

1995

C/74-30

November 1974

ANALYZING GLOBAL INTERDEPENDENCE

by

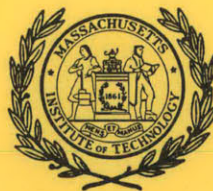
Hayward R. Alker, Jr.

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Nazli Choucri

Volume IV SUMMARY

Prepared by
Irirangi C. Bloomfield



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MASSACHUSETTS INSTITUTE OF TECHNOLOGY
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This study is one of a number done by academic and other research institutions for the Department of State as part of its external research program. The program is planned and coordinated by the Department of State Research Council and managed by the Office of External Research in the Bureau of Intelligence and Research. It is designed to supplement the Department's own research capabilities and to provide independent, expert views to policy officers and analysts on questions with important policy implications.

On many occasions in recent years, both private citizens and government officials have talked and written about the trend toward increasing interdependence, with complex and shifting relationships, among the "actors" on the world scene. For obvious reasons, the emphasis usually is placed on economic relationships, although we are all aware that interdependence increasingly is apparent in other spheres as well--political, strategic, cultural, and so on. Indeed, one of the problems for any student of interdependence is posed by the linkages between or among such sectors.

As they thought about official and private studies and discussions of interdependence, a number of Department of State officers became convinced that at least some aspects of the phenomenon merited more serious or extensive scholarly attention. Do social scientists, they asked, have concepts and methods that can give us a more adequate understanding of the extent and nature of interdependence? Can they provide us with better means for checking assumptions that inform much of foreign policy?

The suggestion for a "conceptual and methodological" study of interdependence came from Mr. Herbert J. Spiro, of the Department's Policy Planning Staff. The detailed terms of reference for the study, designed as a guide for institutions interested in submitting research proposals on a competitive basis, were developed by Mr. Spiro and Mr. Pio D. Uliassi, of the Office of External Research, who served as the project monitor. Both drew generously from the comments of other Department officers.

We in the Department of State have already profited from the effort to define our own policy-related research interests in a more precise way from our meetings with the research team at M.I.T. and from the draft versions of this study that have been quite widely disseminated within our establishment. Our hope now, as it was when the project was first conceived, is that the published study will stimulate additional fruitful discussion and independent work on the problem of interdependence by private social scientists.

E. Raymond Platig, Director
Office of External Research
Bureau of Intelligence and Research
Washington, D. C. 20520

This study was supported by the Department of State under Contract #1722-320084. Views or conclusions contained in this study should not be interpreted as representing the official opinions or policies of the Department of State.

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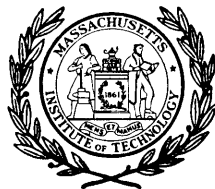
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ANALYZING GLOBAL INTERDEPENDENCE

Volume I ANALYTICAL PERSPECTIVES AND
POLICY IMPLICATIONS

By
Lincoln P. Bloomfield and Hayward R. Alker, Jr.
with Ann Alker

Appendices by
Ann Alker and Steve R. Pieczenik

Volume II ENERGY INTERDEPENDENCE

By
Nazli Choucri
with Vincent Ferraro

Volume III METHODOLOGICAL PERSPECTIVES AND
RESEARCH IMPLICATIONS

By
Hayward R. Alker, Jr.
with Nazli Choucri

Volume IV SUMMARY

Prepared by
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FOREWORD TO STUDY

ANALYZING GLOBAL INTERDEPENDENCE

In the summer of 1973 the U. S. Department of State awarded a contract to the M. I. T. Center for International Studies to conduct a year-long study that would, in the words of the R. F. P. , "describe evolving patterns of interdependence in a multipolar world and develop new methods for projecting and appraising such patterns. "

Given a projected level of effort of only nine professional man-months for the study, our governing research principle was to make maximum use of existing comparative advantages of the researchers involved, drawing to the greatest extent possible on previous or concurrent work they and their graduate students were doing. (It must however be said that all of us found ourselves entering new intellectual ground as our research proceeded.)

It was thus agreed that Professor Hayward R. Alker, Jr. , would review the scholarly literature for issues, themes, approaches, and problems bearing on interdependence, and that he would also take responsibility for drawing conclusions concerning appropriate research methodologies. Professor Alker, drawing on substantial research papers on specific scholarly controversies, prepared (with Ann Alker) Chapter II of Volume I of the report. His methodological review appears as Volume III, in which Professor Nazli Choucri has coauthored the concluding chapter. Among the working papers developed in the course of that part of the project were the following, which are available on request from the M. I. T. Center for International Studies:

Lily Gardner, "Interdependence, Independence, Dependence, and Integration: Whither Western Europe?"

Fabio Basagni, "The New 'Political Economy' Controversy"

Ann Alker, "The Limits to Growth Controversy"

Richard Kugler, "Strategists and Their Critics: The United States National Security Policy Controversy"

Professor Nazli Choucri took responsibility for developing a case study on energy interdependence, with some focus on the Middle East, that would serve the threefold purposes of: suggesting and applying an approach potentially useful in other sectors or geographic regions; illustrating some of the analytical problems, issues, and findings typical of scholarly interdependence controversies; and supplying some policy-relevant insights. Her report is bound separately as Volume II of the report. Professor Choucri also coauthored Chapter IV of Volume III. She was assisted throughout her study by Vincent Ferraro, who contributed valuable research assistance, editorial help, and substantive criticism. Chapter V of Volume II was written with the collaboration of Ijaz Gilani. Major working papers, also available on request, are:

Vincent Ferraro, "Competing Transnational Energy Regimes"

Ijaz Gilani, "Interdependence and Community-Building Among Competing Regimes of the Arab World"

The third dimension of the study was the chief preoccupation of the undersigned, who also acted as coordinator of the project. My own approach follows a generally policy-oriented perspective. In Chapter I of Volume I, I sought to parse out the meaning of interdependence so that it might be approached with more clarity; in Chapter III, I endeavored to offer the outlines of a policy analysis leading to conclusions--which are my own--regarding some desirable policy directions. In the course of this research I asked Ann Alker to prepare a brief background paper on U. S. Nonfuel Mineral Import Practices, which as a useful assembly of data is included as Appendix A to Volume I. I also asked Steve R. Pieczenik, who in addition to being a practicing psychiatrist is a doctoral candidate in the M. I. T. Department of Political Science, to see what possibly relevant insights concerning dependency situations might be drawn from the psychiatric literature. His brief but provocative response is also included, as Appendix B to Volume I.

Although final responsibility remains with the cited authors, each of the principal authors read and commented on each other's contributions for this report, and we are all grateful for the help so received. Dr. Choucri and I benefited from the helpful criticisms of our draft chapters by David A. Kay and Amelia C. Leiss, and I further profited from a review of my chapters by William Diebold, Jr. Professor Alker's work was critiqued in preliminary form by Robert O. Keohane and Ramkrishna Mukherjee. His research for Chapter III of Volume III

was assisted by Scott Ross. Finally, we had the opportunity to consider numerous comments from officers of the Department of State who reviewed the report in draft form.

While the contract did not call for a summary to be prepared, I increasingly felt the need for one, given the complexity of the subject matter and the fact that, despite the project's modest size, we were producing considerably more written material than we had anticipated. We therefore commissioned Irirangi C. Bloomfield, who has in the past performed numerous précis and editorial tasks for the Center, to prepare a summary volume, which we have denominated Volume IV.

My colleagues and I are grateful to Pio D. Uliassi of INR/XR for his tactful and understanding performance of the role of Project Monitor. We are very indebted to Jeanne Amnotte and to Dovianna Barrens, who succeeded her, for devoted and skillful handling of the manifold tasks of Project Secretary.

Lincoln P. Bloomfield
Project Director

Cambridge, Massachusetts
November 1974

SUMMARY OF CHAPTER I, VOLUME I
THE SEMANTICS OF INTERDEPENDENCE:
A POLICY PERSPECTIVE*

There is no generally accepted definition of interdependence, factually or conceptually.

A. Types of Interdependence

Interdependence can be defined in terms of environmental "commons," or mutual nuclear forbearance, but the crucial new foreign policy questions grow out of economic and resource relationships. The most complex mutual dependencies are where the latter interact with military security.

The massive U. S. power which makes relations with its major allies so asymmetric is felt to be a virtue when the Soviets are threatening. During détente it becomes a source of strain. U. S. relations with Latin America and the Middle East also intermix military security and economic activity along a sliding scale of Cold War threat perception. However, military considerations dominate East-West relations, and also affect some resource dependencies. Elsewhere economic relationships dominate.

Particularly as nations seek the autonomy to pursue domestic welfare policies, economic and resource dependencies will directly influence political relationships and thus in the end will affect ultimate issues of war and peace.

B. Interdependence as a "Fact"

U. S. awareness of interdependence escalated with the oil crisis in 1973-74. Other such crises are now predicted. The significant trends appear to be:

*Chapter I is by Lincoln P. Bloomfield.

1. Food

The poorer countries' present dependence on food imports may double by 1985, with the U.S. supplier role expected to expand. However, on the three postwar occasions when world famine was predicted, U.S. surpluses quickly developed and world prices fell.

2. Trade

World trade rose 15% in 1973, twice the previous annual average. The Atlantic countries' share of non-Communist exports is rising, but the trend is to deepening regional interdependence in both hemispheres. U.S. dependence on foreign resources is also rising: LDCs account for one-third of U.S. trade.

3. Foreign Investment

In 1968 LDCs harbored only half as much of the total foreign investment stock as advanced nations, a disproportion that is widening even for the United States vis-a-vis Latin America. Eighty percent of U.S. investment in Europe is direct; 70% of European investment in the United States is in portfolio form.

4. Multinational Corporations

MNCs earn outside their home countries one-quarter of the GNP of the non-Communist world. U.S.-based corporations account for one-third of all the foreign affiliates and produce abroad five times what they export from the United States, representing the dominant form of U.S. involvement in the world economy. MNCs are concentrated in a few developing countries. The extreme case of foreign penetration is Canada, which feels threatened by loss of control over its economic life.

5. Nonfuel Mineral Resources*

The United States is completely dependent on foreign sources for, e.g., manganese, chromium, and cobalt. Nevertheless, substitutions are technically possible (at considerable cost) and the market as at times past may be capable of generating unanticipated supplies and new technology.

*See Appendix to Volume I, entitled "A Note on United States Nonfuel Mineral Import Practices."

C. Interdependence as a "Good"

U. S. policy views the growing linkages as not only inevitable but also desirable in fostering consensus and restraining unacceptable conduct. The United States officially accepts as facts of life the dominant U. S. economic role, the growing "North-North" relationships, and the beneficial role of the MNCs in bringing technology, skills, goods, and services to the LDCs. "Optional" interdependencies have been deliberately created to further larger political designs (EEC, COMECON), and short-range goals of strategic advantage, ideological gain, monetary relief, counter-balancing or diversification (e. g. , U. S. S. R. - Cuba in the early 1960s, U. S. - Egypt, 1974). In U. S. -Soviet relations, the option is pursued by both sides as an alternative to unwanted confrontation and unattainable friendship, and seems justified not only by mixed historical evidence but by political imperatives in this era.

D. Interdependence as a "Bad"

Third World spokesmen and many Western intellectuals view "interdependence" as a codeword for economic bondage. They see equity, social justice, and "economic democracy" negated by the widening gap between affluent and poor societies, and the failure of the masses, rather than just the elites, to benefit from the MNCs. (See Chapter II.)

Comparable criticism applied to relations among the advanced nations reflects the sense of penetration experienced by U. S. trading partners who fear erosion of cultural identity and sense of national self. The process of interdependence is seen as escalating tensions over loss of national and societal autonomy, threatening defeat of national social and economic goals, virulent nationalism and eventually conflict. These negative costs, real or perceived, are increasingly persuasive to policy analysts of the center.

E. Interdependence as Perception

Perceptions of dependency can generate insecure feelings, with potentially explosive security consequences. Like strategic deterrence, the game is played on the basis of educated guesses about how others perceive the reality one sees. Even if asymmetry is an illusion, it is the perception of it that will be acted on. Possible parallels between the behavior of nations and of individuals (which rarely fit but may do so in this case) are drawn in Appendix B.

F. Interdependence as Balance

What matters most for mutually satisfactory relations is the degree to which interdependent relations are (or are perceived to be) symmetrical or asymmetrical. The key is asymmetry. We ought to try to identify the "deficit" in a given relationship by making a "net" assessment and considering whether it can be balanced by substantive or psychological policy actions. (A crude technique for doing so is suggested.)

At one extreme is the stark one-sidedness of U. S. economic relations with poorer countries (petroleum producers excepted). At the other extreme, the deliberately fostered "optional" economic interdependence with the Soviet Union is marginal to the symmetric strategic balance and not a dominant factor.

The more delicately balanced interdependencies combine economic and security factors which together are difficult to "net out" since military security is also ultimately measured by how secure or insecure the parties feel. Yet an overall assessment would reveal, for example, that despite superficial similarities in the relationships, the Japanese are far more sensitive about their security dependence on the United States than are the West Europeans. Gaullism appears to have supplied a quantum of self-esteem to redress the balance, and in addition Western Europe has diversified its economic relations.

Some relationships (e. g. , U. S. -Saudi) turn out to be more symmetrical and less threatening than either side at first perceived (see Volume II). It is more difficult to draw conclusions from a heavily loaded case such as the U. S. -Canada. Although the intensity of contacts and penetration might in some historical cases have led to closer political ties, relations have been deteriorating. Despite comparable asymmetries, the smaller Western European countries strongly support a united Europe. One hypothesis is that the U. S. -Canadian interdependency has crossed a threshold of penetration beyond which the units must merge or else reduce the overload on the more vulnerable partner striving to preserve its autonomy and culture.

Conceptually, interdependence is best defined as a two-way dependence between states or enterprises possessing things of value to others and thus able to indulge or threaten each other with those benefits.

SUMMARY OF CHAPTER II, VOLUME I
FOUR INTERDEPENDENCE CONTROVERSIES:
CONTENDING SCHOLARLY PERSPECTIVES*

A. Why Review Scholarly Analytical Controversies?

Attention to divergent analytical perspectives can make clearer what orientations toward global interdependence are realistically possible, and it can help design approaches to emerging public issues.

B. Which Controversies Should We Review?

Chapter I identified three areas of interdependence central to policy: security, ecological, and political-economic. To illuminate conceptual and methodological issues, a single scholarly controversy from each area has been selected: deterrence; the "Limits to Growth" debate; and the trade, investment, and payments arguments associated with Cooper's The Economics of Interdependence. European integration literature may also have American relevance.

C. The National Security Debate

1. Strategic Perspectives

a. Strategist Thinking: Foreign Policy

Strategist thinking is marked by close government/academic ties and by "Realpolitik," i. e., conflict is unavoidable. Elites, making rational choices, should base policy on the U. S. self-interest (cf. Brodie, Kahn, Kissinger, Wohlstetter).

Current strategy seeks a global modus vivendi under rules of mutual restraint in a balance of power situation. Some strategists say mutual restraint fails to foster functional cooperation or to solve basic economic and social problems.

*Chapter II is by Ann Alker and Hayward R. Alker, Jr.

b. Strategist Thinking: Military Defense Policy

The conceptual framework of the current flexible response strategy has changed from cost-benefit to a systems design approach, and from a unilateral to a mutual assured destruction deterrence strategy accompanied by cooperative crisis management, collective security and arms limitations.

2. Critical Perspectives

a. Radical Left

Either the United States is imperialistic in the Marxian sense, motivated by profit, with structural capitalism making the decisions (cf. Kolke), or the bureaucratic structure is imperialistic in forging a pro-American world order (cf. Barnett). To both, deterrence theory is ideological and lacks scientific stature.

b. Behavioralist Critics, Including Peace Researchers

These critics share a community-building orientation (cf. Boulding, Deutsch, Rapaport, Singer) that rejects the notion of inevitable conflict. Others see deterrence theory more as doctrine than science, and suggest a loss of critical empirical focus when scholars work too closely with government.

c. Government-Oriented Critics

Accepting the basic policy framework, politically influential critics (cf. Allison, Halperin) focus on governmental process in decision-making and often recommend cost-benefit analysis based on applied liberal welfare economics.

D. The Limits to Growth Controversy

1. The Focus of Discussion

Projected exponential growth in five interrelated variables -- population, capital investment, natural resources, investment in agriculture and pollution -- will collapse the system when their growth collides with a fixed environment (cf. Forrester, the Meadows', et al). Some state of "no growth" or "sustainable growth" must be substituted, but current institutions are inadequate for this purpose.

2. Critical Perspectives

Critics decry the models (cf. Sussex group), the authors' values (cf. Falk), and their assumptions. Most think at least a two-world North-South model is necessary to pinpoint issues of distribution, dependency, and responsibility. The central problem is engendering alternative allocations of scarce resources.

E. The New Political Economy Controversy

1. Coping With Market Interdependence and Dependence

Growing advanced nation inter-sensitivities, North-South economic relations, and the role of aid agencies, international banks, and MNCs, are issue clusters linked by a new urgency about questions of autonomy and about whether inequitable North-South relations may be paralleled within U.S. and European national borders.

2. Contending Economic Orientations

a. Market-Oriented Liberals

This group advocates undisturbed, efficient market operations except for government correction of market distortions (cf. Harry Johnson).

b. Institutional Liberals

These approve autonomy and cooperation, regulation of direct foreign investment and the depoliticization of economic activity (cf. Cooper, Keohane, and Nye).

c. Leftist Liberals

This group (cf. Myrdahl, Prebisch, Hirshman) seeks redistribution through elite-sponsored institutional change.

d. Dependency Theorists

Dependency theorists see dependencies as a reflection of international capitalism and advocate more or less revolutionary policies (cf. Cardoso, Bodenheimer, Bonilla, Petras).

e. Radical Political Economy

This orientation is Marxian theorizing in an Anglo-American environment but does not envisage revolutionary political action (cf. Hymer, Baran, Sweezy).

f. West European Marxists

They either (1) desire trade between equals and are structurally but not politically revolutionary (cf. Emmanuel), or (2) regard economic institutions and classes as the actors and predict collapse of the system (cf. Mandel).

F. European Integration Controversies

Left and right have both produced anti-integration analyses, emphasizing either domination or destruction of the nation state.

1. Integration Options

2. Integration Theories

a. Neofunctionalists

Neofunctionalists (cf. Haas) stress the bargaining process among economic groups being translated by supranational leadership into community institutions. Ideas have developed on responses to EEC members' increased economic sensitivity.

b. Transactionalists

Transactionalists (cf. Deutsch) focus on all transactions (not just between groups) and believe high interdependence can induce both conflict and cooperation. Pluralistic or amalgamating integrative processes are necessary but not inevitable.

c. Postfunctionalists

Postfunctionalists (cf. Morse, Young, Ruggie) sense more devolution of authority taking place than supranational evolution and show interest in public goods theory as a way of exploring public sector adjustments to market mechanisms.

3. Traditionalist Critics

The nation-state continues to be decisive; federation is the preferred form of integration (cf. Aron, Hassner, Hoffman). Functional cooperation is sought but not integration at the high policy level.

4. Left Critics

Interdependence is a condition for integration but only when all world groups can collaborate as equals (cf. Galtung). Orthodox Marxists (cf. Mandel) see capitalistic integration as not yet reaching the point requiring international working class revolution.

G. Convergent Preoccupations and Divergent Orientations

Present in each controversy are (1) North-South/rich-poor/strong-weak issues, and (2) left-right/East-West/capitalism-socialism divisions. Other interdependence-related issues are (3) autonomy and invulnerability considerations, (4) loyalty-identity issues, (5) the extent to which (inter)dependence generates positive or negative benefits, and (6) realism versus idealism in community-building. Associated common preoccupations are with (1) piecemeal regional or functional order-building efforts, (2) structure-sensitivity, (3) ecological consciousness, and (4) the increasing complexity of policy analyses.

SUMMARY OF CHAPTER III, VOLUME I

SOME POLICY IMPLICATIONS*

A. Four Insights

Four insights with major importance for policy emerge from the evidence: (1) that problems are created, not by the fact of interconnect-
edness, but by the dependency experienced; (2) that the principle of
"critical mass" operates--too little mutual dependence inhibits under-
standing, too much overloads the relationship unless political integra-
tion follows; (3) that interdependence is not automatic but optional--at
a cost; and (4) that policy is determined by whether asymmetry is felt,
which suggests compensating for the deficit psychologically as well as
tangibly, to reduce interdependency frictions.

B. Some Policy Options

Where unbalanced, asymmetric interdependence is experienced
or perceived, the United States can opt:

1. To reduce the risks inherent in raw materials dependencies,
for example, by:
 - (a) Development of improved political relations
 - (b) Coercive use of U. S. military or economic power
(which may however be irrelevant to capital flows,
production cutbacks, or cartel repricing)
 - (c) Internationalization of the resource, or lesser
collective arrangements for its management
2. To seek to become less dependent by:
 - (a) Disengaging generally from the Third World
 - (b) Pursuing strategies toward raw materials producers
of product substitution, lowered consumption, and
diversified supply sources

*Chapter III is by Lincoln P. Bloomfield.

3. To increase mutual dependency--the current strategy vis-a-vis the U. S. S. R. , the C. P. R. and, increasingly, the Gulf oil-producers.
4. To achieve autarky or self-sufficiency. Some self-sufficiency is sound, but all-out autarky, entailing import barriers, subsidized export incentives, etc., is historically counterproductive.
5. To manipulate interdependence asymmetry as a lever to achieve political purposes, as the Arabs used the oil embargo, and as the United States could use food. This too conflicts with the goal of tension reduction and of a more cooperative world order, and would eventually be counterproductive.

C. Toward a Strategy of Interdependence

Interdependence problems are created by unbalanced dependencies. The goal should be to convert specific asymmetries to true interdependence by eliminating the "deficit" or, failing that, to transform the relationship itself.

The conceptual basis for interdependence policies needs clarification before an ensemble of coherent strategies can be purposefully pursued. Contemporary interdependence arguments reflect deep value differences between those who accept as good and natural the current economic and security dependencies, and those who wish to change what they interpret as excessive U. S. political dominance or corporate control over foreign economies. Specific value conflicts are: growth versus the quality of life and conservation of finite resources; capitalism and free enterprise versus socialism and economic democracy (although in practice both so far pursue "more is better" rather than "enough is best"); economic efficiency which argues for state and/or corporate control versus the desirability of maximum participation in the management of international economic, social, and technological functional interdependencies. The need seems clear to shape and explain revised norms of moderation and sharing.

Given a better thought-through conceptual foundation for a U. S. interdependence strategy, four elements of a strategy present themselves, aimed at remedying "net deficits" in relationships:

1. "Decoupling" those linkages with potential for excessive pressure. The U. S. military and economic presence can be reduced, investment disconnected from U. S. vital interests, regional cooperation encouraged, MNCs regulated, commodity agreements and a world food reserve established to meet the most acute vulnerabilities. In becoming "less conscious" of the poorer nations, the United States can best be guided by humanitarian motives in redefining its interests and seeking a new role toward them.
2. Fostering the mutuality of the links between the United States and the oil producers by increasing their stake in a sound U. S. economy. A similar approach to China should be studied.
3. Applying psychological insights where incremental security and economic policy adjustments are inadequate. Toward Japan, for example, priority actions would include: more prior consultation, encouraging Japanese leadership in regional economic organizations, assistance in obtaining semi-permanent UN Security Council membership, and a (non-Asian) UN peacekeeping role. Canada requires a new, serious study.
4. Handling collectively many functions formerly managed nationally. Currency, trade, investment, communication, nuclear security, environmental "commons," and MNCs are phenomena that ignore borders. Also, state control implies eventual recourse to the "interstate war system." Multilateral management is a necessity, whether by the UN or by whatever institutions a new age of socio-political invention can contrive.

It remains unresolved whether economic and monetary issues should be dealt with at a global, regional, or subregional level. If attacked individually, however, two principles might be applied. Economic and cybernetic theory suggests that the number of policy instruments be at least as great as the number of objectives, if all objectives are to be achieved. And, where early action is needed, "coalitions of the willing" can be organized topic by topic without waiting for universal agreement.

The State Department's capability to handle cross-cutting problems such as energy, monetary issues, trade, ocean resources management, and technology transfer must be upgraded. More basic is that political leaders be willing to accept international arbitration and adjudication and multilateral decision-making even when apparently contradicted by the short-term national interest. The internal costs will be high of acting on Secretary Kissinger's injunction to "transform the concept of world community from a slogan into an attitude." Yet without a new order of creative political and bureaucratic activity, the hazards of present trends may ultimately transform economic interdependence into a problem of military security.

Optional U.S. Strategies ↓		U.S. Relations With →			
		<u>Allies</u>	<u>Communists</u>	<u>LDCs</u>	<u>Resource Producers</u>
1.	Reduce Risks				
	a. Improve political relations	-----	A L W A Y S	U S E F U L	-----
	b. Coercion	Not applicable	Counterproductive	Decreasingly applicable	Not efficacious
	c. Internationalize	- - - COULD LESSEN STRAINS ARISING FROM ASYMMETRIC DEPENDENCY - - -			
2.	Lessen Dependency	Reducing level of mutual dependency, if high, should reduce strains	Not applicable now (excessive future dependency would be undesirable)	Would avoid unwanted intervention consequences and reduce current tensions	Desirable, through: product substitution, alternative energy sources, lessened consumption, diversification of supply.
3.	Increase Mutual Dependency	Danger of producing overload in current atmosphere	Current U.S. -Soviet strategy, based on persuasive logic	Undesirable in terms of lessening U.S. involvement	Very desirable to balance relations better, increase stake in stability of flows
4.	Autarky	- - - H I S T O R I C A L L Y C O U N T E R P R O D U C T I V E - - - - -			
5.	Manipulate Asymmetry Through Linkage Strategies	Theoretically possible to gain economic advantages by threatening insecurity or withholding exports, but chancy	Unproductive	Possibly counter-productive politically	Possible Western countermeasures available in future (but becomes increasingly Option 3)
TABLE 1. <u>Major U.S. Interdependency Options</u>					

SUMMARY OF INTRODUCTION, VOLUME II

ENERGY INTERDEPENDENCE*

Both the exponential growth in global energy usage and the realization that this results from population growth as well as from technological advance are now well recognized. The flow of energy across national boundaries has become one of the most salient issues of our time, pointing to patterns of interdependence as nations try to meet energy demands or trade their own resources. In this context interdependence refers to mutual sensitivities and vulnerabilities as patterns of interaction among nations change with respect to (a) economic issues and their political implications, (b) national security and strategic objectives, (c) integration and community-building, and (d) environmental imperatives. The ties that bind nations along each of these dimensions can be discerned from an analysis of energy flows.

Energy consumption increased on the average of 6% a year over the past decade. The United States alone averaged a 3.1% growth in demand throughout the past twenty years. The United States is the world's largest producer and consumer of energy; the fact that consumption now exceeds production, necessitating energy imports, has become a major issue. Assured access to resources is a paramount national concern. Equally critical are issues such as the cost of extraction of domestic versus foreign sources and the price to be paid for each.

Energy imports are critical also to Western Europe, which has some self-sufficiency in solid fuels and, more dramatically, to Japan, which is entirely dependent on foreign sources for both energy and mineral resources. The Soviet Union is a net exporter of energy, which permits some flexibility in energy policy. China alone seems to have developed a balanced energy budget requiring neither imports nor markets.

All nations are gradually recognizing a common predicament: how to accommodate seemingly irreconcilable objectives in ways that are consistent with the producers' preferences and priorities and which ensure the consumers access to energy. The present malaise reflects

*Volume II is by Nazli Choucri with Vincent Ferraro.

a common search for more viable patterns of interaction, a search shaped not only by basic "realities" but by perceptions and preferences as well. The issues will differ substantially in the longer range. They will pertain to a system based on alternative sources unconstrained by the finiteness of the underlying resources, where political and economic costs are acceptable, where safety is minimally assured, and where technological solutions are feasible.

SUMMARY OF CHAPTER I, VOLUME II

THE PARAMETERS OF THE WORLD PETROLEUM NETWORK

Petroleum is presently the largest single source of energy and the basis for almost all the organic chemicals for which no commercially viable substitutes exist. However, the extraordinary rise in consumption cannot be sustained; given present conditions, known reserves are ample only until the turn of the century.

A. Changing Parameters and Evolving Crises

The world petroleum network has been transformed. The MNCs, which hitherto controlled the flow patterns, now provide intermediary services for the new major actors -- the producing and consuming countries. Remarkable changes have occurred with respect to environmental hazards, patterns of alignments, the politicization of petroleum, and the manipulability of prices. A new ethos of preserving a valued resource and new discoveries (e. g., in the North Sea and South China Sea) inject other elements, while the producers' ability to absorb a large-scale flow of revenues has limits.

For producers and consumers, the issues of embargo; of supply shortages caused by increasing demand and the reluctance to increase production; of price; and of shortages of auxiliary facilities such as tankers, refineries, pipelines, etc., are intimately related to economic and political issues, to national security, to environmental considerations, and to potential community-building. There are differences among producers, among consumers, and between producer and consumer. Oil company policies, however, are dictated mainly by the profit motive. Formerly agents of the consumers, they are now agents of the producers.

The projected growth in demand in the next fifteen years is approximately 1.3% - 3.8% in the United States and between 3.5% - 5.5% for the rest of the world, reflecting spreading industrialization and continued population growth in the LDCs. The United States, Western Europe, and Japan consume about 80% of the world's production. By 1985 they are expected to consume the same percentage of a base doubled in size.

B. Patterns of Production

The exponential rise in output is one of several dramatic changes in the past twenty years. In 1955 the United States led producers with 43% of the world total, followed by Venezuela with 15%. By 1972 the United States still led, but with 18%. The Soviet Union was next with 15%. Middle Eastern and North African fields accounted for 41%. Saudi Arabia will soon replace the United States as the world's leading producer.

There were also declines, due to environmental concerns which depressed demand for high-sulfur crudes, concerns revolving around the Arab-Israeli dispute, unstable prices, national security concerns which tended to restrict U.S. domestic production, and long-range concerns to preserve a valued economic resource.

C. Patterns of Consumption

In 1957 30% of total energy consumption was in liquid form; by 1971 it was 42% and rising. French reliance on oil rose from 24% to 64% in the same period, German from 10% to 52%, British from 15% to 43%, and Japanese from 26% to 72%. The United States and the Soviet Union, with more alternatives available, maintained a relatively stable rate.

Tension may arise with the Western allies and Japan, where the projected growth of petroleum markets is substantially greater than in North America. With increase U.S. reliance on imports, they fear that the MNCs may give the United States priority.

D. Patterns of Crude Petroleum Exports

From 1955 to 1970 total exports rose 361%. Petroleum today comprises 20% of total world trade. The patterns have changed: the Western Hemisphere is no longer the focal point of exports, and the rank ordering of exporters is dramatically different:

	<u>1955</u>		<u>1956</u>
Venezuela	35%	Iran	14%
Saudi Arabia	15%	Libya	13.6%
Iraq	13%	Saudi Arabia	12.7%
Iran	3%	Kuwait	12.3%
		Venezuela	11%

In 1970 the top five were separated by only 3%. That this did not lead to a buyer's market was due largely to OPEC, founded in 1960. OPEC members are predominantly Middle Eastern, sharing a common heritage and political bond vis-à-vis Israel. Economic motives are more critical to OPECs' solidarity than political motives, but priorities are sufficiently diverse to preclude a successful cartel.

OPEC controls a vital product for which no substitutes exist in the short run. Members are not competing for access to consumer markets. The parameters of permissible behavior remain to be defined.

E. Patterns of Crude Petroleum Imports

U.S. imports, which, for economic, political, and security reasons, traditionally ranged from 10% - 20% of total consumption, nearly doubled in the past three years, due to stagnation of the domestic oil industry, declining natural gas production, nuclear plant delays, rising economic productivity, and environmental requirements. In mid-1973 imports accounted for 35% of consumption and will likely increase to 54% by 1980.

The trend is similar in Western Europe and Japan, countries which, as new producers entered the market, have sought to diversify their sources to reduce their dependence on any single supplier. However, diversification may enhance the possibilities of united action by the exporters who can also diversify their markets.

F. Interdependencies of Petroleum Flows: A Preliminary Assessment

The degree of mutual vulnerability and sensitivity between importer and exporter is revealed by the symmetries and asymmetries of the relationship. Two major consumers exhibit clear trade asymmetries favoring the importing countries: the United States vis-à-vis Canada (48% of U.S. needs represent 98% of Canada's petroleum exports), and France vis-à-vis Algeria (26% of French imports account for 59% of Algerian exports). Two major consumers exhibit asymmetries favoring the exporting countries: the United Kingdom vis-à-vis Kuwait (25% of British imports account for only 15% of Kuwaiti exports), and Germany vis-à-vis Libya (41% of imports account for only 26% of exports). In the case of Japan the symmetries suggest a high degree of interdependence and possibly a conscious Japanese policy toward that end.

SUMMARY OF CHAPTER II, VOLUME II

THE CHANGING STRUCTURE OF THE WORLD PETROLEUM SYSTEM

A. The Changing Role of Multinational Corporations

U.S. corporations control over half the world's proven reserves and carry out 80% of exploration investments for oil and gas.

The multinational corporations (MNCs), which have traditionally controlled access, flow, and prices, have gradually become intermediaries between consumers and producers. Their influence was built on tight control of exploration policies, a monopoly of technology and skills, and their access to capital. The recent reactions of the producers to these factors have caused the price and supply problems of the consumers.

The interdependencies are extensive. The producers cannot manipulate prices without using the corporations, nor can they collect revenues directly. The corporations have proven an effective buffer, safeguarding somewhat the interests of both producers and consumers, but always motivated to maximize profit.

The companies' operations in the producing countries are in fact nonprofit--oil is extracted and transferred to the shareholder companies and affiliates at a fraction more than cost. The profit is made when the oil is transferred at posted prices to other affiliates. Higher host government revenues therefore do not mean lower profits to the oil companies.

There are however conflicts of interest. The corporations seek maximum profit before their leases expire; the producers have concerns about future reserves. The United States prohibits assistance to states which expropriate U.S. holdings without compensation and is committed to protect its nationals and their property overseas (a \$24 billion petroleum investment in 1974). Yet there is in return no formal commitment by the corporations for assured access to petroleum. The Soviet Union's emerging role in the Middle East as a potential supplier, consumer, and middleman may furnish added sources of friction.

The MNCs thus face some imponderables. With no short-term alternatives to Middle Eastern oil, pressure on these sources will intensify. The magnitude of the producers' revenues is increasing their ability to manipulate the structure. OPEC has entered the petroleum network as a challenger of established patterns. As consumer countries also become active members of the system, the corporations are increasingly becoming targets of both producer and consumer dissatisfaction.

B. Evolving Institutional Response: The Organization of Petroleum Exporting Countries

OPEC's development can be traced to (1) price-cutting by the MNCs, undertaken without consulting the producers; (2) the possibility of lower cost competition from new producers; and (3) the producers' improved technical knowledge and skills, enabling them to make more knowledgeable decisions about prices and taxes.

OPEC's membership controls 85% of the oil available for export to the non-Communist world. It has succeeded in deterring price competition among its members, increasing profits, gaining participation arrangements with the oil companies, winning compensation for inflation and devaluation in the consuming countries, and conserving oil reserves for the future. Oil revenues for OPEC members will increase to \$65 billion in 1974, some 90% higher than five years ago. By 1985 they will reach half a trillion dollars--about half the current U. S. GNP. Whatever the consequences of such large-scale transfers of funds, they do enhance OPEC's political and economic leverage.

OPEC has not succeeded in identifying and reaching agreement on its members' priorities in unifying petroleum policies, nor in stabilizing petroleum prices. It differs from producers' cartels in that it controls a product that is irreplaceable in the short run; the producers are not now competing for larger shares of the market; their needs for revenue vary extensively; price manipulation does not depend on coordination among the producers, nor are the incentives for price-cutting--so characteristic of cartels--uniformly extensive.

The large-scale transfers of funds to the producers, the attendant Western balance of payments problems, and potential economic dislocations result from increasing petroleum prices, but they cannot be attributed to cartel-like behavior on OPEC's part. Individually motivated price increases would have produced the same reactions. Thus "breaking up the cartel" would not necessarily reduce the effectiveness

of OPEC members in their efforts to attain some control over evolving institutional arrangements among producers, consumers, and international oil companies.

SUMMARY OF CHAPTER III, VOLUME II

ECONOMIC INTERDEPENDENCE:
TRADE ASYMMETRIES AND OPTIONS

A. Total Trade Flows: The Global Context of Economic Relationships

Patterns of trade flows and petroleum flows are remarkably similar. The 1971 figures reflect three important factors. First, mutually directed trade represented a much larger fraction of the producers' trade than of the consumers', revealing the degree of penetration by the industrialized nations. The United States, the United Kingdom, and France (Germany less so) exhibited pronounced asymmetries. Japan appeared to be seeking interdependence by allocating a fraction of its domestic market commensurate with its penetration of the producers' markets. Second, there was much diversification in consumers' trading patterns with the producers. Only Japan allocated shares of imports proportionally to shares of exports. Third, the diversification of trading partners was not paralleled by the producers, with the exception of Iran. For the rest, dependence of producers on consumers far exceeded that of consumers on producers.

B. Alternatives and Options: Commodity Trade Between Petroleum Producers and Consumers

The ability to deny an opponent access to critical goods or services is a function of the alternatives available to the opponent, and they are strongly constrained by prevailing patterns of interactions.

The U.S. trade figures for 1972 give the impression that U.S. exports are more important to the oil producers than theirs are to the United States. But U.S. exports are concentrated on four major commodities, three of which (electric machinery, nonelectric machinery, and transport equipment) are also major exports of Germany, Japan, the United Kingdom, and France, the other major consuming countries. Thus redirection of trade is possible. As regards the fourth commodity, cereals and flours, the one potential alternative to the United States is the Soviet Union. The criticality of this commodity highlights the harsh realities of the resulting interdependencies.

SUMMARY OF CHAPTER IV, VOLUME II

ECONOMIC INTERDEPENDENCE: REVENUE FLOWS AND THE TRANSFER OF FUNDS

Rising prices have implications for the consumers in terms of balance of payments and for the producers in terms of revenue surpluses. Fund transfers have unintended results which are beyond the control of any single nation.

A. First-Order Effects: Increases in Petroleum Prices

Middle Eastern producers in the last three months of 1973 unilaterally raised the price of crude petroleum from \$3.01 to \$11.65 per barrel. Government revenues expanded from \$1.76 to \$7.00 per barrel, signaling a fourfold increase in annual revenues. Transfers of funds in 1974 are expected to reach \$55 billion plus the increased profit of the oil companies.

Analysts agree on two facts: (1) that the cost of production lies far below price, leaving a wide margin for potential accommodation; and (2) that supply and demand do not govern world petroleum prices. The upper limit on prices is likely to be set by the commercial availability of alternative sources of energy.

B. Second-Order Effects: The Balance of Payments Problems for the Consumers

For the major consuming nations, oil imports will likely cost \$50 billion more in 1974 than in 1973. By 1985 the oil bill may well reach \$200 billion, or 20% of all trade. The United States is expected to consume about one-third of energy supplies with imports accounting for one-half of this amount. The U.S. balance of payments deficit could increase by \$20 billion or more.

Britain faces a current deficit of up to \$10 billion, Italy at least \$6 billion, France about \$4 billion, and Japan at least \$7 billion. Over several years, the size of the oil bill matched against reserves (\$173 billion, including gold) augers severe monetary dislocations. Theoretically, five or six countries could wind up owning all foreign exchange.

C. Second-Order Effects: Surplus Revenues for the Producers

Petroleum represents over 90% of the total trade of Abu Dhabi and Qatar (100%), Libya (99.9%), Saudi Arabia (96.8%), Kuwait (95.5%), Iraq (93.7%), Venezuela (90.3%). It is unlikely that oil revenue accounts for less than 50% of total revenues in any oil-producing state. The dependence of the producers on petroleum revenues more than matches the consumers' dependence on petroleum imports. In those terms neither has alternatives to the other as trading partners, but the producers' dependence appears greater, until time is considered. The consumers could not long withstand a denial of petroleum in the absence of alternative sources of energy; the producers might for some time withstand a denial of revenues, depending on such factors as population, rate of change, economic policies, priorities, and so forth. This range is increasingly affecting the structure of the world petroleum system, which was hitherto responsive only to consumer demands and the multinational companies.

The Middle East has the world's fastest growing store of capital. Per capita reserves already range from one to twenty times that of the United States. Even with some dampening of prices, decreases in demand, and increased OPEC imports, an OPEC surplus of \$240 billion by 1980 appears plausible. The producers' ability to absorb this surplus revenue is determined by their domestic attributes, the level of economic development, population, and the rate of growth, all of which differ substantially among them.

D. Third-Order Effects: Policy Options and Manipulables

The options available to consumers include (1) promoting exports to the producers, (2) reducing capital outflows and encouraging inflows, (3) seeking investment in the producers' economies, (4) seeking investments by the producers, (5) accommodating their mutual deficits by collaborative financial policies, and/or (6) reducing consumption markedly.

For producers, the options are to some degree reciprocal and include (1) absorbing surplus revenues by imports from consumers, (2) restricting production, (3) investing in the consumers' economies, and/or (4) collaborating with other producers in financial transactions with the consumers.

For the consumers, even the United States, export promotion would have limited economic impact. Encouraging large-scale invest-

ment by the producers, and repatriation of oil company profits would contribute more. Or currencies could be devalued equalling the overall trade deficit, e. g. , for Japan 10%-20%, for the United States about 13%. Devaluations of this magnitude would necessitate joint monetary planning. Reducing consumption would call for new goals, habits, and attitudes and is thus a longer term policy.

E. Third-Order Effects: Policy Constraints on Producers and Consumers

Producers such as Iran and Venezuela have the population base and skills to absorb surplus revenue internally. Eventually this domestic investment will generate locally produced goods that compete with imports and can even be exported. Others, such as Kuwait, Libya, and Saudi Arabia will, by necessity as well as preference, invest the surplus in the major financial markets.

The more producers become integrated into the global economy as large-scale investors, the more likely they are to coordinate their investment policies with those of the advanced nations. Producers such as Iran promote downstream operations at home and export refined products. Others, such as Saudi Arabia, seek to participate in such operations abroad and export crude petroleum. This could lead to substantial investment in consuming countries, but probably not enough to absorb Saudi Arabia's excess earnings. Moreover, mass foreign ownership might not be acceptable to the consumers.

The present regime is predicated on national initiatives and incentives. Yet conventional trade will not compensate adequately for the deficit, and there are serious constraints on the magnitude of capital flows and investments in the major financial markets. Cooperation between producers, consumers, and international monetary institutions is thus essential.

F. Fourth-Order Effects: Economic Impacts on Other States

The immediate implications of price increases are most serious for developing countries that are not oil producers. These include reduced demand for primary products and thus lower earnings, shortages in crucial fertilizers, reduced inflow of capital, and an impaired ability to attract security loans.

OPEC has been unresponsive to these problems but some individual members have made adjustments, e. g. , Iran vis-à-vis India.

SUMMARY OF CHAPTER V, VOLUME II
INTERDEPENDENCE IN THE MIDDLE EAST

The emerging interdependencies among oil-producing countries can be revealed by focusing on the center of petroleum power--the Arab states of the Middle East.

A. Critical Differentials in the Middle East

Differences in the attributes and capabilities of the Middle Eastern countries have fostered interdependencies that transcend a shared heritage and cleavages that make coordinated petroleum policies increasingly fragile.

Population size ranges from Egypt's 35.9 million to fewer than 500,000 in the Gulf. Resource-rich countries such as Kuwait and Saudi Arabia have the smallest populations and the least need for, or capacity to absorb, surplus revenue. Iran and Algeria, with large populations and the institutional bases for channeling revenues into economic projects, are major producers today but have smaller reserves. Further, the most populated and resource-poor, such as Egypt, are the most technologically advanced and have the lowest growth rate, whereas Saudi Arabia and Kuwait, the most resource-rich and least populated, have high growth rates and need technical and related skills.

These basic imbalances have prompted large-scale interstate population movements, a redistribution of knowledge and skills, and an awareness of the potential for interstate cooperation.

B. Cleavages and Constraints

For those OPEC members with large populations, high prices outweigh the benefits of OPEC membership. Saudi Arabia alone seeks price reductions and may defy OPEC to do so. With a small population and one-third of the world's proven reserves, a Saudi decision to sell oil at high volume and low price would put pressure on OPEC to lower prices.

It is ironic that Saudi Arabia with the least need for revenues, without capacity to absorb them, and with no depletion worries, is in

control of OPEC's pricing policies. Iran, Algeria, and others face constraints. Libyan efforts to avoid rapid and unplanned exploitation, may be ideologically motivated but make economic sense in the absence of large reserves and absorptive capacity.

Efforts toward community-building in the region have a long history. More recently there has been official realization that where political objectives differ so substantially, a new order must be predicated on diversity rather than uniformity.

C. New Policy Directions

The futility of inter-Arab conflicts was finally confronted after the humiliating 1967 war with Israel. No Arab leader, nor ideology, was left with any prestige to protect. The Israelis had defeated Nasserite Egypt, Baathist Syria, and Hashemite Jordan with equal ease. Political power was dispersing. Saudi Arabia was emerging as the new economic power, the Palestine Liberation Organization, and to an extent Libya, as the new revolutionaries, Algeria as the technocratic leader, and Kuwait as the research center.

With the acquisition of technical and managerial capabilities and an understanding of how balance of payments problems and surplus revenues converge, the Arabs were able to use their key resource for political purposes. Nevertheless policies have not been highly coordinated. Iraq cooperated in the military sphere in 1973 but not in the embargo; Libya helped Egypt financially but did not agree with Sadat's moderate policy toward Israel; Saudi Arabia led the oil embargo but made no military contribution; Algeria, Morocco, and Tunisia gave full political support but only token military aid. An evolving consensus regarding the acceptability of such limited commitments is providing the basis for a fragile coordination of policy.

D. Regional Interdependence and Evolving Consensus

By the end of 1973 the Arab states had begun to collaborate successfully on the major political issues between them--ideology, the dispersion of power, community-building, and the issue of leadership. Smaller states, no longer dependent on large ones, could now contribute to regional collaboration. The core leadership of Egypt and Saudi Arabia was moderate, opening avenues for potential resolution of both the Israeli impasse and the petroleum problem.

The reduced emphasis on symbolic politics permits an accommodation with Israel to be sought by negotiation and, indeed, the potential for settlement with Israel has had a unifying effect on the Arab community.

E. Community-Building, Evolving Interdependence, and Competing Regimes

Political objectives differ. Saudi Arabia, Iran, and the Gulf states are concerned about preserving traditional values. Egypt, Algeria, Tunisia, and Lebanon stress economic development. Syria, Iraq, and Jordan seek security. Yet none can impose its order on others. Saudi Arabia's role is now pivotal rather than peripheral. In changing from a hegemonial to an interdependent power, Egypt drew on the different attributes and capabilities of its neighbors to reach consensus on the Israeli war. Despite the differing political orientation of Algeria and Saudi Arabia, their oil ministers visited the consumer capitals together--the new technocrats. Syria's security concern has yielded to a disengagement agreement with Israel--a sign of an emerging pragmatism.

This diversification of activities permits commitments to community-building that are more limited, pragmatic, and purposeful than earlier efforts at unification. These interdependencies may enable Saudi Arabia to convince the Arab members of OPEC not to raise petroleum prices further. OPEC policies of course must also reflect the view of Iran, Venezuela, and Nigeria. Iran is nervous of Arab unity and needs revenues. The other two are likely to side with Iran but neither can substantially influence OPEC decisions.

F. Regional Influences on Global Interdependence

The major external influence is the United States, which seeks an Arab-Israeli settlement and an unimpeded flow of petroleum. It is unclear whether a unified Arab posture would help or hinder these goals.

The reserve displayed by the Soviet Union toward Egyptian-Saudi cooperation may indicate a favorable view of evolving regional interdependence. Western Europeans, however, are concerned mainly with petroleum supply, and while there is little consensus among them there are also fewer tensions in their relationships with the producers.

The producers will not unilaterally reduce prices drastically, nor will the consumers withdraw their demands for lower prices. The only

reasonable solution is mutual accommodation. The other option is to develop alternative sources of energy. If producers persist in raising prices, investments in alternatives will accelerate; if prices are lowered, they will decline. The producers are to this extent able to influence the energy policies of the consumers.

SUMMARY OF CHAPTER VI, VOLUME II

A SUMMARY ASSESSMENT OF
INTERDEPENDENCE IN THE WORLD PETROLEUM SYSTEM

1. An extraordinary rise in world petroleum consumption triggered the alleged "crisis" in supply. The key "crisis" issues are: reluctance to expand production capacity, price, the scarcity of auxiliary services, and the possibilities of further embargo. All are manipulable, with varying social and economic costs.
2. New oil fields and new producers have altered production magnitudes and diminished the role of the Western Hemisphere as a prime exporter.
3. Reliance on oil imports has increased, and there has been a trend toward the diversification of import sources. The resulting trade asymmetries may favor either exporter or importer.
4. Changing flow patterns are mirrored in the changing roles of the oil companies and OPEC.
5. Total trade patterns reflect penetration of the producers by the industrialized nations and effective division of market control of the producers. Both concentration and diversification are reflected in the producers' trade with consumers.
6. There are substantial risks involved in using the producers' dependence on U. S. cereals and flours as leverage on other issues.
7. The balance of payments issue illustrates the intricate interdependencies among actors in the system.
8. The near total dependence of producers on oil revenues more than matches the consumers' dependence on imports.
9. Networks of interdependence are developing among the Middle Eastern countries with implications for the world petroleum system.
10. Solutions to balance of payments/surplus revenue problems will require each party's cooperation.

Thus, neither producers nor consumers can "opt out" of the petroleum network. The initial dependence on the consumer has been transformed into mutually compatible asymmetries, i. e., net interdependence. Two consequences should be noted: First, the meager resources and skills plus the high population growth of the developing countries impede their chances of meeting the economic burden of higher oil prices. Second, the producers' rejection of established rules governing transactions is in turn being countered by the consumers' search for a more equitable price system.

These conclusions need further inquiry and substantiation. Four dimensions of interdependence were probed: (a) political and economic, (b) security of access, (c) implication for community-building, and (d) potential environmental impact (conclusions here are inferential and of little depth).

A move to alternative sources of energy will be accelerated by higher prices and forestalled by price reductions. The producers therefore can and will influence the energy policy of the consumers.

SUMMARY OF CHAPTER VII, VOLUME II
ALTERNATIVE GLOBAL ENERGY SYSTEMS

A. Perspectives for Assessing the Implications of Alternative Energy Sources

The issue of energy in an interdependent world involves the cost of developing alternatives to petroleum on a commercially viable basis, secure access to stable sources, stable relationships between producers and consumers, and minimal environmental dislocations.

Nations rich in petroleum are poor in technology and vice versa. For coal, nuclear fission and fusion, solar energy, geothermal energy, tar sands, oil shale, and other exotica, however, whoever controls technology controls access to the resources.

B. Coal: Resource Base and Technological Constraints

World coal reserves can last over 800 years. By 1985 the United States will have drawn on only 10% of the available 150 million tons that are similar to currently mined resources.

Reliance on coal would reduce U.S. balance of payments deficits by reducing oil imports. International monetary flexibility and domestic employment would increase. No issue of strategic vulnerability nor of potential competition with the U.S.S.R. would arise. Competition with Westner Europe and Japan for a scarce resource would decline but interests might also diverge.

The environmental effects of present extraction processes present technological difficulties which increase the costs of mining, processing, transportation, and distribution. Health and safety measures are costly; new facilities must replace those burning fuel oil; distribution networks and facilities must be updated. Water resources constrain the large-scale development of gassification technology.

In sum, the United States would gain by reducing its vulnerability to the policies of other nations, but at some domestic cost.

C. Nuclear Energy: Fission and Fusion

The major disadvantages of nuclear fission are technological failures, natural disasters, and susceptibility to human error or sabotage. Advantages include fewer pollutants emitted, and less mining and transportation costs, water pollution, and land distribution.

The immediate problem lies in the scarcity of fuel available until 1980 when breeder reactors, which offer lower thermal pollution, cheaper electric energy, and more efficient use of uranium reserves, are expected to become commercially viable. Also, some experts still doubt the likelihood of avoiding accident should a plant lose its emergency core cooling system. Given the long delay between the generation of persistent pollutants in the form of radioactive liquids and wastes and their appearance in the environment, countermeasures may appear too late to avoid unacceptable pollution damage. In terms of security, increased proliferation and the potential for terrorism could be destabilizing. Regulation of the development, employment, transference, and diffusion of nuclear energy presents a formidable challenge.

Progress toward hydrogen fusion involves further development of a relatively new science, plasma physics. No system of magnetic containment of fusion reaction so far tested indicates that net production of energy is economically feasible.

Although oil would remain a major energy source, e. g. , for transportation, a U. S. energy system based on nuclear power would cut petroleum imports and improve related balance of payments deficits. However, higher capital costs reflected in higher costs of manufacture may eventually affect the balance of payments adversely.

The United States controls 41% of the world's current capacity, the United Kingdom 15%, the U. S. S. R. and France, 7% each. Usage has been erratic because of technical and environmental problems, but is expected to double about every five years. It provides 1% of U. S. needs now and is expected to provide from 15%-30% by 1985 to close the gap between energy supplies and a 6% annual increase in demand. But obstacles remain. The "ultimate energy source" is not yet on the operational horizon.

D. Solar Energy

The major obstacles to the use of solar energy are technological and are unlikely to be solved in this century. Eventually it may supply

20% of expected consumption. Because solar power is a renewable, nonexhaustible source of energy, the major linkages among nations will be technological and will reflect increasing dependence rather than interdependence. The potential for control of energy as a political instrument will thus persist. No institutions are yet responsible for anticipating the political and other implications of a world energy system based on solar power.

E. Geothermal Energy

Geothermal heat is essentially a form of fossil nuclear energy produced primarily by the decay of radioactive materials. There are uncertainties regarding the size of recoverable reserves and the air pollution resulting from the high sulfur content of the steam (or other form of heat) brought to the surface.

The most optimistic projection of economically viable energy from geothermal sources foresees up to 1% of anticipated U. S. needs by 1985 being supplied (confined to areas of the West and Southwest). Thus no impact is foreseen on either the national or world energy system. Possibilities for technology transfer exist but are still too limited to affect U. S. relations abroad.

F. Tar Sands and Shale Oil

Tar sands are distinguished from conventional oil and gas reservoirs by the viscosity of the hydrocarbon which cannot be recovered by conventional processes. Canada, Venezuela, and perhaps Colombia, have large deposits. The smaller U. S. deposits are not expected to yield much energy with present technology. Canada will be the only source of commercial production at least through 1985, but technological, capital, and construction constraints will keep production limited.

Shale oil is an oil-bearing rock that may be burned directly and distilled to obtain oil products. Plans to develop the large U. S. deposits are hindered by inadequate water supplies. Significant cost reductions require the removal of bottlenecks in mine and plant organization, in construction, and in further automation. The legal status of shale lands must be resolved.

Reliance on tar sands and shale oil is unlikely to be sufficient to affect U. S. relations with others.

G. Global Interdependence and Alternative Energy Sources

For the United States, or other industrial countries, to invest in alternatives to petroleum is to make some commitment toward energy autonomy. For some, this autonomy would be too costly--in political, environmental, and dollar terms.

Because access to sources of energy is a basic requisite to national survival in an industrialized world, and because every alternative requires technological developments which only the advanced nations can make, the sharing or transferring--or withholding--of technology would become the most crucial issue confronting all nations, large and small.

SUMMARY OF CHAPTER VIII, VOLUME II
ALTERNATIVE ENERGY REGIMES AND
PATTERNS OF GLOBAL INTERDEPENDENCE

A. Control of Energy Sources

The control of petroleum and geothermal energy is geographically determined. Nuclear fission and fusion are primarily technological and control will lie with advanced nations. Both geography and technology determine the control of oil shale and tar sands.

B. Distribution of Energy Resources

Both economic and political factors determine distribution patterns. Like petroleum, the transfer of nuclear technology can be used as a political "weapon." For solar power, geothermal energy, oil shale, and tar sands, economic factors will likely shape distribution.

C. The Issue of Price

As in the case of petroleum prices, it is unlikely that the price of nuclear energy will be directly related to cost, although control over product, distribution, and price will rest with the advanced nations. The latter will also control solar power, geothermal energy, oil shale, and tar shale, but factors that might divorce cost from price are not apparent. Economic factors will thus determine price.

D. Regulatory Mechanism for Alternative Energy Systems

Present-day institutions are inadequate for regulating the transactions associated with alternative sources, and efforts must be made in the next ten critical years to avoid incremental and piecemeal approaches and the familiar snowballing process whereby a solution generates other problems ad infinitum.

E. Alternative Energy Regimes: An Illusion

Alternatives for regulating international energy transactions include (a) free market, (b) joint, (c) multilateral, and (d) international regimes. Autarchy is not a viable option.

Under a free market or joint system, control of energy products would be determined by resource, capital, and technological factors, distribution by market mechanism, and price--the basic regulatory mechanism--by supply and demand. Under a joint system, however, the role of government would be more direct. Regimes under (c) or (d) would differ substantially. Under (c) control would be designed to maximize benefits to the group as a whole; under (d) resources would be apportioned according to need. Community interests as well as market mechanisms would determine distribution and price under (c). Under (d) explicit rules and regulations would apply.

SUMMARY OF CHAPTER I, VOLUME III

A METHODOLOGY FOR INTERDEPENDENCE RESEARCH*

A. Outstanding Questions

It is clear from the previous volumes that important but unanswered research questions exist relating to, for example, what trends, strategies and outcomes are likely, desirable, or possible.

B. Reasons for a Methodological Study

There is a need for a review of research techniques that have relevance, as understanding emerges of what ought to be studied and how it might be done.

C. The Methodological Strategy

A methodology is needed to assess the relevance of particular techniques for interdependence research. Explicit, agreed-upon methodologies are a prerequisite for fruitful communication between and among the producers and consumers of the research.

Chapter II seeks to identify analytical problems common to the different scholarly perspectives reviewed in Chapter II, Volume I, and offers a methodological focus for interdependence research. In Chapter III, this focus is further articulated in terms of precise canons (maxims) from which the relevance of techniques or approaches can be judged. Several dozen studies are reviewed, particularly those of Alker, Bloomfield and Choucri. Although the techniques may be unfamiliar and difficult to grasp, it is hoped that the multilevel conceptualization of interdependence phenomena in Chapter IV will be generally intelligible as an aid to clear thinking. Chapter IV also builds on Chapter III's methodological maxims for possible use as questions to ask in reviewing subsequent research proposals. As a concrete example, the steps to be taken in studying commodity interdependencies are illustrated. The Chapter is coauthored with Professor Choucri.

*Chapter I is by Hayward R. Alker, Jr.

SUMMARY OF CHAPTER II, VOLUME III

COMMON ANALYTICAL PROBLEMS: A PARTIALLY SYNTHETIC APPROACH*

This chapter suggests a partially synthetic methodological approach to the analytical problems raised by the controversies and policy issues of Volumes I and II, in the form of a design-oriented, historical systems approach focused on cross-state world order possibilities, emphasizing competing quasi-regime alternatives.

A. Common Analytical Problems in Interdependence Issues

As other actors become increasingly relevant to achieving domestic and international objectives, it is harder but more necessary to answer: who gets, or should get, what, why, when, and with what side effects? Much of the discussion in Volume I evidenced growing concern with restructuring relationships, i. e. designing new, if partial, world orders to realize mutually satisfactory relationships. It is necessary to consider simultaneously both policy and structure.

I. Mixed Interest, Interaction-Contingent, Collective Outcome Dilemmas

The first common analytical problem falls under the "Prisoner's Dilemma" label--a situation in which an independently acting player is tempted to "outdo" another, although a cooperative outcome is actually to be preferred by both. The collective outcome possibilities are dramatized by depletion of ocean stocks or global inflation controls that affect everyone; such outcomes are pure public (or collective) goods or bads.

When one party cannot by himself control the outcome, his alternatives are interaction-contingent or sensitivity interdependent.

Two parties are positively interest interdependent when the action of one, taken in his own interest, enhances the other's

*Chapter II is by Hayward R. Alker, Jr.

payoff. When one does well and the other poorly, the interest interdependence is negative. Mixed interest situations fall between the two.

Each of the issues raised in Volumes I and II has analytical problems that can be characterized as mixed interest, interaction-contingent, collective outcome dilemmas.

2. Pervasive Units of Analysis Problem

What interests, at what level, are to be analyzed? A search for creative/regulative political orders requires studies at close to the global level. The collection of units--supranational, transgovernmental, governmental or transnational--collectively referred to as cross-state actors, must be considered. More cross-state data is needed.

3. The Need for Comparative Costing of Multiple Objectives

Making short-run policy payoffs and larger-run order-building efforts commensurable involves taking account of resource and opportunity costs, political designs, the sensitivity interdependence of multiple actors, and different commitments to the values of autonomy, efficiency and equity.

4. The Instruments-Objectives Constraint

According to cybernetic theory, to achieve success there must be as many independent policy instruments as there are objectives. Complex questions will not be resolved unless policy goals that can be administered flexibly are sufficiently articulated.

5. The Likelihood of Unanticipated Negative Consequences

Examples abound.

6. The Need for Counterfactual System Assessment

Are there feasible, preferable, as yet non-existing (counterfactual) alternatives to systems of interdependence? Vulnerability interdependence can be defined as the opportunity costs of transforming relationships. Dependency is par excellence the case of asymmetric vulnerability interdependence: one side can break the relationship with relative ease, the other cannot.

B. Components of a Partially Synthetic Methodological Approach

Reconceptualizing certain questions can make the possibilities for governmental action more apparent, likely, and effective.

1. A Historical Systems Approach

This is a combination of generalizing historical analysis, a structure-sensitive viewpoint, and the elaborations of modern systems theory.

2. A Focus on Partial World Order-Building Efforts

The Miriam Camps concept of interdependence is articulated in pluralistic world order terms, e. g. progress toward disarmament, peaceful change, improved welfare, human rights, and so on. With differing emphases and conceptual interpretations, conservatives, liberals and radicals all discuss the same objectives.

3. Design Research on Interdependence Alternatives

A third feature is analysis of alternative, artificial (in the sense of requiring human effort) systems of global interdependence. An artificial science requires a design orientation. Designs may be thought of as interfaces between an inner environment (conceivable as domestic public goods to be maintained) and an external, natural, social, technological environment. A distinction between ground rules, operating rules, and generative/regulative norms should also be preserved.

4. An Emphasis on Competing Cross-State Quasi-Regimes

A regime evidences mutuality of benefits: consensus on rules; stability, coherence, effectiveness; and institutionalized relationships. Rule systems satisfying only some of these are, by default, quasi-regimes.

Energy politics is full of competing visions of what kinds of world order should emerge. It is toward their analysis that the present methodological framework has been developed.

SUMMARY OF CHAPTER III, VOLUME III
METHODOLOGIES, MAXIMS, AND TECHNIQUES*

A. Methodological Maxims for Interdependence Research

The historical systems approach to questions of world order design, emphasizing competing cross-state quasi-regime alternatives, can be restated in some twenty methodological maxims, within six topics suggested by Herbert Simon, that focus on what interdependence research should look at.

Topic 1 The Representation of Interdependence Design Problems

An important representational feature of cross-state quasi-regimes is their openness as systems. Making projections or predictions about such systems requires knowledge of their resource and information inputs and other exchanges with their environment. Multiple objectives subject to multiple constraints can be compared by developing formalisms simultaneously representing equity, coercion, and efficiency objectives. Conceptual typologies of regulative principles, policy possibilities, and problem situations also belong here.

Topic 2 Theories of Natural and Social Environments

Maxim 1 Theoretical specifications (and hopefully models) should be made of the dynamics and transformability of natural and social environments external to contemplated regime participants.

Since completely autonomous self-control is usually impossible for open systems, the principles governing the behavior of external environments are important design constraints.

*Chapter III is by Hayward R. Alker, Jr.

Maxim 2 But because such environments are rarely accurately predictable, a probabilistic error treatment, using appropriately specified random variables, is desirable concerning parts of the environment not deterministically modelable.

This maxim is grounded in an historical systems philosophy that does not see social and natural processes as completely deterministic.

Maxim 3 Ascertain actual and potential information and resource flows, including causal impacts from environments into major actors and actual or potential regimes.

Projections based on systems of probabilistically determinative equations, including internal bureaucratic pressures and external threats, often explain more than half the variance in political variables as, for example, armaments, territorial expansionism, and violence (all in the 1892-96 period; cf. Choucri-North).

Maxim 4 Attention should be given to the potential, often-unanticipated impacts or side effects of quasi-regime alternatives on natural environments, and on social groups whose support is not necessary in the short run to sustain the inner structure of quasi-regime practices.

The maxim embodies the insight, common to Marxist, radical-liberal, neofunctionalist, and conservative theoretical traditions, that cross-state regimes depend on and reward the support of important transnational social groups. Data must be tested for these effects.

Maxim 5 The findings of scientific experts with different doctrinal/value emphases must be examined, checked and compared at least to the extent likely regime participants differ in their environmental assessments.

Topic 3 Theoretical Analyses of Interdependence Practices
(Including Internal Environments and Regime Capabilities)

Maxim 6 Actor-relevant time-specific actions, sensitivity effects, resource costs, outcome trade-offs, and policy opportunity-costs should be routinely part of analyses of interdependence practices.

Maxim 7 Policy analyses should, moreover, be structure sensitive, making explicit estimates of the relevant impacts of external environments, internal organizational constraints, policies, and cross-state quasi-regimes.

Maxim 8 The appropriate multiplicity of relevant cross-state actors should be studied.

Difficult causal assessments, not usually made when interaction patterns are measured, are implied. The Choucri-North model indicates how much work is involved. The Mesarovic-Pestel model contains possibilities for multi-level impact assessments, joined with an analysis routine showing the alternate effects, trade-offs, and opportunity costs associated with different policy options. Forecasts, alternative policies, and more specific implementation strategies can all be explored.

Maxim 9 The subjective interests, preferences, identities, and expectations of cross-state actors should be researched, including their assessments of alternative interface arrangements (including various regime possibilities).

Recently developed techniques make this possible with a kind of third generation content analysis linked to cognitive processing simulations.

Maxim 10 Judgments of actual (or hypothetical) system functions should be supplemented, wherever appropriate, by explicit theoretical statements of operational rule structures and capability-loads analyses of them.

Various institutionalized practices (or quasi-regimes), e. g. deterrence and crisis management, rest on assumptions about shared ground rules. The capabilities of such practices to handle various loads--crises, problems, or demands--should be assessed. One needs to know which rules may operate in what context with what effects.

Maxim 11 Memory-rich specifications of quasi-regimes are to be preferred over ahistorical ones because the performance, reproduction, and self-transformation of historical systems depend importantly on memory processing capabilities.

Modelers find this standard hard to meet. It emphasizes the importance of human memory in innovative policy thinking, implemented through systems such as the Bloomfield-Beattie CASCON. Human and man-machine games are also important here.

Topic 4 Logics for Prescribing/Describing Interdependence Designs

Practical politicians use rhetoric, persuasion, and propaganda to advantage. At a higher level of discussion rationality logics, including variants of choice theory, cost/benefit analysis, and labor value theory are used in making political arguments. Statistical evidence and judgmental data must be mixed.

Topic 5 The Search for Successful Interdependence Politics

Systematic policy searching involves imagining alternative regime prospects and multiple objectives. Learning from order-building efforts, historical deterrence/compellance actions or political-military games how to enhance conflict resolution capabilities requires identifying the design principles that prove successful plus post-mortems of both successes and failures. Thus:

- Maxim 12 More than one "possible world" should be considered.
- Maxim 13 Historical practices should be used in (re)designing multiple alternatives.
- Maxim 14 Sequentially explicit design principles must be explicated.
- Maxim 15 Feasibility arguments should spell out and make plausible the attainability of necessary and/or sufficient conditions for each order-building stage.
- Maxim 16 Explicated regime construction or redesign principles must be subject to post-mortem analyses.

Topic 6 The Evaluation of Cross-State Interdependence

- Maxim 17 Interdependence relationships, including regimes and less consensual structures, should, at a minimum, be analyzed for the efficiency, equity, autonomy, capacity, modernization, and conservation objectives meaningful to potential participants in such relationships.

- Maxim 18 Moreover, the use of such evaluative criteria should be extended to include the opportunity costs for relevant actors of quasi-regime alternatives.
- Maxim 19 As part of the scientific contribution to such discussions, an appropriate mix of judgmental, rational, and complex causal assessments should repeatedly be used in order to ensure relatively comprehensive quasi-regime evaluations in changing conditions of historical interdependence.
- Maxim 20 Public debate and cross-paradigm adversarial science are necessary for the discovery of latent system functions (such as inequity perpetuation) and the definition of quasi-regime objectives susceptible to legitimate institutionalization.

B. A Provisional Review of Research Technique Relevance to Interdependence Analysis

Several conclusions emerge from a relevance scorecard for the analytical techniques discussed:

Most techniques do not satisfy most maxims of relevance, let alone harder tests of adequacy.

Techniques exist that move toward meeting almost any one of the maxims of relevance the analytical context has suggested.

We do not know how factorable interdependence issues really are, but the Mesarovic-Pestel model suggests a technique for simultaneously addressing several parts of the energy problems we have looked at.

It is not the techniques per se but the guiding research programs or methodological orientations that need discussion.

An historical systems approach to world order design questions, emphasizing competing cross-state quasi-regime alternatives, has been developed to address as many of the key concerns and analytical problems in the interdependence literature as possible. The next chapter will suggest how this focus and its derivative maxims apply to particular research areas.

SUMMARY OF CHAPTER IV, VOLUME III

METHODOLOGICAL CONCLUSIONS AND RECOMMENDATIONS*

A. Six Analytical Meanings of Interdependence

Clarity is enhanced by distinguishing between (1) consumption interdependence--the flow of goods and services in ways whereby one cross-state actor's consumption does not exclude that of others; (2) the relations and structures that determine cross-state interactions including resource flows; (3) the sensitivity, symmetric or asymmetric, of an actor to others and/or to its natural or social environment; (4) the degree of similarity in the stakes (utilities) nations attach to certain goods, policies, or outcomes. Greater similarity means greater positive utility interdependence; (5) cross-sectoral interdependence, which concerns the functions performed by actors or their subunits in realizing or frustrating overall objectives; and (6) vulnerability interdependence--the degree to which a cross-state actor can transform its sensitivity, utility, and cross-sectoral interdependencies.

The above encompass the definition of interdependence of Chapter I, Volume I--that interdependence is a situation of two-way dependency --but also highlight the multi-dimensional and multi-faceted nature of the phenomenon.

B. Implications for Analysis of Energy Interdependence

The six meanings illuminate the situation of global interdependence for petroleum thus:

1. Consumption Externalities Generated by Flows of Goods and Services

The network of petroleum transactions is defined by imports and exports in a situation of exchange with mutual gain.

*Chapter IV is by Hayward R. Alker, Jr. and Nazli Choucri.

2. Causal Relations Determining Actual or Potential Flows of Goods and Services Across National Boundaries

Petroleum flows are structured by the need for resources and by the values and preferences of the trading parties.

3. Cross-State Sensitivity

The policies of producers affect consumers and vice versa (although less directly).

4. Shared Utilities

Each party attaches extremely high stakes to the transaction--the consumers to maintain modern economies, the producers for national income.

5. Cross-Sectoral Interdependence

The economic consequences of petroleum flows have led to mutual sensitivities in political and strategic areas.

6. Vulnerability Interdependence in Terms of the Asymmetrical Ability of One State to Reshape its Interrelationships

The consumers are vulnerable to price increases; the producers to the freezing of foreign assets. The implications of vulnerability interdependence derive from all the preceding factors.

C. Applications of Maxims (of Chapter III) to the Analysis of Energy Interdependence

- Maxim 1 Theoretic specifications of the energy system must include delineation of production, consumption, energy reserves, and changes in such patterns over time.
- Maxim 2 Those aspects whose structure and behavior are not well specified should be incorporated by a probabilistic error system.
- Maxim 3 Delineate flows of energy and of the information and technology that condition them, to determine causal relations.

- Maxim 4 Examine the unanticipated consequences of emerging flow patterns and assess the stresses on prevailing regime rules.
- Maxim 5 Divergent definitions of reality emerging from different scientific traditions must be taken into account.
- Maxim 6 Existing studies lack systematic investigation of opportunity costs.
- Maxim 7 Account must be taken of the impact of policy outcomes on production, consumption, and basic reserves, and on OPEC and the MNCs in terms of possible constraints on their behavior.
- Maxim 8 A perspective is needed that ceases to downgrade the producers' role in international politics.
- Maxim 9 Subjective assessments of the actors' interests, identities, and expectations are needed to compensate for the ethnocentric perspective of almost all current research.
- Maxim 10 Shared operational rule structures must be distinguished from shared goals and objectives, e. g. while MNCs may be "tax collectors" for the producers, there is not necessarily collusion.
- Maxim 11 Important historical events and developments must be specified.
- Maxim 12 Alternative regime designs are needed to place prevailing patterns in perspective and point to alternatives not intuitively obvious.
- Maxim 13 Analysis of producer/MNC/consumer transactions, in the 1950's and on, is a necessary prelude to designing alternative futures.
- Maxim 14 The design principles looking to alternative regimes ought to be predicated on alternative definitions of "reality" with their implications explicitly articulated.
- Maxim 15 Delineating the requisite conditions for alternative regimes must take account of natural and social environments and the options available to each state.

- Maxim 16 The design must ensure that, at any point, developments can be examined for their effect on prevailing regimes and, by inference, alternative regimes.
- Maxim 17 The study of energy relationships needs to take into account efficiency, autonomy, and the capability attributes of the actors and the prevailing quasi-regimes.
- Maxim 18 The opportunity costs of alternative arrangements for each nation must be made explicit.
- Maxim 19 As conditions change, a clearly specified mix of judgmental, rational and causal assessments is critical.
- Maxim 20 Public debate should be encouraged on evaluation, assessment, design, and institutional issues.

D. Generalizing the Above Approach

The methodological maxims can serve as a relevance checklist in reviewing or formulating interdependence research.

There is need for more vigorous analysis along these lines of other commodity flows, particularly of minerals. Information and resource flows in the scientific and technological areas also need study.

In sum, this volume recommends the consistent application of a multi-faceted, design-oriented approach to the analysis of partial global interdependencies.