets

The direct impact of U.S. manipulations of its international financial instruments can be extremely serious for the Saudi "petrodollar" purchasing capability. The United States, through devaluation of the dollar, restrictions of Saudi investments in the United States, and expansion of the money supply in conjunction with restrictions of the capital market, can decrease the Saudi purchasing capability. The Saudi Arabian petroleum revenues, however, are far in excess of the absorptive capability of the Saudi economy. For example, in 1974 when the Saudi oil revenues were in excess of $25 billion, the Saudi economy was able to absorb only about one-sixth of this. Another one-sixth was absorbed through trade, aid, and imports of armaments.[9] The rest of this large amount of revenue, four-sixths of the total, was invested in short- and long-term markets in Europe, the United States, and Japan.[10] Thus even a sharp decrease in the purchasing capability of Saudi "petrodollars" would not have much direct impact on the Saudi economy. That is, key economic variables such as employment, GNP (excluding oil revenues), and consumer prices would not be affected by a drop in the international purchasing power of the Saudi revenues.

This unusual phenomenon would hold as long as Saudi Arabia continues to earn oil revenues substantially in excess of its requirements for

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[9] These figures should be considered as approximate. The actual breakdown of Saudi investments is not known publicly.

[10] Some small amounts were also invested in Third World countries. There were, however, other forms of transfers to the Third World. In fact, most of the transfers to the Third World countries were in the form of soft loans and outright gifts.

domestic, trade, and security purposes. This is illustrated in Figure 1, which shows a hypothetical breakdown of the uses to which Saudi Arabian oil revenues are put. Note that among the five categories only the lowest two (domestic and import expenditures) have a direct impact on the Saudi economy. Once Saudi Arabia is able to pay its domestic and import capital needs (for such items as development, welfare, and defense), then every additional dollar of revenue becomes a luxury. These additional revenues usually go into foreign aid, long-term foreign investments, and short-term capital investments. These investments act as a buffer that protects the Saudi economy against inflation, foreign recession, or restrictions by foreign governments, which reduce the purchasing power of Saudi "petrodollars."

In addition, the fact that the sizes of these nonessential investments can be reduced, with no direct (short-term) impact on the Saudi economy, gives Saudi Arabia a great deal of economic power and policy flexibility. Thus, not only is the Saudi economy little affected by foreign economic actions, but it also has the power to reduce its oil production substantially and still meet all its essential expenditure needs.[11] In fact, in 1973 Saudi Arabians repeatedly were claiming that at that time they were producing more than enough oil to meet all their revenue needs. Therefore, they argued, if the Western countries wanted more Saudi oil, they would have to agree to give the Saudis additional incentives (such as favored treatment of Saudi exports and investments) to make it worthwhile to produce more oil (El Mallakh and McGuire, 1974).

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[11] The argument made here becomes stronger if it can be assumed that either the price of oil would continue to increase or inflation would make foreign capital investments highly unattractive. There are also other implicit assumptions pertaining to the rate of oil production, oil reserve life-span, interest rates, and the political climate of investments, under which investing in a foreign country becomes unattractive compared to keeping oil underground.

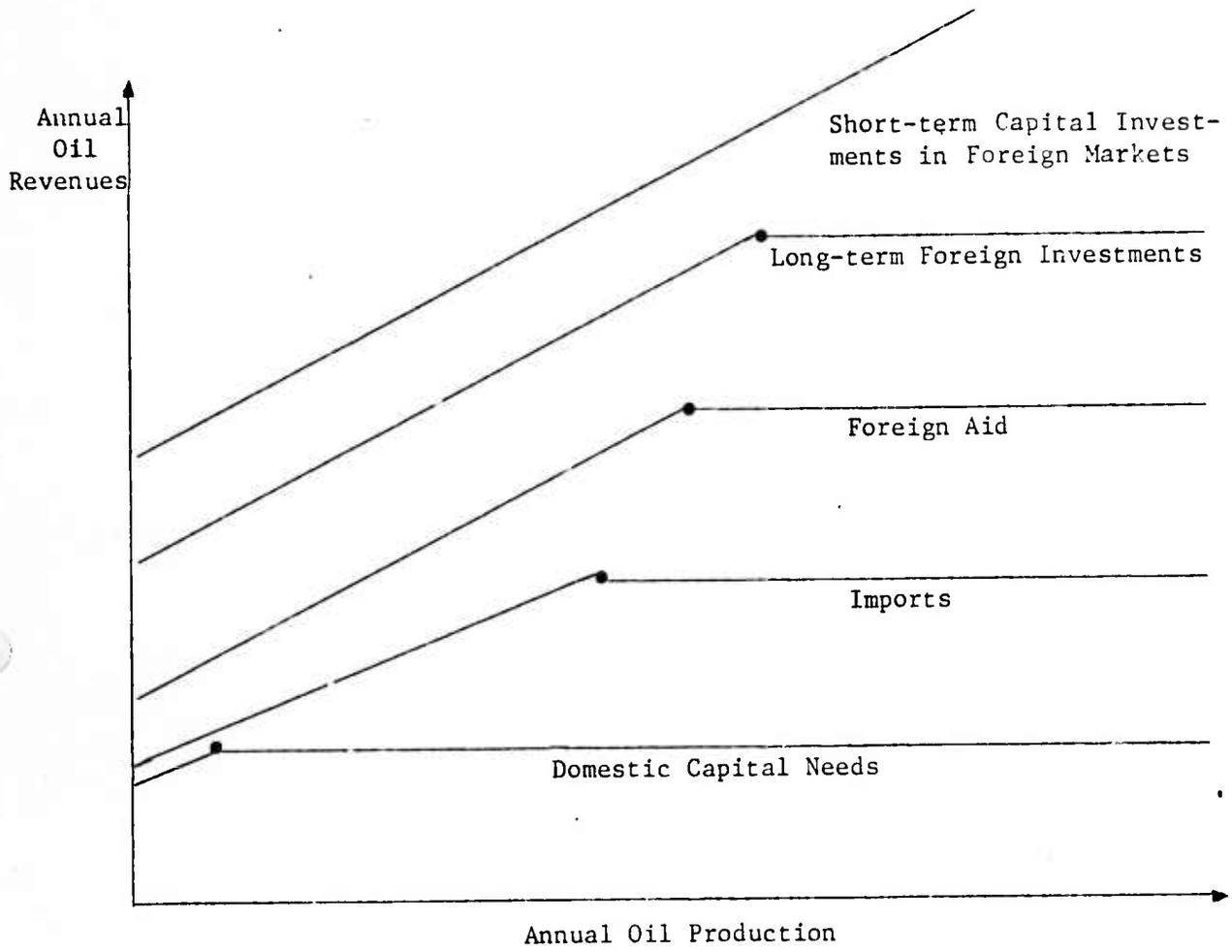
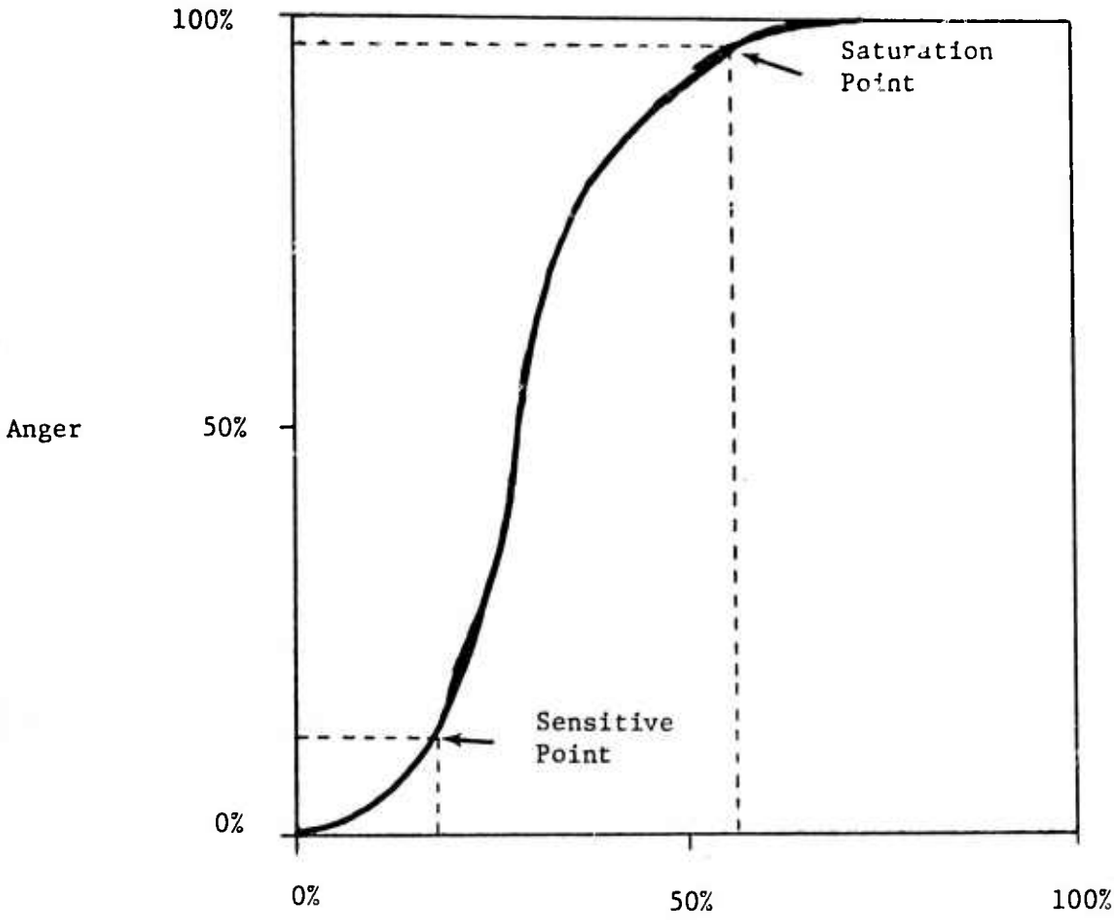


Figure 1. A Hypothetical Breakdown of Saudi Oil Revenues by Use

In summary, it can be stated that Saudi Arabia would be little affected by any U.S. economic policy. The models of Saudi economy can demonstrate this fact for U.S. trade policy. In addition, the arguments presented above indicate that U.S. embargoes of strategic materials and manipulations that reduce the purchasing capability of Saudi oil revenues would be either ineffective or would have greater costs for the United States than for Saudi Arabia.

Nevertheless, it is conceivable that the United States, under certain circumstances, would take actions that reduce the purchasing capability of Saudi oil revenues. Such actions could come about either as a result of U.S. apprehensions about the impact of petrodollars on the U.S. economy or as a result of political conflict between the two countries over such issues as Israel, U.S. military sales, and an oil embargo. If it is assumed that such action is taken by the United States, then its resulting hostility (or anger) is expected to vary according to the relationship shown in Figure 2. It is assumed that, given that the present conservative Saudi Government will remain in power, Saudi Arabia will be expected to remain relatively insensitive to the first 15 percent drop in the purchasing power of its petrodollars. This is largely because of Saudi Arabia's huge amount of oil revenues which are far in excess of the capital needs of Saudi Arabia. Furthermore, the Saudi Government has generally been very friendly toward the United States and would, therefore, be reluctant to endanger its relationship with the United States through over-reaction. On the other hand, if U.S. actions reduce Saudi purchasing capability by more than 50 percent, it would be expected that Saudi anger would approach its upper limit (or saturation point).



Reduction in the Purchasing Power of Saudi Petrodollars
(relative to 1974 oil revenues of 25 billion U.S. dollars)

Figure 2. Relationship between Reduction in the Purchasing Power of Saudi Petrodollars and Saudi Anger.

THE IMPACT OF POTENTIAL SAUDI ACTIONS ON U.S. MILITARY CAPABILITY IN THE ARABIAN PENINSULA-PERSIAN GULF REGION

As was explained earlier, the U.S. military capability located in the Arabian Peninsula-Persian Gulf region is relatively small. The United States, however, can project additional military capability from the Pacific (Seventh Fleet), Thailand, and the Mediterranean (Sixth Fleet). Furthermore, the fact that many countries in the region have had long-standing formal and informal cooperative military ties with the United States increases the U.S. capability for quickly projecting military power from far-away locations. Using equation 3 from Chapter III, the total U.S. military capability in the Arabian Peninsula-Persian Gulf region can be simplified as

$$C_{TA} = \frac{C_A}{h_{AA}} + \frac{C_M}{h_{MA}d_{MA}} + \frac{C_T}{h_{TA}d_{TA}} + \frac{C_P}{h_{PA}d_{PA}}$$

where the subscripts are defined as follows:

M = Mediterranean

T = Thailand

P = Pacific

A = Arabian Peninsula-Persian Gulf.[12]

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[12] It should be recalled that C is military capability, h is hostility, and d is distance of capability to target. Therefore,

C_A = U.S. military capability in the Arabian Peninsula-Persian Gulf,

h_{AA} = Hostility of the countries in the region A toward the use of C_A in region A,

d_{MA} = Distance of U.S. capability in region M (Mediterranean) from the region A (Arabian Peninsula-Persian Gulf),

and so on.

Verbally, this can be described as follows. Total U.S. military capability in the Arabian Peninsula-Persian Gulf area is the sum of the effective capability in the region and the potential projections of the U.S. capabilities in the Pacific, Thailand, and the Mediterranean. This means that, for instance, the potential projected U.S. military capability from the Mediterranean or

$$\frac{C_M}{h_{MA} d_{MA}}$$

depends on (1) the actual U.S. military capability in the Mediterranean,[13] (2) the hostility of the Mediterranean people to the use of the capability for the specific purposes for which it is being projected,[14] and (3) the distance of the location of U.S. military capability in the Mediterranean to the target in the Arabian Peninsula-Persian Gulf region.[15]

The expression for C_{TA} (presented above) can now be used to illustrate the impact of U.S. economic actions against the Saudi economy on U.S. military

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13 In this case the capability can be conceptualized as all U.S. military capability in the NATO countries as well as the Sixth Fleet. Alternatively, the U.S. capability can be broken down by country and for each case the projected capabilities can be calculated separately.

14 In reality, it is expected that the hostility of all Mediterranean countries would not have the same weight. Countries where the United States has large numbers of troops and major bases would have a greater impact on U.S. capability. Furthermore, countries in which the United States has no military capability, but would be on the path of the projection of U.S. capability, may have a great impact on the ability of the United States to project its power. It should be noted that the present model is not as suitable for measuring the ability of the United States to project naval capability as well as land-based capability. This is because the former sometimes may not be affected greatly by the hostility of the countries in the region.

15 Measuring distance for a widely distributed capability, such as NATO forces, is a major problem. A similar problem is presented in measuring the distance for a constantly mobile capability, such as the Sixth Fleet.

capability. First, note that U.S. military capability can be affected by (1) direct Saudi actions, and (2) Saudi hostility.[16] A list of the possible range of Saudi actions against the United States is presented in Table 1. This list is obviously not exhaustive nor are the actions necessarily mutually exclusive. The hostility of Saudi Arabia can be approximately measured from the graph that was presented in Figure 2. These concepts would roughly indicate the impact of any U.S. action on U.S. military posture. For instance, assume that the United States puts such severe restrictions on investments of Saudi petrodollars in the United States that these reduce Saudi purchasing power by 18 percent. Based on the graph in Figure 2, this would lead to a 15 percent increase in the level of Saudi anger toward the United States. The net result of this increased hostility would be a 17 percent drop in U.S. military capability in the region.[17] But it was stated earlier that the existing U.S. military capability in Saudi Arabia and vicinity is relatively

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16 It should be remembered, however, that according to Chapter V the Saudi actions in part also depend on the level of Saudi hostility.

17 This figure is based on the assumption that a 15 percent increase in Saudi anger would be added to an existing regional anger level of 1. Therefore, the new regional anger level would be

$$h_{AA} = 1.2\ h$$

$$\frac{C_A}{h_{AA}} = \frac{C_A}{1.2h}$$

and

$$\Delta\frac{C_A}{h_{AA}} = \frac{C_A}{h} - \frac{C_A}{1.2h} = \frac{0.2C_A}{1.2h} = 0.17\ \frac{C_A}{h}$$

TABLE 3

Potential Saudi Arabian Retaliations in
Response to Harmful U.S. Economic Actions

Saudi Arabia blockades the Persian Gulf to non-Arab vessels.
Saudi Arabia expels all U.S. citizens from its soil.
Saudi Arabia breaks diplomatic relations with the United States.
Saudi Arabia blockades the Red Sea to non-Arab vessels.
Saudi Arabia demands the withdrawal of all U.S. and British forces from the Indian Ocean.
Saudi Arabia demands the withdrawal of all U.S. and British forces from the Persion Gulf and the Red Sea.
Saudi Arabia expels the U.S. military training mission from Saudi Arabia.
Saudi Arabia places an oil embargo on the United States.
Saudi Arabia refuses to invest petrodollars in the United States.
Saudi Arabia places an embargo on imports from the United States.
Saudi Arabia imports Soviet arms (instead of U.S. arms).
Saudi Arabia imports French arms (refuses U.S. arms).
Saudi Arabia demands 50% increase in OPEC oil prices.
Saudi Arabia decreases oil production by 40%.
Saudi Arabia sends three Air Force Squadrons to the Arab front.
Saudi Arabia demands the annihilation of the Zionist State of Israel.
Saudi Arabia demands a 20% reduction in OPEC oil production.
Saudi Arabia increases its military aid to liberation groups.
Saudi Arabia joins in an Arab blockade of the Gulf of Aqaba.
Saudi Arabia demands the secularization of Jerusalem.
Saudi Arabia reduces its oil production by 20%.
Saudi Arabia demands 20% increase in OPEC oil prices.
Saudi Arabia expands its diplomatic relations with Communist nations.
Saudi Arabia expands its economic relations with East Europe.
Saudi Arabia takes steps to reduce its economic dependence on the United States.
Saudi Arabia protests against U.S. economic measures.
Saudi Arabia takes no action in response to U.S. economic measures.

small. This means that, even if large changes occur in the level of anger, the resulting impact on U.S. military capability would be very small.[18]

The hostility of Saudi Arabia, therefore, is of little consequence for U.S. military capability in the Arabian Peninsula-Persian Gulf region. In fact, the United States has little capability that would be affected even by direct Saudi Arabian actions.

As Table 3 indicates, the options available to Saudi Arabia are mostly economic and diplomatic. Among its economic options Saudi Arabia has a number of important strategic policy choices, such as an oil embargo. This, however, has little direct impact on U.S. military capability.

Among the few Saudi military options, the most important are blockades of the Persian Gulf and the Red Sea to Western shipping. To blockade the Persian Gulf, Saudi Arabia would need Iranian cooperation, which is highly unlikely to be forthcoming. To blockade the Red Sea, Saudi Arabia would be faced with coping with the military might of Israel and would risk U.S. military intervention. But even if Saudi Arabia decides to risk these dangers by blockading either of these two waterways, the impact of such action on U.S. military capability would be small. Therefore, even the most extreme Saudi actions would have no signficant impact on U.S. military capability.

To summarize, the United States does not have much trade leverage against Saudi Arabia. There are, however, certain financial instruments that the

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[18] In other words,

$$C_A << C_M,\ C_P,\ \text{or}\ C_T.$$

Therefore, if C_A or h_{AA} change, the impact on overall U.S. capability would be very small. Note that even for a very large change in C_A or h_{AA} the relative change in C_{TA} would still be very small because

$$\frac{\Delta C_{TA}}{C_{TA}} << \frac{\Delta C_A}{C_A},$$

as long as $C_A << C_M,\ C_P,\ \text{or}\ C_T$.

United States can manipulate that can reduce Saudi purchasing power. If Saudi purchasing power is reduced substantially, this may lead to high levels of hostility toward the United States which can reduce total U.S. military capability either directly through hostility level (h) or by actions that reduce the components of capability (C). As was demonstrated, however, neither of these can significantly affect U.S. capability in the region, even at a very high hostility levels. This is due, in part, to the fact that most of the potential projected U.S. capability would have to come from other regions.[19] Furthermore, the Saudi military capability itself is relatively small and would not be strong enough even for dealing with the marginal U.S. forces presently in the Persian Gulf and Indian Ocean.

SUMMARY

Saudi Arabia was selected for this study due to its extreme characteristics. Saudi Arabia is a country with an unusual economic structure as well as a unique relationship with the United States. While the economy is highly dependent on oil, in recent years its oil revenues have exceeded the absorption capacity. Therefore, despite its overwhelming dependence on oil, the viability of the Saudi economy in the short run would not be affected by moderate decreases in the purchasing power of its oil revenues. Thus, variables such as unemployment, growth, and inflation, which were analytically useful for the Japanese case study, were not useful for the analysis of Saudi Arabia. The Saudi unemployment rate has never been an important political issue. Recession and inflation have had greater political significance, but in recent years increased oil revenues have led the Saudis to ignore their inflation rate or accept it as a fact of life. Furthermore, unemployment as such is no longer a serious threat. It is estimated that today there are one million foreign workers in Saudi Arabia

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[19] It can be argued, however, that the low level of U.S. presence in the Persian Gulf may be due to the fact that most of the local states are highly pro-U.S. and may, if needed, act as an extension of U.S. military power.

and still there is a labor shortage. Thus it would be unlikely that Saudi Arabians would have to deal with any significant unemployment problem.

Given these points, we conclude that there is little economic leverage that the United States could use directly to damage the Saudi economy in terms of employment, growth (other than in the oil sector), and inflation. The United States, however, could take actions that would reduce the purchasing power of Saudi petrodollars. However, such action would not directly affect the Saudi economy. An important secondary effect from such action could be the increased hostility of Saudi decision-makers and populace. Such increased Saudi hostility could either lead to hostile actions and policies against the United States or directly reduce U.S. military capability by increasing the overall hostility of the region toward the United States. It should be noted, however, that the U.S. military presence in the Arabian Peninsula and vicinity is relatively minor. Furthermore, Saudi options for direct retaliation against the United States are few. Finally, Saudi Arabian governments have been pro-America on almost all issues, the major exception being the Arab-Israeli conflict. Given the present regime, Saudi Arabia would be reluctant to harm its good relations with the United States.

In short, there is little that the United States can do to harm the Saudi Arabian economy except through the financial market. Although the economic tools developed in this study are not suited for analyzing the impact of international financial variables on economies, it was found that one could easily use the concept of hostility to analyze changes in variables other than unemployment, recession, and inflation. In the case of Saudi Arabia, decreases in the purchasing power of Saudi petrodollars were used to derive Saudi hostility toward the United States. Moreover, the index developed for U.S. military posture can be used to analyze certain aspects of U.S. capability without the use of the other models.

To conclude, the application of the tools and methodology of this study to Saudi Arabia has demonstrated some of their limitations. But it has also

shown that they are fairly adaptable. The limitations were no more than expected. Some can be removed by further improvements of the models, but others are inherent in the nature of the models and can be eliminated only by constructing alternative models.

APPENDIX A: FINLAND

This appendix reviews the 1958 dispute between Finland and the Soviet Union. Several considerations influenced the selection of this dispute. First, it qualifies as an instance of interstate economic conflict because the Soviet Union employed economic sanctions against Finland to achieve its objectives. Second, the Soviet objectives were not solely economic, but were largely political and military-related. Finally, the dispute is an example of economic conflict between two nations of different economic development levels where use of economic sanctions was successful.

BACKGROUND

A discussion of important patterns in the historical relations between Finland and the Soviet Union is a necessary introduction to the events of the 1958 dispute. To provide an historical perspective, five important features of the two countries' relations are described. These are: (1) the historical importance, deriving from geographic considerations, of Finland to Soviet military strategy; (2) the essentially neutral orientation of Finland's foreign policy; (3) the international trade policy of Finland; (4) the domestic political climate in Finland during 1958; and (5) the international political climate during 1958.

Geographic Considerations

The geographic position of Finland has been historically important in Russian strategic planning. The Russian view has been that Finnish territory is the northern access route to Russian territory. Wars between Sweden and Russia were traditionally fought in Finland. In 1809 Russia annexed and heavily fortified Finland to secure a buffer zone against invasion, and Finnish territory has continued to be strategically important to Russian interests. The 1939 winter war against

Finland was based on a desire to secure Leningrad from a German invasion through Finland. Soviet-Finnish relations, as viewed by the Soviets, were influenced by military considerations even during peacetime.

> The essential peacetime objective of Soviet policy in the Baltic...is to keep Finland from becoming a launching site or advance base for any hostile military thrust into the northwest Soviet Union....This objective also necessitates support of Swedish neutrality and requires that Norway and Denmark remain free of Western military bases (Holsti, 1964: 66).

Soviet support of Finnish neutrality is not only of direct importance to Soviet plans, but also serves as an example of "peaceful coexistence." The Soviet leaders consider Finland part of a "neutral peace belt" of Scandinavian countries between the East and West (Holsti, 1964: 68).

Foreign Policy of Finland

Finnish foreign policy is directed toward achieving a neutral position regarding East-West relations. Since World War II, the presumption has been that friendly relations with the Soviet Union will insure Soviet respect for Finnish independence. Finland's desire to avoid potential involvement in conflicts between the Soviet Union and the United States stems from this perceived foreign policy requirement.

International Economic Relations

Prior to the initiation of sanctions, Finland's two most important trading partners were Great Britain and the Soviet Union. In 1958, England purchased approximately 25 percent of Finland's exports. The Soviet Union purchased 71 percent of Finland's production of industrial goods and mineral ores (Statesman's Yearbook, 1959, 1958).

In 1958, apparently as a move to offset a deteriorating balance of payments, Finland began to shift its trade toward the West. As Table 1

TABLE 1

Distribution of Exports and Imports, 1957 and 1958
(in Billions of Marks)

Currency Area	Entire Year 1957		Jan - July 1957		Jan - July 1958	
Exports		%		%		%
U.S. and Canada	10.9	5.1	5.9	5.8	5.9	4.5
Sterling Area	50.0	23.5	24.9	24.2	31.9	24.3
Other EPU Countries						
- Multilateral	53.5	25.2	26.2	25.5	24.9	26.6
- Bilateral	17.1	8.1	6.6	6.4	11.7	8.9
Eastern Bloc	62.4	29.4	29.3	28.5	36.3	27.7
Others	18.5	8.7	9.8	9.6	10.4	8.0
TOTAL	212.4	100.0	102.7	100.0	131.1	100.0
Imports						
U.S. and Canada	13.0	5.7	8.6	7.1	8.0	6.1
Sterling Area	40.8	17.9	19.4	16.0	24.3	18.4
Other EPU Countries						
- Multilateral	72.3	31.7	34.2	28.3	50.9	38.6
- Bilateral	14.1	6.2	8.2	6.8	7.6	5.7
Eastern Bloc	70.2	30.8	40.2	33.2	32.5	24.6
Others	17.5	7.7	10.4	8.6	8.7	6.6
TOTAL	227.9	100.0	121.0	100.0	132.0	100.0

Source: Vayrynen (1969: 212).

indicates, exports to the Eastern bloc declined and those to EPU[1] countries increased. A more noticeable shift occurred in imports. The columns of Table 1 showing percentages of exports and imports show the relative magnitudes of the shifts in trade. The changing trade patterns were not interpreted as purely economic phenomena; they introduced the possibility of Finland's affiliation with the European Free Trade Association (EFTA). Such an economic realignment would have presented difficulties for trade relations with the Soviet Union. EFTA membership would have required Finland to grant preferential trade programs to other member countries, programs deriving from "most favored nation principles," that would have been detrimental to the relationship with the Soviet Union (Vayrynen, 1969: 212).

Domestic Conditions

The Finnish domestic political environment in the pre-sanction period was not stable. During 1957 and 1958, there were four changes in government, indicative of a highly polarized political climate. The cabinet that emerged in 1958 was a coalition encompassing all parties except those most ideologically aligned with the Soviet Union. The exclusion occurred even though the parties won support normally sufficient to ensure representation. To make matters worse, some of the newly appointed ministers were unacceptable to the Soviet Union (Vayrynen, 1969: 214). The importance of this development to the Soviet Union was revealed in a speech by Krushchev in Helsinki:

> We understand that in various Finnish circles there are different opinions toward the Soviet Union, that there are those who hold a grudge and warn [the Finns] to be on guard against us. But try to understand that in such circumstances we, too, have to be on guard. You have parties in which there are representatives that do not favor friendly relations with the Soviet Union. Thus, there is always the possibility of..."frosts," "thaws," and "morning dews"... It is known that in Finland not everyone approves of [Kekkonen's] policy toward the Soviet Union. You might

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[1] European Payments Union. Now disbanded, the organization was part of the International Monetary Fund.

> declare that whatever occurs is your own internal affair. Naturally, these are internal affairs of the political parties. We recognize this. But to me, as a neighbor, and to our people, it is not at all a matter of indifference what policy toward the U.S.S.R. this or that party's... representatives choose to follow--whether they espouse a policy of building friendship with their neighbors, or a policy which will damage that friendship. Naturally we don't wish to interfere in your internal affairs, but I believe we can express our opinions about certain individuals' positions toward the U.S.S.R...(Holsti, 1964: 77).

International Political Conditions

The international political situation in 1958 was characterized by cold war confrontations. Three major areas of involvement between the Soviet Union and the United States were Lebanon (the scene of U.S. military intervention following an Iraqi coup d'etat), the China-Taiwan dispute over the islands of Quemoy and Matsu, and the recurrent crisis involving Berlin.

Although no conclusive evidence exists as to the relative importance to the Soviet Union of the imposition of the sanctions against Finland, it would appear that the Finnish situation ranked low. Interestingly enough, Russia's behavior vis-a-vis Finland is consistent with Wallensteen's (1968: 49) findings that economic sanctions tend to be applied in low priority conflicts.

Thus, international political tensions, the apparent Finnish shift away from the Soviet Union despite the historical context and the contiguity of the two nations, and Finnish internal political instability and Western leaning posture all apparently contributed to the Russian perception of deteriorating Soviet-Finnish relations. Hence, the Soviets attempted to rectify what they interpreted as politically and economically unhealthy developments.

SANCTIONS AND RESPONSES

The Soviet leadership apparently perceived the political and economic developments in Finland as unfriendly, or at least counter to their interests, and took measures to force realignment toward the Soviet Union. The initial actions of the Soviet Government were to recall the Soviet Ambassador and to suspend diplomatic relations in October 1958. At the same time, the Soviets made it difficult for Finnish diplomats to meet and talk to Soviet officials.

First Escalation--Suspension of Negotiations

When no immediate accession to Soviet demands was forthcoming, the sanctions were escalated to the economic realm and economic negotiations were discontinued. This Soviet action was particularly effective because Soviet-Finnish trade was arranged by annual contracts usually negotiated during October and November. Also, the signing of an agreement that would have allowed Finnish fishermen access to Soviet territorial waters was postponed by the Soviets on "technical grounds."

Second Escalation--Suspension of Trade

The next stage of action against Finland was the suspension of trade. During November, Soviet and Finnish officials discussed the level of trade between the two countries. The Soviet desire was to maintain the previous level of imports from Finland. When no agreement was reached, the Soviets suspended imports from Finland and postponed payment of obligations owed Finland.

Domestic Impact of Soviet Sanctions

As a result of the economic sanctions, Finland experienced its worst post-World War II period of unemployment during the fall and winter of 1958-59. Unemployment relief became the largest item in the Finnish

budget (Forster, 1960: 149). The loss of Soviet markets was particularly damaging to the woodworking industry. The boycott cost Finland 1,900 million marks, or 4 percent of Finland's total exports to the Soviet Union that year (Vayrynen, 1969: 219).

Finnish Response to Soviet Sanctions

Although the Finnish Government and individual industries attempted to counter the effects of the trade embargo, other measures were directed toward appeasing Soviet demands. In September the Finnish Government had purchased extra commodities from the Soviet Union and placed them in storage. In October the Minister of Trade and Industry concluded an agreement to decrease purchases of Western crude oil by 450,000 tons and to import the same amount from the Soviet Union (Vayrynen, 1969: 227-8).

The rapid imposition and escalation of the sanctions had immediate effects on the Finnish economy and on the Finnish political situation. Vayrynen (1969) has studied the cohesion of the Finnish political system during the pre-sanction and sanction periods by analyzing the content of relevant editorials in various party newspapers and journals. These editorials were examined to determine the extent of governmental cohesion in foreign and domestic politics. Vayrynen's results are presented in Table 2.

TABLE 2

The Cohesion of the Whole System in the Area of Internal Politics and Foreign Policy

Month	Internal Policy Cohesion	Foreign Policy Cohesion
August, 1958	-2.08	-13.68
September	-7.19	-0.59
October	-11.99	-8.48
November	-23.85	-6.89
December	-11.63	-22.22
January, 1959	-6.81	-10.40

Source: Vayrynen (1969: 226).

Foreign policy cohesion, initially low, decreased until the Soviets applied sanctions in November and then increased until the sanctions were terminated. Domestic policy cohesion was lowest during August and December. This lack of cohesion during the sanction period was an apparent harbinger of the impending dissolution of the government.

Finally, in January 1959, a new government was formed by V.J. Sukselainen. After a meeting between President Kekkonen and Krushchev in early January 1959, diplomatic relations were resumed between the two countries On February 2, a new Soviet ambassador was appointed to Finland. Relations quickly returned to the pre-sanction status. The fishing agreement was finally signed on February 21, and on March 13 the trade contract for 1959 was signed. It was agreed that Finland would increase its imports from the Soviet Union by approximately 15 percent, thereby ensuring the Soviets a better balance of trade that year.

EFFECTIVENESS OF SANCTIONS AGAINST FINLAND

The sanctions against Finland were successful in part because of their selective nature. However, the rapidity with which the Soviets escalated their sanctions to the economic arena ensured their success as well. In essence, the measures began with diplomatic sanctions and were escalated in two months to a limited economic boycott. The effect was to place a temporary "freeze" on relations between the two countries. The costs to Finland were obviously high enough to force accession. They involved continued and perhaps exacerbated domestic political instability, unemployment, industrial disruption, and a general economic downturn. Each of these developments contributed to the dissolution of the anti-Soviet government, its replacement by a more sympathetic and responsive regime, and finally the restoration of the pre-sanction status quo. The Soviets had accomplished their goal.

APPENDIX B: IRAN

This appendix reviews the economic conflict between Iran and Great Britain during 1950-53. The dispute centered on control of the Iranian oil fields. It erupted largely as a result of the Anglo-Iranian Oil Company's (A.I.O.C.) unwillingness to renegotiate the terms of the oil concession to correspond to the demands of the Iranian Government.

BACKGROUND

During the 20-year period prior to the British use of sanctions in 1951, the Iranian Government had challenged the A.I.O.C. and Britain in attempts to acquire increased control of oil exploration and extraction agreements. The issues that led to the nationalization of the oil company surfaced in 1947. Iran proposed the commencement of negotiations with the A.I.O.C. to discuss bilateral participation in the management of the oil company and the distribution of oil profits. At that time, the oil company controlled 100,000 square miles of territory in Iran but had explored only a fraction of the area. The Iranian Government desired to reduce the area controlled by the A.I.O.C. and to open the unused area for petroleum exploration and extraction. The contract governing the A.I.O.C.'s operations had been signed in 1933 and was to continue for 50 years. The Iranian Government wanted to renegotiate on the following issues: (1) reduction of the contract period to 30 years; (2) Iranian representation on the board of directors to acquire a voice in the A.I.O.C.'s management and the right to inspect the transactions and accounts of the company; (3) an increase in the number of Iranians in senior positions in the company; and (4) reduction of the price of petroleum products resold to Iran. The A.I.O.C. refused to accept the major provisions of the proposal and declined to discuss the proposed profit sharing system or to allow Iranian representation in management.

Additional Iranian grievances against the oil company were submitted to the U.S. Department of State in August 1948 and mediation was requested. The complaints against the British included: (1) delay by the British in settling a $40-60 million debt owed to the Iranian railroad; (2) non-payment of royalties in gold as provided in the A.I.O.C.'s 1933 concession; (3) failure to implement the training of Iranians for technical and managerial positions; (4) failure to begin negotiations for the revision of the 1923 concession; (5) non-fulfillment of the terms of the concession by the A.I.O.C. and the Imperial Bank of Iran; and (6) lack of British concern for Soviet interference in northern Iran. The United States, however. refused to become involved in the Anglo-Iranian dispute.

On July 17, 1949, a new agreement was finally signed between the A.I.O.C. and the Iranian Government to supplement the 1933 concession. However, this agreement was unpopular with the Iranians and failed to pass the parliament. A campaign to nationalize the oil industry was initiated by Dr. Musaddiq and the newly formed National Front.

In summation, the background to the Anglo-Iranian oil dispute reveals traditional power considerations at work. The Iranian Government sought the power to control the oil industry directly and to increase its share of profits. The British oil company simply refused to relinquish any authority or additional money.

Initial Action - Nationalization

Iranian opposition to the nationalization movement collapsed with the assassination of Prime Minister Razmara on March 7, 1951. On March 15, after the formation of a new government by Dr. Musaddiq, the parliament unanimously voted to nationalize the oil industry.

The events following nationalization -- the ensuing sanctions and responses -- can be viewed in phases marked by attempts to negotiate

the dispute. Each phase followed a general pattern. Initially, proposals and counterproposals were submitted for negotiation, a stalemate was reached, and finally, sanctions were maintained or intensified. There were five major attempts to negotiate a settlement: (1) in April 1951 the British Government joined the A.I.O.C. in initiating negotiations, but neither would accept nationalization; (2) in the beginning of June the controversy was advanced to the international level when the British brought the dispute before the International Court of Justice; (3) in the latter part of July sanctions were increased by both parties with the British extending their sanctions to anyone who continued to purchase Iranian oil; (4) on December 8, 1951, the International Bank for Reconstruction and Development began an unsuccessful attempt to negotiate a settlement; (5) the dispute was finally settled in 1954 by an agreement negotiated with an international petroleum consortium.

In general, the British responded to nationalization of the A.I.O.C. by issuing warnings to the Iranian Government against proceeding with nationalization and backing the admonitions with implicit and explicit military threats. British policy positions were not constant. They fluctuated from a desire to renegotiate the 1933 concession to agreement to nationalization provided "sufficient" compensation was paid to the A.I.O.C. and provided an "efficient" oil industry was maintained. There were perceptible shifts in British strategy toward the dispute as the Iranian Government remained adamant in its nationalization policy.

Phase I - Initial British Responses

Following the nationalization of the oil company, the ensuing political unrest, and anti-British civil disturbances throughout Iran, Britain's initial response was to issue a warning that Britain would act "to protect British lives and property." Subsequently, five British warships were stationed within "reasonable range" of Abadan, in Iran's oil-producing region.

First Negotiation. On April 28, the British Government and the Anglo-Iranian Oil Company dispatched a message to Tehran offering to negotiate a new agreement. Two days later the British proposed that A.I.O.C. operations be handled on the following basis:

1. A.I.O.C.'s concession and assets in Iran be transferred to a new company to be named the Southern Iranian Oil Company. Representation of the Iranian Government on the board of directors be granted and equal profit sharing be initiated.

2. The distribution of oil in Iran be transferred to an Iranian national company, which would be given full responsibility for the operation.

3. The new oil company would gradually replace non-Iranian employees with qualified Iranians.

Underlying the British willingness to negotiate was a desire to seek arbitration under the terms of the 1933 concession agreement. Implicit in this reasoning was a reluctance to negotiate a settlement on the basis of the current situation -- the British refused to recognize nationalization without prior negotiation.

The Iranian Government, on the other hand, considered nationalization a fait accompli and was only willing to acknowledge some factors from the pre-nationalization situation. The government recognized previous ownership by the A.I.O.C. and was willing to compensate for losses. It also acknowledged the position of traditional buyers of Iranian oil and was willing to continue to sell to them. However, the Iranian Government refused to reverse nationalization and refused to submit to international arbitration. A letter from the Iranian Government to a representative of the oil company demanded that the A.I.O.C. name representatives to assist the government in assuming operation of the industry and formally rejected the company's proposal for arbitration.

First Escalation - Troop Movements. The breakdown of negotiations was followed by a period of mutual threats and hostility. On May 24, 1951,

the Iranian Government allowed the A.I.O.C. one week to begin arrangements for effective nationalization of the company's oil concession. The British responded the following day by announcing that their one available paratroop unit would be sent to the Mediterranean and stationed in Cyprus, threatening to occupy the Iranian port city of Abadan, ostensibly an action intended to protect British interests.

Phase II - Internationalizing the Conflict

The second phase, which commenced in early June 1951, was characterized by Britain moderating its demands by acknowledging "some form of nationalization," but refusing to accept the unilateral cancellation of the British concession. During this phase the British asked the International Court of Justice to appoint an arbiter to settle the nationalization issue. The Iranian Government refused to recognize the competence of the World Court to act in this dispute.

The U.S. Government urged both parties to expedite a peaceful settlement. Prime Minister Musaddiq responded on June 2, 1951, by declaring that his government would be willing to negotiate only one issue, the future sale of oil to Britain; nationalization was not a negotiable issue. The A.I.O.C. notified Iran that it would send representatives "as soon as possible in order to hold full and frank discussions" about the oil dispute. The Iranian Government considered this announcement an acceptance of the expropriation of company property. A few days later the British retreated from their previous acceptance of nationalization by admitting that the purpose of sending the A.I.O.C. delegation was to "educate" the Iranians and to convince them that they could not possibly operate the enormously complex oil industry.

As a precondition for the commencement of negotiations, the Iranian Government demanded the immediate surrender of 75 percent of the A.I.O.C.'s revenues for oil exported after March 20. The A.I.O.C. was willing to pay a fixed sum of 10 million pounds "as an advance against any sums

which may become due to the government as a result of eventual agreement between the government and the company." The offer was summarily rejected by Iran and negotiations were terminated.

Second Escalation. On June 20, the day after rejecting the British proposal, the Iranian Government ordered the immediate seizure of A.I.O.C. properties, and directed the British General Manager of the company to declare in a written statement whether he was prepared to serve under the new National Oil Company of Iran. Great Britain responded by applying to the International Court of Justice to enjoin Iran from expropriating the properties of the British oil company. The A.I.O.C. further ordered its tanker fleet to unload oil taken on board and to leave Abadan immediately.

Iran then submitted a statement to the International Court declaring that the dispute did not come under the Court's purview. Nevertheless, the court recommended on July 9 that the A.I.O.C. be reinstated to complete control of its property with revenues to be frozen in bank accounts pending a final conclusion of the dispute. The Iranian response was to withdraw from the International Court.

Phase III - U.S. Intervention

The third phase of the controversy began on July 24. The United States intervened and renewed its attempt to convince the disputing parties to negotiate. The British agreed to send a delegation to Iran headed by Richard Stokes. On August 13 he submitted seven proposals to the Iranian Government:

1. That the A.I.O.C. transfer to the National Oil Company of Iran its entire installations, machinery, plant and stores in Iran;

2. That a purchasing organization be formed under a long-term contract to provide an assured market for Iranian oil;

3. That the National Oil Company be free to make additional sales of oil provided they did not prejudice the interests of the purchasing organizations;

4. That the purchasing organization provide transportation and marketing service and, in order to be assured of the fulfillment of oil commitments, manage, on behalf of the National Oil Company, the operations of searching for, producing, transporting, refining and loading oil in the area;

5. That the terms of the agreement be more advantageous to the purchasing organization than could be secured anywhere else;

6. That the oil operations in Iran resume immediately on an interim basis;

7. That Iran be represented on the board of directors of the operating organization, and non-Iranian staff be employed only to the extent necessary for the efficiency of the operation.

The Iranian Government rejected the British plan and submitted the following counterproposals: (1) that Iran sell oil to Britain only for domestic needs; (2) that Iran consider compensation only if Britain accepted counterclaims of over $280 million; and (3) that the british technical staff remain in Abadan only under certain detailed conditions. The counterproposals were rejected by the British.

Third Escalation - British Show of Strength. Following the third breakdown in negotiations, the British resumed coercive measures by announcing, on September 5, that the A.I.O.C. would sue any party who purchased oil from the Iranian Government. Prime Minister Musaddiq countered this action by confronting the British with a 2-week ultimatum -- the residency permits of British oil technicians would be cancelled if Britain did not agree within 14 days to reopen negotiations on Iranian terms.

Refusing to accede to this demand, Britain responded by sending four additional destroyers to the Persian Gulf to stand by to protect British personnel in Iran in the event of violence. In addition, Britain withdrew

certain special sterling exchange facilities from Iran in order "to limit the harm which had been caused to the United Kingdom's economy by actions of the Iranian Government." The British Government then placed an embargo on the export of essential raw materials and manufactured goods to Iran. All British ships en route to Iran with cargoes of "scarce" goods were ordered to return or to find other ports.

The Iranian Government repeated its warning that British oil experts would be expelled unless negotiations were resumed within 15 days. The exchange of sterling into Iranian currency by the Anglo-Iranian Oil Company was banned as was the privilege accorded to the British Bank of Iran and the Middle East of buying and selling foreign currency. Subsequently, all government departments were ordered to withdraw their deposits from the British bank and transfer them to other banks. These economic measures were being taken as pro-British Iranians were being arrested and harassed. Finally, late in September, the military seized the refinery at Abadan.

Phase IV - The Involvement of the International Bank

In December, the fourth phase of the dispute began with efforts by the International Bank for Reconstruction and Development (IBRD) to achieve a settlement. The IBRD's proposals were: the IBRD would finance, as trustee, the Iranian oil industry; oil and refined products would be sold to the A.I.O.C. at current Persian Gulf rates; and Iran would receive part of the sales revenues. Again the Iranian Government rejected the offer, refusing to allow the re-engagement of British oil experts and refusing to sell oil to Britain at a price below the international rate. The Bank proposed an alternative plan whereby it would finance and operate the oil industry. The Iranian Government rejected the alternate plan as Iran refused to share oil profits with a foreign buyer, and insisted that the Bank be accountable to the government.

Fourth Escalation - Deterioration of Relations. After the unsuccessful attempt by the International Bank to negotiate a settlement, relations between Iran and Britain continued to deteriorate. Consulates were closed, law suits were brought against countries buying Iranian oil, and periodic disputes over rightful ownership of oil-in-transit arose.

In early August 1952 the Iranian Government again offered to resume negotiations on the condition that the A.I.O.C. first pay the debt due Iran. The governments of Britain and the United States responded by submitting proposals to the Iranian Government outlining actions they were prepared to take. The proposals included: submitting to the International Court the question of compensation to be paid to the A.I.O.C.; appointing representatives to negotiations to create arrangements for the flow of Iranian oil to world markets; and allowing the A.I.O.C. to make arrangements for shipping oil stored in Iran. If these provisions were accepted, the British Government promised to relax restrictions on exports to Iran and on Iran's use of sterling; and the United States agreed to extend an immediate grant of $10 million to the Iranian Government to assist in solving budgetary problems. These offers were rejected by Prime Minister Musaddiq, who also threatened to sever diplomatic relations with Britain if economic pressure was continued.

After formally rejecting the Anglo-American proposals, counterproposals were submitted to the United States and Britain demanding in advance payment by the A.I.O.C. of $1372 million. The counterproposals were rejected as "unreasonable and unacceptable." The Iranians responded by breaking off diplomatic relations on October 16.

Phase V - Settlement

The dispute was not settled until almost a year after Musaddiq was overthrown by a military coup d'etat. Soon after the overthrow in 1953, the United States resumed aid to Iran. In December 1953 an international petroleum marketing consortium was established in London to negotiate with Iran the reopening of the Abadan refinery. An agreement was

finally reached whereby an international consortium of oil companies purchased part of the A.I.O.C.'s concession rights and improved the terms of payment to the Iranian Government (50 percent of the profits). Control of production and marketing remained vested in the consortium, which effectively acquired the A.I.O.C.'s status. Iran, however, became the legal owner of its petroleum resources and, in practice, enjoyed greater control over the new consortium than had been exercised over the A.I.O.C. The A.I.O.C., on the other hand, lost its prominence in Iranian oil operations. In theory, it maintained 50 percent control in the new consortium; in practice, major U.S. oil companies controlled the consortium. Thus, in the long run, neither Iran nor the A.I.O.C. (nor Britain) were able to gain all their demands. By escalating the conflict they both demonstrated their resolve but eventually both sides compromised.

EFFECTIVENESS OF SANCTIONS AGAINST IRAN

The economic and military sanctions applied by Great Britain against Iran had a great impact on conditions within Iran for the following reasons: (1) the universality of the oil embargo; (2) the economic disruption caused by the measures; and (3) the ensuing political disorder. These factors combined to effect the overthrow of Prime Minister Musaddiq, the leader of the nationalization movement.

Universality

The inability of the Government of Iran to find alternate markets for oil was of major importance in its failure to circumvent the sanctions. The British were able to effect a near universal application of the embargo by bringing cases of its violation before judicial review. The British position received international legal approval by the International Court of Justice, which had recommended, on July 5, 1951, that the A.I.O.C. be reinstated to full control of its properties. Despite the rejection of this recommendation by Iran, the British were able to employ the decision as a legal foundation for suit against anyone purchasing oil from Iran. On June 19, 1952, the Supreme Court of Aden

ordered the Italian tanker Rose Mary, carrying crude oil from Iran, to remain at Aden until a decision was reached as to the rightful ownership of the oil. The Court ruled that the oil cargo of the tanker was the property of the A.I.O.C. even though the Iranian Government had nationalized the oil fields. A similar attempt was made in February 1953. The Italian tanker Miriella was impounded by a Venetian court to determine the ownership of the oil. Despite initial action, the court subsequently refused to rule on the issue.

By the summer of 1953, immediately prior to the settlement of the dispute, the British were gradually losing international support of the embargo. The Japanese were continuing to purchase oil from Iran in increasing quantities. Furthermore, in a later ruling the International Court decided it had no jurisdiction in the Anglo-Iranian oil dispute. It is quite possible that had the dispute continued much longer, the Iranian Government could have found other markets and could have circumvented the British oil embargo.

Economic Disruption

The substantial disruption of the Iranian economy caused by the oil embargo was the second factor in the effectiveness of the sanctions. The oil embargo resulted in the unemployment of many Iranians. The loss of income from the industry reduced the income of the Iranian Government and prevented payment of civil servants. The government budget was reduced; military weapons purchases were postponed.

Oil income was of major importance to the Iranian balance of payments. Table 1 shows that the percentage of revenue received from income paid by the Anglo-Iranian Oil Company (up to 1951) and the oil consortium (since 1954) and foreign exchange sold by the oil companies for rial expenditure in Iran dropped precipitously after the nationalization of the oil industry. When this income was completely cut off in 1953 and 1954, the total foreign exchange receipts decreased from $180.9 million in 1951 to $98.4 million and $63.5 million in 1952 and 1953 respectively.

TABLE 1

Foreign Exchange Receipts
(in millions of U.S. dollars)

Year	Oil Income	Rial Purchases of Oil Companies	% of Total Receipts
1950	40.0	69.4	75.3
1951	58.9	56.1	63.6
1952	8.4	21.5	30.4
1953	---	---	---
1954	---	---	---
1955	22.5	11.9	15.5

Source: Iran Almanac (1963: 277).

The economic disruption caused by the oil embargo led to increasing reliance on foreign assistance. Table 2 shows the increase in the amount of foreign loans and aid during the period immediately following the termination of the embargo. Foreign assistance was necessary to revitalize

TABLE 2

Foreign Aid, 1951-1956
(in millions of U.S. dollars)

Year	Foreign Aid	% of Total Income
1951	---	---
1952	8.8	9.4
1953	---	---
1954	41.9	33.1
1955	81.4	36.6
1956	92.2	30.0

Source: Iran Almanac (1963: 277).

the Iranian economy which had been severely damaged by the sanctions. Foreign aid was acquired from UNESCO, the U.S. Export-Import Bank, the International Monetary Fund, and the United States -- the latter under the Mutual Security Act.

Political Disorder

The nationalization was also followed by civil unrest caused by economic disorder and Communist agitation. The extent of the disturbances led to the imposition of martial law and the eventual dissolution of democratic government as Prime Minister Musaddiq assumed dictatorial authority.

Immediately following nationalization, the Communists called for a general strike in the oil region. Martial law was proclaimed in Abadan, Agha Jari, and Bandar Ma'shur where disturbances were occurring, and the government sent troop reinforcements to the area. By the beginning of April 1951 native office workers had joined the manual laborers' strikes in the oil fields and nearly 12,000 persons were refusing to work. Rioting, which accompanied the strikes, led to injuries and deaths -- three British subjects were killed and another injured. Along with strikes and rioting, many anti-British and anti-American mass demonstrations were held in Tehran that spring. These demonstrations were allegedly instigated by the Communists but by all accounts were popularly supported among the Iranians.

A consequence of these disturbances was an increased suspension of civil liberties. In the months immediately following nationalization, the following laws were decreed: martial law was proclaimed in Tehran and the oil fields; government censorship prohibited anti-government articles in the press and disallowed the transmission of foreign press cables that appeared to endanger state security or to violate "decency." In June 1952 the Prime Minister requested and was granted unlimited authority for a six-month period to deal with the economy. Later Musaddiq requested that his extraordinary powers be extended another year, during which time he attempted to limit the authority of the Shah and to unconstitutionally dismiss the parliament. Soon after, however, Musaddiq was deposed and the Shah appointed a new Prime Minister.

The political effect of the oil embargo was the accumulation of unlimited authority by the Prime Minister. He was allowed to acquire power with the hope that he could ease the economic burden of the sanctions. However, as he refused to retreat from his positions during the negotiations, his policies resulted in an increase in the length and severity of the sanctions.

WORLD IMPLICATIONS OF THE DISPUTE

The effects of the loss of Iranian oil to world markets were not great. While the sanctions were in effect, the world oil trade lost about 485,000 barrels of petroleum daily, petroleum that had been refined at Abadan (Snodgrass and Kuhl, 1951: 502). The loss of Iranian refined oil did have worldwide repercussions: aviation gasoline was rationed in India, Pakistan, and Malaya; fuel stocks were reduced; the U.S. and Canadian refineries lost Iranian oil that had previously been shipped there. However, these were relatively minor, and short-term problems that were quickly solved.

The loss of Iranian crude (unrefined) petroleum had less effect on the world economy than the loss of refined petroleum. Production increases in other countries, particularly Kuwait and Iraq, easily compensated for the loss resulting from the British sanctions. In the 1950's, the world could easily do without Iranian oil but the Iranian economy could not forego oil exports. The Iranians were aware of the asymmetric nature of the relationship. But at the time, nationalism and anti-British sentiments were running so strong that Iran consistently opted for rejecting British demands. Even after the nationalistic movement was crushed by the Army and Musaddiq was overthrown, the Iranian Government refused to deal directly with the British. It took many months to find the complex compromise that would satisfy the Iranians.

APPENDIX C: RHODESIA

This appendix discusses the economic sanctions that have been applied against Rhodesia. The sanctions were first imposed by Britain in 1965 and have since been adopted by other countries. This instance of economic sanctioning was selected for study because it exhibits characteristics of interest to the project and because it may be usefully compared to other cases. Interest in the British use of sanctions derives from their decision to employ the sanctions in lieu of military action. This case differs from others studied in that it represents conflict between two economic unequals, and is an example of the ineffectual use of economic sanctions.

BACKGROUND

On November 11, 1965, the Rhodesian Front Government unilaterally declared its independence from the residual jurisdiction of Great Britain. Having eschewed the use of force, the British resorted to a policy of economic sanctions to undermine what they considered to be a Rhodesian "rebellion." The sanctions were designed to affect incomes, employment, and general economic activity and to generate sufficient dissent within the Rhodesian white population to bring about the termination of the Rhodesian Government.

The important background conditions producing the situation were Rhodesia's desire for independence from Great Britain and its discriminatory treatment of the native black population. In addition, Rhodesia's geographical location has played an important role in determining the effectiveness of the economic sanctions.

Geographic Conditions

Rhodesia's geographical location, namely its distance from the principal sanctioner, Great Britain, and its relative proximity to sympathetic South Africa and friendly Mozambique, have enabled Rhodesia to weather the sanctions and to mitigate their impact. Despite the sanctions, Rhodesia has been able to secure African markets for its exports to prevent the collapse of the Rhodesian economy. To a large degree, traditional purchasers of Rhodesian products have continued to trade with Rhodesia even if they opposed the Rhodesian policies that led to the sanctions. Zambia is an example. Until 1973, Zambia depended heavily upon Rhodesia for coal needed to operate its copper industry.

Domestic Conditions

The domestic conditions that in part led to the imposition of sanctions against Rhodesia included its discriminatory treatment of the black population in the country. Such treatment became increasingly discriminatory as Rhodesia progressed toward independence. Despite its status as a British colony, Rhodesia governed itself. The British ostensibly retained a veto prerogative in order to influence Rhodesia's domestic or foreign policies but almost invariably refused to exercise that power. Hence, the Rhodesian whites were able to pass discriminatory legislation without redress by Great Britain. Given its minority position, the white population in Rhodesia clearly fears any political measures designed to grant blacks greater influence in domestic affairs.

A key issue in the dispute between Britain and Rhodesia was the British demand that an independent Rhodesia have a constitution recognizing the legitimate interests of the black majority. In fact, it was this issue that culminated in the unilateral declaration of independence by Rhodesia and the subsequent imposition of sanctions by the British.

International Conditions

The focal point for a discussion of background international conditions is the colonial status of Rhodesia. Although Rhodesia was denied statutory independence from Great Britain it did have self-governing status. This enabled it to control virtually all domestic affairs without interference. British insistence that Rhodesia's constitution recognize the black majority was virtually ignored during the years prior to independence. In fact, the two major issues in the 1962 Rhodesian election were independence for Rhodesia and maintenance of white minority rule. Needless to say, the two issues were inextricably linked -- the latter ensured by the former. The British policy of non-interference resulted in virtually no British influence on the new constitution. The historical pattern demonstrated to Rhodesia that resistance to British desires was a viable policy.

The colonial status of Rhodesia, world public opinion, and the attendant economic linkages that existed prior to independence were important factors in the British decision to employ economic sanctions. Rhodesia depended on Great Britain for many of its imports and for export markets. The British undoubtedly thought that economic sanctions could compel the Rhodesians to incorporate greater rights for the black majority as a part of the constitution. The bargain was simple enough -- independence would be granted provided majority rights were included in the constitution. But the Rhodesian Government, fearing the threat of black dominance, rejected the British offer and unilaterally declared independence. The British Labour government was pressed by world public opinion, particularly in the Commonwealth countries, to take action. Furthermore, the Labour Party had won the 1964 election on a platform that included a promise to protect the rights of the black majority in Rhodesia. The British public and the Conservative opposition in the House of Commons, however, opposed the use of force against the white regime in Rhodesia. Consequently, the Labour government, caught in the cross-pressure, decided to impose limited economic sanctions on Rhodesia.

SANCTIONS

Since Rhodesia's declaration of independence, the initial sanctions imposed on Rhodesia have been gradually widened by Great Britain and adopted by other countries. The United Nations joined Britain in condemning Rhodesia's action and directed its members to implement economic restrictions.

Phase I - Initial Action

The general policy followed by the British Government in applying economic sanctions against Rhodesia is best described as a graduated and gradual escalation along two dimensions. The economic measures began as selective and partial sanctions and have proceeded toward total economic restriction against Rhodesia. At the same time, they have spread from unilateral action by the United Kingdom to the universal action the British envisaged (Galtung, 1972: 345). Some of the gradualism was planned -- to prevent excessive damage to Rhodesia -- but some was unavoidable due to the time required to pass legislation (opposed by the Conservatives) to implement the sanctions. The gradual application of economic sanctions against Rhodesia may be divided into three successive phases. The first phase began immediately after independence. The second phase began in December 1966 when the U.N. Security Council imposed selective sanctions. Phase three commenced in May 1968, marked by a U.N. Security Council resolution requesting an embargo on all trade with Rhodesia.

The initial economic sanctions were applied by Great Britain on the same day Rhodesia announced independence. The sanctions prohibited British territories from importing Rhodesian tobacco and sugar. The purpose of the sanctions was to diminish Rhodesian export earnings and create a foreign exchange crisis that would make it impossible for the Rhodesian Government to purchase imports necessary for economic viability. The British felt that the ban on tobacco alone would be responsible for 90 percent of

the effectiveness of the plan. Prior to the sanctions, yearly tobacco sales were as high as 130 million dollars, and provided approximately 30 percent of Rhodesia's foreign exchange (Good, 1973: 212). As 60 percent of exported tobacco was traditionally sold to the United Kingdom, the British felt their actions would have a significant disruptive impact (Doxey, 1971: 78).

First Escalation - Expansion of Boycott. Within a few weeks the boycott was expanded to include asbestos, copper and copper products, iron, steel, concentrates of antimony, chromium, lithium, tantalum, corn, meat, and other foodstuffs. The expanded list included over 95 percent of Rhodesia's exports to Britain, including oil (Good, 1973: 69-70). On January 30, 1966, the trade ban was further extended to prohibit all exports to Rhodesia except humanitarian items, books, films, exports for the land-locked Central African countries and prepaid goods awaiting shipment. By the end of February, a total ban on imports from Rhodesia was in effect (Doxey, 1971: 68).

Further measures to restrict currency transactions were applied by Britain in the months immediately following the imposition of the boycott. Virtually all pending payments by residents of the United Kingdom to Rhodesia were halted. This action reinforced an earlier embargo on capital transfers and made it illegal for British firms or banks to transfer funds to subsidiaries or branches in Rhodesia. The Board of Directors of the Rhodesian Reserve Bank was replaced to provide increased British control over Rhodesian assets held abroad, and to freeze approximately 10 million pounds held in London. Rhodesia was excluded from membership in the Commonwealth preference area as well as the Commonwealth Sugar Agreement. All financial aid to Rhodesia was terminated. The London capital market was closed for any Rhodesian dealings. Rhodesian sterling was blocked and could not be exchanged for foreign currency in Britain. In addition to these financial measures, restrictions were placed on travel to Rhodesia (Doxey, 1971: 69; Good, 1973: 70).

International Actions. During the initial phase of the sanctions, mild pressure was applied by the U.N. Security Council. It requested "all states to refrain from any action which would assist and encourage the illegal regime, and, in particular, to desist from providing it with arms, equipment and military material, and to do their utmost in order to break all economic relations with Southern Rhodesia, including restrictions on trade of oil and petroleum products (Security Council Resolution No. 217, 1965). In April 1966 the Security Council authorized Britain to intercept ships bound for Beira, Mozambique, through which oil was transshipped to Rhodesia.

Despite the U.N. approval of economic sanctions, international participation remained at a low level. Within the United Nations, only Zambia strongly backed the British policy. The Council of Ministers of the Organization of African Unity (O.A.U.) issued mandatory sanctions against Rhodesia in December 1965. These measures were more stringent than the immediate British actions, encompassing a total economic boycott of Rhodesia. Included was a ban on communication and denial of overflight rights to Rhodesian aircraft (Doxey, 1971: 71). In March 1966 the United States banned exports to Rhodesia, and France imposed restrictions on imports of Rhodesian tobacco and sugar. Other countries felt obliged to meet existing commercial contracts and still others exploited the opportunity to buy Rhodesian products at a reduced price. More importantly, Portugal and South Africa supported Rhodesia and refused to place any restrictions on their transactions (Curtin, 1968: 102). Thus, despite the increasing stringency of the sanctions imposed by Britain and the support by the United Nations, the lack of international solidarity severely limited the effect of the measures during this first phase.

Phase II - U.N. Sanctions

The second phase began in December 1966 when the Security Council imposed a limited number of sanctions. All members of the United Nations were required to boycott asbestos, iron ore, chrome, pig iron, sugar, tobacco,

copper, meat and meat products and hides, skins and leather originating in Southern Rhodesia and exported therefrom (Security Council Resolution No. 232, 1966). In addition, the export of petroleum, arms, ammunition and military equipment, vehicles, and aircraft was proscribed. The effectiveness of these measures was diminished by the lack of universal application. The reasons for noncompliance with the sanctions were varied. Zambia, despite a great deal of effort, remained economically unable to completely break off its trade with Rhodesia. Portugal and South Africa continued to support Rhodesia. Other countries preferred to profit from the situation by continuing to trade.

Phase III - U.N. Escalation

The third phase was initiated by another Security Council Resolution in May 1968 (No. 253). This resolution escalated the U.N. sanctions to the level finally imposed by the British, that is, restrictions on all trade except that for humanitarian, medical, or educational purposes. In addition, restrictions were placed on air travel and shipping, and funds for investment were not to be made available. The Security Council recommended withdrawal of all consular and trade representation in Rhodesia, and urged members to discourage emigration to Rhodesia. In March 1970 the above sanctions were reinforced by another resolution that called for stricter sanctions including mandatory severance of diplomatic and consular relations and a complete ban on communications with Rhodesia (Security Council Resolution No. 277). By the end of 1970 almost all countries in the U.N. had withdrawn diplomatic representatives.

IMPACT OF SANCTIONS ON RHODESIA

In general, the impact of the sanctions on Rhodesia was far-reaching, extending to all major sectors of the economy. However, countermeasures applied by the Smith Government did offset some of the effects of the negative economic measures. While economic growth declined, no sector

of the economy faced complete collapse. Politically, the white minority remained unified. And in addition, they have been able to make the black population absorb the main burden of the sanctions. Consequently, the propensity of the black population to revolt against the white government has increased over time. The number of guerrillas and their activities have been steadily expanding, forcing the Rhodesian Government to increase the amount of state security expenditures.

Economic Impact. The overall economic impact of the sanctions can be measured by the decline in major economic indicators immediately following the application of sanctions. All of the indicators in Table 1, except the consumer price index, displayed a substantial decline in 1966. But by 1967 gross domestic product (GDP) and gross fixed capital formation returned to pre-sanction levels. Exports continued to decline after 1966 while imports increased in 1967, exceeding the previous year's level.

TABLE 1

Economic Indicators for Rhodesia, 1963--1967

	1963	1964	1965	1966	1967
GDP (in million pounds, at current prices)	310.8	327.2	352.1	342.7	369.6
Exports (in thousand pounds) including re-exports	--	140.6	164.7	103.9	100.6
Gross (in million pounds) Fixed Capital Formation	45.8	43.1	47.4	38.4	47.8
Consumer Price Index (1964 = 100)	96.25	100.0	102.1	105.0	106.8

Source: McKinnell (1969: 565 and 581)

1. Agricultural Sector. The agricultural sector of the Rhodesian economy suffered more damage as a result of the sanctions than other sectors of the economy. Tobacco farmers were particularly hard hit. The tobacco boycott was effective as Great Britain was able to control a large proportion of Rhodesian sales. Prior to the sanctions, tobacco accounted for

nearly 30 percent of Rhodesia's exports with 60 percent sold to Britain. After the sanctions were imposed, the Rhodesian Government puchased and stored the tobacco that could not be sold abroad. The open market price of tobacco declined from 33 pence per pound to government-fixed prices ranging downward from 28 pence per pound (Doxey, 1971: 78). Tobacco growers' earnings fell from $95 million in 1965 to approximately $40 million in 1967. Even at depressed prices, it has been estimated that the government was paying farmers two to three times as much as it was receiving from export sales (Good, 1973: 213).

In 1968 the Rhodesian Government released data indicating the impact for the boycott on the tobacco industry. Subsidies granted the tobacco farmers for the 1966 and 1967 crops amounted to more than $95 million (Good, 1973: 213). By 1968 the number of tobacco farmers had declined to 1,700 from the pre-independence high of 2,800. In 1968 the government fixed the maximum weight quota for the tobacco crop at 132 million pounds, amounting to only half of the 1965 crop (Doxey, 1971: 78). Concurrently, the farmers were urged to diversify crops and to increase production of corn, cotton, wheat, peanuts, soya beans, and cattle.

Besides the sanctions, two other factors affected Rhodesian agriculture. First, a severe drought exacerbated the agricultural situation. Second, an immense over-supply of sugar depressed prices on the world market. The Commonwealth Sugar Agreement had guaranteed Rhodesian farmers long-term price arrangements for the sale of sugar at 46 pounds per ton. By the end of 1966 only 14 pounds per ton could be received.

2. Industrial Sector. Rhodesian industrial activity consists mainly of processing and packing agricultural products, textiles, clothing, and manufacturing building materials. Rhodesia also has an iron and steel industry which relies on domestic sources of coal, iron, and limestone. Additional industrial activity includes motor assembly, oil refining, furniture, paints, and electrical appliance manufacturing. The economic sanctions applied against Rhodesia severely affected certain industries,

causing Rhodesian manufacturers to lose export markets. Export of manufactured goods was generally not banned until the Security Council resolution of May 1968 embargoed all trade with Rhodesia by U.N. members. Zambia, Rhodesia'a primary market for manufactured items, has progressively reduced imports. South Africa, another major importer of Rhodesian goods, has also restricted imports from Rhodesia by placing tariffs on certain commodities to protect its own domestic industry. The loss of sales to export markets has been partially off-set by increased sales for domestic consumption. During 1966 clothing, footwear, furniture, paints, and electrical goods were all produced in larger quantitites than in the previous year.

3. Mining Sector. Rhodesia provides the world's markets with valuable supplies of chrome ore, copper, and nickel -- minerals in heavy and general demand on world markets, and they can be sold as if they were of non-Rhodesian origin. Asbestos, chrome ore, and copper were major contributors to the Rhodesian balance of payments before independence. In 1965 they earned 10.7 million, 3.5 million, and 6.5 million pounds respectively.

The main customer for Rhodesian chrome ore was the American corporation Union Carbide, which refused to respond to the U.S. State Department's appeal for voluntary cessation of trade. It was not until mandatory sanctions were required by the United Nations in 1968 that it became possible for this trade to be legally banned in the United States. Thereafter, legal supplies of chrome ore could only be obtained from the Soviet Union. However, the United States continued to import chrome ore under contracts pre-dating the Security Council resolution.

Copper also remained in demand, particularly in the United States. But it is impossible to determine the amount of copper being exported because the Rhodesian mineral is indistinguishable from South African or Zambian copper, both of which are heavily exported. Since all use the transport facilities of Mozambique, it is impossible to determine how much of the copper is of Rhodesian origin.

Despite the application of sanctions on Rhodesian minerals, the mining industry was able to expand during 1967. Plans were announced for the opening of three new nickel mining operations. One of the producers, the Anglo-American Corporation of South Africa, planned to invest 10 million pounds. It was estimated that the three mines would produce nickel valued at over 7 million pounds annually (Good, 1968: 215).

Structural Adjustments in the Economy. Table 2 shows structural changes that occurred in the Rhodesian economy. During the period 1965-68, the contribution of each sector of the economy to national output changed so that by 1968, of the three sectors, the tertiary was contributing nearly half of the gross domestic product. The increased activity in the tertiary sector helped maintain incomes and employment but did not promote expansion in the basic productive sectors.

Political Impact

From an economic standpoint, Rhodesia seemed extremely vulnerable to sanctions because of the importance of trade and foreign investment to its economy. Authoritarian controls placed on economic activity to mitigate the most severe effects of the sanctions generated some political support, and it has been argued that the successful use of sanctions is not conditioned by the economic vulnerability of the target country so much as by political sensitivity to economic damage (Sutcliffe, 1969: 117). The British Government assumed that economic pressure would generate dissent among the white population, and assumed that dissent would force political change to remove the damaging sanctions. The British believed a 10 percent decline in national income within one year would be sufficient to force the collapse of the government. The sanctions have not been effective because the Rhodesian Government is an authoritarian, elitist political system and as such is able to react quickly to implement policies, and because the social situation (that is, black-white hostilities) has been an important determinant of domestic unity. Further, the sanctions themselves have instilled a sense of unity within the white population.

TABLE 2

Structural Changes in Rhodesia, 1965-68

Economic Sectors	1965		Change After 1965		1968	
	Contribution to GDP		1965-67	1965-68	Contribution to GDP	
	£*	%	£*	%	£*	%
Primary Sector						
European Agriculture	45.7	13.0	-1.7	-11.0	34.7	8.9
Mining & Quarrying	24.1	6.8	-1.4	-1.9	22.2	5.7
African Agriculture	20.3	5.8	+6.5	+4.4	24.7	6.3
Total Primary	90.1	25.6	+3.4	-8.5	81.6	20.9
Secondary Sector						
Manufacturing	66.6	18.9	+2.9	+12.4	79.0	20.3
Trans. & Communicat'n	30.9	8.8	-3.6	+1.5	32.4	8.3
Bldg. & Construction	15.9	4.5	+2.9	+7.2	23.1	5.9
Total Secondary	113.4	32.2	+2.2	+21.1	134.5	34.5
Tertiary Sector						
Distribution	49.6	14.1	-1.7	+2.6	52.2	13.4
Pub. Adm & Defense	16.4	4.7	+2.9	+4.6	21.0	5.4
Electricity & Water	14.6	4.1	+1.8	+2.8	17.4	4.5
Education	11.6	3.3	+1.1	+1.9	13.5	3.5
Domestic Services	10.1	2.9	+0.6	+1.3	11.4	2.9
Ownership of Dwellings	10.1	2.9	+1.1	+2.4	12.5	3.2
All Other Services	36.2	10.3	+6.1	+9.8	46.0	11.8
Total Tertiary	148.6	42.2	+11.9	+25.4	174.0	44.6
Gross Domestic Product	352.1	--	+17.5	+38.0	390.1	--

* Figures represent millions of pounds.

Source: McKinnell (1961: 570).

The Rhodesian Front Government has been able to maintain political support by subsidizing the white standard of living. Traditionally, support for the Rhodesian Front Party has come from the white farming community. However, recent political support has developed in the urban sectors. As three-quarters of the white population lives in the cities, urban support is necessary for the continuation of the Rhodesian Government. This support has been acquired by government controls that have created new jobs for those unemployed by the sanctions and have required some firms to continue to employ and pay workers even when no jobs remained for them (Sutcliffe, 1969: 119).

The white standard of living has been subsidized to the further impoverishment of the black population, particularly the rural black population, because the sanctions have accelerated the trend of rural impoverishment. Increased rural poverty will probably lead to gradual and visible rural political discontent and contribute to the nascent guerrilla movement.

RHODESIAN RESPONSE TO SANCTIONS

The Rhodesian Government's first response to the economic sanctions was to initiate protective measures to counter the impact of the sanctions on the economy. These measures were directed toward controlling Rhodesia's balance of payments deficit, inflation, and unemployment.

Balance of Payments Controls. Rigid exchange and import controls were imposed prior to independence to prevent a serious payments crisis if exports, particularly tobacco, were curtailed. To conserve foreign exchange, import licensing was imposed at the time of independence and all international debts were repudiated. Gold production, worth approximately $20 million per year, was held off the world market and used to strengthen the Rhodesian reserves (Good, 1973: 70). To further conserve foreign exchange, Commonwealth preference was revoked, foreign travel allowances were reduced, purchase of foreign securities and the transfer of all funds to Britain, Zambia, and East African countries was prohibited,

and interest payments on loans issued in London or guaranteed by the British Government were suspended (Doxey, 1971: 85). To regulate international trade, excise and customs duties were increased as well as the price of sugar.

Inflation Controls. To curb inflation caused by the sanctions the Rhodesian Government assumed extraordinary power to control the economy. The government acquired the prerogative to issue directives to the managements of banks, commercial concerns, and industries, and if necessary, to sequestrate firms. The Rhodesian Government absolved itself from obligations to pay interest, rents, dividends, profits, and capital to citizens of the United Kingdom and refused to honor debts to the British Government and the World Bank. The credit squeeze created by the farmers' demands for overdraft facilities prior to the 1966 harvest was met by independence-bond sales, lowered liquidity requirements for commercial banks, decreased import levels, and expropriation of United Kingdom funds trapped in Rhodesia after independence (Good, 1973: 83-84). Surplus purchasing power was eliminated by instituting savings campaigns and restraining banks from making non-productive loans (Doxey, 1971: 85).

Unemployment Controls. The basic government policy to reduce unemployment was to replace previous production-for-export with production-for-domestic consumption, with emphasis directed toward commodities which could no longer be purchased abroad. The government instituted controls to alleviate white unemployment, especially in the agricultural sector. Compensation plans and other forms of financial assistance were enacted by the government to support farm incomes. Furthermore, farmers were encouraged to shift production from sugar and tobacco to substitute crops, especially wheat, corn, and cotton. Regulations to control manpower and prevent unemployment were applied to industries particularly injured by the sanctions. Industries undertook substantial restructuring operations, switching from producing for export to manufacturing items to replace former imports, thereby helping to relieve the unemployment problem as well as the shortage of import commodities. Unemployment among the white population was further

abated by numerous appointments to public service. African unemployment was slightly relieved by the emigration of many non-indigenous Africans (McKinnell, 1969: 564).

IMPACT OF SANCTIONS ON GREAT BRITAIN

In general, the sanctions policy has had an adverse impact on the British economy in four distinct ways: (1) the loss of export markets for British goods; (2) the loss of imported Rhodesian products; (3) the loss of profits by British firms with investments in Rhodesia; and (4) damage to the British balance of payments (Sutcliffe, 1969: 115-117).

British exports to Rhodesia fell from 32 million pounds (0.6 percent of total exports) in 1965 to 2.3 million pounds in 1966 and less than 1 million pounds in 1967. The actual decline in British sales was not quite this dramatic since some British goods reached Rhodesia through South Africa (11 million pounds worth of goods in 1966, according to the Rhodesian Government). British exporters were able to offset some resultant trade losses by gaining additional markets in South Africa, Zambia, and Malawi. British imports from Rhodesia fell from about 29 million pounds in 1965 to 5 million pounds in 1966 and 2 million pounds in 1967. The primary British import from Rhodesia was tobacco, and it has been primarily tobacco products manufacturers who have suffered from the loss of trade.

British investors owning Rhodesian stocks have lost the earnings from their investments as a result of Rhodesian restrictions on interest and dividend payments to Britain. Following the unilateral declaration of independence, the Rhodesian Government proscribed the continuation of any payments to Great Britain. The firms that have suffered most have been those with manufacturing operations in Rhodesia, particularly BMC, Ford, and Rover.

The loss of balance of payments was estimated at approximately 42 million pounds in 1966. This figure does not include the amount of British exports

that have reached Rhodesia through third parties (estimated at 11 million pounds in 1966). With the British balance of payments deficit at 404 million pounds in 1967, the role of Rhodesia in the deficit appears small, even when using the maximum figure. It is apparent that neither the burden on the British balance of payments nor the damage to private economic interests has been severe enough to undermine the sanctions policy.

THE EFFECTIVENESS OF SANCTIONS AGAINST RHODESIA

Thus far, the sanctions applied against Rhodesia have been somewhat ineffective in achieving their vaguely defined goals. Debates in the British Government and the United Nations concerning the democratization of Rhodesia and an improvement in the political status of the Africans notwithstanding, the real purpose of the sanctions appears to be a return to "legality," that is, colonial status.

Although the Rhodesian economy appeared to the British to be extremely vulnerable to economic pressure, it has survived for several reasons: (1) the sanctions were applied too gradually to have a disruptive impact; (2) the Rhodesian Government was able to find alternate markets in South Africa, Mozambique, and Portugal; (3) Rhodesia was able to apply countermeasures to offset the negative impact of the sanctions; (4) the protectionist measures taken prior to independence helped prevent economic disaster; and (5) racial fears have strengthened white determination not to submit to coercion.

MILITARY-RELATED IMPLICATIONS

The military-related implications of the sanctions arise from Rhodesia's importance as an exporter of relatively scarce raw materials, such as chrome, copper, nickel, and asbestos. Application of trade restrictions has not been universal because of Rhodesia's importance as a market for these minerals. Countries that have proscribed the import of Rhodesian chrome have had to rely on the Soviet Union, the only other major exporter

of the ore. Reliance on the Soviet Union as a source of chrome ore creates a potential point of vulnerability for members of the Western camp who view any dependence on the Soviet Union as a liability endangering their national security.

Whereas other cases of economic sanctions have demonstrated the importance of location, the importance of products, and so forth on the effects of the sanctions, the Rhodesian case reveals that the possession of strategically important materials can undermine sanctions and prevent international cooperation.

The lack of decisiveness by the British prevented the successful application as well. Such a gradualist approach appears to have provided enough time for the highly unified Rhodesian Government to act to counter the effects of the sanctions.

APPENDIX D: BERLIN

This appendix discusses the 1948-49 Berlin crisis. While the general features of the period are well-known, this instance of U.S.-Soviet conflict was selected for study because it is an example of major power conflict deriving in part from economic considerations and requiring actions by both sides to maintain the economic viability of East and West Berlin. The dispute illustrates the interaction of economic, political, and military interests.

BACKGROUND

As is well-known, at the end of World War II Germany was divided into two areas. During the war, the United States, Great Britain, and the Soviet Union had discussed the post-armistice future of Germany and had agreed that Berlin would be divided into three zones, one British, one Soviet, and one American. However, as the Allies began to occupy sectors of Berlin, difficulties arose between Soviet and Western officials. Apparently hoping for eventual Communist control of the entire city, Soviet officials attempted to delay the formation of centralized German agencies and to hinder economic reconstruction. Interzonal travel by Germans was prohibited. Manufactured products from East Germany were withheld from a common "fund" to meet Germany's import requirements.

SANCTIONS AND RESPONSES

During 1948 both the Soviet Union and the Western Allies employed economic and political controls to achieve their respective goals vis-a-vis Berlin's (and Germany's) future. The dispute can be divided into four phases: (1) January 1948 to June 1948, a period of minor challenges by the Soviets to the Western Allies; (2) mid-June to late July, a period marked by the initiation of the blockade and concomitant economic sanctions; (3) late July to mid-November, a period of relative stability as

the initial sanctions were continued but not escalated; and (4) mid-December to May 1949, a period marked by increased economic pressure on the East German economy created by the continuing airlift, and the dispute's resolution consolidating the administrations of East and West Berlin and terminating the blockade and counter-blockade.

Phase I - Russian Initiation of Restrictions

During the first period of the U.S.-Soviet dispute over Berlin, January to June 1948, the Soviets began to restrict access to Berlin. These restrictions by the Soviet Military Administration in the Soviet zone began as limitations on travel from East Germany to Berlin. After a few weeks the Soviets restricted Allied traffic between the Western zones and Berlin. The Allies countered the Soviet action by initiating a "little airlift" to supply occupation forces in Berlin. In April, the Soviet authorities closed freight routes to Berlin from Munich and Hamburg and imposed limitations on barge traffic to and from Berlin. The initial phase ended as Soviet representatives walked out of a meeting of the Allied Command and refused to participate in the joint military governing body of Germany.

Phase II

The beginning of the second period in mid-June was marked by the Western Allies' announcement of a currency reform for West Germany, but excluding Berlin. The immediate Soviet response was to impose renewed travel restrictions; all vehicles, including trains, were denied entry to the Soviet zone. Subsequently, the Soviets declared Berlin to be a part of their zone, and within a few days Soviet officials announced a currency reform for East Germany and Berlin. The proposed reform established preferential exchange rates for Soviet-controlled industries and affiliated Communist interests. General public and private enterprises were to receive a much less favorable rate of exchange. The Western

military governors then insisted that the Soviet currency reform be applied to East Berlin only, and announced that the new Western currency would also be introduced in West Berlin.

The currency controversy was followed by a riot at Berlin's City Hall, located in the Soviet sector. The riot occurred after the city government voted that the two currencies apply simultaneously to Berlin; the Soviet currency in the Eastern zone and the Allied currency in the Western zones. When the meeting adjourned, a Communist-led mob was waiting for the delegates to emerge. A number of assemblymen were attacked and severely beaten by the hostile crowd. The police did not intervene to stop the violence; it has been reported that they helped the rioters by pointing out delegates (Davidson, 1958: 97). As a consequence, future assembly meetings were held in the Western zones.

The Berlin Blockade. In late June, complete blockade of Berlin was imposed. The Soviets stopped freight traffic from Western Germany to Berlin and cut off electricity to the Western sectors. It was announced that all food subsequently brought into Berlin from East Germany would be distributed only to the Soviet sector, defying the initial agreements. The day after the blockade, Britain airlifted 6½ tons of supplies to its garrison in Berlin. Two days later, the Allies began to airlift supplies into the Western zones of Berlin. In July, when the Soviets showed no intention of lifting the blockade, an airlift goal was set: 450 daily flights carrying over 1,000 tons would continue to supply Berlin.

After the blockade and during the airlift, Soviet representatives officially withdrew from the governing Military Command. Western action regarding currency reform was blamed for creating a situation in which the meetings could no longer be beneficial. However, the Soviets did continue to negotiate with the West. The Allies were willing to allow the use of Soviet currency in the Western zones in exchange for lifting the blockade. The basic issue from the Soviet view, however, was the unification of Germany under Communist rule. The consolidation of the

Eastern and Western zones of Berlin was only a prelude to that goal. To the Soviets, the currency issue was unimportant by comparison. The blockade continued.

Phase III - Negotiations

During the third phase of sanctions, late July to mid-November, the blockade and Allied airlift continued, paralleling negotiations. In early August, Stalin met with Allied ambassadors and expressed a willingness to lift the blockade if the Allies would accept the Soviet currency in Berlin. However, when the agreement was to be drafted, the real issue (postponement of the formation of a West German Government as a precondition for ending the blockade) reemerged and a stalemate quickly terminated the negotiations. In late August a modified agreement was reached in which (1) the West agreed to recognize the East German mark as sole legal tender in Berlin; (2) the Soviets agreed to lift the blockade; and (3) Stalin orally agreed that the Allies could share in the control of the new currency. The last statement, however, did not appear in the written form of the agreement and a settlement was prevented.

Underlying the currency question was the key issue of political control over Berlin and Germany. In early September, a parliamentary council met in Bonn to draft a constitution for West Germany. The Soviets hoped that pressure in Berlin would obstruct the formation of a West German Government. Consequently, they continued their attempts to consolidate power in East Berlin and to divide the city politically and economically. Gradually, the Soviets succeeded in dividing various government departments in the city into separate Eastern and Western jurisdictions. Finally, at the end of November, a front government for the Eastern zone was established and all non-Communist economic institutions were forced out of the Soviet sector.

Phase IV - Countermeasures and the End of the Blockade

During the fourth period, mid-December until May 1949, the West began to take the initiative in exerting political and economic pressures. All truck traffic to the Soviet zone was stopped. Prior to this time, the counter-blockade had been sporadic and voluntary. Anyone could purchase unrationed commodities in the Western sectors and carry them into Soviet territory. In February all vehicles to or from the Soviet zone were forbidden to cross U.S. or British boundaries.

The recalcitrance of the West Berliners and Allied officials, together with the effect the blockade was having in East Berlin,[1] finally forced an end to the blockade.

Termination of the Blockade. On May 5 an official statement announced the termination of the blockade within a week. The following agreement was reached:

> 1. All the restrictions imposed since March 1, 1948, by the Government of the U.S.S.R. on communications, transportation, and trade between Berlin and the Western zones of Germany, and between the Eastern zone and the Western zones [would] be removed on May 12, 1949.
>
> 2. All the restrictions imposed since March 1, 1948, by the Government of France, the United Kingdom, and the United States or any one of them, on communications, transportation, and trade between Berlin and the Eastern zone and between the Western and Eastern zones of Germany [would] also be removed on May 12, 1949.
>
> 3. Eleven days subsequent to the removal of the restrictions referred to in paragraphs one and two, namely, on May 23, 1949, a meeting of the Council of Foreign Ministers [would] be convened in Paris to consider questions relating to Germany and problems arising out of the situation in Berlin, including also the question of currency in Berlin (quoted from Department of State Bulletin, May 15, 1949, p. 631 in Smith 1968: 129-130).

[1] The West Berlin press mentioned that a number of industries in East Berlin had been forced to restrict working hours and the number of employees as a result of the countermeasures (Davidson, 1958: 265).

The Soviets finally agreed to lift the blockade without receiving concessions in return. Their foremost purpose for indulging in sanctions in the first place (to prevent the formation of a West German-oriented government in place of a Communist-dominated one) was unrealized. The Soviet intent was eventually thwarted in May 1949 when a new West German government officially proclaimed its constitution and confirmed its non-Communist orientation.

EFFECT OF THE BLOCKADE ON BERLIN

The effect of the Soviet blockade was to compound the economic damage caused by World War II and to slow East Berlin's economic recovery in comparison to West Germany. Industries, lacking adequate supplies of raw materials remained idle; businesses were deprived of normal commercial contacts with the surrounding area; and transportation costs increased. West Berlin was prevented from participating in the 1948 currency revisions that returned a stable Deutsche Mark to West Germany. Also, unemployment remained a significant problem in West Berlin.

These effects, despite their importance to Berlin, were in a sense incidental as the real confrontation was between the United States and its Allies and the Soviet Union. Berlin and its inhabitants were caught in between. However, the pressures that were brought to bear on Berlin should not be dismissed completely as they were instrumental in solidifying popular attitudes in the Western sectors and undermining Russian efforts to secure Communist control of the entire city. In many respects, the Berlin crisis was a testing ground for Soviet foreign pressure. They were clearly testing the U.S.-British resolve to support Berlin. The Berlin airlift demonstrated that resolve in the face of Russian pressures.

APPENDIX E: CUBA

This appendix discusses the economic sanctions employed by the United States against Cuba. This instance of interstate economic conflict differs from others studied as the two countries are not geographically distant (as were Great Britain and Rhodesia); but the sanctions nevertheless failed (in marked contrast to the Finnish-Soviet dispute).

BACKGROUND

When Fidel Castro came to power in Cuba on January 1, 1959, he expressed discontent with the extent of U.S. involvement in the Cuban economy. He apparently believed that such involvement created a dependence on the United States that would prevent complete independence and would be harmful to social and economic development.

U.S. Economic Involvement in Cuba

The extent of U.S. involvement in, and control over, the Cuban economy was significant. In 1958, U.S. direct investments reached approximately $1 billion, and were distributed as shown in Table 1.

TABLE 1

U.S. Investments in Cuba, 1958

Areas of Investment	Millions of U.S. Dollars
Agriculture	265
Petroleum and Mining	270
Manufacturing	80
Services	386
TOTAL	1001

Source: Seers (1964: 10).

For the same year, the geographical composition of Cuba's foreign trade is shown in Table 2. Both sets of data suggest that any systematic effort to alter extant economic relations between the two countries would have immediate effects on American interests.

TABLE 2

Cuban Foreign Trade, 1958

Countries	$ (million U.S.)	% of Total	$ (million U.S.)	% of Total
U.S.	490.7	67.1	542.9	69.9
Common Market	34.9	4.8	60.7	7.8
Other W. Europe	44.5	6.1	26.6	3.4
Sino-Soviet Bloc	17.7	2.4	2.2	.3
Latin America	10.5	1.4	79.9	10.3
Other	133.3	18.2	64.8	8.3
TOTAL	731.6	100.0	777.1	100.0

Source: Direction of Trade (1963) International Monetary Fund: 205-206.

Castro's first move toward regulating trade was to tighten exchange controls in order to reduce imports of luxury items from the United States. Imports from other countries were encouraged as a means to promote sugar exports (Adler-Karlsson, 1968: 209). At the same time, the level of sugar exports to the United States remained stable, creating an improvement for the balance of payments.

The next step in Castro's plan to decrease American economic control was to propose agrarian reforms. Under the 1959 law, the seizure and redistribution of land was authorized. At the time, five U.S. sugar companies owned or controlled over two million acres in Cuba -- equivalent to 40 percent of the industry (Adler-Karlsson, 1968: 209) -- and stood to lose all but 16,650 acres if the law was enforced (Bloomfield and Leiss, 1969: 98). U.S. opposition to agrarian reform was quickly voiced and a reduction of

the Cuban sugar quota[1] (intact since 1934) was threatened. The sugar quota was an agreement by which Cuba was guaranteed a U.S. market for three million tons of sugar per year at 2¢ per pound above the world market price (Bloomfield and Leiss, 1969: 98). Given the importance of sugar to the Cuban economy (see Table 3), suspension of the sugar quota by the United States before Cuba had an opportunity to find new markets would have substantially decreased exports and disrupted the Cuban economy. The expected loss of revenue that would result from suspension of the quota made the threat a viable instrument for exerting U.S. influence and control over Cuban domestic policies.

TABLE 3

Breakdown of Cuban Exports by Commodity, 1958

Commodity	Millions of U.S. Dollars
Sugar	594
Tobacco	50
Minerals	44
Other	46
TOTAL	734

Source: Seers (1964: 19).

Deterioration of U.S.-Cuban Relations

Relations between the United States and Cuba were further strained by Castro's frequent anti-American pronouncements throughout 1959. Castro charged that periodic bombing flights over Cuba by exiled Batistianos took place with American complicity. He also demanded the return of the refugees and the money they had taken with them but the U.S. Government refused extradition.

[1] The use of the term "quota" to describe a preferential U.S. policy toward Cuba is somewhat counter to the "normal" meaning of the word. However, as the term has been traditionally applied to the system, it is adopted here also.

Alignment Shift

Throughout 1959, U.S. officials expressed concern over Castro's policies and the rising influence of Communists in the Cuban Government. The pro-Soviet shift in Cuban policy orientation heightened U.S. anxiety over Castro's attempts to export his revolution throughout Latin America. The U.S. State Department charged that Castro had "aided or supported armed invasions of Panama, Nicaragua, the Dominican Republic and Haiti" (U.S. Department of State: Cuba, 1961). The climax of this trend occurred in February 1960 when a trade agreement between Cuba and the Soviet Union was signed. The agreement guaranteed yearly Soviet purchases of one million tons of sugar for five years. The percentage, volume, price, and credit differences between the Cuban-Soviet and Cuban-U.S. sugar agreements notwithstanding, the new agreement created an alternate market for sugar, a market that became increasingly more important as U.S.-Cuban relations deteriorated. Castro appeared determined to sever the economic links to the United States and alignment with the Soviet Union seemed logical. He apparently believed that the great distance between the two countries would preclude Soviet domination of the Cuban economy and that as an alternate trading partner, the Soviet Union offered a market equal to the United States.

SANCTIONS AND RESPONSES

Throughout 1959 and 1960 the relations between the United States and Cuba steadily deteriorated. Concomitantly, Castro sought economic assistance from the Soviet Union to accelerate the removal of the U.S. presence in Cuba. During this period, U.S. policy focused on attempts to open negotiations to settle the differences between the two countries. But the policies of Cuba and the United States remained irreconciliable as Castro insisted on removing U.S. interests from Cuba without compensation while the United States would not accept nationalization of American property without remuneration (which Castro could not provide).

U.S. Escalation

In March 1960 the United States shifted from its policy of attempting to negotiate with the Cuban Government to an implied policy of active intervention in Cuban domestic affairs. Incidents implicating CIA-trained Cuban exiles further incited Castro's antipathy and increased anti-U.S. sentiment in Cuban public opinion. The changed U.S. policy orientation culminated in active U.S. sponsorship of military intervention in Cuba in June 1960.

Cuban Escalation

The U.S. Government's active opposition to Castro's anti-American policies in June 1960 was in part a response to controls imposed on U.S.-owned oil refining companies. These controls consisted of confiscation of records, redistribution of Cuban oil profits, and appropriation of gas stations. When the payment of Cuban oil debts to the oil companies in Russian crude oil was not accepted by the oil companies, the Cuban Government nationalized the three refineries and began to refine Soviet oil in sufficient quantity to meet Cuba's entire petroleum requirements.

U.S. Escalation - Reduction of Sugar Quota

In July 1960, on the same day Congress passed legislation giving President Eisenhower power to lower Cuba's sugar quota, he suspended the balance of the quota for the year.

Cuban Response - Expropriation of U.S.-Owned Land

The Cuban Government's immediate response to the suspension of the sugar quota was to authorize the expropriation of U.S.-owned land at the discretion of Castro. The Law of Nationalization, issued on July 5, provided compensation for the confiscated property based on a fund created by proceeds from the sales of sugar to the United States, but only sales in excess of 3½ million Spanish long tons at a price of at least 5.75¢

per pound. The owners of the expropriated property were to receive 30-year bonds bearing 2 percent interest based on the fund (Bonsal, 1971: 151-152). Since the fund would not have resources unless the United States purchased more Cuban sugar than it had since World War II and at a price well above the prevailing quota price, it was clear that the intent of the law was to confiscate U.S. property without compensation. The law was implemented on August 5 when Castro announced the nationalization of all 36 sugar mills, the two oil refineries, and two utility companies (a telephone company and an electric light and power company) owned by U.S. firms. These actions were followed by additional nationalizations covering all American property on the island.

The Cuban response to the suspension of the sugar quota was directly contingent upon Soviet support in the form of weapons shipments and sugar purchases (at world prices) paid for in Russian goods. It was after the arrival of the arms and the Soviet agreement to purchase the sugar that the Cuban Government responded to the suspension of the sugar quota by nationalizing all U.S.-owned property in Cuba.

Soviet bloc aid to Cuba was extended by a multilateral trade agreement in January 1961. This was a further attempt by the Castro regime to counter the U.S. sanctions by increasing trade with the Communist bloc. The trade agreement provided for the purchase of 4 million tons of Cuban sugar by Communist bloc countries. In other provisions of the treaty Cuba was promised assistance in reopening two nickel plants, technical training for 2,400 Cubans, shipyard equipment, and equipment to outfit 24 factories to manufacture such products as automobile parts, paper, dynamite, and rubber (Bloomfield and Leiss, 1969: 113).

U.S. Escalation - Trade Embargo

Further economic sanctions were applied in the fall of 1960. The U.S. Government prohibited all exports to Cuba except nonsubsidized foodstuffs, medicines, and medical supplies. This action was followed by

additional restrictions on trade relations between Cuba and the United States: in December 1961 the importing of Cuban sugar was prohibited; in early 1962 all Cuban imports were prohibited. Since February 1963 the United States has published a monthly blacklist of all ships carrying cargo to Cuba. Blacklisted ships have been denied entry to U.S. ports and denied permission to transport government-owned or government-financed cargoes.

EFFECTIVENESS OF SANCTIONS

The United States attempted to ensure the success for the economic sanctions by trying to convince other countries to ban trade with Cuba. When that failed, coercive measures were used to gain compliance. The U.S. Government first sought Latin American participation in the sanctions against Cuba through the Organization of American States. Throughout 1960 and 1961 the members of the OAS refused to condemn Castro's actions and did not apply economic sanctions against Cuba, despite the urging of the U.S. representative. Finally, in January 1962, the delegates effectually expelled Cuba from membership by declaring that Cuba had placed itself "voluntarily" outside the OAS by adhering to Marxist-Leninist ideology (the OAS charter lacked provision to expel members). A resolution was passed to suspend immediately trade in arms and implements of war with Cuba. The United States urged the members to vote a complete embargo, but the others would only agree to the possibility of extending this ban to other items. It was not until the discovery in July 1964 of a Cuban arms cache intended for Venezuelan guerrillas that the OAS voted to suspend diplomatic relations, sea transport, and trade with Cuba (except food, medicine, and medical supplies). Chile, Bolivia, and Uruguay dissented from these recommendations. Mexico refused to comply with the decision to sever diplomatic relations.

Trade data in Table 4 show the relative success of U.S. attempts to convince the Latin American countries to sever trade relations with Cuba. The substantial increase in imports from Latin America in 1964 was due

TABLE 4

Cuban Trade with Latin America
(in millions of U.S. dollars)

	1958	1959	1960	1961	1962	1963	1964	1965	1966
Exports to Latin America	10.5	20.8	5.5	11.0	4.8	5.5	2.4	1.1	0.4
Imports from Latin America	79.9	65.5	4.3	8.1	9.7	4.2	17.1	11.0	0.8

Source: Direction of Trade

to a significant increase in trade with Mexico. Mexico's exports to Cuba rose from $1.9 million in 1963 to $10.5 million in 1964.

Blacklisting

Besides pressuring the OAS to participate in the sanctions, further actions undertaken by the U.S. Government to try to ensure the success of the sanctions included blacklisting ships that continued to carry cargo to and from Cuba, as well as suspending foreign aid to countries that continued to trade with Cuba. The purpose of this legislation was to force nations to participate in the embargo.

Foreign Aid Curtailment

An additional U.S. measure to force compliance with the sanctions was included in a clause of the Foreign Aid Act of 1963. The clause required the President to cut off aid to recipients who did not take "appropriate steps" to curtail shipments to Cuba. The President retained the option to continue aid if he found it in the national interest to waive the penalty.

Trade Fluctuation

An examination of the volume of trade maintained by the countries against whom penalties were either threatened or imposed and a few other major

trading partners with Cuba illustrates the lack of success of the U.S. policy to force participation in the embargo. The general trend of the countries listed in Table 5 -- Canada, France, German Federal Republic, Japan, Morocco, Spain, the United Kingdom, and Yugoslavia -- shows a decrease in trade with Cuba from 1960 through 1963, followed by an increase in the volume of trade during 1964 and 1965. The initial decrease in trade is probably due more to Cuban shortages of foreign exchange and the generally poor business climate than to U.S. measures. Each of the countries had commercial interests in continued trade with Cuba, interests which generated opposition to the U.S. shipping restrictions. As a result, these countries stressed a "freedom of the seas" policy and refused to adhere to the embargo.

FAILURE OF SANCTIONS

The U.S. sanctions against Cuba did not achieve the desired changes in Cuban policy. They had the greatest disruptive effect on the Cuban economy during the first three years after their imposition. Thereafter their impact was gradually reduced as the Cuban Government initiated countermeasures. To repeat, the sanctions imposed by the U.S. Government against Cuba included: the suspension of the sugar quota; trade ban on imports from and exports to Cuba; restrictions on financial dealings; and restrictions on countries that continued to trade with Cuba. The Cuban Government's response to these sanctions was to nationalize all U.S.-owned industries and property on the island and establish multilateral trade agreements with the Soviet bloc.

Four factors contributed to the failure of the economic sanctions imposed upon Cuba: the gradualism with which the measures were applied, the availability of alternate markets, the ability of Cuba to restructure its economy, and Cuban nationalism.

TABLE 5

Trade with Cuba by Country, 1959-1965
(in millions of U.S. dollars)

Country	1959	1960	1961	1962	1963	1964	1965
Canada							
Exports to Cuba	16.2	17.3	39.2	11.9	10.8	42.1	53.7
Imports from Cuba	10.4	7.8	4.0	2.7	13.7	2.8	4.9
France							
Exports to Cuba	14.3	----	----	----	5.9	----	14.8
Imports from Cuba	8.8	----	----	----	2.5	----	10.3
German Federal Republic							
Exports to Cuba	29.7	22.1	17.7	14.0	11.7	18.0	3.8
Imports from Cuba	14.0	12.6	13.1	0.4	0.3	0.8	0.8
Japan							
Exports to Cuba	10.0	10.5	11.4	10.8	5.2	41.5	3.8
Imports from Cuba	28.0	15.1	26.4	25.6	20.6	50.0	26.4
Morocco							
Exports to Cuba	1.7	0.1	1.5	6.7	13.6	19.0	8.8
Imports from Cuba	13.1	11.9	10.6	11.9	27.2	65.3	33.1
Spain							
Exports to Cuba	7.8	----	----	----	14.0	----	37.8
Imports from Cuba	6.1	----	----	----	23.1	----	28.0
United Kingdom							
Exports to Cuba	42.9	23.0	16.6	11.7	10.5	37.3	46.4
Imports from Cuba	9.1	8.5	12.5	11.6	22.6	25.6	13.3
Yugoslavia							
Exports to Cuba	----	----	----	----	2.8	----	5.3
Imports from Cuba	----	----	----	----	1.8	----	4.9

Source: Direction of Trade

Gradualism

The gradual application of sanctions against Cuba diminished the economic as well as the psychological impact of the measures on the Cuban population. The sanctions could only be applied gradually because of constraints placed on the U.S. Government by the 1960 election, the independent role played by the Cuban refugees, Soviet-American relations, and world opinion.

Dealing with the Cuban situation was one of the major issues of the 1960 Presidential election. The election and the subsequent change in administration forced deferral of any actions until Kennedy took office. The actions of Cuban refugees against Cuba, such as bombing sugar refineries, created further problems for the U.S. Government which was confronted by American sympathy for the refugees. Unfortunately, every incident accelerated the Cuban-U.S. conflict and hindered a negotiated settlement of the dispute. A further constraint on American action was the stalemate between the United States and the Soviet Union over Cuba, and the increasing danger of nuclear confrontation. Finally, U.S. policy options were influenced somewhat by world opinion, which generally disapproved of drastic coercive measures.

Alternate Markets

Although the United States had been the major purchaser of Cuban sugar, as well as the supplier of most of Cuba's imported commodities, economic action by the United States alone was insufficient to ensure the success of the embargo. The availability of markets in countries unsympathetic to the U.S. cause and the success of smuggling undermined the sanctions. Cuba was not forced to be dependent on the United States for its imported items; many developed countries were able to provide substantially the same products. However, the suspension of the sugar quota did create a problem for the Castro regime. Since sugar was the major export, it was Cuba's primary source of revenue for purchasing food, clothing, and machinery. Consequently, alternate sugar markets were necessary if Cuba's economy was to survive.

The Soviet Union and the Soviet bloc filled a substantial portion of the gap in Cuba's sugar export market created by the boycott. But payment in Soviet goods rather than cash denied Cuba the needed foreign exchange to import goods from other countries, and tied the Cuban economy closely to that of the Soviet Union.

Table 7 reveals the changing pattern of Cuban trade that resulted from the U.S. embargo. Prior to and immediately following Castro's takeover, the United States was Cuba's main trading partner, but by 1961 the United States had been replaced by the Soviet Union. The trend continued during the next three years. The percentage of Cuba's total trade with the Soviet Union eventually exceeded the level it had reached with the United States prior to Castro's rise to power.

TABLE 7

Percentage of Total Cuban Trade with the United States and Sino-Soviet Bloc, 1958-1963

	1958	1959	1960	1961	1962	1963
U.S.						
Exports	67	70	53	5	0.7	--
Imports	70	63	49	4	0.1	4
Sino-Soviet Bloc						
Exports	2.4	2	24	73	79	67
Imports	0.3	0.2	49	68	82	81

Source: Direction of Trade

Cuban trade patterns underwent further realignment following 1964, probably as a result of increasing economic stability. Table 8 lists Cuban trade by groups of major trading partners according to the pre-Castro economic trends. By 1964 trade alignments had changed sufficiently for the "Sino-Soviet Bloc" and "Other" countries to account for 97.8 percent of Cuba's imports and exports. The table further indicates that Cuban exports to the Sino-Soviet bloc decreased from 67 percent of the total Cuban exports in 1963 to 57.6 percent of the total in 1964. Cuban

Table 8

Cuban Exports
(in millions of U.S. dollars)

Country	1958	1959	1960	1961	1962	1963	1964
U.S.	490.7	444.6	326.3	30.2	4.1	--	--
Common Market	34.9	44.6	12.6	13.1	.4	25.0	.8
Other W. Europe	44.5	32.9	--	--	--	36.3	--
Sino-Soviet	17.7	13.2	147.2	453.1	412.8	364.1	410.8
Latin America	10.5	20.8	5.5	11.0	4.8	5.5	2.4
Other	133.3	81.5	126.5	117.4	98.5	112.2	299.7
TOTAL	731.6	637.6	618.1	624.8	520.6	543.1	713.7

Cuban Imports
(in millions of U.S. dollars)

Country	1958	1959	1960	1961	1962	1963	1964
U.S.	542.9	436.7	309.7	26.1	.6	35.4	--
Common Market	60.7	75.4	22.1	17.7	14.0	28.8	18.8
Other W. Europe	26.6	21.0	--	--	--	27.1	--
Sino-Soviet	2.2	1.1	118.2	477.1	623.1	700.5	668.6
Latin America	79.9	65.5	4.3	8.1	9.7	4.2	17.1
Other	64.8	92.5	183.6	173.5	111.8	70.4	311.0
TOTAL	777.1	692.2	637.9	702.5	759.2	866.4	1014.7

Source: Direction of Trade

imports from the Communist countries likewise decreased from 80.9 percent of the total imports in 1963 to only 65.9 percent of the total during the following year. The "Other" category included 20.7 percent of the total Cuban exports in 1963, but increased to 42 percent of the total in 1964. Cuban imports from "Other" countries increased from 8.1 percent of the total imports in 1963 to 30.6 percent of the total imports in 1964. This significant increase in the percentage of trade with countries in the "Other" category is due to substantial increases in trade with Canada, Japan, and miscellaneous non-specified European countries, indicative of a second realignment of Cuban trade patterns away from restrictive dependence on Sino-Soviet trade and toward more diversified international trade, especially with non-aligned industrial countries.

A factor with the potential to impede Cuba's ability to locate alternative markets was its geographical location. As an island, Cuba's proximity to the United States made it extremely vulnerable to quasi-military pressure such as a naval blockade to enforce the embargo. Had such a tactic been utilized by the U.S. Government, universal participation could have been enforced.

Ability to Restructure the Economy

The Cuban Government was able to restructure its economy to overcome adverse economic effects of the sanctions. Some of the most noticeable effects included: the disappearance of durable consumer items from stores; the rationing of basic consumer items such as soap, toothpaste, and clothing; food rationing; sharply reduced supplies of fertilizer, fodder, and agricultural machinery; and a critical spare parts shortage. But because adequate warning had been given by the U.S. Government that sanctions might be imposed, precautions could be taken to offset the initial effect of the embargo.

The ideological orientation of the Cuban Government was an important factor in its ability to restructure the economy after the disruption caused by the sanctions. Castro's increasingly Communist orientation provided guidelines for industrial development, and also provided the Cubans with a moral crutch to ease the burden of the disrupted economy. In addition, Communism afforded Cuba valuable allies with resources to facilitate their economic development. Communist ideology furnished a framework for mass mobilization for rapid industrial development, and the Soviet bloc provided the necessary technical expertise and physical equipment.

Cuban nationalism was a dominant obstacle to the success of the U.S. sanctions policy. The United States underestimated the strength of increasing nationalism in Cuba, which was opposed to economic domination by foreign companies and the influence exerted by the U.S. Government to protect their interests. The U.S. Government and American

businesses had dominated Cuban trade and finance throughout most of this century, creating domestic resentment of foreign economic domination and control. Nationalism made the Cubans willing to pay the price of the sanctions and, augmented by Communist ideology, provided them with a scapegoat on which to place the blame for all the shortages, rationings, breakdowns, inefficiencies, and incompetencies of the past fourteen years.

Thus, the Cuban situation represents still another unique instance in which economic sanctions were implemented in an effort to alter a domestic situation (political and economic) distasteful to the sanctioning power. The vulnerability of Cuba to complete naval blockade and the failure of the United States to employ such a tactic is indicative of the restraint that the United States used during the crisis. This restraint plus the gradual escalatory nature of the sanctions contributed significantly to the failure of the U.S. effort. In addition, the ability of Castro to mobilize the Cuban people remains a key factor in overcoming the potential economic disaster. Finally, the Cold War situation, which Castro exploited by opting for Soviet orientation, contributed to the failure of the sanctions as Cuba was able to use its ideological shift to gain alternative markets for its sugar. Short of a blockade, which in the context of the times might have resulted in a major war, the United States could do little to influence Castro's behavior and the subsequent alignment of Cuba with the Soviet bloc.

APPENDIX F: SOUTH AFRICA

This appendix discusses the economic sanctions that have been imposed against South Africa in the post-World War II period. Initiated by India in 1946, the sanctions have since been adopted by many countries, particularly during the 1960's. This instance of economic sanctions has been selected for study because it permits examination of the effectiveness of sanctions and the responses of a target country that possesses strategic raw materials needed by many of the sanctioning nations.

BACKGROUND

The Indian Government's initial decision to impose economic sanctions on South Africa was reached in November 1944 as a reaction to South Africa's announcement of "Natal Ordinances" denying South Africans of Indian origin the right to occupy and acquire land in the Union. India implemented economic sanctions in July 1946, the date the South African ordinances became effective. The Indian sanctions did not follow the "gradualism" associated with other uses of economic sanctions -- all trade with South Africa was banned.

International Economic Conditions

It is generally asserted that economic sanctions are more effective if the target country depends upon the sanctioning country for trade but the reverse dependence does not hold. On these grounds, the Indian sanctions should have been successful. India was South Africa's third largest source of imports, while Indian shipments to South Africa accounted for only 5.5 percent of total exports. Further, India was the world's major producer of jute, the principal export product to South African markets.

Unfortunately for India, two factors substantially obviated these advantages. First, the revitalization of the world economy following the close of World War II provided South Africa with a number of new export markets, making the South African economy much less dependent upon traditional trading patterns. Second, the partition of Pakistan and India in 1947 removed the jute-producing areas from Indian control. Pakistan controlled the bulk of the crop -- India was forced to import jute from Pakistan to supply established Indian industry -- and Pakistan was willing to continue the South African trade. Table 1 illustrates the growth in exports from Pakistan to South Africa from 1951 to 1960.

TABLE 1

Pakistani Exports to South Africa, 1951-1960
(in millions of U.S. dollars)

Year	Exports
1951	---
1952	2.7
1953	2.3
1954	6.8
1955	10.1
1956	11.9
1957	16.7
1958	14.7
1959	15.3
1960	16.7

Source: United Nations, Direction of International Trade

Political Alignment

South Africa's alignment with Great Britain and the Commonwealth had established international commercial linkages which were not only important to South Africa but important to Great Britain and other developed nations as well. In addition, the availability of resources in South Africa contributed to policies of non-support for the Indian sanctions. There were simply too many national interests at stake to attract the support of many countries in the immediate post-war period.

Also, the embargo appears to have broken down because there was no way for India to control the re-routing of its exports from third parties to South Africa. In particular, the export of jute bags to Australia increased sharply during 1945-1948 even though the overall export of jute from India declined. South African trade statistics indicate that during the same period imports from Australia rose sharply from $3 million to about $14 million in 1948. While not conclusive, these items suggest that re-routing was not merely a minor phenomenon. There is similar evidence of the re-routing of Indian products to South Africa through other Commonwealth neighbors, such as Kenya, Rhodesia, and Tanganyika (Segal, 1964: 201).

Implications of Indian Sanctions

The above evidence suggests that South Africa's geographic location played an important role in undermining the Indian sanctions. South Africa's proximity to sympathetic British Commonwealth nations clearly facilitated its search for markets and for sources of re-routed Indian exports.

The initial Indian boycott was not effective because it failed to attract commitments from other nations. As long as South Africa could establish alternate trading markets, costs to South Africa would be minimal. It is probable that the greater loss was suffered by India -- the loss of a lucrative, established, and growing South African market for its exports.

Finally, it should be pointed out that the Indian actions represented the initial effort to muster anti-apartheid world opinion. The Natal Ordinances were only one aspect of apartheid but served to focus international attention on South Africa's domestic situation. The second phase of sanctions against South Africa began when its discriminatory policies were brought before the United Nations.

U.N. SANCTIONS

The first attempt to alter the domestic policy of apartheid through the application of specific economic measures came in November 1962 when the

General Assembly recommended that comprehensive measures be taken by member states. The sanctions included: closing ports to South African flag vessels; prohibiting their own ships from entering South African ports; boycotting all South African goods; banning exports to South Africa; refusing landing and overflight privileges to South African aircraft or aircraft registered under South African laws; and suspending diplomatic relations with the Government of the Republic of South Africa or refraining from establishing such relations. The resolution also expressed hopes that the Security Council would "...take appropriate measures, including sanctions, to secure South Africa's compliance with the resolutions of the General Assembly and Security Council on this subject and, if necessary... consider action under Article 6 of the Charter [which provides for expulsion from U.N. membership]" (General Assembly Resolution No. 1761, November 6, 1962). By the fall of 1963, 46 members of the United Nations reported full implementation of the resolution and an additional 21 stated they either did not have or would now sever trade and political relations with South Africa (Leiss, 1965: 99-100).

First U.N. Escalation of Sanctions

In 1963, additional recommendations concerning restrictions against South Africa were passed in the General Assembly, and for the first time, the Security Council be an debate on the issue. The General Assembly recommended the proscription of petroleum and petroleum product sales to South Africa. The Security Council discussions were absorbed by whether or not the situation in South Africa constituted a threat to peace, a breach of peace, or an act of aggression. Members opposed to actions against South Africa argued that none of these conditions applied. A motion concerning the boycott of all South African goods and the embargo of all strategic goods of direct military value was defeated by Brazil, China, France, Norway, the United Kingdom, and the United States in opposition to Ghana, Morocco, the Philippines, the Soviet Union, and Venezuela. The resolution that was adopted (with France and the United States abstaining) recognized "that the situation in South Africa is one that has led to international friction and if continued might endanger international peace and security."

In addition, the resolution called upon South Africa to "abandon the policies of apartheid and discrimination" and urged the member states "to cease forthwith the sale and shipment of arms, ammunition of all types, and military vehicles" to South Africa (U.N. Document S/5386, Resolution of August 7, 1963). On July 22, 1964, 66 members reported compliance with the Security Council resolution and 2 reported partial compliance (Leiss, 1965: 100). The restrictions were extended on December 4, 1963. The Security Council voted to ban the sale and shipment of "equipment and materials for the manufacture and maintenance of arms and ammunition in South Africa" (U.N. Document S/5471, Resolution of December 4, 1963).

IMPACT OF SANCTIONS AND SOUTH AFRICAN RESPONSE

The extent of the imposition of economic sanctions against South Africa has been very limited and the possibility of universal application remains extremely unlikely. And yet, despite their relative ineffectiveness, the threats of future, more successful sanctions have inspired South Africa to undertake precautionary measures to reduce the effect of any harmful developments. Advance precautionary actions have included stockpiling and the development of alternate sources of supply, stimulation and diversification of domestic sources of supply, development of industrial substitutes, and the generation of mass support for government actions by a systematic propaganda campaign (Doxey, 1971: 121).

Stockpiling and Alternative Supplies

The South African Government has initiated a policy of stockpiling essential imported commodities. In 1968 importers of chemicals and rubber were requested to accumulate a stockpile equal to six months' normal supply. Since 1965, South African oil companies have maintained a six months' supply of oil products. In addition to stockpiling, South Africa has developed new sources of supply for imported goods. In particular, close trading links have been formed with France and Japan. France has supplied South Africa with military equipment, despite the Security Council

resolution, in exchange for purchases of South African uranium, and Japan has continued to increase its trade with South Africa during 1964-1968 (see Table 2).

Diversification and Substitution

The South African Government has also attempted to diversify domestic production and to develop industrial substitutes. South Africa's main point of vulnerability to sanctions is a lack of indigenous oil resources. The government has been trying to offset this liability by encouraging a massive program of oil exploration, both on land and offshore. The estimated government expenditure for this program was £5 million in 1966-67, £5 million in 1968, and £10 million in 1970 (Doxey, 1971. 124).

Propaganda

In addition to economic measures, the South African Government has employed a psychological campaign to gain extensive popular support for opposition to international pressures. In the face of worldwide disapproval of its racial policies, the South African Government has received increasing support from the domestic white population. The attitude of the white South Africans has been characterized as follows:

> ...the typical white South African attitude is now one of hostility to 'world opinion' which is presented and seen as uninformed and misguided as to the true position in the country. Over-simplification of issues for presentation to the public by press and radio makes the man in the street conscious and resentful of an external and unjustified threat to his orderly and comfortable way of life (Doxey, 1971: 132-133).

FAILURE OF SANCTIONS

South African economic and political planning and action have increased the ability of the country to withstand the pressures of the imposed sanctions.

TABLE 2

South African Exports and Imports, 1964-1968
(in millions of U.S. dollars)

Exporting Countries	1964	1965	1966	1967	1968
United States	124.3	138.6	188.0	150.7	146.2
Canada	21.1	22.4	27.5	30.1	34.0
United Kingdom	478.4	498.5	552.4	574.4	666.5
Japan	118.1	100.4	118.3	244.9	286.2
Common Market	272.7	274.6	312.3	339.3	371.1
Other W. Europe	72.4	93.8	100.5	101.4	77.5
Latin America	5.8	7.6	8.5	6.4	11.4
Middle East	4.6	3.7	3.7	3.0	4.2
Africa	126.9	206.0	274.7	315.9	348.7
Asia	41.6	27.3	29.0	34.6	38.6
Soviet Area	2.7	1.6	1.9	3.6	1.7
Miscellaneous	141.2	103.6	54.7	96.7	27.4
TOTAL	1409.8	1478.1	1671.5	1901.0	2013.5

Importing Countries	1964	1965	1966	1967	1968
United States	408.9	463.7	408.1	451.7	465.9
Canada	65.2	69.6	71.1	80.0	62.4
United Kingdom	605.8	692.2	626.9	696.0	629.3
Japan	114.1	140.9	126.4	162.4	173.5
Common Market	433.2	521.0	460.1	607.7	646.1
Other W. Europe	126.1	137.2	134.0	167.0	156.4
Latin America	21.8	20.4	22.8	19.4	15.8
Middle East	1.8	2.8	2.7	3.3	5.3
Africa	177.2	152.4	180.0	198.2	168.6
Asia	190.7	194.8	182.8	209.4	222.8
Soviet Area	9.7	6.7	5.8	7.1	9.2
Miscellaneous	50.5	62.3	86.8	90.8	51.7
TOTAL	2205.0	2464.0	2307.5	2693.0	2607.0

Source: Direction of Trade 1964-1968 (1969) International Monetary Fund: 310-311.

In addition to South African policy actions, certain features of the South African economy have allowed the government to undertake its programs despite the sanctions. These important economic conditions include: self-sufficiency in food, gold, and mineral reserves; a highly developed industrial sector; and a declining reliance on imported capital for further development. The ability to produce sufficient quantities of food is an obvious asset for the South African economy. With adequate food supplies, the economy did and has not come under immediate or short-term pressures as a result of the sanctions. The possession of gold and important mineral reserves has allowed South Africa to continue to earn needed foreign exchange despite the supposed ban on the purchase of its exports. The foreign exchange acquired by the sale of resources has assisted the government's "transition" programs to make South Africa virtually autonomous. The developed industrial sector has meant that the economy could produce needed products that had been previously imported. Although the domestic costs of production have been higher than the costs of purchases in world markets, the economy has not been forced to do completely without many commodities. Longer term development of the economy has not been thwarted because the foreign exchange earned through mineral export has provided needed investment capital and permitted the domestic economy to become less reliant upon world financial markets for subsequent growth. Each of these internal conditions has contributed to the ability of South Africa to continue to withstand the sanctions.

Lack of Universal Compliance with U.N. Resolutions

While conditions internal to South Africa have made the sanctions less effective, the force of the sanctions themselves has been defused by lack of universal support. In general, during U.N. debates, intervention in South African affairs has been opposed by the United States, the United Kingdom, and France. Those members consistently favoring U.N. action have been the Soviet Union, and the majority of Asian, African, and Latin American countries.

At the same time, despite their condemnation, many countries (and regions) have expanded trade with South Africa during the period of the sanctions. (See Table 2.) Those countries and blocs that have maintained the highest volume of trade with South Africa are the United Kingdom, the United States, Japan, Western Europe, and Africa. Although most African countries favor economic measures against South Africa, Table 2 indicates that they seem to have found continued trade with South Africa to be in their interests.

Additional Factors

Several factors have inhibited some nations from taking actions against South Africa. The first factor has been a basic unwillingness by industrialized countries to become involved in South Africa's domestic affairs. The United Kingdom, the United States, Japan, France, and West Germany have considerable interests in preserving the present economic arrangements, and are unwilling to forfeit trade, investments, or access to strategic materials provided by South Africa. A second factor that has inhibited both the Soviet Union and the United States from pressing the issue in the United Nations has been the desire to avoid disrupting the current trend of detente. A third factor has been the unwillingness of independent African states, many of whom are troubled by their own social problems, to elevate the issue of liberation of the black South Africans to a priority item. As Table 2 illustrates, many African countries have not supported the trade embargo. Numerous African countries have even been unwilling to pay dues to the South African Liberation Committee of the Organization of African Unity. In fact, many have responded to recent South African diplomatic offensives and have increased diplomatic contact with the South African Government (Potholm, 1972: 633-637).

SUMMARY

South Africa's limited vulnerability to economic sanctions, and the lack of universal application of the U.N. "mandatory" resolutions have rendered

collective measures against South Africa ineffective. The Indian experience with economic sanctions showed that the lack of universal application would thwart the effectiveness of the sanctions. Pakistan's entry into direct trade with South Africa in 1952, and the continued growth of trade between Africa and South Africa further reveals that the lure of monetary profits makes it difficult for countries who morally condemn South Africa's policies to apply sanctions. Thus, the two factors limiting the effectiveness of economic sanctions against South Africa have been the viability of the domestic economy (including the availability of resources, relative industrialization, established markets, and international economic autonomy) and the absence of international support for the sanctions. Either of these conditions is sufficient to undermine the imposition of economic sanctions -- together they virtually assure failure.

APPENDIX G: THE ECONOMIC MODEL

This appendix presents a more formal statement of the economic model employed in the project. As this appendix is intended to be a supplement to the discussion in Chapter 4, very little discursive material is included.

The structure of the model is developed from Klein's (1952-53) interpretation of input-output analysis. The analytic setting for the model is also very similar to the neo-classical adaptation of the von Neumann growth model -- consumer expenditures are endogenous.

The model treats simultaneous changes in prices and quantities within a general equilibrium framework. The following sections present the major equation systems of the model. As the assumptions required by the model follow usual patterns, only brief reminders are included.

PRODUCTION

Each industry in the model is viewed as the prime unit of analysis. It is assumed that each industry behaves competitively in the sense that marginal productivity conditions prevail in factor markets. Alternatively, each industry may be viewed as if it were composed of identical firms such that competitive activity is maintained.

Each industry's production function displays the multiple input, Cobb-Douglas form:

$$\ln X_j = \ln A_j + \gamma_j t + \sum_{i=1}^{n} \alpha_{ij} \ln X_{ij} + \varepsilon_j \ln Z_j + \lambda_j \ln L_j + \vartheta_j \ln K_j, \qquad (G1)$$

where:

X_j = units of output of the j^{th} industry ($j=1,2,\ldots,n$),

A_j = an efficiency parameter,

γ_j = neutral technical change,

t = time,

α_{ij} = partial output elasticity for the i^{th} input (i=1,2,...,n),

X_{ij} = quantity of the i^{th} good used to produce the j^{th} good,

ε_j, λ_j, θ_j = partial output elasticities of imported inputs, labor, and capital respectively,

Z_j = non-competitive imported inputs,

L_j = labor input,

K_j = capital stock of the j^{th} industry, and

ln = the natural logarithm.

It is assumed that all production functions are linear homogeneous with respect to material inputs and factors:[1]

$$1 = \varepsilon_j + \theta_j + \lambda_j + \sum_{i=1}^{m} \alpha_{ij}.$$

Technical change is introduced by including a time trend in the production function. Given the Cobb-Douglas form, the interpretation for this specification may be either neutral or labor-augmenting as the two are formally equivalent.

By assuming short-run behavior for the industries, profits are total revenues less indirect taxes (net of subsidies) and less the sum of payments to all productive inputs except capital.

$$\pi_j = P_j(1-t_j)X_j - \sum_{i=1}^{n} P_i X_{ij} - P_j^Z Z_j - w_j L_j \qquad (G2)$$

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[1] Non-competitive imports are products not produced by the economy -- they are imported. Discussion of these terms appears later in this appendix.

where:

π_j = profits for the j^{th} industry, $(j=1,2,\ldots,n)$,

P_j = price of the j^{th} product,

P_j^z = price of non-competitive imports used in the j^{th} industry,

w_j = wage rate in the j^{th} industry,

t_j = rate of indirect taxation in the j^{th} industry.

Given all prices, tax rates, and the capital stocks, the first-order conditions for the profit maximization problem are:

$$\begin{aligned} \alpha_{ij} &= (P_i X_{ij})/P_j(1-t_j)X_j \qquad (i,j=1,2,\ldots,n), \\ \lambda_j &= (w_j L_j)/P_j(1-t_j)X_j \qquad (j=1,2,\ldots,n), \\ \varepsilon_j &= (P_j^z z_j)/P_j(1-t_j)X_j \qquad (j=1,2,\ldots,n). \end{aligned} \tag{G3}$$

Using (G1), (G2), and (G3), outputs, profits, and input demands may be written as explicit functions of prices. Label the resulting set of equations (G4):

$$\ln X_j = Q_j - D_j - \ln(1-t_j) - (1/\theta_j)(\theta_j-1)\ln\delta_j - (\varepsilon_j/\theta_j)\ln\delta_j^z - (\lambda_j/\theta_j)\ln\omega_j + \ln K_j \qquad (j=1,2,\ldots,n),$$

$$\ln X_{ij} = Q_j - D_j + \ln\alpha_{ij} + (1/\theta_j)\ln\delta_j - \ln\delta_i - (\varepsilon_j/\theta_j)\ln\delta_j^z - (\lambda_j/\theta_j)\ln\omega_j + \ln K_j \qquad (i,j=1,2,\ldots,n),$$

$$\ln Z_j = Q_j - D_j + \ln\varepsilon_j + (1/\theta_j)\ln\delta_j - (\lambda_j/\theta_j)\ln\omega_j - (1 + \varepsilon_j/\theta_j)\ln\delta_j^z + \ln K_j \qquad (j=1,2,\ldots,n),$$

$$\ln L_j = Q_j - D_j + \ln\lambda_j + (1/\theta_j)\ln\delta_j - (\varepsilon_j/\theta_j)\ln\delta_j^z - (1 + \lambda_j/\theta_j)\ln\omega_j + \ln K_j \qquad (j=1,2,\ldots,n).$$

$$\ln \pi_j = Q_j - D_j + \ln\theta_j + \ln\omega + (1/\theta_j)\ln\delta_j - (\varepsilon_j/\theta_j)\ln\delta_j^z - (\lambda_j/\theta_j)\ln\omega_j + \ln K_j \qquad (j=1,2,\ldots,n),$$

where:

$$Q_j = (1/\theta_j)\left[\ln A_j + \gamma_j t + \ln(1-t_j) + \varepsilon_j \ln\varepsilon_j + \lambda_j \ln\lambda_j + \sum_{i=1}^{n} \alpha_{ij}\ln\alpha_{ij}\right] \qquad (j=1,2,\ldots,n),$$

$$D_j = \sum_{i=1}^{n}(\alpha_{ij}/\theta_j)\ln\delta_i,$$

$$\delta_j = P_j/\omega,$$

$$\delta_i = P_i/\omega,$$

$$\delta_i^z = P_i^z/\omega,$$

$$\omega_j = w_j/\omega,$$

and ω is the economy-wide average wage. Normalizing by the economy-wide wage is introduced here. The purpose is to facilitate a later discussion of the labor market equation established within the model.

CONSUMPTION

The consumers' problem is treated in two stages. First, the total expenditure for consumption purposes is determined by real income and the previous period's consumption expenditure. Then, expenditures on each good are determined by relative prices and the previously identified expenditure level. Population is introduced in order to approximate the problem of the individual consumer by using per capita forms of the variables. The consumer price index, rather than the implicit GNP deflator, is chosen to create real variables. (An exponential form of the consumption function is specified in order to permit direct estimation of the elasticities of the consumption variables.) The form of the total expenditure relation is:

$$\ln(C/N) = \ln E + \beta\ln(Y/NP) + \phi\ln(C/N)_{-1}, \qquad (C5)$$

where:

C = consumption expenditures (in constant prices),

Y = disposable income (in current prices),

P = consumer price index,

N = population,

and the subscript indicates a one-period lag. Using total consumption expenditures as an independent variable, expenditures on particular goods are given by:

$$\ln(C_r/N) = \ln E_r + \beta_r \ln(C/N) + \phi_r \ln(P_r/P), \qquad \text{(G6)}$$

where the subscript r=1,2,...,R, identifies particular goods.

Combining (G5) and (G6) yields the completed form of the consumption (or demand) functions:

$$\ln(C_r/N) = \ln E^* + \beta_r^* \ln(Y/NP) + \phi_r \ln(P_r/P) + \phi^* \ln(C/N)_{-1} \qquad \text{(G7)}$$

where:

$$P = \sum_{r=1}^{R} e_r P_r,$$

$$E^* = E_r (E)^{\beta_r}$$

$$\beta_r^* = \beta \cdot \beta_r$$

$$\phi^* = \phi \cdot \beta_r$$

e_r = constant expenditure-share weight.

Because it is likely that consumption surveys record different commodity classes than those used in input-output systems, a "concordance" is specified:

$$C_j = \sum_{r=1}^{R} c_{jr} C_r \qquad \text{(G9)}$$

$$P_r = \sum_{j=1}^{n} c_{jr} P_j$$

where C_j is consumption of the j^{th} input-output commodity and c_{jr} is the proportion of the r^{th} consumer good corresponding to the j^{th} production commodity, and

$$\sum_{j=i}^{n} c_{jr} = 1 \qquad (r=1,2,\ldots,R).$$

DISPOSABLE INCOME

This section is formulated for empirical implementation. The problem is to relate disposable income, consisting of wages and distributed profits, to the previously identified variables, wages before taxes, and total profits. The crucial assumption is that distributed profits are a function of total profits:

$$Y = (1-t_y)\left[\sum_{j=1}^{n} \omega_j L_j + \xi^*\left(\sum_{j=1}^{n} \pi_j\right) + \xi P^*\right] \qquad (G10)$$

where:

P^* = general price level (a weighted average of P_j's),

t_y = average income tax rate.

IMPORTS

The demand for imports depends upon previous period imports and the price of imports relative to domestic goods. Admittedly, specifying a one-period lag and introducing the dependent variable as an independent variable creates estimation bias. Conceptually, however, the lagged term represents the adjustment delay necessary to realize the previous period's import decision. Additionally, the lag compensates for familiar inaccuracies in the data, imports occurring in one period but reported in the next period's figures. Finally, imports relative to domestic production

are the preferred forms for the equations:

$$(M_j/X_j) = a_o + a_1(M_j/X_j)_{-1} + a_2(\delta_j^m/\delta_j) \quad (j=1,2,\ldots,n), \quad (G11)$$

where M_j represents imports of the j^{th} good (industry type).

The import equations may be augmented to include monetary influences on the balance of payments; the ratio of foreign exchange reserves to the value of total imports can be another independent variable. While a term of this sort "captures" monetary influence, monetary policy (and changes in policy) can only be added by changing the parameter values appropriate to the term. Changes in the variable only adjust the "intensity" of the policy.

The possibility of non-competitive imports does introduce a complication in the model. The simplest specification is to assume producers are able to purchase desired amounts and allow the input demands to be determined by import prices (c.i.f.). In this case, such demands have been stated previously.

LABOR MARKET

The labor market specification is a Phillips curve relation between changes in prices and changes in wages, conditioned by the level of unemployment.

$$\Delta\omega/\omega_{-1} = b_o + b_1(\Delta P/P_{-1}) + b_2(\sum_{j=1}^{n} L_j/L) \quad (G12)$$

L represents the labor force and "Δ" denotes changes.

Wage differentials are not explicitly incorporated within the model. For most economies, these differentials change relatively slowly. With this in mind, the pattern of differentials across the time period of model implementation can be assumed constant. Should such an assumption not be adequate in any particular case, equations relating the changing patterns of wage differentials can be appended to the model.

ADDITIONAL REQUIREMENTS

To complete the model, the remaining sources of final demand must be stated. The components of final demand not yet discussed are investment, the public sector, and exports. Investment criteria are not included in the model. Investment purchases are exogenous.

Government expenditures are intentionally exogenous to the model. Because such expenditures constitute an important policy instrument which can be used to offset the impacts of foreig (and domestic) international economic policies, the ability to specify the details of these expenditures in a variety of situations allows individual evaluation of responses available to the government.

Exports are also exogenous, at least in a strict sense, to the model. The determination of export demand for particular products is accomplished by adjusting entries in a world trade matrix to conform to changes in the international economic policies of other countries and economic conditions domestic to other economies. Econometric studies of the elasticities of import demand with respect to prices and incomes provide useful guides for this work.[2]

EQUILIBRIUM CONDITIONS

The equilibrium conditions for the model are market-clearing conditions. The excess supply functions are:

$$E_j = X_j + M_j - \sum_{i=1}^{n} X_{ji} - C_j - F_j \quad (j=1,2,\ldots,n), \quad (G13)$$

where F_j is the total of exogenous components of demand. Thus, the

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[2] Leamer and Stern (1970) summarize the details of the techniques and provide a substantial bibliography. CACI (1974) has also produced a study estimating income elasticities for many countries.

equilibrium conditions are:

$$\Xi_j = 0 \qquad (j=1,2,\ldots,n). \qquad \text{(G14)}$$

The equations of the model are (G4), the definitions of normalized prices and wages, and (G7) through (G14). The simple counting of equations and unknowns is, of course, not sufficient to insure the existence of a solution. However, counting criteria are satisfied. Because empirical implementation will determine whether or not a unique solution exists, for current purposes the equal numbers of equations and unknowns are assumed to be sufficient.

Price determination in the model can be briefly described. Assume import prices (and non-competitive import prices) are exogenously given relative to the average wage.[3] Outputs and input demands are then functions of relative prices only (recall relative wage differentials are assumed constant). By inspection, the consumption demand equations have the familiar properties; they are homogeneous of degree zero in income and prices. Thus they too may be normalized by the average wage. The exogenous demands are then sufficient to close the system to determine relative prices and allow the solution of equilibrium employment levels. Finally, the labor market equation establishes the level of the average wage.

COMPARATIVE STATICS

To relax the somewhat cumbersome notation requirements of previous sections, the equilibrium conditions are re-expressed in a simpler form:

$$\Xi_j = f_j\,(\delta_1,\ldots,\delta_n;\ D_1,\ldots,D_m) = 0 \qquad \text{(G15)}$$

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[3] This assumption implies something akin to the small country assumption. Homogeneity (deflated by the average wage) of these prices is the simplest specification.

where the terms for relative prices, the δ_j's, are as before and the D_m's represent the predetermined variables in the system.[4]

Taking partial derivatives of (G15) with respect to the predetermined variables and equating them to zero yields, in matrix form:

$$\Psi_\rho \Delta_\rho + \Psi_D = 0 , \qquad \text{(G16)}$$

where:

$$\Psi_\rho = \left[\frac{\partial \Xi_i}{\partial \delta_j}\right] \quad \text{(of dimension n x n; evaluated at the equilibrium point),}$$

$$\Delta\rho = \left[\frac{\partial \delta_j}{\partial D_m}\right] \quad \text{(of dimension n x m),}$$

$$\Psi_D = \left[\frac{\partial \Xi_j}{\partial D_m}\right] \quad \text{(of dimension n x m; evaluated at the equilibrium point).}$$

Solving (G16):

$$\Delta_\rho = -\Psi_\rho^{-1}\Psi_D, \qquad \text{(G17)}$$

the matrix of relative price changes induced by changes in the predetermined variables. As the order of the predetermined variables in (G15) is immaterial, let the final demands, F_j, be the first n of the m predetermined D's. From (G13), the values for $\partial \Xi_j / \partial F_i$ will equal one when i=j and zero otherwise. Thus Ψ_D may be partitioned such that an n by n identity matrix is the "upper" submatrix. Hence the elements of Ψ_ρ^{-1} describe the changes in relative prices induced by unit changes in final demands.

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[4] These include exogenous variables and previous period values of endogenous variables.

Employment changes are developed from (G4). Taking derivatives:

$$\Delta_L = \Phi_\rho \Delta_\rho + \Phi_D \qquad \text{(G18)}$$

where:

$$\Delta_L = \left[\frac{dL_j}{dDm}\right] \quad \text{(of dimension n x m),}$$

$$\Phi_\rho = \left[\frac{\partial L_j}{\partial \delta_i}\right] \quad \text{(of dimension n x m; evaluated at the equilibrium point),}$$

$$\Phi_D = \left[\frac{\partial L_j}{\partial D_m}\right] \quad \text{(of dimension n x m; evaluated at the equilibrium point).}$$

With (G17):

$$\Delta_L = -\Phi_\rho \Psi_\rho^{-1} \Psi_D + \Phi_D \qquad \text{(G19)}$$

Finally, output changes are calculated by first noting that value added for each industry is the sum of wages, profits, and net tax payments. Dividing this sum by the industry price yields an expression for value added as a function of relative prices. Let v_j denote this expression. Then

$$\Delta_v = \Gamma_\rho \Delta_\rho + \Gamma_D$$

or

$$\Delta_v = -\Gamma_\rho \Psi_\rho^{-1} \Psi_D + \Gamma_D$$

where:

$$\Gamma_\rho = \left[\frac{\partial v_j}{\partial \delta_i}\right] \quad \text{(of dimension n x n; evaluated at the equilibrium point),}$$

$$\Gamma_D = \left[\frac{\partial V_j}{\partial D_m}\right]$$ (of dimension n x m; evaluated at the equilibrium point),

$$\Delta_\nu = \left[\frac{\partial V_j}{\partial D_m}\right]$$ (of dimension n x m).

From this, "multipliers" for GNP are column sums of $-\Gamma_\rho \Psi_\rho^{-1}$.

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Los Angeles Offices: 12011 San Vicente Boulevard, Los Angeles, Calif. 90049, Telephone (213) 476-6511
New York Offices: 529 Fifth Avenue, New York, New York 10017, Telephone (212) 661-7330
Washington, D.C. Offices: 1815 North Fort Myer Dr., Arlington, Virginia 22209, Telephone (703) 527-8012
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