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BACKGROUND PAPER NO. 16

U.S. Raw Materials Policy: Problems and Possible Solutions

December 28, 1976

U.S. RAW MATERIALS POLICY: PROBLEMS AND POSSIBLE SOLUTIONS

The Congress of the United States
Congressional Budget Office

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PREFACE

The security of raw materials supply is not a new concern for the Congress. Since 1939, the United States has maintained stockpiles of critical materials. The Arab oil embargo of 1973 focused new attention on the problems of raw materials supply; since that time there have been repeated calls for a "national materials policy." In December, 1976 the Congress is to receive the report of the National Commission on Supplies and Shortages, and in March, 1977 negotiations on international commodity agreements are scheduled to begin under the auspices of the United Nations Conference on Trade and Development. The domestic and international importance of these events appears sufficient to guarantee that the Congress will continue to be concerned with raw materials supply.

This Background Paper is intended to outline the major problems of raw materials supply and to discuss various methods available to the Congress for dealing with these problems. A more detailed treatment of specific options in this area (particularly international commodity agreements) may be found in Commodity Initiatives of Less Developed Countries: U.S. Responses and Costs, a Budget Issue Paper to be published by the Congressional Budget Office.

This paper was prepared by C.R. Neu of the National Security and International Affairs Division of the Congressional Budget Office (CBO), under the direction of Lawrence G. Franko and John E. Koehler. The author wishes to acknowledge the assistance of Lawrence H. Oppenheimer of the CBO Natural Resources and Commerce Division and Robert D. Reischauer, Special Assistant to the Director. The paper was edited by Patricia Johnston, and the several drafts were typed by Nancy Swope.

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Director

December 1976

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SUMMARY

The Arab oil embargo of 1973 served as a stark reminder to industrialized nations that interruptions in the flow of raw materials could place serious burdens on their economies, on their internal political systems, and on their relations with other nations. Coupled with less severe disturbances in the commodity markets, the embargo prompted many observers to call for a serious rethinking of policies designed to insure the dependable supply of essential materials. In December, 1976, the report of the National Commission on Supplies and Shortages will be submitted to Congress, and in March, 1977, negotiations on international commodity agreements are scheduled to begin under the auspices of the United Nations Conference on Trade and Development. These two events suggest that issues of raw materials supply (with a potentially large impact on the federal budget) will be of concern to the 95th Congress.

Since the end of World War II, U.S. concern with the problems of materials supply has gradually changed focus. The traditional view has emphasized preparations for the United States to survive an extended interruption of the physical flow of raw materials brought about by hostile action. This view of the problem led to stockpiling large quantities of materials for which the United States was highly dependent upon imported supplies. These stockpiles were for use in national emergencies only, and were not to be used for "economic" purposes.

Lately we have seen that there are other problems of commodity supply. Spot shortages and rapid price changes can disrupt the planning essential for the running of a highly industrialized economy. Unstable commodity markets can affect the entire economy, sometimes producing unpredictable shortages or price changes in markets for processed goods. Although the direct impact of commodity price

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changes on the general price level is not great, the effect of these price changes in highly concentrated industries and on national fiscal policy can sometimes be quite pronounced. A materials policy focused on alleviating short-term problems would have to include provisions not only for commodities imported to the United States, but also for those produced domestically whose markets are particularly volatile.

In addition to domestic effects, the international implications of uncertain supplies are of concern in the United States. The economies of our allies are more vulnerable to supply disruptions than is our own and U.S. economic and foreign policy interests depend to some degree on the continued health of these economies. In addition, periods of tight supply can place industrialized nations in the position of competing for scarce resources. If this competition forces these nations to seek independent solutions, the common interests of the alliance may suffer.

Although the recent dramatic rises in commodity prices were due to the simultaneous occurrence of several unusual events, there is reason to think that some of these events could recur, causing further problems. In addition to natural variations in supply, wars and political unrest in producing nations must be expected periodically to reduce supplies. The short-term exploitation of monopoly or near-monopoly positions by these countries is not out of the question. Closer links among the developed economies can be expected to cause further problems as these economies expand and contract in unison in the future.

Factors not related directly to the supply of and demand for commodities also played a part in recent price fluctuations. The failure of primary processing capacity to keep up with industrial growth, increased speculative activity in the commodity markets, and a general flight from currency all contributed.

Several alternatives are available for dealing with the unstable commodity markets. Because the causes of instability are diverse and the results widespread, none of these will be appropriate in all cases. Some have an impact on the federal budget and others will not. The most often suggested are as follows:

Stockpiling provides the most direct approach to assuring availability of materials. Stockpiling can be quite expensive, and there are certain to be difficulties in delineating the powers and responsibilities of stockpile managers if the stocks are to be used for "economic" purposes. Stockpiles are most appropriate for commodities whose supplies are susceptible to easily identified fluctuations. For the most part, this would suggest stockpiling agricultural products and commodities likely to be cartelized.

Price controls are the most direct means of restricting price fluctuations, but have some important limitations. To be effective, they will usually require accompanying export restrictions. They would be most effective when applied to commodities produced or processed in highly concentrated industries or to commodities in which the United States is nearly self-sufficient.

Export restrictions can produce diplomatic tensions, particularly if enforced against allies. They are, however, particularly attractive in some circumstances when foreign demand is perceived to be increasing U.S. prices.

Trade agreements concluded in coming years are likely to be multilateral rather than bilateral, with producing and consuming nations participating. Most proposed agreements involve the establishment of stockpiles to stabilize prices. Agreements are likely to come slowly because of the difficulty of reconciling conflicting interests of participants over management, control, pricing, and location of the stocks.

Policies toward private firms can have effects on materials supply. Among the most important of these policies are the tax treatment of windfall profits, the regulation of multinational corporations, and anti-trust provisions affecting the ability of U.S. firms to bargain as a unit with supplying nations.

Rationing and allocation schemes are usually viewed as last resorts in dealing with supply shortages. They are most appropriate when supply disruptions are viewed as temporary and it is thought the pre-shortage conditions will once again prevail.

Development of alternative sources of supply may reduce the vulnerability of consumers to cartel actions, but may do little to reduce fluctuations arising from other causes.

Most problems of materials supply are due not to insufficient production, but to sporadic interruptions of production or distribution. New sources of supply will not necessarily be immune to these interruptions.

Security of supply is not the only goal of U.S. economic and foreign policy. Attention to supply problems will inevitably involve some conflict with other, sometimes more important goals.

CHAPTER I INTRODUCTION

The Arab oil embargo of 1973 served as a stark reminder to industrialized nations that interruptions of the flow of raw materials could place serious burdens on their economies, on their internal political systems, and on their relations with other nations. Lesser signals of impending trouble in world commodity markets had been present even before the oil embargo, and the events of the winter of 1973-74 served to redirect attention to these signals: the dramatic rise of commodity prices in 1973 and 1974, the increased militancy of some Third World suppliers of raw materials, and the slowly growing realization that total world resources are indeed finite. While these latter problems may not have aroused serious concern at other times, many observers (with sensitivities heightened by the very real impact of the oil embargo) began to call for a serious rethinking of developed nations' policies for maintaining a dependable supply of essential commodities. In December, 1976, the report of the National Commission on Supplies and Shortages will be submitted to Congress, and in March, 1977, negotiations on international commodity agreements are scheduled to begin under the auspices of the United Nations Conference on Trade and Development (UNCTAD). These two events suggest that issues of raw material supply (with a potentially large impact on the federal budget) will be of concern to the 95th Congress.

Concern in the United States over the supply of raw materials is not, of course, a new phenomenon, although over the years our perceptions of the major problems of materials supply have changed. As early as 1939, Public Law 75-117 required the stockpiling of "strategic and critical" materials whose conditions of supply were inadequate to meet "the industrial, military, and naval needs of the country for a common defense" and to "thereby decrease and prevent wherever possible a dangerous and costly dependence of the United States upon foreign nations for supplies of these materials in times of national emergencies."

The provisions of the Act were amended in the Strategic and Critical Materials Stockpiling Act of 1946, but the focus remained the same: defense production. Materials could be released from the stockpile only "on order of the President at any time when in his judgment such release is required for purposes of the common defense or in time of war or during a national emergency with respect to the common defense." This same orientation towards meeting the requirements of defense production is found in the Defense Production Act of 1950. While this Act did not specifically require stockpiles of materials, it did authorize the Department of Defense (DoD) to buy materials essential for defense production if such purchases were required to maintain productive capacity in the United States, and in practice this Act allowed the accumulation of materials inventories in excess of those already mandated by the 1946 Act. More generally, the Act was intended to provide for the "expansion of productive capacity and supply beyond the levels needed to meet civilian demand, in order to reduce the time required for full mobilization in the event of an attack on the United States." Although the size of government holdings has been decreased in recent years, the inventories accumulated under the provisions of these two Acts still represent almost all official stockpiles of critical materials.[1] Until the passage of the Energy Policy and Conservation Act in 1975, which mandated the creation of a strategic petroleum reserve, these Acts, still in force, provided the only legislative authority for government stockpiling of nonagricultural commodities.

By 1951, concerns over materials supply had broadened somewhat, and President Truman appointed the President's Materials Policies Commission (the Paley Commission) to study "the broader and long-range aspects of the nation's materials problems." Even at this time, however, the deliberations of the Commission were dominated by the increased materials requirements and subsequent price rises associated with the Korean War.

By 1970, the emphasis had shifted away from consideration of national defense to concern over the environment. The National Materials Policy Act of 1970 was enacted to "enhance environmental quality and conserve materials by developing a national materials policy to utilize present

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1. There is an Interior Department stockpile of helium purchased under the 1960 Helium Act Amendments.

resources and technology more efficiently, to anticipate future materials requirements of the Nation and world, and to make recommendations on the supply, use, recovery, and disposal of materials." The only consequence of this Act was the formation of the National Commission on Materials Policy, which devoted its attention primarily to longer-term concerns of environmental quality and materials availability rather than to problems of near-term interruptions in supply.

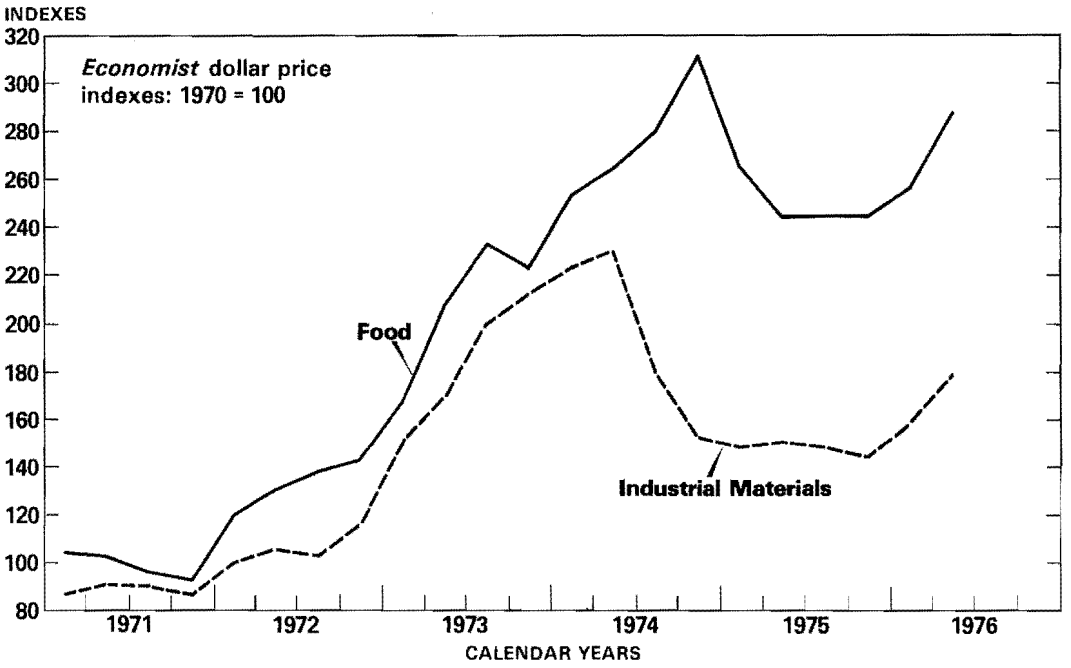
Today, the sources of concern seem to have changed again. Since the end of 1972, international commodity markets have been in an unprecedented state of flux. The Economist index of industrial materials prices more than doubled between the last quarter of 1972 and the second quarter of 1974, and then fell by some 34 percent by the end of 1974. Now industrial materials prices are once again on the rise. Agricultural prices have shown a similar pattern, although they did not fall off as sharply in 1974 as did industrial materials prices (see Figure 1). During this period, short-term shortages of many commodities were reported or feared, and many businesses began to accumulate additional holdings of materials to reduce vulnerabilities to shortages. In attempts to counter rising prices and potential shortages, the U.S. Government instituted a variety of price controls and export restrictions which caused controversy at home and consternation abroad.

The problems of materials supply for the United States in recent years (with the exception of the oil embargo) were not the sort that policy had been designed to handle. There were no major interruptions of supply due to hostile action; the world had not reached the limits of its resources; we were not faced with grave environmental crises. Instead the United States had to deal with wide price variations, irregular supply conditions, strained relations among trading partners, and questions about the appropriate roles of the government and the private sector in managing the economy.

These concerns prompted a search for a new "National Materials Policy" that had a broader perspective than had the traditional policies. The Defense Production Act Amendments of 1974, which established the National Commission on Supplies and Shortages, contain for the first time, direct legislative references to the effects of supply interruptions on the functioning of a peacetime economy. Among the findings reported in the amendments is

Figure 1

RECENT COMMODITY PRICE MOVEMENTS



Source: *The Economist.*

that "shortages of resources and commodities are becoming increasingly frequent in the United States, and such shortages cause undue inconveniences and expense to consumers and a burden on interstate commerce and the Nation's economy." The report of the latest commission is to be submitted to Congress in December of 1976 and may be expected to form the basis for proposals for a new national materials policy.

The principal component of current U.S. materials policy is the Strategic and Critical Materials Stockpile. Ninety-three different industrial commodities are held in these stockpiles, and the total market value of holdings on December 31, 1975, was nearly $7.5 billion.[2] Expenditures for the operation of the stockpiles are relatively small, amounting to just over $4 million during the first half of fiscal year 1976.[3] Recent recommendations by the National Security Council that these stockpiles be reconstituted to contain sufficient quanities of all materials for three years of wartime production will, if acted upon, require both acquisitions and disbursals from the stockpiles. The budget implications of these have not been calculated yet, but it is expected that a net outlay will be required.

In addition to these stockpiles, the Energy Policy and Conservation Act of 1975 mandated the creation of a U.S. strategic petroleum reserve. The Act specifies the creation of this reserve in two steps: 150 million barrels are to be accumulated by December, 1978, and by December, 1982, total stored petroleum is to reach 500 million barrels. At the current world price for crude oil of $13 per barrel, these stocks would cost $6.5 billion, not including the costs of storage facilities.[4]

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2. General Services Administration, Federal Preparedness Agency, Stockpile Report to the Congress, July-December, 1975, April 1976, p. 2.

3. Ibid., p. 6.

4. For a discussion of these costs, see Petroleum Storage: Alternative Programs and Their Implications for the Federal Budget, Congressional Budget Office, Background Paper No. 14, November, 1976.

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At present, the United States maintains no stockpiles of grain. On October 13, 1976, however, the Department of Agriculture announced the raising of grain price support levels, and as a result, government holdings may be expected to grow in the future.[5]

Present policy also includes standby authority for the restriction of exports of various commodities, although none are currently in force. Finally, research and development of alternative sources of supply (particularly in the energy field)[6] are funded under a variety of programs.

Changes in U.S. materials policies could have large impacts on the federal budget. Even under the present policy, sales from government stockpiles have produced more than $7 billion since a program of disposing of excess holdings was initiated in 1958. In 1974 government receipts from such sales amounted to more than $2 billion.[7] A recent decision (announced by the President on October 1, 1976) to revise the inventory goals for government holdings of strategic materials has resulted in an increase in the goals for 78 materials and a reduction for 10.[8] No decisions have yet been announced concerning the rate at which materials will be bought or sold in accordance with these new goals, but it is expected that there will be net purchases for the stockpile in the next several years. (At present, some materials are held in excess of the new requirements; to meet these goals additional amounts of 52 materials are required and excess amounts of 38 could be disposed of.) Estimates of the cost of constituting government stockpiles

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5. For more on this subject, see U.S. Food and Agricultural Policy in the World Economy, Congressional Budget Office Report, April 26, 1976.

6. See Energy Research: Alternative Strategies for Development of New Energy Technologies and Their Implications for the Federal Budget, Congressional Budget Office, Background Paper No. 10, July 15, 1976; and Financing Energy Development, CBO Background Paper No. 12, July 25, 1976.

7. GSA, Stockpile Report to Congress, p. 13. The Federal Preparedness Agency requested approval from Congress to sell $746 million worth of excess materials in fiscal year 1977, but this approval was not granted.

8. Ibid. pp. 5-8, and GSA News Release of October 1, 1976.

to control price fluctuations vary widely, but none appear to be below $500 million at current prices. The cost to the United States of the proposed UNCTAD Integrated Program for Commodities is estimated to be in the $200 to $800 million range.[9]

Several bills to revise current U.S. materials policies were introduced in the 94th Congress. With the notable exception of the Energy Policy and Conservation Act of 1975, none were acted on, but they do give an indication of the concerns felt by the Congress. S. 1869 (sponsored by Senator Harrison Williams) and H.R. 9597 (sponsored by Rep. Thomas Rees) offered amendments to the Defense Production Act of 1950 that would have broadened the use of the strategic stockpiles, respectively, to combat embargoes by supplying nations and to stabilize domestic industry through the purchase and sale of materials. S. 26 (Sen. Frank Moss and Sen. Clifford Hansen), H.R. 1110 (Rep. Olin Teague), and H.R. 14439 (Rep. James Symington and Rep. Charles Mosher) called for research programs to increase and stabilize the supply of critical materials. Other bills were aimed at promoting conservation (H.R. 6860, sponsored by Rep. Al Ullman) or monitoring materials availability (S. 1415, sponsored by Sen. John Tunney). One bill called for the establishment of an executive Department of Natural Resources (S. 2726, sponsored by Sen. John Tunney).

With the multiplicity of issues involved in materials supply, no single one has emerged as being the most pressing in the formulation of a new national materials policy--principally because there are many issues involved, all of which are interlinked. This inability to identify a unitary goal for national policy has often confused the terms of debate and hindered progress towards an acceptable policy. What has gradually become apparent is that the various goals of a national materials policy for the United States are sometimes in conflict with each other and with the broader goals of economic policy; no one set of policy tools can be appropriate in all circumstances. Further, world trade has reached such proportions that it is no longer possible for the United States to formulate a materials policy for itself alone; the interests of the United States extend far

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9. See Commodity Initiatives of Less Developed Countries: U.S. Responses and Costs, Congressional Budget Office Budget Issue Paper (forthcoming).

beyond its borders, and it is necessary that policies designed to protect those interests do so also.

CHAPTER II THE PROBLEM

THE TRADITIONAL VIEW

The traditional aim of U.S. materials policy, as reflected in the legislation cited above, has been to protect U.S. industry from major interruptions in the physical flow of raw materials. These interruptions have usually been envisioned as arising from hostile actions against the United States--either wars or embargoes. A policy designed to guard against this sort of threat could be quite simple. Steps were taken to ensure that the United States could supply its own needs for essential materials in the event of a supply interruption. This was done by encouraging the development of domestic production capacity for some materials and by encouraging the conservation of deposits of others. If self-sufficiency proved unattainable (or at least unattainable at a reasonable cost) for a particular material, there was no recourse other than to accumulate stocks of the material sufficient to meet national requirements for the expected duration of any supply interruption and to release these stocks only in the event of a national emergency.

Implicit in this notion of the problems of raw materials supply was an emphasis on raw materials imported to the United States, materials which might be denied to the United States in wartime. With minor exceptions (coffee, tea, cocoa, etc.), the United States is self-sufficient in agricultural products, and until recently has met most of its needs for iron ore and energy with domestic production. This left nonferrous metals and other minerals (recently including oil) as the commodities of greatest concern for the traditional materials policy. Table 1 gives an indication of U.S. dependence on imports of some minerals.

The traditional policy was also based on the assumption that the circumstances requiring the release of

Table 1. Sources of Industrial Materials Consumed by the United States (1974)

Product	U.S.	Canada	Other Developed Nations	Developing Nations	Communist Nations
Columbium	0%	1%	2%	97%	0%
Cobalt	1	1	48	50	0
Manganese	2	0	43	48	7
Chromium	10	0	44	29	17
Bauxite	12	7	18	63	0
Platinum	13	1	58	1	27
Mercury	14	29	13	38	6
Tin	16	0	5	73	6
Fluorspar	19	0	14	67	0
Nickel	28	42	20	6	4
Tungsten	36	8	17	35	4
Zinc	41	31	14	14	0
Titanium	53	20	25	2	0
Vanadium	64	0	24	7	5
Copper	80	5	4	10	1
Lead	81	5	3	11	0
Iron	83	7	1	9	0
Phosphates	100	0	0	0	0

Source: International Economic Report of the President, March, 1976, p. 96.

stockpiled materials would be unambiguous. Wars and embargoes would constitute clear national emergencies during which American industry might face starvation from lack of material inputs. Stocks were not intended for use during less clearly defined "economic" difficulties; they were not intended to be used to restrain price rises or to alleviate short-term failures of the market's allocative or distributive functions. Most importantly, stockpiles were not to be allowed to interfere with the day-to-day workings of the market.

While the intent of the strategic stockpiles has been and remains the protection of U.S. defense production, there have been occasions on which the government has been accused of using the stockpiles to achieve purely economic ends. The disposal of surplus aluminum from the stockpile in 1965 was said to have been done to reduce both the federal deficit and the balance of payments deficit.[1] In 1972 a program of stockpiling titanium was begun at a time when the U.S. titanium industry was facing a severely depressed market. Copper sales from 1964 through 1966 were made ostensibly for defense production, but served to reduce pressure on supplies for all consumers of copper. The dramatic reduction of stockpile requirements in April, 1973, was widely criticized as a budget-balancing "trick" in a time of high inflation.

Interpretations of these events will of course vary, but it is clear that any action by stockpiling authorities will have economic consequences. The laws establishing the stockpiles recognized this in requiring that buying and selling of stockpiled materials be done so as to minimize these effects. In practice, this has usually meant buying when prices are low and selling when prices are high. In this way, the stockpiles may have served a purely economic function of stabilizing commodity markets.

In recent years, the prevailing view of raw materials supply has gradually altered. As the American economy has grown and diversified, it has become apparent that the United States is highly dependent on foreign suppliers for some of its materials needs and will become even more dependent in the future. True self-sufficiency appears out

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1. For more detailed treatments of these specific cases, see An Assessment of Alternative Economic Stockpiling Policies, Office of Technology Assessment, August 1976, Appendix B.

of the question, at least within the limits of technologies currently available or clearly foreseen. At the same time, there has been a growing realization that the United States is unlikely ever again to face the prospect of a long, worldwide war. Conflicts in the future will most likely be localized (as was the Vietnam conflict) or fought and decided quickly (as a major war in Europe is usually envisioned). Indeed, the lethality of the modern battlefield is expected to be such that the military stocks of combatants will be destroyed or exhausted long before it is possible to use even those raw materials the belligerents may have on hand for war production. Partly in recognition of this fact, the requirements for the national strategic stockpiles were reduced in April, 1973, from quantities sufficient for three years of wartime production to a one-year supply.[2]

At the same time that concern over the stockpiling requirements for wartime was diminishing, the Arab oil embargo aroused renewed interest in the threat posed by politically inspired interruptions of supply. In the wake of the oil embargo, there came many predictions that oil was simply the first of a long list of commodities (bauxite is often cited as the next likely candidate) whose supply could be used as political weapons against the United States. In the years since the embargo, no major curtailments of supply have been attempted, and more careful analyses of the possibilities for politically motivated supply restrictions have suggested that there is little danger of such actions involving any commodities other than oil.

Few commodities which the United States imports are truly without substitutes, and any prolonged reduction in supply could be expected to bring about the required retooling and restructuring of industrial capacity to utilize these substitutes. In addition, the growing dependence of less developed countries (LDCs) in recent years upon the developed world as a source of foreign exchange suggests that the ability of many suppliers (even oil producers) to forego revenues during an embargo is limited. Finally, it is difficult to imagine the basis for a political coalition of the suppliers of most materials. (For example, virtually

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2. In August, 1976, the National Security Council recommended that requirements be returned to the three-year level, and on October 1, 1976, the Ford Administration announced the adoption of this recommendation.

all of the world's chromium is produced by Rhodesia, South Africa, Turkey, and the Soviet Union--unlikely partners unless Soviet influence in Southern Africa is increased.) The importance of the United States and "safe" countries such as Canada and Australia in the production of many raw materials makes it unlikely that truly effective embargoes could be imposed on the developed world.[3] There is even a growing body of opinion that holds that further political use of oil is becoming unlikely as a result of the development of new sources of supply and increasing tensions among the principal participants in the 1973 embargo.

Simply stated, it seems that the traditional U.S. concern with being able to survive extended major interruptions in the flow of raw materials may no longer be appropriate. This is not to say that there are no problems of supply facing the United States; recent events make it clear that there are many. Rather, it is to suggest that the nature of the problem is somewhat different than it was when the traditional view was formulated.

NEW PROBLEMS

The ability of producers and consumers to engage in long-term planning is essential to the operation of a highly industrialized economy. Sophisticated production methods are usually characterized by large-scale capital requirements and long lead times. Unexpected changes in the conditions surrounding production can disrupt plans already underway, and uncertainty about what conditions might prevail in the future can discourage the development of new industrial capacity. As the techniques of production become increasingly complex, the costs of adopting the wrong plan grow also. Uncertainties that can hinder the planning process arise from a variety of sources. Changes in demand for final products in the economy (brought on by war, recession, or perhaps just a change in

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3. Even these nations may not be entirely "safe." In 1970 a strike of mine workers in Canada interrupted virtually all shipments of nickel to the United States for 128 days. In 1975 Australia joined the organization of bauxite producers, the International Bauxite Association (IBA).

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the tastes of consumers) can upset elaborate production plans. Variations in environmental standards or antitrust policy can force expensive redesign of phyiscal plant or corporate structures. The uneven advance of technology itself can create new production methods which are more efficient, and hence more competitive, than older, once promising methods.

A secure supply of raw materials is also essential if planning is to be successful. Even a brief interruption in supply can reduce the productivity of workers and equipment as they stand idle at some periods and work at overfull capacity at others to make up for lost production.[4] A firm might avoid shutting down for lack of materials by maintaining an inventory of required inputs, but only at the cost of tying up resources unproductively. The more undependable the supply of raw materials, the larger the inventory that would be required and the greater the costs associated with maintaining the inventory. While the existence of substitutes for most raw materials lessens the danger of long-term interruptions in supply, it does little to ease the difficulties of spot shortages, since in the short run it is usually impossible to retool a plant to utilize these substitutes.

Not only is the availability of materials important, but so too is the price. Rapid fluctuations in prices can pose serious problems for an industry that is locked into the use of particular production techniques. Long-run price changes can be met by the adoption of alternative processes such as those adopted by electrical utility companies in the face of permanently higher prices for fuel oil. But such adaptations are time-consuming and costly. If the prices of its inputs change suddenly or fluctuate continually, an industry will find itself operating at less than maximum efficiency for most of the time. The only

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4. Not only do producers require a constant flow of materials, they often require a constant flow of very special kinds of materials. Modern plants are often finely tuned to process materials from particular sources, and slightly differing materials from alternative sources can be utilized only after major alterations of plant and equipment are undertaken. U.S. aluminum producers, for example, are reported to be dependent on particular types of bauxite ore and are unable to use other types. See "A New OPEC in Bauxite," by C. Fred Bergsten, Challenge, July-August, 1976, pp. 12-20.

way to hedge against these price changes is to buy materials in advance of their intended use (either physically or through futures markets) at known prices, again tying up resources in unproductive activities.

Besides the disruptions caused within a particular industry by variations in the conditions of supply, additional problems affecting the entire economy can arise. As production is disrupted in one sector, shortages may develop in markets for substitute commodities. If goods in short supply are needed in turn for the production of other goods, the original disruption can affect many sectors of the economy. Raw materials are by their nature inputs (either directly or indirectly) to almost every sector, and variations in raw materials prices or availability can have wide-ranging and often unpredictable effects.

A good example of such secondary effects is to be found in the behavior of agricultural markets in 1972 and 1973. Anchovy meal is a major source of livestock feed in Europe, and most of the world's supply of anchovies comes from the Pacific coast of South America. In 1972 and 1973 there were major failures of the Peruvian anchovy crop. Forced to seek other sources of feeds, Europeans turned to the United States, buying large quantities of soybeans and soybean meal. As soybean prices rose, cattle raisers in the United States and Europe increasingly switched to other feed supplements such as cottonseed oil and meal, raising the price of those commodities. High feed costs forced cattle raisers to reduce the size of herds, leading to a temporary drop in meat prices as slaughter rates increased but resulting later in higher meat prices as the supply of meat contracted.

The direct effect of increases in raw materials prices on the general price level in the United States is small but not negligible. This is because, although raw materials are direct or indirect inputs into nearly every sector, the costs of producing final goods also include the costs of labor, capital, management, and so on. Raw materials account for only a small part of the costs of production of most final goods. It has been estimated that, assuming a direct passing on of price increases, a 14½ percent rise in prices of non-food raw materials would be required to

raise the consumer price index in the United States by one percent.[5]

There are also indirect effects of commodity price changes. The major users of raw materials tend to be the primary processing and manufacturing sectors of the economy, sectors that in most cases are dominated by a small number of very large firms. When prices of raw materials rise, the prices of processed and manufactured goods also rise. Unfortunately, when raw materials prices fall, the prices of goods produced in highly concentrated sectors can be "sticky," because of a lack of competition, and can remain high. It is possible in this way for fluctuations in the price of raw materials to drive an inflationary ratchet, even if there is no overall upward trend in raw materials prices. Price increases in raw materials may also serve as highly visible rationalizations for increases in negotiated wages and prices.

Inflation induced by fluctuations in the prices of raw materials may be incorrectly interpreted as arising from excessive demand, and national governments may be tempted to respond by instituting restrictive fiscal and monetary policies . These policies could be expected to accomplish little under these circumstances except to raise the level of unemployment. Coming at a time when investment is needed to allow the shift from one technology to another, restrictive policies can slow the adjustment to a new set of prices. The fiscal policies of the U.S. Government in 1972 and 1973, for example, have been criticized on the grounds that they suffered from exactly this confusion and precipitated the recession of 1974-1975.

The traditional U.S. policy of holding large stockpiles of materials deemed essential to the functioning of the economy has not proved effective in handling short-term disruptions in the raw materials markets. Indeed, it was never intended to serve this function. The law required that the strategic stockpiles be held against a potential national emergency, and their use to counter market disturbances has not been considered proper. To deal with the market-related

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5. Joel Popkin, "Commodity Prices and the U.S. Price Level," Brookings Papers on Economic Activity, (1:1974), p. 256.

problems of today, a new sort of national materials policy will be required, one which focuses not only on major interruptions in supply, but also on short-term disruptions in price and availability.

Changing the focus of raw materials policy in this way broadens considerably the range of commodities which must be covered by a materials policy. In the older national-security/defense-production formulation, emphasis was placed on those commodities for which the United States was dependent upon foreign supplies, since there was little danger of the United States losing access to goods it produced domestically. But a policy aimed at damping short-term disruptions must recognize the fact that events in other parts of the world can cause fluctuations in the prices and supplies of domestically produced goods also. The United States is self-sufficient several times over in the production of grains, yet American consumers still suffered from the high food prices that accompanied large Soviet purchases of grain in 1973 and 1974. Estimates suggest, for example, that as much as two-thirds of the rise in prices experienced in the United States between November, 1972, and August, 1973, was due to increased agricultural prices.[6] The United States is not a large importer of fish meal, but the failure of South American catches raised the price of substitute American feed products and strained our relations with our traditional trading partners.

Critical materials were once characterized by the level of U.S. dependence on imports, the importance of the commodities to the U.S. economy, and the likelihood that supplies might be interrupted. It now seems more appropriate to identify critical materials by the volatility of international markets, the effects of price and supply variations on other sectors of the economy, and the likelihood that uncontrollable events (war, drought, embargo, etc.) could seriously disrupt markets. Practically, this requires the addition of many agricultural commodities to the list of critical raw materials, as well as some domestically produced minerals such as copper.

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6. William Nordhaus and John Shoven, "Inflation 1973: The Year of Infamy," Challenge, May-June, 1974, p. 17.

INTERNATIONAL IMPLICATIONS

Economic Effects

Disturbances in the markets for primary commodities are of concern in the United States not only because they affect the domestic economy, but also because their effects sometimes extend to the economies of other nations whose interests are allied with our own. The United States is rich in many raw materials and has an economy sufficiently diversified to overcome most short-term disruptions. The economies of our allies are for the most part much more fragile. Table 2 illustrates just how dependent Western Europe is on imported materials, and Japan is in an even less favorable position. What may be a temporary inconvenience for the United States can become a major crisis in other countries. For an example of this, one need only remember that while Americans waited in lines for gasoline in the winter of 1973-1974, people of the Netherlands gave up driving almost entirely.

U.S. interests in Japan and Western Europe are based on economic as well as cultural and philosophical ties, and anything which damages these economies threatens U.S. interests also. The effects of supply disruptions on the economies of our allies might not be felt directly or immediately in the United States. Ultimately, though, the United States stands to lose if these economies falter. Declining standards of living in allied nations may reduce the willingness of these nations to devote resources to our common defense. Discontent over economic conditions may increase the influence of political parties not committed to friendly relations with the United States. Supply shortages may force some nations into concessions to suppliers and reduce their willingness to lend political support to U.S. initiatives. (Japan's refusal to support U.S. and Israeli positions after the Arab oil embargo and the tendency of some European countries--notably France--to deal directly with Arab states are examples.) As the economies of our traditional trading partners decline, U.S. firms will have to look elsewhere for markets for their goods and for sources of imports, perhaps tying the United States more closely to less friendly and less predictable countries.

The fact that that United States is a major producer of many commodities required by our allies is not sufficient to allay their fears of supply disruptions. Events in parts

Table 2. Dependency of European/EEC Countries on Imports of Raw Materials (1972)

Product	% Dependency
Wheat	3[a]
Maize	42[a]
Rice	33[a]
Oil Seeds	100[a,d]
Cotton	100[a]
Wool	92[a]
Copper	93[b]
Lead	75[b]
Zinc	61[b]
Tin	96[b]
Bauxite	51[b]
Iron Ore	37[b]
Phosphates	99[b]
Oil	97[b,c]

Source: "Development and Raw Materials--Problem of the Moment," Bulletin of the European Communities, Supplement 6/75, p. 43.

a. Dependence of the EEC.

b. Dependence of European OECD nations.

c. The European Multinationals, Lawrence G. Franko, p.60.

d. Europe, Raw Materials, and the Third World, Commission of the European Communities, May, 1974, p. 9.

of the world other than Europe or America can strongly influence the price of U.S.-produced goods. (Soviet grain purchases are an example.) There is not even any assurance for our allies that payment of higher prices will in fact maintain the flow of goods from the United States. On occasion we have limited exports to our allies, sometimes doing harm to the long-term competitive position of American producers. As a consequence of the U.S. soybean export restrictions, Japanese interests have invested heavily in Brazilian production of soybeans in the hopes of developing a more dependable source of supply.

Political Effects

Perhaps more important than the international economic effects of supply shortages would be the political effects. During periods of tight supply, developed nations will find themselves competing with each other to obtain needed materials. If this competition prompts nations to seek independent solutions, the broader interests of the alliance could suffer. In the summer of 1973, the United States was forced by public concern over rising food prices to restrict the export of soybeans and other livestock feeds. This action was keenly felt by Japan and the Western European nations, coming as it did just when their needs for U.S. products were unusually high. (This excess demand in Europe and Japan was largely responsible for the rise in world feed prices in the first place.) A short time later, in the aftermath of the oil embargo, calls by the United States for concerted action among developed nations on energy matters were met with some opposition. In November, 1974, France refused to join with other industrialized nations in forming the International Energy Agency (IEA). Instead, the French preferred to adopt a purely national policy of conservation, development of nuclear power, and direct "dialogue" with the Third World (particularly within the Arab states). The stated French desire was to avoid the appearance of confrontation between producers and consumers, but it was widely recognized that the French objected to what they perceived as U.S. domination of the IEA. The obstacles to forming an effective consumers' block to counter OPEC were many, and it is unlikely that French cooperation would have guaranteed the success of this attempt. It is difficult to imagine, though, that this squabbling among allies did not hinder the effort.

The problems of coordinating commodity policies among developed nations will always be great. The prerogative of

each nation to control its own economic policy is jealously guarded, and to sacrifice this autonomy in order to adopt a multilateral policy would be politically very difficult. The problems faced by a democratic government trying to adhere to the principles of free international trade would be severe if such adherence meant higher food prices at home. Similarly, many governments would find it difficult to accumulate stockpiles of materials if it were known that in a crisis these stocks might be used to reduce pressure on other nations.

The United States is the world's largest consumer of raw materials, as well as its largest producer, and because of our sheer size, there is little we can do that will not have international implications. The interests of both domestic consumers and suppliers of materials are strongly represented and often inalterably opposed in the process of forming U.S. policy. Farmers demand free export of agricultural products, while industrial workers demand that U.S. grain be used to feed Americans. When left to their own devices, the large multinational oil companies provided a kind of international buffer stock of crude oil, diverting supplies from some nations to others more severely affected by the Arab embargo, but U.S. consumers demanded that these companies be required to release their stocks during periods of shortage. These conflicts will not disappear, and the implementation of a national materials policy will require not only that one be devised that will adequately treat our international concerns, but that this policy be made politically palatable to domestic constituencies.

Finally, security of materials supply is not the sole aim of U.S. foreign policy, and some conflicts with broader policy goals must be expected. Cooperation with other developed nations must inevitably lead to the strengthening of foreign enterprises that compete (and compete with unfair assistance from their governments, in the view of many) with American firms. Trade concessions can be important for diplomatic reasons, but they can have noticeable effects on domestic markets. The interests of U.S. industry in maintaining a flow of materials from some Third World countries can create embarrassing dependencies on governments that may be repugnant to U.S. ideals for other reasons. (Chile and South Africa are often mentioned in this context.)

Development assistance and direct investment in countries with the potential to supply raw materials may run counter to the stated U.S. aim of aiding the poorest people in the less developed world.[7]

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7. See Commodity Initiatives of Less Developed Countries: U.S. Responses and Costs, CBO (forthcoming).

CHAPTER III THE OUTLOOK

A materials policy designed to counter major hostile actions by other nations appears today to be outmoded or at least inadequate. This is because there seems little prospect of any hostile action severe enough or of long enough duration to require the United States to subsist on its own internal resources for more than a few months. Other disturbances in the commodity markets can cause considerable turmoil within the U.S. economy and within our political and economic alliances. There seem to be reasons to expect that these smaller disturbances will continue to occur and may, in fact, become more frequent. A consideration of some of the causes of shortages and price variations in the past few years suggests that, although a number of unusual events coincided to produce the dramatic rises in commodity prices in 1973 and 1974, many of these events could easily recur, producing further difficulties.

FACTORS AFFECTING SUPPLY AND DEMAND

There will always be unexpected natural variations in the supply of agricultural commodities. Because demand for these commodities is usually quite inelastic (that is, demand is relatively insensitive to changes in the price level), prices can be expected to fluctuate widely in the absense of buffer stocks that will make up shortfalls or absorb excesses. The trade in agricultural commodities has become sufficiently international, with few countries independent of the world commodity markets, that disturbances in one part of the world can affect prices everywhere. Recent examples of volatile price movements resulting from natural causes abound: grain prices rose dramatically in 1973 because of poor harvests in the Soviet Union and Southern Asia; sugar prices rose worldwide in 1974 because of storm damages to the Philippine crop; coffee prices rose sharply in the second half of 1975 because of frost damage to Brazilian coffee trees. Wars and political

upheavals within producing nations can interrupt production, with results similar to those produced by natural causes. Internal conflicts reduced exports of copper from Chile and coffee from Angola, while disputes with neighboring countries have reduced copper shipments from Zaire and landlocked Zambia.

Unilateral actions by supplying nations against consumers must also be expected. While the market power of individual nations may be limited in the long run, short-term gains can be realized by exploiting what amounts to near monopoly positions in some markets. Morocco was able unilaterally to increase taxes on exported phosphate rock in 1975, although there are other suppliers of phosphates (including the United States), because Morocco supplied almost the entire European market and time would be required for European consumers to establish new sources of supply. Similarly, Jamaica exploited the position of large multinational firms in 1974 to raise the taxes on exported bauxite. These multinationals had invested heavily in Jamaican production and had no alternative in the near term but to pay the higher taxes and pass the cost increases to their consumers.

The prospect of further political use of commodity supplies may be slight, but the possibility of collusion for purely economic gain remains. Some important commodities are concentrated within a few nations (see Table 3 for examples), and cartel arrangements have succeeded among nations with quite varied political aims. (Libya, Venezuela, Indonesia, and Nigeria, for example, are all members of OPEC.) The existence of organizations of producers of bauxite, copper, and natural rubber suggests continued interest among producers in coordinated activities.

On the demand side of the commodities markets, there are also signs of increasing instability. The general growth of international trade, the increased mobility of capital, and the growing influence of multinational companies operating in several economies have produced a growing integration of the developed economies without the simultaneous growth of institutions for ensuring the stability of this new extranational economy. As a result, business cycles in the United States, Western Europe, and Japan have become closely synchronized without any effective mechanism to control the cycles. When all of these economies expand in unison as they did in 1972 and 1973, demand for all raw materials, especially those needed for industrial production, increases rapidly. In the short run, it can be very difficult to expand production of

Table 3. Materials With Concentrated Production

Material	Major Producing Countries, 1975 Excluding the United States	Percentage of World Production, 1975
Platinum Group	USSR, South Africa	91
Manganese	Australia, Brazil, Gabon, South Africa, USSR	88
Chromite	Rhodesia, South Africa, Turkey, USSR	80
Tin	Bolivia, Indonesia, USSR, Malaysia, Thailand, Australia	73
Mercury	Spain, USSR, Yugoslavia, Mexico, Italy, Algeria	73
Bauxite	Australia, Guinea, Guyana, Jamaica, Surinam	67
Copper	Australia, Canada, Chile, Peru, Zambia, Zaire, USSR	56
Phosphate Rock	Morocco, Senegal, Spanish Sahara, Togo, Tunisia, USSR	47

Source: Commodity Data Summaries, 1976, Bureau of Mines, U.S. Department of the Interior.

most primary commodities. If demand rises sharply, production can be expected to lag behind, resulting in rapid price rises and occasional localized shortages. In the past, various national economies operated more independently of each other, and in general, when one economy was expanding, others might be contracting, tending to smooth out demand for commodities.

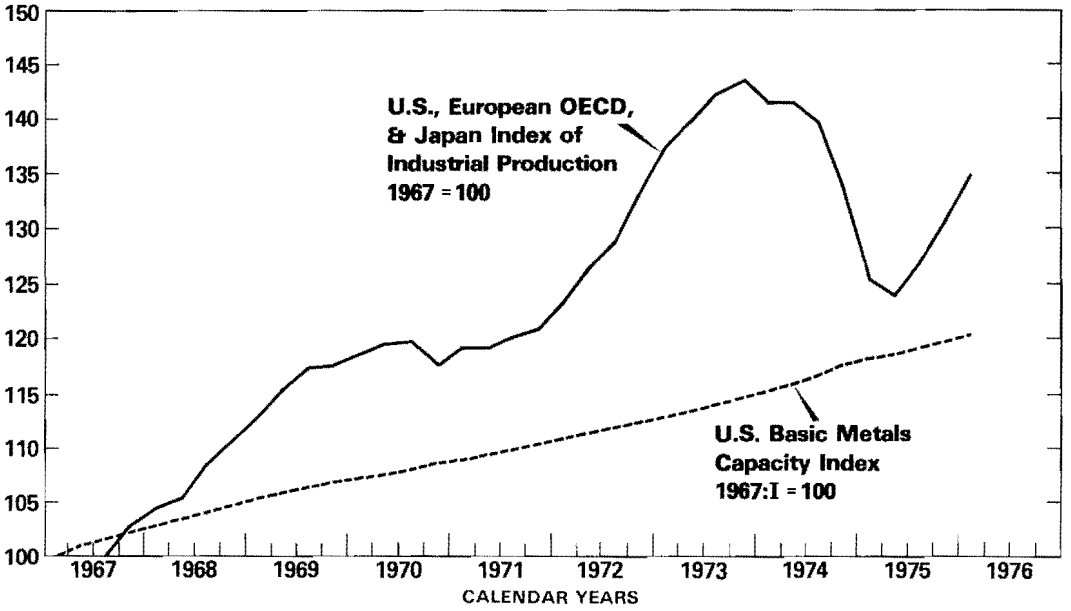
CAPACITY PROBLEMS

Factors other than simple supply and demand conditions of commodities can also influence their price and availability. Indeed, disturbances in commodity markets are sometimes reflections of problems in other sectors of the economy. The extraction and processing of raw materials require large amounts of long lead-time investment, and if the growth of processing capacity lags, shortages will develop, even if nothing unusual is happening to supply or demand. It is probably true that the simultaneous expansion of the industrial economies in 1972 and 1973 would have strained almost any reasonable amount of productive capacity. On the other hand, a consideration of the growth of capacity for processing industrial materials suggests that, even without the sudden boom, capacity problems would have arisen eventually.

In Figure 2 the broken line shows the growth of capacity in the United States for processing basic metals as estimated by the Federal Reserve. The solid line shows the growth of industrial output in the United States, Western Europe, and Japan. Because basic metals are widely traded in international markets, world industrial output provides a rough measure of the demand for raw materials, and it is apparent that from 1967 on (capacity figures for earlier periods are not available), capacity (in the United States at least) has not kept pace with general economic growth. Figure 3 shows the rate of capacity utilization in the U.S. basic metals sector in the 1967-1976 period. It becomes clear that shortages in 1973 and 1974 were due not to any ultimate scarcity of mineral ore or to the interruption of regular flows of supply. Instead, the problem was that the basic metals sector simply could not produce any more processed materials for input to other industries. The fact that U.S. capacity did not keep pace with world demand does not in itself explain the tight markets of 1973 and 1974, since capacity could have grown elsewhere. There is some evidence,

Figure 2

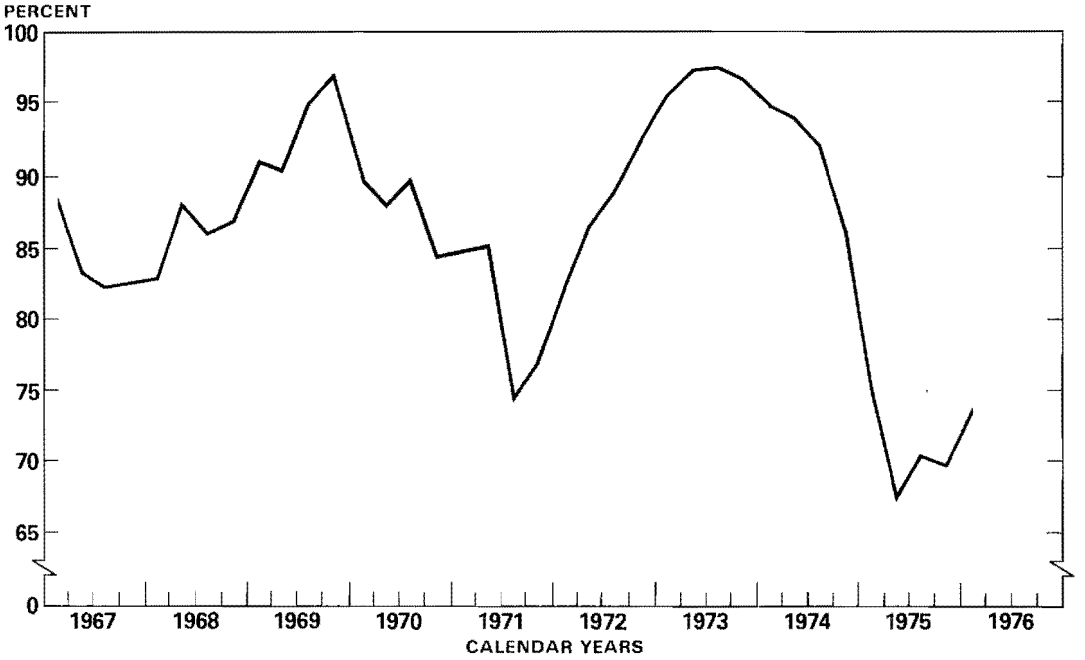
INDUSTRIAL PRODUCTION AND U.S. BASIC METAL PROCESSING CAPACITY



Sources: Industrial Production -- *Business Conditions Digest*, U.S. Department of Commerce.
Capacity — U.S. Department of Commerce.

Figure 3

PERCENTAGE CAPACITY UTILIZATION — U.S. BASIC METALS INDUSTRY



Source: U.S. Department of Commerce.

however, that processing capacity lagged throughout the noncommunist world during the 1970-1973 period.[1]

Many causes have been suggested to explain the failure of capacity in the primary metals sector to keep pace with the rest of the economy. Widely cited is the claim that environmental restrictions in the developed nations had a heavy impact on the extractive and processing industries. Meeting environmental standards added to the cost of new capacity, and uncertainty about the exact requirements of new laws encouraged firms to delay investment decisions pending clarification. At the same time that expansion of capacity was impeded in developed nations, political turmoil in the Third World and a generally unstable international economic situation are reported to have hindered direct investment in developing countries. The sudden easing of demand in 1970 and 1971 caught many producers by surprise, and large inventories were accumulated. These inventories masked the beginning of rapid growth of demand in 1972, and plans for expansion were not implemented until too late.

Other theories about the effects of inflation on profit margins and expectations have also been advanced. The point here, however, is that, for whatever cause, material processing capacity failed to grow rapidly enough, and a policy designed to maintain a smooth flow of inputs to industry must concern itself with such diverse elements as environmental quality, the incentives to investment, and the investment climate in less developed countries.

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1. Cooper and Lawrence report figures for the annual rates of growth of total productive capacity in the noncommunist world for selected nonferrous materials.

Period	Annual Percentage Increase in Capacity			
	Copper		Lead	Zinc
	Smelting	Refining		
1955-1965	3.0	4.1	N.A.	N.A.
1965-1970	2.2	5.9	4.1	5.0
1970-1973	-1.0	3.4	1.5	0.5

See "The 1972-1975 Commodity Boom," By Richard N. Cooper and Robert Lawrence, in Brookings Papers on Economic Activity, #3 (1975), p. 694.

SPECULATION IN COMMODITY MARKETS

Another cause of large fluctuations in commodities prices that is not directly tied to supply and demand conditions is speculation. The usual image of a speculator is that of an entrepreneur who himself has no use for commodities, buying in one period and selling at some later time in the hopes that the price will have risen in the meantime. Commodity users may also purchase supplies beyond their immediate requirements because they fear that prices will rise or that supplies will be unavailable later. In perfectly functioning markets, there would be no distinction between "price" speculation (buying now because prices may rise later) and "availability" speculation (buying now because supplies may be unavailable later at any price), but commodity markets are not perfect. Many buyers have contractual arrangements with sellers that will be honored even if other buyers offer higher prices for the same goods. Further, most nations have records of intervening in markets in recent years to direct the flow of supplies or limit price rises. The prices of some commodities (oil is the prime example) are related only indirectly to market conditions, and one might expect these prices to be maintained (at least in the short run) in the face of changing market conditions. As a result, it is possible to imagine either dramatic price rises or temporary unavailability of particular materials occurring without the other, and it is thus possible to imagine speculative hedging behavior directed toward ensuring against one or the other of these events.

While the motivations for speculative buying may be different, the effects are the same. During times when prices are rising or supplies are short, entrepreneurs may be expected to speculate, demanding additional supplies, driving prices still higher, and further depleting supplies. Because the motivations of speculators can differ, different policies may be required to control speculation. A determined policy to maintain prices at a constant level, for instance, will do little to discourage speculation motivated by a fear of future unavailability. It may, in fact, increase such speculation if controlled prices are expected to exacerbate shortages. Similarly, a program to supply users from government inventories may increase price fluctuations as speculators attempt to second guess government decisionmakers.

Speculation is not in itself an evil. Speculators provide a valuable function in that they accept the risks of fluctuating prices that producers and consumers might shrink

from in much the same way that insurance companies accept risks that individuals would prefer not to bear. Similarly, industrial users who accumulate extra inventories during times of adequate supply provide the economy with a cushion to soften the impact of possible disruptions. The problem is that sometimes speculation can feed on itself, with the attempts of individuals to avoid uncertainty actually increasing uncertainty for all. The goal of policy, then, is not to eliminate speculation, but to keep it from running away, to dampen the swings in prices that arise from speculative transactions. Many commodity exchanges already provide some dampening influence by limiting the amount by which commodity prices may rise or fall on a single day. When the limit is reached for a particular commodity, no further trading in that commodity is permitted. Events of recent years have shown, however, that these controls are sometimes inadequate.

Although it is difficult to measure the amount of speculation going on, there are indirect signs that it is on the rise. Anecdotal evidence abounds about the participation in commodities markets of entrepreneurs who are neither producers nor users of commodities. The number of commodities futures contracts traded has grown rapidly in the last several years,[2]

2. Quoted in Cooper and Lawrence, "The 1972-1975 Commodity Boom," p. 703.

Annual Volume of Turnover on Commodity Futures Markets in London and New York, Selected Commodities, 1970-74
Thousands of long tons; except cotton, millions of bales

Commodity	Marketplace	1970-72	1973	1974 a/
Copper	London b/	2,303	4,222	3,068
	New York c/	2,470	6,301	6,887
Cotton d/	New York	25	45	40
Lead	London	801	1,341	1,251
Rubber	London	148	599	590
Tin	London	154	169	248
Zinc	London	612	1,325	1,276

Sources: W.C. Labys, Speculation and Price Instability on International Commodity Futures Markets, United Nations Conference on Trade and Development, TD/B/C.1/171 (UN, 1974) p. 4; tabulation provided by New York Cotton Exchange.
a. January-June, annually adjusted; b. London Metal Exchange, wirebars only; c. Commodity Exchange, Inc., only; d. No. 2 contract traded on New York Cotton Exchange.

indicating increased speculative action, and international trade statistics have recently revealed commodity movements which can be interpreted only as speculative flows. For example, in 1974, when industrial production began to slacken, Japan, a country dependent on imports for all of its materials, apparently became very nearly self-sufficient in copper.[3] The only explanation for this behavior seems to be that Japanese firms had been accumulating large inventories of industrial materials during the period of rising prices in 1972 and 1973. When prices began to weaken in 1974, the excess stocks were liquidated.

Several factors seemed to contribute to the recent increase in speculative activity. The simplest was a growing realization that the world is indeed finite and a fear that the limits of resource supply were being approached. These views, although greatly exaggerated, were lent credence by some ominous, but mostly coincidental, signs: a decline of the world fish catch from 1970 to 1973, the disappearance of American agricultural stockpiles, and the predicted depletion of petroleum reserves in the foreseeable future. Accelerated inflation in the developed countries in the late 1960s and early 1970s led to expectations of continued inflation and intensified the beginnings of a "shortage mentality." Coupled with these fears was great uncertainty about the entire system of international trade. In August, 1971, the New Economic Policy of the Nixon Administration imposed a 10 percent surcharge on all imports to the United States and officially suspended convertability of the dollar into gold;[4] both of these actions produced serious shocks in the rest of the developed world. Finally, and probably most importantly, the discontent of the Third World materials producers became apparent. The success of OPEC encouraged talk of (and even some action toward) the formulation of cartels controlling other materials. Whatever the reasons were for speculation, it is clear that they were diverse and that many similar causes may be easily imagined in the future. Policy will have to contend with active speculative markets.

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3. Edward Fried, "International Trade in Raw Materials: Myths and Realities," Science, February 20, 1976, p. 642.

4. For practical purposes, dollar convertability had been suspended in 1968 with the establishment of the two-tier gold price.

Related to speculation and similar in its effects on commodity prices was the apparent flight of asset holders from currencies. In March, 1973, after two enormous waves of speculative capital movements, all attempts to maintain fixed exchange rates among major currencies were abandoned, and these currencies were allowed to float. There had been a short period of floating rates in the fall of 1971 (between the suspension of dollar convertability in August and the "Smithsonian" Agreements in December), but the prospect of a more or less permanent flexible exchange rate regime was unprecedented. Not willing to risk the unknown market for currencies, many holders of assets chose instead to buy commodities. Prices of nearly all commodities rose much more rapidly than the general rate of inflation, indicating a devaluation of currencies relative to commodities. During the same time period, the prices of traditional hedges against currency fluctuations also increased. Gold prices rose sharply after February, 1973, and prices of gems, wines, art works, and real estate were reported to have risen dramatically. What is important is that the international currency markets respond to a wide variety of stimuli such as strikes, changes of government, variations in national policies, and so on, and the fluctuations of exchange rates have been particularly high in 1976. If the price levels of commodities are related to the amount of turbulence in currency markets, they must be expected to continue to fluctuate as the currency markets fluctuate.

There is, then, no single problem of raw material supply. Disruptions in commodity markets can arise for a wide variety of reasons. Often problems in the markets for raw materials are only symptoms of more serious problems elsewhere in the world economy. Sometimes the problems in commodity markets that we seek to solve are themselves the result (perhaps at several removes) of other government policies. Although policies focused on the commodity markets themselves can help in some cases, it is apparent that in others the best way to bring stability to these markets is to increase the stability of the national and international economies.

CHAPTER IV POSSIBLE SOLUTIONS

Just as there is no single problem of raw materials supply, there is no single strategy for ensuring supply security. A wide variety of mechanisms are available to governments. but none can be effective in combating all the sources of instability outlined above, and a comprehensive national materials policy would most likely incorporate several of these. Among the most frequently proposed are the following.

STOCKPILING

The basic intention behind the stockpiling of raw materials is to smooth out sharp discontinuities in the price or availability of materials. Ideally, this is accomplished by accumulating materials for the stockpile when supplies are plentiful and releasing them in times of relative scarcity. An additional function of stockpiling is to provide a deterrent to embargoes or arbitrary price increases. If the consumer possesses significant stocks of the commodity in question, it may for some time hold out during an embargo or simply discontinue buying after a price rise. The larger the stockpile, the longer actions by suppliers may be resisted and the greater will be the losses in foregone earnings sustained by suppliers. It must be remembered, however, that suppliers may also accumulate revenues (stockpile money, as it were) before an embargo or price hike to improve their ability to outlast consumers.

Presumably, governments would become involved in accumulating stockpiles only in cases where private sector inventories were considered inadequate for some reason. Priate stockpiles might be considered too small or it might be felt that allowing private interests to control the disbursals of stocks during a period of shortage would produce an undesirable distribution of resources or would place excessive power in the hands of holders of private stocks. The theory

of operating stockpiles may be simple, but the practice is exceedingly difficult. If stocks are released only in cases of national emergency, they are of no value in reducing the impact of isolated embargoes, price actions, crop failures, or simple increases in demand. If government stockpiles are available for market stabilization purposes, the government will possess great power over individual sectors of the economy that is sure to become the subject of controversy. If, for example, the world price of grain rose dramatically, inflating U.S. food prices, would it be acceptable for the government to release whatever stocks of grain it might possess, aiding consumers but reducing the income of farmers? Similarly with other commodities, any time the government takes action to increase or decrease its holdings, the economic interests of U.S. citizens or corporations will be affected, with some gaining and some losing. The one institution which does have such stabilizing responsibilities now--the Federal Reserve Board--is the center of continued controversy. The Fed does continue to function, however, and in the view of most observers performs a useful service. It is not impossible that a stockpiling authority could do likewise.

Stockpiling may be the most direct approach to avoiding materials shortages, but it can be expensive. For example, an estimate of the size of the stockpiles that would have been required to keep prices of nonferrous metals within 15 percent of the trend line of these prices during 1973 and 1974 is about 9 percent of U.S. annual consumption,[1] if the stockpile were optimally managed to promote price stability. For just copper, tin, and zinc, using 1974 consumption and prices, this 9 percent would have a value of roughly $526 million. The capital costs of these stockpiles would depend on what is chosen to be the appropriate interest rate for government funds. Usually, this rate is in the 5 to 10 percent range, yielding annual costs of maintaining the stockpile of around $26 million to $52 million. These estimates must be taken with a great deal of caution, of course, but they do give some indication of the magnitude of the sums involved. Larger stockpiles would be required to allow for less than optimal use, and nonferrous metals represent only a small fraction of the raw materials produced and consumed in the United States. Total costs of a major stockpiling effort could go much higher.

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1. Cooper and Lawrence, "The 1972-1975 Commodity Boom," p. 712.

It might not be necessary for the United States to spend large amounts to create stockpiles, since the government already holds extensive stocks of nonagricultural materials for strategic purposes. Table 4 shows government holdings of some selected materials. For most of the nonferrous metals, well more than 9 percent of yearly consumption is stockpiled and only a change in the law regarding these stockpiles would be required to use them for price control purposes. Such action would risk having stocks depleted at some time in the future when they were needed in a more serious national emergency. If it is felt that currently held stocks should be maintained for such a contingency alone, then the use of stockpiles for economic purposes would require additional government holdings.[2]

There may be other, secondary effects of establishing government stockpiles. Private concerns now maintain some stocks of required materials to hedge against uncertainties and pay a price to do so. (Table 4 gives an indication of the size of some of these private stocks.) If these private interests were assured that government stocks would be released under certain circumstances, they would find it to their advantage to reduce their holdings. The establishment of government stocks would in such cases serve only to shift some of the costs of doing business from the private to the public sector. For this reason it is sometimes suggested that part or all of the costs of stockpiling should be paid by industrial users. The Energy Policy and Conservation Act of 1975, in fact, allows the administrator of the Strategic Petroleum Reserve to require each importer or refiner of crude oil to hold an amount of oil (not greater than 3 percent of its annual production) as part of the reserve.

A similar problem arises with regard to the international implications of stockpiling. To the extent that releases from U.S.-held stocks would reduce pressure in world markets, foreign as well as domestic consumers would gain. As long as international trade were relatively free, the volume of U.S.

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2. It has been suggested that if the aim of stockpiling were only to counter speculative price movements and not to guarantee supply availability, it would not be necessary always to maintain positive stocks of materials. By selling short in futures markets at appropriate times and going long at others, the average cost of the stockpile could be near zero.

Table 4. U.S. Strategic Stockpile Inventories for Selected Commodities

Commodity	Units	(1) U.S. Consumption 1974	(2) U.S. Govt. Stockpile 11/30/75	(3) Months Consumption 12 x (2)/(1)	(4) U.S. Private Stocks 12/31/75
Columbium	1,000 lbs.	7,876	2,856	4	4,545[a](i)
Cobalt	ST	9,431	23,448	30	700 (c)
Manganese:					
Ferro	ST	1,880	629	4	350 (p,c)
Ore	ST	1,115	3,608	39	1,900 (p,c)
Chromium:					
Chromite	1,000ST	1,447	3,155	26	950 (c)
Ferro	1,000ST	585	781	16	N.A.
Bauxite	1,000 LDT	16,904	9,562	7	4,300 (p,c)
Platinum Group	1,000 Tr. Oz.	1,981	1,725	10	1,050 (i,im,d)
Mercury	Flasks	60,070	200,062	40	22,500 (c,d)
Tin	LT	64,742	206,898	38	25,000 (p,d)
Fluorspar:					
Acid Spar	1,000ST	841	890	13	750 (m,c)
Metal Spar	1,000ST	648	412	8	
Nickel	ST	208,409	206,898[b]	12	37,500 (c)
Tungsten	1,000 lbs.	16,298	116,948	86	2,350 (p,c)
Zinc	1,000 ST	1,288	375	3	145 (p,c)
Titanium	ST	26,896	31,692	14	6,000 (i)
Vanadium	1,000 lbs.	14,400	1,080	1	3,400 (c)
Copper	1,000ST	2,194	489	3	190 (p)
Lead	1,000ST	1,599	602	5	190 (p,c)
Iron Ore	million LT	138	0	0	68 (m,do,c)
Phosphate Rock	1,000 ST	34,720	0	0	10,000 (i)

Source: U.S. Department of the Interior, Bureau of Mines, Commodity Summaries, 1976, various pages.

Notes: Consumption for 1974 was used for comparisons because it represents peak usage in recent years. Consumption for nearly all commodities declined in 1975.

a. January 1, 1975
b. December 31, 1975
(i) Industry
(im) Importers
(c) Consumers
(p) Producers
(d) Dealers
(m) Mines
(do) Docks
N.A. Not available

Units:
lbs. Pounds
ST Short Tons
LT Long Tons
LDT Long Dry Tons
Tr.Oz. Troy Ounces

purchases and sales of primary commodities makes it likely that any action within the United States would affect world prices. The knowledge that U.S. stockpile operations might have this effect could reduce the incentives of other nations to embark on stockpiling programs. Without agreements among developed nations on joint or at least simultaneous national stockpiling, the United States could find itself in the position of financing commodity insurance policies for others.

At present, it appears that other developed nations have taken few steps in the direction of stockpiling essential materials.[3] France has embarked on a program of accumlating a two-month supply of some essential materials for use only in periods of extreme supply shortages or price rises. Sweden has introduced tax incentives for private firms that have the effect of increasing private holdings of materials. Japan is considering a policy of aiding private firms to increase holdings by providing government guarantees for private stockpile financing. In any event, the actions of these nations will do little to affect world prices or supplies during a crisis because any of one of these nations accounts for only a small share of the international market in raw materials. To provide a significant degree of market stabilization, Japan and Western Europe would have to act in concert. The difficulties inherent in any stockpiling plan, though, are increased in multilateral arrangements by the necessity of agreeing on such potentially controversial issues as how control is to be shared and where the physical stocks are to be maintained.

A stockpile policy could succeed at limiting price fluctuations that arise from temporary changes in the underlying supply and demand situation by simply meeting excess demand or soaking up excess supply, but its effectiveness at combating speculative swings is questionable. This is because the motivations for speculation are often difficult to recognize before the price changes they cause are well advanced. Speculative price changes can also be short-lived;

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3. Oil is a notable exception. Several European nations have instituted oil stockpiling programs, but it must be remembered that since there is no direct relation between the price of oil and supply and demand conditions, no sale of oil from national stockpiles is likely to affect its price. It appears that these nations are hedging against another embargo.

stockpile transactions might come too late and simply intensify the reaction that follows a speculative rush. The presence of large holdings which might be increased or decreased at unpredictable intervals might even increase speculative pressures.

A final problem with stockpiling is that the benefits of such a program are impossible to calculate simply. This is true for two reasons. The first is that much of the value of the stockpile lies in its deterrent effect. As with all deterrents, it is impossible to know what would have happened in the absence of the deterrent and thus impossible to know what has been gained. The second reason is that for most commodities stockpile transactions can have profound distributional effects, helping some parties and hurting others. It is unlikely that many would be satisfied with the simple assurance that gainers gained more than losers lost. Since much of the political purpose of stockpiling materials in the first place is to achieve some redistribution of benefits, the distributive aspects of a stockpile policy must be of concern.

Since most of the serious difficulties involved in managing a stockpile will be in establishing a clear definition of what constitutes conditions of shortage or excess, it would appear that stockpiling would be most effective for those commodities which are characterized by relatively constant demand and natural, observable variations in supply. For the most part, this will mean agricultural commodities. To attempt to stockpile industrial raw materials would require much more difficult judgments about the level of demand for such products throughout the business cycle and would run the risk of duplicating the inventories of large private industrial enterprises.

Another important characteristic of stockpiles is that their size can be continually varied; they are not on/off sorts of arrangements. This makes them particularly useful for conveying messages to the international market. Each signaling may be particularly useful in combating actions of other nations designed to alter arbitrarily the prices or quantities of goods normally traded. Since increasing or decreasing holdings will be perceived as reflections of national policy, such actions might be expected to be particularly effective in influencing acts of other nations as opposed to providing a tool for intervening when purely market forces are at work. To the list, then, of commodities which might potentially be stockpiled could be added those which are likely targets for political or economic exploitation.

PRICE CONTROLS

Just as stockpiling is the most direct way of influencing availability, price controls are the most direct way of influencing prices. Unlike stockpiling, the imposition of price controls would have only minor effects on the federal budget. The most serious impediment to price controls is the international nature of trade in most raw materials. A nation cannot impose price controls beyond its borders, and, in the absence of export restrictions, holders of controlled materials will sell outside the countries with controlled prices, exacerbating the conditions of domestic shortage the controls were designed to overcome. Price ceilings on copper scrap, for example, had to be abandoned by the United States in August, 1973, to allow domestic firms to compete with foreign buyers.

Price controls may be effective for short periods on goods that are normally produced and consumed domestically. Some time is generally required for new markets to be opened, and in the short run, little flight may be expected. The price history of nonferrous metals, for example, shows major differences between U.S. prices and prices on the London Metal Exchange, suggesting that, for short periods at least, more than one price can be sustained. For commodities which already have well developed international markets, even short-term price controls may be impossible. Multinational corporations in particular have the ability to shift commodity shipments from one country to another with relative ease. The major oil companies were widely accused of diverting supplies away from the United States during the summer of 1974 to nations with less stringent price controls. Controls will be totally ineffective, of course, in the case of materials that are imported to a nation; it must pay the going price or forego the imports.

An announced policy of willingness to impose price controls may also encourage speculation. Enforcing prices below those which would prevail naturally must inevitably produce some form of rationing, with users not being able to buy all they desire. Anticipating such difficulties, users may be encouraged to try to accumulate supplies before the imposition of controls, hastening the price rise. Because of this potential for speculation, price controls would be most effective for commodities with very inelastic demand. Similarly, it is important that supply not be highly dependent on price, or price controls will simply reduce supplies further.

It has been argued that because the processing of many raw materials is highly concentrated in the hands of a few firms, competitive market forces cannot be depended on to set prices for these materials. In such cases, the argument goes, price controls will be desirable even in the absence of unusual circumstances, and when shortages provide a rationale for price rises in such industries, price controls become a necessity. The other side to this argument is that in times of fluctuating market conditions, concentrated industries will have difficulty reaching tacit agreement on pricing policies. By imposing a price ceiling, the government acts as a price leader for the industry, and the price ceiling becomes in practice a price floor. Such behavior was seen when meat prices dropped significantly after the relaxation of meat price controls in 1973. Which of these effects may be expected to predominate will depend on the structure of the industry; if there is already a secure price leader in the industry, there would be little danger of price controls doing damage to industry competition.

EXPORT RESTRICTIONS

Export restrictions can prove embarrassing diplomatically. In the long run, much stability could be brought to the commodity markets by eliminating erratic changes in the trade policy of the United States to encourage free international trade. To restrict exports of essential materials can do damage to our allies and invite retaliation. If trade restrictions proliferate, they will have the effect of making matters worse for all countries that depend on imports and can exacerbate whatever international tensions or economic instability may have been responsible for the disruptions in supply in the first place.

There is no denying, however, the political attractiveness (even necessity) of trade restrictions when domestic supplies become thin. This attractiveness is heightened by the fact that a program of export restrictions requires no direct governmental funding. It will usually be one of the goals of policy, however, to avoid situations in which there is no alternative to trade restrictions.

TRADE AGREEMENTS[4]

Many types of multilateral trade agreements covering raw materials have been concluded or proposed in recent years, and it is impossible to deal adequately with all of these types of agreements here. Some general points about these agreements can, however, be made.

Most of the international agreements that are now being proposed have as their principal feature stockpiles of materials managed jointly by consumers and producers. The bassic idea behind these proposals is that, since all participants in a market can benefit from more stable prices, all participants should bear some of the costs of maintaining stockpiles. Beyond this level of basic agreement, though, there is little common ground, with differing views about cost-sharing, management, size, and location of the stockpiles. There are also serious questions about the enforceability of agreements of this sort. Establishment of a multilateral stockpile would necessarily begin with the purchase of excess materials, helping producing nations. There is some fear among consuming nations that agreements may not last long enough for the benefits of stable prices to accrue to them, that when the time came to reduce prices by selling from the stockpile, the agreements would fail.

To the extent that multilateral stockpiling agreements do succeed, the losses and gains caused by price and supply fluctuations are spread among all nations with claims on the stockpile. This will reduce somewhat the incentive for any group of nations to attempt to exploit these conditions for their own gain. Thus, the participation of nations in such agreements may reduce the likelihood of political use of commodity supplies. It may at the same time, however, provide an international forum for the airing of political grievances and make commodities the focus of unrelated disagreements.

Other sorts of agreements are possible. Sharing arrangements among consuming nations have been proposed recently, the most notable being the International Energy Agency. By agreeing to coordinate policies and share supplies during periods of shortages, consuming nations can hope to present

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4. For a more detailed treatment of commodity trade agreements, see Commodity Initiatives of Less Developed Countries: U.S. Responses and Costs, CBO Budget Issue Paper, (forthcoming).

a unified front to counter any attempts at cartel behavior by producers. Few such arrangements have been subjected to severe tests, and it is easy to have doubts as to whether the sharing called for in the agreements will really take place. This is particularly true if the supply problems of the near future should arise from variations in demand, which would pit one consuming nation against another, rather than from cartel action by suppliers.

Some agreements may serve to make other policies diplomatically more palatable. The agreement between the United States and the Soviet Union regarding grain sales makes export restrictions automatic at certain points, in that it places upper limits on the amounts the Soviets may purchase. Thus, in a time of short supplies, restrictions can be applied with minimum provocation, and the Soviets know exactly at what points they will be imposed.

Bilateral agreements between consuming and producing nations which bind the parties to a certain amount of trade or to certain prices seem to be disappearing. The ostensible reason is that conditions have been changing rapidly enough lately that any such bilateral agreement will very likely run sufficiently counter to the interests of one of the parties to encourage its repudiation of the treaty. If agreements are to succeed in the future, they will probably have to be more broadly effective and provide mechanisms for the adjustment of terms.

At best, commodity trade agreements are likely to provide support for long-term national goals, but they will not be sufficiently flexible to serve as the principal mechanism of a national materials policy. It may well be that their greatest value will be political rather than economic in that they will provide some recognition of the importance of developing producer nations to developed consuming nations.

POLICIES TOWARD PRIVATE FIRMS

Some governmental policies toward private firms, although often instituted for other purposes, may have effects on the supply of raw materials. An example of such a policy is the treatment of windfall profits. For reasons of tax equity, substantial levies may be placed on the profits that accrue to holders of materials stocks during a period of rising prices. An announced policy of such taxation or the fear that such taxes may be imposed may discourage private holdings of materials and make the economy much more

vulnerable to small disturbances. On the other side of this coin, it would be possible to offer tax credits for the accumulation of private stocks.

In another area, questions have been raised about the legality under current antitrust laws of agreement among U.S. firms to present a common front when dealing with foreign nations. An example of such an agreement was the Libyan Producers Agreement of 1971, by which U.S. oil companies producing in Libya agreed to share reserves with any company that resisted price rises imposed by the Libyan government. Further, the companies agreed to restrict sales of shared reserves to preexisting customers. This agreement was never challenged, but its legality has been questioned,[5] and producers in the future might face serious difficulties in trying in combination to counteract monopolistic power of exporting states.

U.S. policy towards the operation of multinationals is currently the subject of controversy for many reasons, but buried within the debates are some issues for materials supply. Briefly, these issues revolve around questions of whether multinationals are in better or worse position for dealing with exporting governments than would be smaller national-based companies. On one side is the argument that the large investment of multinationals in exporting countries can be held hostage. Rather than endangering these investments, multinationals might be willing to accede to supplier-country demands and exercise their market power to raise prices in consuming nations. If, instead, extraction and primary processing were done by national firms within exporting countries, an attempt to raise prices might be met by distributing firms shifting their purchases to other sources, limiting the ultimate rise in prices to consumers.

The other side of the argument is that multinationals provide as powerful a counterweight to the power of exporting countries as can be achieved without the direct involvement of consuming-nation governments. It is generally agreed that the large international oil companies reallocated supplies of crude oil during the 1973 embargo, softening its impact on

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5. See "Nonfuel Mineral Cartels--United States Economic Policy and Changing World Resource Patterns," by Donn A. Beloff, Michael J. Frantz, and Lawrence Richmond in Law and Policy in International Business, Vol. 7, Summer 1975, pp. 883-890.

the United States and the Netherlands. If such action had been taken or explicity approved by a national government, retaliation by the Arab states would probably have followed. It is also argued that it is desirable to keep governments of consuming nations out of bargaining over individual commodities because the sometimes conflicting aims of foreign policy and economic policy may become embarrassingly intermingled if governments must involve themselves in direct negotiations.

RATIONING AND ALLOCATION SCHEMES

Rationing schemes have usually been viewed as the last resort for distributing scarce resources. These schemes involve the government in the details of resource allocation that are normally handled by the workings of the market, forcing it to decide at a very detailed level who will buy what and at what price. Besides placing a tremendous administrative burden on the government, these schemes respond only slowly and imperfectly to changes in the demand for rationed goods. At a time when radical changes in the pattern of demand are required, they can freeze precrisis patterns by allocating supplies on the basis of past consumption, delaying needed adjustments. The controversy and inconvenience that usually accompany rationing were demonstrated dramatically in the United States by the gasoline allocation program of 1973-1974, and the potential for black market formation is always present during rationing programs.

Rationing does have the advantage of providing a direct approach to inequities caused by shortages and has no important international repercussions as long as exports are not restricted. For short-term applications, rationing would be most valuable in the cases of commodities whose supply is seriously interrupted but can be expected to return to normal quickly. If there is no hope for a return to preshortage conditions, it would probably be desirable to let the market force the beginnings of the adjustments that will ultimately be required.

DEVELOPMENT OF ALTERNATIVE SOURCES

Even at best, a program of developing alternative sources of supply can overcome only some causes of instability in the flow of commodities. It can, for example, reduce the danger of cartel action by developing a source of supply

outside of potential cartels. Similarly, it can distribute more widely the production of commodities to diminish the chances of supply interruption because of drought, political turmoil, or export restrictions in certain areas. After the United States soybean embargo of 1973, for example, the Japanese invested heavily in soybean production in Brazil to provide them with an alternative to U.S. production. Developing new sources, however, can do nothing to reduce instability due to unpredictable demand or speculation.

Such a program must be viewed as a long-term and potentially quite costly solution to supply problems. In general, a development program will require price supports to operate; if it were profitable to operate a new source, presumably there would be no need for a special development policy. Government guarantees of future profitability would be particularly necessary for investment in unstable markets, exactly the markets of greatest concern. At the very least, it would seem necessary for governments to offer subsidies for the initial phases of development. Examples of government support for new sources may be seen in the "infant industry" policies adopted by some nations of placing high tariffs on particular imported commodities or offering subsidies for the export of their domestically produced counterparts. In November, 1974, Secretary Kissinger proposed that the developed nations guarantee a minimum price for oil to encourage the development of alternative, presumably more costly, energy sources. In most cases, more than just investment in research and development will be required, since the technologies for many alternative production means are already known. What is required is the investment in operations of sufficient size to make the alternative methods economically feasible. Examples of alternative production technologies which might be exploited abound: alumina processing from clay sands; shale oil production; deep sea mining of manganese. As yet there has been no incentive or clearly pressing need (in the United States, at least) to make the substantial investments required to take advantage of these possibilities.

As we have seen, the principal problem of commodity supply is not really that inadequate amounts are produced on the average. Rather, it is that production is not smoothly distributed over time or that what is produced is not always dependably available to users. If new sources of supply are to alleviate these problems, they must be immune from those forces that make supply undependable. In many cases, there is no reason to think this will be so.

Short-term overproduction can be as disruptive to resource allocation decisions as can underproduction; both represent states of disequilibrium which cannot long remain without something giving way. In some cases, development of new sources may do more harm than good.

CHAPTER V CONCLUSIONS

Some lessons emerge from this discussion of the problems of supply security and potential remedies for these problems. Most obvious is that none of the solutions considered above is appropriate for dealing with all types of commodity market disruptions. Perhaps not so clear is that few of these solutions do anything to improve the long-term prospects for stable supply. Inevitably, there will arise conflicts between the private economy's efforts to adapt to changing conditions and a government's attempts to ensure that this adaptation does not impose unacceptable costs on particular individuals or to prevent the actions of independent interests from being counterproductive for all. Indeed, if there were no conflict, there would be no need for government action. If these interventions are skillfully managed, they can soften the impact of unexpected variations in market conditions. They are, nevertheless, interventions. To the extent they are unpredictable, they can add uncertainty to the planning process. Limiting price rises, controlling allocations, forbidding exports, and regulating trade do reduce the profitability of dealing in primary commodities and can, in the long run, reduce supplies.

Perhaps even more importantly, there are causes of price and supply instability which are beyond the influence of any policy directed primarily at commodity markets. Many of the recent difficulties were due to general instability in the world economic order: chaotic international currency markets, unchecked business cycles in developed economies, and active speculation in many assets. It appears that in many cases materials supply difficulties are only a symptom of other more serious problems of national and international economies. A truly effective national materials policy must inevitably be a national economic policy.

A concern for materials supply will impose on a national economic policy some new conditions that may be difficult to accept. Stabilizing the flow of materials may, for example, require coordination of economic policies with other developed nations, thus, reducing the autonomy of the United States in managing its own affairs. Controlling the actions of large firms operating in the highly concentrated primary products sector of the economy may require at least the beginnings of national economic planning. Maintaining equilibrium in international markets may require indefinite floating and continued adjustment of currency exchange rates, increasing the uncertainty involved in international transactions. Insulating the United States from variations in supply conditions may require that we insulate ourselves from some sellers or some buyers, perhaps at some cost to other economic or foreign policy goals.

The point of all this is not to suggest that it is futile to attempt to formulate solutions to the problems of materials supply. Rather, it is to stress that the causes of these problems are diverse and deeply rooted in other interests of the United States. Control of commodity supplies can be advanced, but only at a cost. This cost may or may not be reflected in the federal budget, depending on the case at hand, but it will always be present.

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