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# *Towards a Forecasting Model of Energy Politics: International Perspectives*

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We should have learned from Vietnam that it is easier to get into a war than to get out of it. I am not saying that there's no circumstance where we would not use force. But it is one thing to use it in the case of a dispute over price, it's another where there's some actual strangulation of the industrialized world.

Henry Kissinger, in  
an interview in *Business  
Week*, January 1975.

The U.S. has a right to put forward [i.e. oil strangulation] as a problem tied to human civilization. But consider: Other people are being strangled by hunger. . . . The U.S., in the name of the industrialized world, demands a guarantee of obtaining a stream of oil. All right. We also ask these countries not to strangle other countries with food problems. Oil is available; it is even in surplus. You are aware of it, President Ford is aware, Kissinger is aware. You are trying to limit consumption by imposing a duty on the import of oil. So I don't see how there could be a state of strangulation.

Houari Boumediene of Algeria,  
in an interview with *L'Humanite*,  
1975.

This paper reports ongoing research on international energy problems supported by the National Science Foundation (RANN), and draws upon a more detailed report, *Energy Problems and International Politics: A Model of Exchange, Price and Conflict* (M.I.T.: Center for International Studies, 1976). This paper was presented to the meetings of the International Studies Association, Toronto, Ontario, February 25-27, 1976.

Almost everyone recognizes an energy problem but uncertainties remain about its political and economic implications, both domestic and international. Indeed, there is disagreement on the extent to which it is a crisis. The spectrum of opinion ranges from those who argue the present situation is due largely to shortages of supplies and impending depletion of oil reserves (Akins 1973), to those who maintain the crisis is artificial, created mainly by induced departures from perfect market conditions (Adelman 1972). Both groups agree the United States and the industrialized world face a problem, but the definition and solution of the problem remain much debated.

The unprecedented rise of energy consumption over the past few years, coupled with an increasing reliance on imported fuel, have rendered the United States particularly vulnerable to external pressures. The oil embargo of October 1973 was a dramatic demonstration of the vulnerability of an industrial society to the denial of a critical source of energy. While the motivations for the embargo were largely political, the economic implications persist and the possibility of similar events in the future cannot be discounted. The maintenance of high petroleum prices through the cohesion among producers, coordination of production cutbacks and, possibly, allocation of market shares, provides the United States with further obstacles to the unimpeded access to petroleum imports.

The severity of this situation has prompted a series of responses, most notably Project Independence which seeks self-sufficiency by 1985. A recent report from the National Academy of Sciences points to the undue optimism of such calculations (Gillette 1975). Regardless of the precise figures, it is clear that major consuming countries are encountering significant problems in efforts to meet domestic energy needs and that continued reliance on external sources will persist, at least over the coming decade.

In the absence of global policies designed to regulate: (1) exploration for, and extraction of, scarce resources; (2) economic exchanges between producers and consumers; (3) consumption and production policies for importers and exporters; (4) national growth policies and economic development; and (5) orderly technological developments and advances—it is likely that disputes between importers and exporters of energy resources will continue and the use of force will become increasingly probable. There is no precedent without retaliations, nor are there any precedents for the emerging strength of a cartel for a resource as crucial as petroleum.

The common predicament is this: How to meet the continued demand for energy resources without generating political, economic, or environmental externalities which could lead to large-scale international conflict. Perceptions of "strangulation" may be sufficient to impel a major consumer to use force. When vital national interests are at stake, policy options that are ruled out under other conditions may become increasingly attractive.

Prevailing analyses of the energy crisis focus primarily on the problems of consumer countries and tend to neglect the interdependence between requirements of consumers and demands of producers. Few studies have examined energy transactions systematically, and insufficient recognition is given to international consequences of national policies. This study does not seek to assign blame or responsibility for the current crisis, but to isolate the

international aspects and to point to interrelationships between consumer perceptions and problems and producer reactions and responses, and to their effects upon international economic transactions. We seek to define the present crisis in ways that assist in identifying the potential consequences of alternative policies to solve the common predicament and to isolate the implications of options for conflict and violence among nations. Secretary Kissinger is not alone in viewing force as a viable policy option; it may assume greater prominence in the event of another embargo.

### **1. The Problem: Resource Scarcity and International Conflict**

The United States is the world's largest producer of energy but it is also the largest consumer. Even with its favorable production/consumption position relative to other advanced societies, it will not become self-sufficient by 1980 or even 1990. Policies designed for self-sufficiency if implemented today would not reduce the United States' vulnerability to external impacts in the foreseeable future. There will be a 15–20 year lag during which the United States will share the same problems of the other consumer countries.

The generic problem facing all consuming nations is to make an orderly transition—with a minimum of economic, political and social dislocation—from a past characterized by relatively few constraints on energy utilization, to an immediate future of increasing economic, environmental and political constraints. This transition period is one of adjustment in demand, supply, and price and will persist well past the turn of the century until alternative sources of energy become commercially viable. The constraints on energy consumption are manifested in various ways, and prevailing views of the energy crisis pay insufficient attention to the multiplicity of political and economic factors which make it difficult for previous—or even current—patterns of consumption to persist in the future.

The resources available to a nation greatly affect its involvement in international politics and the types of interactions with other states (Aron 1966, 243–78). Many violent clashes can be traced to resource conflicts (Choucri and North 1975). A state will seek to import resources if the total perceived costs (including price, foreign exchange effects, military implications, environmental impact, and so forth) are comparatively acceptable. A driving motivation is to close the gap between domestic production of some resource and its consumption. For some nations the gap is always large, due to limitations of internal production or large consumption, for others the gap is small. But how this difference is perceived by different governments will dictate the policies adopted. Increasingly, foreign policy becomes an extension of resource politics. Nations are beginning to view the meeting of their resource needs as a major objective of foreign policy. With the possible exception of the Soviet Union, the advanced countries all depend upon outside sources of energy. This situation may lead to competition among them for assured sources of supply. Political disputes have emerged regarding relations with oil producers, and arrangements for assuring access to pe-

troleum or for attracting investments of oil revenues in their own economies. This situation must be placed in the context of the broader energy context and the anticipated evolution of the crisis in the future.

Figure 1 describes the energy problem in terms of growth in demand, the reliance on petroleum, and developments of alternatives. Demand for energy will continue to grow over the next 3 to 5 years; but as conservation policies begin to take effect, demand may gradually stabilize. Beyond 2000, the commercial availability of alternative energy sources will accommodate the gap between demand and available alternatives. But between now and 2000, the difference between demand and the availability of conventional sources—most notably petroleum—defines the magnitude of the energy problem for the major consuming countries (Naill, Miller, and Meadows 1974).

The immediate issues involve access to, and availability of, petroleum and natural gas. Nuclear energy and coal are not viable commercial substitutes. The production of petroleum and natural gas from domestic sources declined by about 5% last year. Natural gas accounts for 32% of the United States power system today and it is being depleted much faster than oil. Assuring access to petroleum necessitates reliance on imports or substantial reduction of consumption. If policies designed to reduce consumption are ineffective, the use of external sources of petroleum will remain as the only option for the immediate future.

Cohesion among the producers of energy resources, regional political conflicts, embargo possibilities, limitations of production schedules, and increased prices of energy imports are all factors that make consumer countries vulnerable. Unless there is agreement between producer and consumer countries on these factors, the increasing dependence of the consuming countries on external energy sources and of the producing countries on petroleum revenue and foreign technology confronts both with a common predicament. Any stable solution to their individual problems may require joint policies and shared costs and benefits.

From a global perspective, several problems exacerbate the dilemma confronted by consumers, producers, and the multinational petroleum corporations: (1) Increasing dependence on external energy resources is likely to worsen international tensions by placing demands on resources that may

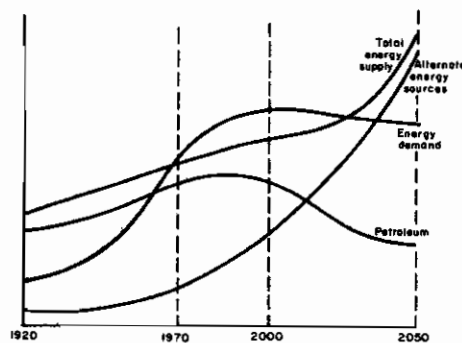


FIGURE 1. THE FORECASTED ENERGY PROBLEM

eventually become scarce. (2) The large-scale transfer of revenues from consumers to producers in payment for imports will increasingly place pressures upon existing international financial institutions that are not equipped to process or handle funds of such magnitude in a short period. (3) As non-renewable resources are depleted, the costs of production and imports will increase. (4) Oil and gas are finite with clear depletion horizons. Everyone is confronted with the problem of developing alternative energy sources. (5) Since the poorer states cannot accommodate to rising prices, there will be greater international inequalities. (6) Consumers, producers and managers are interdependent. The policies and priorities of one party are the constraints of another.

At least six problems can be identified from the perspective of the advanced consumer countries: (1) Increasing imports will accentuate dependence on the production schedules of the producer countries; these schedules will be determined more by the producers' domestic political and economic policies than by the requirements of the consumers. (2) The growing volume of international financial transactions and the enlarged level of short-term deposits will require added instruments for insuring the stability of Western financial institutions. (3) Unstable oil import prices will reduce incentives for investments in the development of alternative sources of energy. (4) Increasing dependence on imports may endanger access to critical fuels for military requirements and increase overall strategic vulnerability. (5) The short-term problem facing an importing country is to fill the gap between domestic resource production and desired consumption by maintaining a satisfactory level of imports on acceptable economic and political terms both in the short and long run. (6) Policies designed to acquire energy resources at low prices may stimulate short-term economic growth and reduce unemployment, but may have high political costs, and/or increase a nation's strategic vulnerability.

For the poor consuming countries of Asia, Africa, and Latin America, the problems caused by impeded access to energy resources or by rising prices are extensive. Their development plans will invariably be affected as will their ability to obtain food and other scarce goods. Problems posed by potential energy shortages simply accentuate those occasioned by rapid population growth.

At least six problems can be identified from the producing countries' perspective: (1) Increasing production of energy resources may exceed existing capabilities to absorb revenues from added exports. The result may be economic dislocations, domestic dissatisfaction, and possible political instability. (2) The potential entry of new producers into the international market may create pressures to reduce prices and increase investments in alternative energy sources. (3) To counter such pressures, cutbacks in production may be instituted which could create international tensions. (4) Any policies designed to reduce production will be perceived as threatening by the consumers, possibly analogous to economic warfare. (5) Developing policies for external investments of revenues from exports will necessitate investments in the economies of consumer countries. This situation will lead to further financial dependence upon the consumers. (6) Producer countries seek to

increase their industrial development, delay the depletion of domestic resources, and increase investments in foreign economies, all in order to develop a future non-oil source of income. Yet policies designed to conserve resources by initiating a cutback of production may reduce the accumulation of development capital.

The producers must design policies to meet seemingly conflicting objectives of conserving their resources, increasing their revenues, and discouraging the consumers from large-scale investments in alternative sources of energy.

Several problems can be identified from the perspective of the multinational energy corporations: (1) Increasing dependence of the consumers on external sources may cause them to seek greater control over resource management by placing restrictions on the multinational corporations' extraterritorial status and controls on their investments in exploration and development. (2) These restrictions may signal a larger role of consumer governments in the policies of the multinational corporations propelling the producers to greater controls over multinational assets, through nationalization, forced sales, or other procedures. (3) Increasing taxes by producing governments beyond some threshold may reduce the multinationals' profits. (4) Reduced profits for the multinationals may decrease incentives for investments in exploration and development. (5) Reducing exploration and development investments will make it difficult for the managers to have access to new sources of energy. (6) Instability and uncertainty will prevent future corporation investment. If uncertainties and risks are regarded as too high, future action may be inhibited. (7) Over the long run, the multinational corporations are confronted with the eventual depletion of non-renewable resources. (8) They will increasingly be confronted with the problem of safe-guarding their role as system managers and being forced to accept investment, tax or other policies that are not perceived as markedly threatening to either producers or consumers.

Decisions that generate positive, short-term consequences (such as an acceptable price of imports) may result in negative outcomes in the long run (such as worsening the country's balance of payments and/or motivating the producer countries to increase taxes). There must be criteria to judge the policies of producers, consumers, and multinationals. These criteria differ among actors. From a global perspective, it is desirable to employ criteria that: (1) minimize the use of violence (since violence entails an unproductive use of resources); (2) assure access to critical resources (since without such assurances problems will persist); (3) stabilize interactions between producers and consumers (since stability reduces uncertainty); (4) introduce a degree of predictability in mutually directed policies (since uncertainty increases the probability of miscalculations).

National policies generally depend on three factors: the type and degree of information available to decision-makers; their values and goals, and those of society-at-large; and the structure of the policy process. In the area of resource policy, information is often incomplete. Further, what information there is regarding resource availability is not ordered to assist decision-makers in evaluating its significance. In addition, existing models and associated data tend to be confined to geological issues. As a result, there is



insufficient understanding of alternative policies and their interactions with policies of other states.

There are numerous options open to both consumers and producers. Consumer countries may reduce consumption; develop institutional means for accommodating surplus revenues of producers; seek a coalition of consumers and place economic and or political pressure upon producers; restrict the investments of the producers in consumer economies; accelerate investments in alternative sources of energy; or use force to ensure access to critical resources.

Similarly, producing countries may cut back production to change prices and output. Over the long run they may even develop a credible military deterrence. The probability of overt conflict between producers and consumers will depend on the "mix" of policy options adopted by each. If the consumers view force as an acceptable policy and the producers opt for cutbacks in production, violence is likely. The outcome of the encounter will influence ensuing prices, the degree of petroleum availability and the extent of stability in interactions between producers and consumers.

Conflict refers to the antagonism of interests, goals, and values of competing parties and to the active response through policies to reduce the opponent's ability to pursue competing goals. Such tensions can be represented by continuous variables. Actual behavior or events that are high in hostility value may be represented as discrete, discontinuous actions which intensify underlying antagonisms. Some policies may lead to discrete actions of hostility; others may raise levels of tensions and increase the probability a conflict will result in overt violence.

Potentials for political conflict are present at every stage of exploration, investment, and import and export of scarce resources. The recent petroleum crisis illustrates the economic, political and environmental problems that can arise.

So far, scholars and policy makers have focused primarily on immediate aspects of the crisis. They tend to view events as unique and overlook the evolution of the situation. But it is necessary to look at the trends and developments in their continuous, rather than discrete, aspects.

The complexity of interdependencies requires a model that takes a global perspective and accounts for the international determinants of major economic and political costs of meeting resource demands with attendant sources of conflict; enables analysis of the consequences of potential policies for both producers and consumers; assumes a global perspective by differentiating among producers, consumers, and managers; takes into account the production process and the points influenced by producers', consumers' and multinationals' decisions; and assists in identifying conflicts that arise from policies to resolve problems confronting all parties.

## **2. A Dynamic Model of Energy Flows and International Relations**

Consumers and producers seek a set of viable policies to: provide imports to consumers without increasing their strategic vulnerability or worsening their balance of payments; meet investment requirements of producers; assure investments in exploration and development of future capacity; pre-

vent the rapid depletion of scarce resources; and evolve a stable price structure. The need to develop such policies will persist as long as imports are used to satisfy a large fraction of domestic energy consumption.

The purposes of our model of petroleum flows and international relations are: (1) to determine the effects of international policies on the price and supply of oil, taking into account the consequences for producing nations; (2) to identify the consequences of alternative petroleum and price policies of producing nations and their impacts upon the consumers; (3) to determine the balance of payments and depletion effects upon producers and consumers of different exploration and investment policies adopted by multinational corporations; and (4) to identify the level of conflict likely to arise from various policies.

The model assumes a *global* perspective when examining the consequences of *national* policies. Thus, for example, policies intended to close the gap for the consumers may have an impact on the producers who may respond by initiating further policies that would confront the consumers with additional (unanticipated) economic or political problems. The model represents a generic structure of the dynamics of resource flows across territorial boundaries and of external resource acquisition, illustrated by the specific case of the United States as a major consumer, with petroleum as the key resource.<sup>1</sup> The dynamic relations should be applicable to other advanced industrial societies and, with minor modifications, to resources other than petroleum. These specifications provide the international dimension to a large-scale study of the technological, economic, and environmental implications of a program to increase coal production and use in the United States.<sup>2</sup>

The *time horizon* of this model is the next 25 years, a period in which dependence on petroleum imports will almost certainly increase. This is also the period that will elapse before the United States (or any other consumer country) has obtained significant coal conversion capabilities or other less expensive alternative sources of energy.

Construction of the model requires identification of conditions that generate alternative energy demands, balances of payments, capital outflows, financial investments, prices, and exploration and development costs. These factors are likely to lead to varying degrees of future conflict between consumer and producer countries. For example, conflict between the United States and Saudi Arabia might take five alternative forms illustrated in Figure 2. Some policies may lead to increased international conflict, following time path (1); or, alternatively, they might result in a constant level of conflict, as in time path (2); or they may lead to an increase in conflict, a leveling off, then a decrease, as in time path (3); or they may increase rapidly and then drop off sharply, following the trend in (4); or they may result in a decline of conflict, following time path (5). The same time patterns might be

<sup>1</sup>A generic structure is one that includes the relationships involved in the general class of problems. It provides useful information on all consumer countries with external resource dependence and their interactions with producer countries, but not complete information on any one country.

<sup>2</sup>Project on Long Range Resource Availability in the United States supported by NSF-RANN (Grant No. GI-34808X), under the direction of Dennis L. Meadows, Dartmouth College.

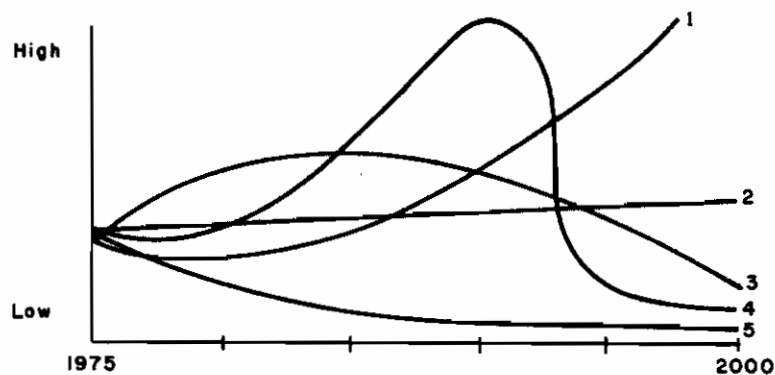


FIGURE 2. FIVE ALTERNATIVE BEHAVIOR MODES FOR CONFLICT BETWEEN TWO COUNTRIES

observed for the behavior of the consumer's oil import demand, balance of payments, strategic vulnerability, exploration and development costs, or of the producer's investments abroad, industrial capital and so forth.

Current projections of increasing energy demand in consumer countries estimate a rise in imports, with initial increases in prices, or growing substitution availability, and decreasing strategic vulnerability (U.S. Senate 1972), as illustrated in Figure 3. The Ford Energy Policy Project forecasts in one scenario a growth in demand to twice the current levels (Ford Foundation 1974). Given limited oil and gas reserves, increased demands must be met through imports and substitutes. Both of these sources will become increasingly important in any policy. An immediate consequence of resource demand will be an increase in imports, with an eventual leveling off due to substitutes. Increasing availability of substitutes would increase the country's strategic vulnerability and also lead to a reduction of prices. Over the long run, depletion will set in and the need for substitutes will become increasingly critical. Whether imports continue to rise, whether prices decline, or whether strategic vulnerability decreases are major questions we address. These is-

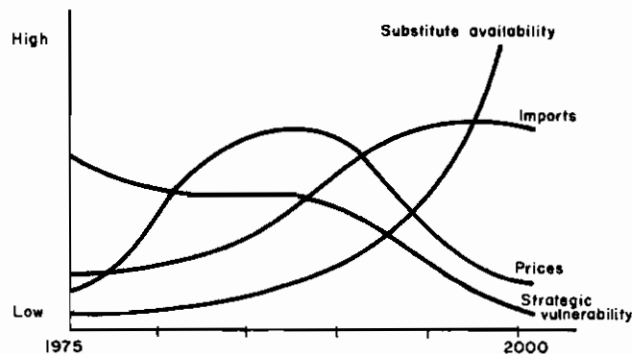


FIGURE 3. SOME CONSEQUENCES OF CONSUMER RESOURCE DEMAND

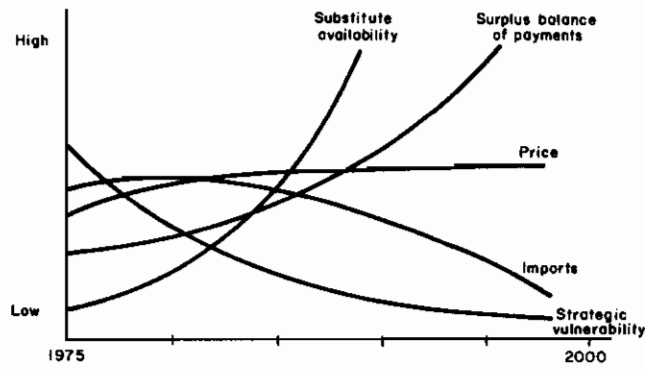


FIGURE 4. EQUILIBRIUM CONDITIONS FOR A RESOURCE IMPORTER

sues are important until alternative sources of energy become commercially viable.

A situation more desirable to the consumer is shown in Figure 4. This situation is one in which the price of petroleum remains fairly stable, where the dependence on imports would decline gradually, where the importer's balance of payments position would improve accordingly. The rapid availability of substitutes to petroleum would also be an important feature of such a situation particularly since it would result in the decline of the importer's strategic vulnerability.

From the perspective of producing countries, a stable and preferred situation is illustrated in Figure 5. Desired conditions for the producer are ones in which there is increasing repatriation of investment profits, rising domestic industrialization, a gradual decline in resource reserves and a gradual but steady rise in price. Despite the sharp increases of the past two years, the stabilization of prices to a mutually agreed level is desirable to exporting countries. The more stable the price, around an agreed figure, the lower is the probability that force would be employed in any future dispute between producers and consumers.

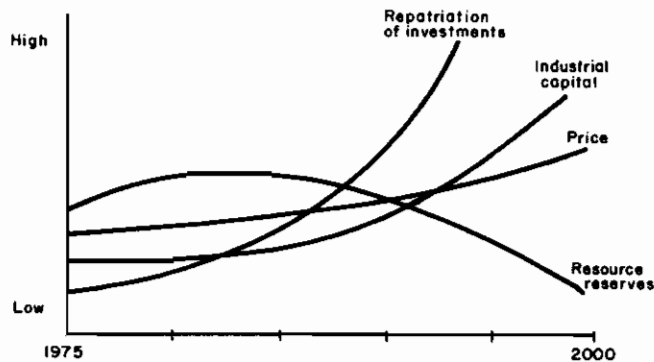


FIGURE 5. EQUILIBRIUM CONDITIONS FOR A RESOURCE PRODUCER

In the event of conflict between producers and consumers, instruments are available to each with varying degrees of potential effectiveness, and varying implications for the probability of violence. The consumer countries can: freeze foreign assets of producer countries; place restrictions on trade in their export commodities; reduce or withdraw technical or military assistance; send troops to occupy oil fields. On their part, the producer countries can: unilaterally withdraw their assets from Western financial markets; cut-back production; initiate a selective, temporary oil embargo; announce cut-backs or embargo with no time limit specified; increase prices; boycott third parties.

The multinational corporations are confronted with different problems and concerns. For them, desired conditions are illustrated in Figure 6. They seek to increase profits while decreasing costs, preferably maintaining them at a low level, and reducing investments in petroleum development and exploration without decreasing production capacity. The corporations are becoming increasingly vulnerable to the actions of producers or consumers. Since each views the multinationals as "agents" of the other, the corporations' extraterritorial status is becoming threatened, and the instruments available to protect their status are increasingly ineffectual.

In the event of conflict between producers and consumers, a varied set of policy instruments are available to the multinational oil companies, including: refuse the use of tankers; refuse to produce; divert oil shipments; incapacitate capital; expand alternative production sources; increase investment in alternative energy sources.

Figures 4, 5, and 6 illustrate an incompatible set of desired outcomes, and this inconsistency is likely to give rise to conflict among producers, consumers, and multinational corporations. Alternative policies may lead to varying degrees of conflict, as illustrated by the time paths of Figure 2. At the global level, it may be that the least conflictual situation would be one in which there is (1) a gradual rise in consumer imports and then a leveling off, (2) stable prices, (3) gradual repatriation of investment by producer countries, (4) gradual decline in depletion, (5) gradual increase in substitute availability, (6) improvement in the balance of payments situation for the consumers, and

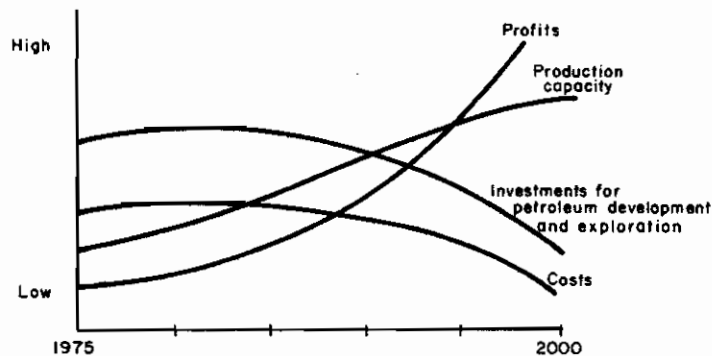


FIGURE 6. EQUILIBRIUM CONDITIONS FOR RESOURCE MANAGERS

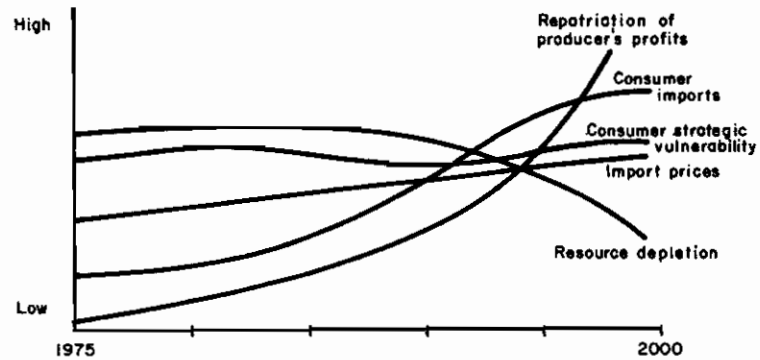


FIGURE 7. FIVE REQUISITES OF GLOBAL SYSTEM STABILITY

(7) stabilization of development and exploration. Figure 7 illustrates five requisites for system stability at the global level.

To some extent producers and consumers face mirror-image problems. For example, the rising dependence on external resource imports leads to a balance of payments problem for the consumer countries and, by extension, a problem of absorbing export revenues for the producers. So, too, the monetary policies of the producers will affect the consumers in that the former are likely to invest in the consumers' economies. A decision to continue production is, almost inevitably, a decision to invest overseas (Choucri 1976).

### 3. Model Description: A Summary

Figure 8 is a simplified causal loop diagram of the important relationships governing petroleum transactions and international relations. A brief discussion of the structure of the model will illustrate the underlying dynamic interdependencies.

The model behavior is strongly influenced by the consumer's demand for petroleum. This demand is a function of price which also bears upon the

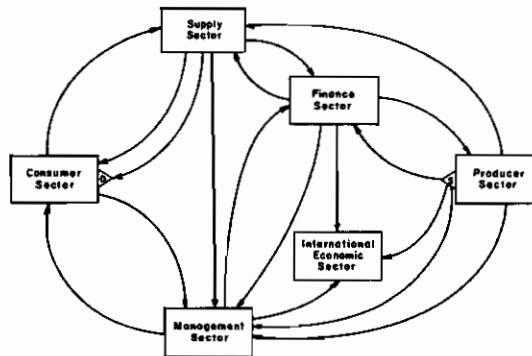


FIGURE 8. SIMPLIFIED MODEL OVERVIEW OF MAJOR CAUSAL LOOPS

availability of substitutes. The difference between domestic production and consumption determines the consumer's demand for imports.

Actual levels of petroleum imports are set by consumer demand, oil prices, and the production decisions of exporting countries. There is a physical constraint on production imposed by geological availability. Investment in exploration and development is required to extract petroleum. Major sources of such investment are profits accruing to the multinational corporations from sales to the consumers. These profits depend upon oil price, production costs, and sales volume.

As specified in the model, part of oil company earnings go to the producer governments as taxes and royalties. This petroleum income, as well as development priorities and levels of industrialization, determine the producer's distribution of receipts among development investment, imports, and investment abroad. The producer's investments abroad help offset the consumer's oil import expenditures and reduce the consumer's balance of payments deficit. To the extent that the producers invest their income, they directly influence the consumers' balance of payments.

These relationships influence the price of petroleum. This price is set by development and exploration costs, production costs, profit margins of the multinational corporations, and the producer's taxes and royalties which presently account for the largest fraction of price. The determination of these taxes and royalties (an exogenous variable in Figure 8) results from a complex balancing of demand and supply, preferences for conservation, estimated future income requirements and the other political and economic relations described earlier.

This model represents an integrated conceptual framework for thinking about our common resource predicaments. It includes the structural factors that decision-makers need take into account in the formulation of energy policy. To be useful, it must be employed as a simulation model to examine the consequences of alternative assumptions about energy demand and international relations, and the consequences of alternative policies. The goal of the model is to reproduce the behavioral modes described earlier and to identify appropriate policies. This model adopts a systems view of energy issues and is designed to assist in the identification of the unanticipated consequences of alternative policies, as well as the long term implications of short term options, and the reverse. This view of energy problems takes into account the priorities and preferences of all major actors and seeks to identify the consequences of their interactions and of the policies designed to alleviate the problems of one party or another. Such a systems perspective will assist in avoiding the statecentric distortions inherent in prevailing discussions of United States energy policy.

This model, illustrated in Figure 9, is composed of six sectors, together depicting generic processes of international energy transactions:

- (1) The *supply sector* provides the core of the model and represents the investment in petroleum discovery and production.
- (2) The *oil management sector*, bound closely to the supply sector, models the factors that generate price and the major investments of the

multinational corporations in development and exploration, as well as the reinvestment versus the repatriation of profits.

(3) The *finance sector* represents the factors that produce the profits of the multinational corporations and the factors that produce the development and exploration investments.

(4) The *producer sector* generates the investments of the oil exporting countries and their demands for commodity imports. This sector also models the process of recycling surplus petroleum revenues.

(5) The *consumer sector* represents the import demand of the oil importing nations and the monitoring mechanisms for calculating vulnerability to and dependence upon external sources of supply.

(6) The *international economic sector* performs essentially accounting functions by calculating the balance of payments of the consumer countries and the recycling activities of the producing states. It is a major linkage, accounting for import demands of consumer countries, the multinational corporations' calculations and the investments of the producer countries.

Imbedded in energy transactions are fundamental political and economic problems that could lead to overt conflict. It is important to understand how energy flows harbor violence among nations and to appreciate how policies designed to solve the predicament of the United States may be counter-productive, giving rise to unanticipated conflicts. The lessons will be of assistance in confronting problems of access to other resources.

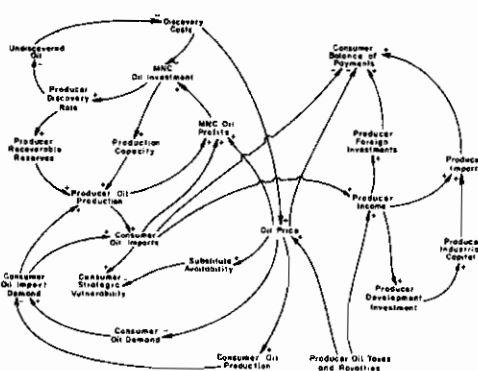


FIGURE 9. SECTOR LINK DIAGRAM

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