direct effect on the economy, or by forcing fiscal and monetary policy-makers to implement restrictive policies, the higher oil prices associated with oil disruptions inevitably result in reduced output and employment.

Supply-Related Effects

If less oil is available to run machines, manufacturers are forced to curtail operations, which reduces aggregate supply. Other oil consumers, such as the utility and transportation industries, also may have to cut back, further reducing output. Since a disruption reduces the physical amount of oil available, no government policy can lessen this decline unless the energy source is replaced. The initial reduction in supply is further aggravated by its uneven nature--some sectors of the economy lose more than others--and the resulting bottlenecks hamper the efficient use of the available energy.

Supply Effects by Sector. In each energy-intensive sector of the economy (transportation, residential and commercial, industrial, and utilities), the reaction to a shortfall and the possibilities for reducing the amount of oil used will be different. In general, however, consumers, both individual and institutional, will find it difficult to conserve energy in the short run.

Transportation is the most petroleum-dependent of all sectors, and has few options for switching to other fuels. Furthermore, alternative means of transportation are either not available or more costly in terms of time and/or money. Therefore, this sector can absorb massive price increases without significant decreases in demand. In addition, anticipation of shortages can even create higher demand, as happened in 1979. For example, motorists keeping their gas tanks filled (topping off) accounted for some of the gasoline lines in 1979. As a result, the transportation sector is likely to be a weak link in a policy that relies on higher prices to restrain demand.

In the residential and commercial sector, demand is more sensitive to both economic and moral persuasion. Space and hot water heating account for the major uses of petroleum in this sector. These activities are less petroleum-dependent than transportation and they can also be modulated more easily without major changes in the services provided. For example, thermostats can be reset with the turn of a dial without significantly affecting the lifestyle or comfort level of users.

In the industrial sector, the short-run response of demand is largely determined by the availability, rather than the price, of energy. While there is significant long-run potential for price-induced savings of oil, that fuel is

typically a small fraction of the cost of goods sold. Thus businesses tend to be much more concerned with security of supply, since those without access to oil or alternatives may have to cease operations. These businesses make every effort to ensure continued supplies and are relatively insensitive to higher prices, which are included in the price of final goods and services. Therefore, the factor that weighs most heavily in reducing industrial demand is the availability of alternative energy sources.

While some firms may be able to use alternative energy sources, such as coal or natural gas, the number is not thought to be large. In response to government efforts to reduce natural gas consumption by industrial users, many companies switched from natural gas to oil in the last decade. If factories that switched did not substantially modify their equipment and remove their gas hookup, they might be able, in the event of a shortfall, to return to natural gas and decrease the need for petroleum. Since the move from natural gas was encouraged when oil was cheaper, it is unlikely that much of the original gas-using capital equipment is still in place. 1/ Changing to coal is much more complicated. Unless a firm has special facilities (for example, emissions control devices and furnace loaders), it cannot burn coal. Building these takes time. Realistically, therefore, only natural gas could serve as an alternative to industrial fuel oil in the very short run. Since the decision to modify equipment is made by many private individuals, precise estimates of the number of industrial boilers still capable of burning natural gas are not available.

Public utilities are in a peculiar situation; their demand for oil is determined by the demand for electricity, which is partly out of their control. While fuel adjustment clauses will immediately reflect the increased costs of oil and so reduce demand, a regulatory decision is needed to change the monthly fixed charge. Hence electricity consumers will feel the entire oil price increase only after a delay. Unlike other firms that can determine their output according to market conditions, utilities are enfranchised to serve a particular community's electrical needs, regardless of short-run market conditions. Utilities are, therefore, limited in their ability to reduce their oil use in response to a shortage. Their only short-term alternatives are fuel switching and power pools. Utilities have the same constraints on switching to alternative fuels as do industrial consumers. Boilers designed solely for oil cannot burn coal without modification, while some boilers can burn both natural gas and oil.

1/ For one optimistic view of the potential impact, see National Petroleum Council, Emergency Preparedness for Interruption of Petroleum Imports Into the United States (April 1981).

Utilities' other conservation alternative is to share electricity. To reduce the aggregate amount of petroleum used to produce electricity, utilities with relatively more nonpetroleum-powered capacity (for example, coal, nuclear, natural gas, and hydroelectric) could coordinate their output with utilities reliant on oil-fired plants. Much of this sharing takes place already, however, induced by the large difference in cost between oil-fired generation and its alternatives.

In addition, not all oil companies will benefit from a shortage and, indeed, some may suffer. Oil refiners who do not have access to a continuous source of crude oil will have to pay world spot oil prices for their oil, and so be at a disadvantage relative to those who have more secure access. With the expiration of price and allocation controls on September 30, 1981, this problem may become severe. Without allocation controls, some independent refiners and oil companies may have to bear a disproportionate share of the shortfall. This issue is treated in depth in Appendix B.

Limitations on Increased Domestic Oil Supply. Lags and institutional barriers may prevent significant short-run oil supply responses, even though, in theory, a shortfall and its attendant price increase should encourage the domestic production of more oil and the refining of those products for which the need is highest. A number of factors, however, could hinder increased U.S. production. Most importantly, there is little known excess capacity in operating oil production facilities and output is currently declining. Furthermore, drilling equipment in the United States is already being used and produced at or near maximum rates.

Construction of new oil production facilities is costly and time-consuming. Expansion of current production facilities is also hampered by legal constraints that were imposed to ensure that oil fields are not destroyed through improper field management, which can reduce the amount of oil ultimately recovered.

At the next stage of production, unless refiners get more oil, they cannot respond to higher prices by increasing their output. Capacity utilization would drop further if refiners gird themselves for a drawnout shortage. Stocks of crude might rise, while stocks of product would be drawn down. Thus, from the consumers point of view, the shortfall might be exacerbated.

In sum, the higher prices that accompany an oil shortfall may not have a strong effect in increasing domestic oil supplies in the short run.

Demand-Related Effects

The second source of decline in output from an oil shortfall is the sudden shift in income. Consumers, who usually cannot shift from petroleum products to other energy sources in the short run, have to pay more for the oil that they use. Since there are few close substitutes for oil, demand does not respond quickly to price pressures and prices increase dramatically. Thus, over a period of a few months, large amounts of money are transferred from consumers to oil producers at home and abroad. As their real income is reduced, consumers cut back spending in other areas.

At the other end of the income flow, oil producers--both domestic and foreign--who receive the added billions of dollars cannot spend it fast enough or in the appropriate sectors to maintain the predisruption level of aggregate demand. Since money accruing to foreign producers is increasingly recirculated through the Eurodollar market, these dollars may be slowed in their flow back to the U.S. economy. Although domestic producers are not as likely to be diverted in spending their additional income, there will be a delay in their expenditures nonetheless. Oil companies have to consolidate their income stream and make plans for major capital expenditures--and all of this takes time. Thus, the prompt respending of higher oil revenues in the U.S. economy from both domestic and foreign sources is not assured. This lag in respending is called the "oil price drag."

Such oil price drags can be significant. Following the Arab oil embargo, the cost of U.S. imports of fuels and lubricants rose from $7.1 billion in 1973 to $23.9 billion in 1974. Similarly, following the Iranian Revolution, net dollar outflows for oil rose from $41.1 billion in 1978 to $71.0 billion in 1980. The transfer from consumers to domestic producers was of a comparable magnitude. These flows were not promptly recirculated. For example, current account surpluses of oil-exporting countries grew from $6 billion in 1973 to $68 billion in 1974, and from $68 billion in 1979 to $112 billion in 1980. By contrast, capital exploration and lease expenses by the U.S. oil industry grew by only $6 billion from 1973 to 1974, although the industry's domestic revenues rose by $10 billion over that period. More recently, oil industry capital expenditures are only now beginning to approach the added income streams created by 1979 oil price increases.

When foreign and domestic oil producers do spend their increased revenues, they often spend them differently than would have been the case without the change in income distribution. While much of the money that flows abroad will eventually return to the United States through private banks, these funds are often used to buy real estate and other nonenergy

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investments. The composition of demand, therefore, changes. Since the composition of output cannot be changed as quickly, a shift in demand will have many of the same effects as a decline in aggregate demand. Output will decline in those industries from which demand has shifted, and the sectors into which demand has moved will experience bottlenecks and inflationary pressures.

As domestic output declines, so does employment. Businesses whose products face reduced demand need fewer employees. Increased unemployment, in turn, further decreases demand.

Obviously, some sectors of the economy are more sensitive to oil price increases than others. The hardest hit areas are those that are most directly centered around petroleum use and those in which consumer purchases are most easily postponed. The automobile industry and its peripheral industries of rubber and steel are, therefore, likely to suffer greatly in a shortfall-induced economic downturn. Industries producing other consumer durables are also likely to suffer.

The temporary decline in some plants may become permanent as the higher costs of oil make some plants and products obsolete, for example, plants producing large cars. In the second quarter of 1980, demand for large cars dropped by a greater percentage than demand for all cars. Furthermore, demand for large cars may never return to previous levels. In such a case, some V-8 engine plants may become redundant. Since synthetic rubber is petroleum-based, a similar pattern may occur in the rubber industry. Thus, temporary cyclical unemployment may become permanent unemployment for some plants and workers.

INCREASED INFLATION

Several factors combine to increase the price level during an oil disruption. The price of imported oil rises. In response, domestic oil producers raise their prices. Once this has occurred, the increased costs of doing business are reflected in the price of all goods and services dependent on oil. Other businesses and employees then attempt to catch up with higher prices and so an upward spiral begins. The extent of the price spiral depends, in part, on macroeconomic policy and expectations about that policy. Once the general price level has risen, it is not likely to return to its original level, even after the original pressures dissipate. In the wake of the Organization of Petroleum Exporting Countries (OPEC) price boost of 1973, for example, all petroleum-based products continued to rise even after oil prices had ceased their climb. In the last quarter of 1974, when refined

petroleum product prices actually declined marginally, petrochemical prices, such as plastics, synthetic rubber, and pharmaceutical materials, were increasing at double-digit rates. Wages experienced their largest increase a year later, in 1975 (despite the record 8.5 percent unemployment rate). By the beginning of 1976, the general price level, as measured by the GNP deflator, was up by approximately 20 percent over the pre-embargo level. Although not all of the increase was caused by oil price increases, it is indicative of the inflationary effects of an oil shortfall.

International money markets also aggravate domestic inflation. Higher oil prices increase the number of dollars abroad, causing a glut. Soon the value of the dollar, relative to other currencies, begins to deteriorate, increasing the prices of goods imported from countries whose currencies have appreciated. Higher import prices may also allow domestic industries producing the same goods to raise their prices.

IMPACT ON INCOME DISTRIBUTION

An issue closely related to, but distinct from, the oil price drag is the income redistribution arising from a shortfall and its attendant oil price increase. Policy must concern itself with several major income flows, including from the United States to foreign producers, from domestic consumers to domestic producers, and from domestic producers and consumers to the government.

International Income Distribution

As the result of an oil shortfall, the first major change in the flow of income is from oil-consuming nations, including the United States, to oil-producing nations. As illustrated by the 1979 events in the world oil market, even a small shortfall--or the expectation of a large disruption--can raise the price of oil substantially and thus redistribute income drastically. For example, the U.S. net foreign oil payments rose from $54.1 billion in 1979 to $71.0 billion in 1980--a 30 percent increase. Outflows of this magnitude have a depressing effect on the economy and negative effects on the balance of payments. In addition, although the major purpose of raising interest rates in 1980 was to combat inflation, higher rates also were needed to bring this money back into the United States. Therefore, capturing the windfall created by an oil disruption before it leaves the country is one of the options that should be considered in developing a shortfall policy.

Domestic Income Distribution

Domestic oil producers also reap substantial windfalls from the price increases associated with a shortfall. These redistributions of income raise issues of equity and regional balance. While much of domestic producers' increased revenues will be retrieved through the existing windfall profits tax and increased corporate taxes, decisions about the remainder will depend on the shortfall policy chosen.

The Congress passed the windfall profits tax to ensure that the transfer of income to the oil industry resulting from decontrol would be limited. But it also would provide billions of extra dollars to the government following a shortfall. The tax receipts resulting from a disruption would represent a significant increase in government revenues. Whether the government should keep these revenues, or reimburse the money to consumers, is another of the questions that should be considered in choosing a shortfall policy.

Consumers are also affected unevenly by oil price increases. While upper-income families consume more gasoline, heating oil, and other petroleum products than do lower-income families, poorer families spend more on these products as a percentage of their income. 2/ Currently, families in the lowest income fifth spend, as a percent of income, more than twice as much on gasoline as families in the top income fifth. Similarly, the poor spend four times as much on heating oil and twice as much for the fuel in other goods and services they consume (see Table 1).

Consumers in different parts of the country are also affected to different degrees. Consumers in the Northeast use considerably more home heating oil than do consumers elsewhere, and rural consumers spend a larger percent of their income on petroleum products than do urban and suburban consumers. Thus, if consumers continue to spend in these patterns, or even with some shifting, the income flows will hurt low-income, Northeastern, and rural families more than consumers at large.

2/ Congressional Budget Office, The Decontrol of Domestic Oil Prices: An Overview, Background Paper (May 1979).

TABLE 1. AVERAGE ANNUAL PETROLEUM PRODUCT EXPENDITURES AS PERCENT OF INCOME, PER FAMILY (Families ranked by money income in 1972-1973)

Families Ranked by Money Income	Gasoline Expenditures	Heating Oil and Kerosene Expenditures	Indirect Expenditures on Oil
Lowest Fifth	6.5	2.0	7.8
Second Fifth	6.2	1.2	5.4
Third Fifth	5.3	0.6	4.3
Fourth Fifth	4.4	0.7	3.4
Highest Fifth	3.2	0.5	3.1
All Families	5.1	0.8	4.6

SOURCE: Bureau of Labor Statistics, Consumer Expenditure Survey Series: Diary Data 1972.

CHAPTER III. CHARACTERISTICS OF POTENTIAL OIL SUPPLY DISRUPTIONS

The desirability of various policies for dealing with supply disruptions depends considerably on the characteristics of the event they are intended to address. This chapter discusses the following salient characteristics of potential disruptions:

- The size and duration of the disruption; and
- The behavior of prices during and after the curtailment.

The discussion notes how the nature of the disruption might affect the specific goals toward which each policy is directed.

SIZE AND DURATION

At least 16 nations, including Iran and Iraq when not at war, each supply 2 or more percent of the world's oil production (1.0 million barrels per day). With so many producers, instability in the world oil market can come from any one of many directions. A shortfall need not be large or lengthy in order to have significant repercussions. The 1979 Iranian shortfall was only a small percentage of the world market, yet it triggered price increases that lasted throughout the year. The initial size of the shortfall may not necessarily reflect its ultimate effect. Again in the Iranian case, Iranian production decreased permanently, while the shortfall on the world market lasted only months.

Excess Capacity

The size and duration of a shortfall will largely be determined by the extent to which market slack exists or can be solicited, through using either excess producing capacity or existing stocks. Both the 1979 Iranian and the current Iraqi-Iranian cutbacks were mitigated by increased production in other nations. To compensate for reduced Iranian production, the Organization of Arab Petroleum Exporting Countries (OAPEC) increased production from a 1978 average of 18.5 million barrels per day to 21.0 million barrels per day, a 14 percent increase. They were joined by other OPEC members and together kept the total Iranian withdrawal from being felt. Overall OPEC production actually rose 5 percent during the disruption.

In the fall of 1980, the excess capacity in the market softened the impact of the Iraq-Iran War. Before the war, there was also significant stockbuilding that helped to absorb the blow. Even so, spot market prices and some official prices increased to reflect the disruption caused by the war.

Most nations with spare capacity, however, are those most likely to be involved in hypothesized disruptions. In this decade, significant excess capacity will be limited to a few major producers, notably Saudi Arabia, Kuwait, and the United Arab Emirates. Iraq may have such capacity after rebuilding the facilities destroyed in the current hostilities; Mexico may be able to bring new capacity on-line quickly. The excess capacity of Venezuela and Nigeria, which have traditionally replaced oil lost through disruptions, may decline. Thus, long-term excess capacity will probably be centered, as it is now, in Saudi Arabia, and dependent on the special United States-Saudi relationship. The mitigating role of spare capacity is, therefore, limited. In addition, the potential costs of obtaining this extra production through diplomatic or economic concessions must be weighed against the costs of enduring shortfalls, alleviated with other policy tools.

A major consideration in relying on excess capacity is that, with each long-term disruption of the market, there are fewer sources left to replace any additional shortfalls. For example, increased production in Iraq helped replace the 1979 decreased production in Iran. With the destruction of Iraqi productive facilities, other producer nations have to replace, at least temporarily, not only the lost Iraqi production but also that share of lost Iranian production that Iraq was replacing. In short, with each shortfall the next disruption becomes potentially more destabilizing.

Stocks

Using oil stocks can mitigate the effects of a disruption in several ways. First, a cessation of stock-building purchases reduces demand in the market and so lessens the severity of any shortfall. Second, stocks can replace the physical loss of oil from a shortfall. Finally, stocks provide a psychological buffer that can moderate price pressures.

Stock levels are theoretically easy to translate into numbers of days of consumption at alternate rates. In reality, stock depletion is rarely so orderly because of the uncertain duration of the oil import curtailment. It is true, however, that larger aggregate stocks would result in more moderate price increases when supply is cut. When the Strategic Petroleum Reserve (SPR) is complete, the critical importance of choosing the proper shortfall policy will be reduced as the net amount of any shortfall is reduced. But even if current fill schedules hold, the reserve will not be

large enough to alleviate a moderate supply disruption until 1985 when it will contain more than 400 million barrels of oil, enough to provide over 1 million barrels per day for a year.

In response to being caught with very low levels of stocks in 1979, major oil-consuming nations have increased their stocks of crude oil and products to levels significantly above the average of the late 1970s. This effort has been aided by the sluggish economic growth in most industrial countries, which has depressed demand for oil products. U.S. stocks, not including the 150 million barrels in the Strategic Petroleum Reserve, currently stand at approximately 1.3 billion barrels. (Of these, only 200 to 300 million barrels are actually available for drawdown. The rest represent tank bottoms, pipeline, and the minimum needed to maintain distributive continuity.) Japan is reputed to hold over 100 days worth of stocks. Germany has launched a public corporation to increase its Industrial and Strategic Petroleum Reserves.

These strategic government stocks may be the only source of any long-term excess inventory available during a disruption. In the future, after the memory of the 1979 events has faded, consuming nations may draw down these surplus stocks, which are expensive to build and maintain (as much as $.50 per barrel per month in interest payments alone). If this drawdown takes place and another curtailment does occur, consuming nations may again find themselves bidding against each other to ensure continuity of supply.

In an effort to increase unity among consuming nations, the International Energy Agency (IEA) has mandated oil-sharing in the event of a shortfall of 7 percent in any of the signatory nations. While the IEA has served to coordinate a massive stockpile building effort and to discourage spot market buying by member nations, the sharing agreement remains untested. (It was not used in 1979.) Complicating any effort to share supplies are increasingly stringent OPEC contracts that limit the destination of oil. Producer nations have expressed their intention to gain greater control over the market, and so IEA signatories may find themselves unable to comply with IEA agreements without risking further curtailment. Despite these problems, the existence of the IEA does provide a device through which policy options calling for a multilateral response could be implemented.

Potential Future Shortfalls

Another oil disruption is not only possible, but quite likely. Both major shortfalls and a series of small and intermediate reductions in oil production, originating from a variety of causes, are likely. Currently (in 1981),

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the United States is consuming 16.6 million barrels of oil per day, of which 5.8 million barrels are imported. Several potential situations exist that might reduce this amount suddenly. If the Strait of Hormuz was closed and if the United States lost oil in proportion to its share of world oil imports, the U.S. loss would be approximately 5 million barrels per day, or over 80 percent of present imports. A change in Saudi Arabian political orientation and subsequent total withdrawal from world production would similarly reduce U.S. imports by roughly 3.3 million barrels per day, or over 50 percent of present imports, again assuming a proportional U.S. loss of world supplies. Even reduction of Saudi production to levels needed only for its present industrial development (5-6 million barrels per day) could cost the United States 1.5 million barrels per day, or 25 percent of imports. Beyond these political events are Acts of God--an accident in the North Sea wells, for example. These could, just as surely, reduce U.S. imports, at least temporarily until such damage could be repaired.

THE BEHAVIOR OF PRICES DURING AND AFTER A CURTAILMENT

The crucial questions about the behavior of prices during an oil interruption are:

- How high will prices go?
- Will prices return to the preshortfall level?

Price Levels

In the past, demand for oil products has been relatively insensitive to changes in price. Prices of many refined products doubled in the 1979 disruption and consumption only dropped a small percentage in the short run. Furthermore, the drop in consumption may have been caused as much by the recession as by increased prices. Significant adjustment to changes in oil prices must await changes in the capital stock of major users, a long-term process.

Since, in the short run, petroleum has few substitutes for many uses, consumers are willing to pay a great deal to ensure availability. Shortfalls are rarely orderly and, in the face of uncertainty, consumers tend to hedge. They buy more oil and pay more for it than they might ordinarily. Refiners and industrial fuel users will pay a premium for marginal oil supplies to avoid the cost of shutting down operations. All of these factors tend to cause large short-term price increases in response to shortages.

Acting to retard this tendency is the decline in real income experienced by consumers as the prices of goods increase. Demand for a good is a function of both its price and the consumer's real income. At very high prices, many persons simply will not be able to afford to buy what they used to. Moreover, as was seen in 1973-1974 and 1979, oil supply interruptions result in sizable losses in economic growth in the year and one-half following the shortfall. This suggests that lowered incomes lead to market slack that could tend to restore oil prices to preshortfall levels.

In sum, the two forces operating on demand are uncertainty and real income. The role of policy in this regard, therefore, is to reduce uncertainty, insofar as possible, and decrease demand. In the event of a shortfall, the pattern of uncertain and steplike price increases may provide an opportunity to put policies into effect to decrease demand, capture the scarcity premium, and provide for the allocation of whatever oil is left during the short-term surge of prices following a disruption.

Spot market purchases can also affect the price of oil. Although the IEA discourages consumer nations from entering the spot market in periods of shortage, this principle has often been ignored. If individual nations enter the spot market, this tends to drive up spot prices and thus increases all consumers' oil prices. In times of need or uncertainty, however, all nations use it. Although the spot market can be quite volatile, it has a significant economic impact since producer nations use it as a guide for their pricing policies. In the fourth quarter of 1979, Japan massively increased its purchases on the spot market, and the average spot market price peaked at over $40 per barrel. In response, OPEC raised its average official price from $20 to $28 per barrel. In the fall of 1980, despite record stocks, Japan reentered the spot market. That reentry, combined with general market concern over the Iraq-Iran War, served to push up crude oil prices by as much as $6 to $6.50 per barrel in the case of premium crudes.

The Time Path of Prices

In both previous shortfalls, the official prices established during the shortfall became the official prices after the shortfall, except in those cases in which individual nations raised prices above the norm. After 1974, prices decreased in real terms, but steadily increased in nominal terms. Prices also held after 1979. Because oil prices have already been raised so much, it is possible that they may level off for several years, if present production is sustained.

In fact, it is possible that future disruptions will not result in price increases as large as those experienced in the past. In other words, the

elasticity of demand may be increasing. A consensus is emerging that oil prices might have risen substantially in the 1970s even without the catalyst of the OPEC oil embargo. This could mean that, despite the continued presence of OPEC price-setting, the oil market may function more like a competitive market in the future than it has in the past decade. Therefore, if an oil disruption is only temporary, there is a growing probability that oil prices might, in fact, fall when production is restored.

CHAPTER IV. POLICY OPTIONS AND ANALYSES OF OPTIONS

A shortfall policy should encourage efficient use of oil, restrain oil demand, and capture some of the windfall from increased prices and return it to consumers. Because the policy options discussed in this chapter would accomplish these tasks to different degrees, each would result in a different constellation of effects. Thus, either tradeoffs would have to be made or the different policies could be treated as complementary rather than as exclusive alternatives. As outlined in the chapter on shortfall characteristics, oil import curtailments can vary in many ways and, consequently, present different targets for action. Thus, policy must match the particular configuration of a given oil shortage. This chapter discusses how different disruptions would bring out different advantages and disadvantages of various policy options.

POLICY OPTIONS

In the event of an oil shortfall, the government has several options with which it could respond. The policy approaches discussed here are:

- Pursue a neutral policy based largely on authorities that will remain after expiration of the Emergency Petroleum Allocation Act (EPAA), namely, the present tax structure and market allocation of oil;
- Attempt, through taxes or tariffs, to collect and recycle into the economy a portion of the windfall revenues that would otherwise flow to foreign and/or domestic producers;
- Control domestic oil prices during the disruption, and establish a coupon rationing plan to allocate the shortage in a manner similar to that in EPAA.

This section concludes with a discussion of domestic price policies in the event of a shortfall.

Neutral Policy

In the event of an oil shortfall, the simplest policy would be to allow the market to allocate it. Producers and refiners would be allowed to

charge whatever consumers would be willing to pay. Inevitably, this would promote conservation because, as prices rose, individuals should begin to reduce oil consumption. The market would accomplish its traditional "rationing through price." Marginal additions to domestic supply might occur, although the U.S. oil industry generally operates at full capacity.

Market allocation of oil would not necessarily imply that the government would remain inactive. Part of the shortage premium--approximately 70 to 80 percent--eventually would be captured by all levels of government through the windfall profits tax, increased corporate income taxes, state and local taxes, severance taxes, and other payments to government. There might be considerable delay, however, in both collection and expenditure of these funds by all levels of government, which would cause some slowing of economic growth ("fiscal drag"). To mitigate this, the government could provide a tax cut in anticipation of increases in windfall profits tax collection, but this would require either standby authority not now provided or special legislation at the outset of the disruption. In any case, automatic stabilizers, such as unemployment insurance and other transfer payments, would force government expenditures to rise in the event of such a shock. The government would, therefore, play a role in mitigating some of the macroeconomic and redistributional effects of the shortfall, while leaving the market to establish allocative efficiency.

Oil Tax or Import Tariff

If an objective of policy was to capture and recycle into the economy the windfall revenues accruing to foreign and/or domestic producers, a tax or tariff on crude oil and refined products is an instrument worthy of consideration. In theory, the tax or tariff would work as follows. In response to a world shortfall, the government, either alone or preferably in consonance with other oil-importing nations, would institute an oil tax that would raise the cost of oil products. As a result, demand for oil in the United States would decrease, and less would be imported. This, in turn, would reduce the amount demanded on the world market, and hence producer prices might not rise as much as they would have in the absence of the tax. The market would, however, establish an equilibrium at a price higher than the predisruption price. Imposing a tax in addition to the higher price might capture some of the shortfall premium by reducing demand to a level below the original amount of the shortfall, thus "softening" world oil prices. Because it is imposed above the price that the market would reach after the disruption, however, U.S. consumers would pay more for oil used than they would have had the government done nothing.

Tax proposals would collect large amounts of funds, even at relatively low levels of shortfall. Present U.S. annual consumption of crude oil is over 5 billion barrels. If the low short-term responsiveness of demand to price continues as it has in the past, the fees necessary to lower demand significantly would be quite large. Any shortfall tax would, therefore, collect tens, possibly hundreds, of billions of dollars. For this policy to be effective, these funds would have to be distributed in a manner deemed appropriate by the Congress before they could create significant fiscal drag. While the President has the authority to impose a tariff, he does not have the authority to institute a rebate. Hence, to impose any tariff or tax rebate plan would require new legislation.

A tax or import tariff would be most effective in capturing the shortage premium if imposed by all, or most, major oil-consuming countries. If major International Energy Agreement (IEA) members imposed taxes or import tariffs to reduce internal demand, their actions would lessen increases in world prices. If the United States had to act unilaterally, however, the effectiveness of a tax or tariff would be greatly reduced. The United States is only one-third of the world market and unilateral action would serve mainly to improve availability elsewhere.

Depending upon the response of foreign oil producers, the oil price premium created by the shortfall would remain in the hands of the governments of the consuming nations for use to mitigate the negative macroeconomic effects of the shortfall. 1/ Thus it would be essential that use of this policy be tailored to the anticipated response of the producer nations.

Several types of oil taxes are available. The principal options, discussed below, include import tariffs, crude oil refining fees, and gasoline taxes.

Import Tariff. If a tariff were imposed on imported crude oil and products, the price of all domestic oil and products would also rise to the world price plus the tariff. Thus, while foreign producers might lose some of their shortage premium, domestic producers would benefit doubly from

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1/ If faced with a tariff, oil producers could either cut production to maintain prices, or cut prices to maintain production, or cut some of both. The exact nature of one's assumptions about their response would determine the shares of the tax burden.

the initial price rise and from the tariff. This double windfall might encourage some increased domestic oil production as the duration of the disruption increased.

Crude Oil Refining Fee. This option would place a tax on all crude oil used by U.S. refiners, both domestic and imported. Imported refined products would be taxed on an equivalent basis. Thus, its effects would be felt by domestic as well as foreign crude oil producers, unlike the import tariff. Reduction of domestic producers' windfall would lower, if not eliminate, incentives for increased production, although significantly higher production might not be possible in any case, at least for the short term. Like the tariff, a refining fee could be imposed unilaterally or in conjunction with other nations.

Gasoline Tax. Instead of using a tax to increase the prices of all oil products, the government could concentrate the effects on one product: gasoline. The benefits of concentrating the price increase on one good is based on the following argument. If the prices of all oil products rose, these increases would filter through the economy and raise the price of all goods and services. If the price of oil subsequently declined after the shortfall when the tax was removed, prices of all goods and services would not be likely to come down, since prices tend to stick at their higher levels. Thus, the general price level would have been increased. With a tax on gasoline alone, this rise in general prices could be avoided to a certain extent. Since businesses use only 20 percent of gasoline, most gasoline is in the final demand sector. Therefore, increases in gasoline prices do not ripple through the economy as much, and then only after a delay through indexed benefits and the price-wage spiral. In addition, restricting the use of gasoline might be more equitable than restricting heating fuels and less recessionary than restricting industrial fuels.

Coupon Rationing

Unlike the various tax policies discussed above, coupon rationing would not use the pump price to limit demand for gasoline. Under this policy, the government, through administrative action, would set the quantity of gasoline that could be consumed by restricting gasoline purchases to holders of ration coupons. In the event that this policy was invoked, the government would ascertain the size of the shortfall and issue coupons accordingly. Price controls would be needed, since, without them, prices would rise to their market clearing level, rendering the rationing system redundant.

Under the current standby rationing plan, coupon checks would be issued quarterly to registered vehicle owners, using the states' historical

levels of use as a basis for allocation. These checks could then be taken to specified locations and exchanged for coupons that would be used when buying gasoline. The coupons would be freely negotiable and persons with extra coupons would probably be able to sell them at some profit. Thus, because of price controls, the price of gasoline would remain stable, while the price of coupons would rise. Gasoline would still be allocated according to demand, but only a portion of demand would be expressed at the pump; the rest would be expressed in the price of the coupons. In this way, the shortage premium would remain in the hands of the consumers as a group. An additional advantage of coupon rationing is that many people view it as the most equitable method of allocating a scarce resource.

Domestic Price Policy

In the event of a shortfall, policymakers will have to decide how they wish to treat domestic oil prices. This is a problem common to most disruption policies. The question is not whether long-term price controls should be reimposed--the decision to decontrol domestic oil prices for the long run was made in 1975. Rather the issue concerns how to address transient price increases.

The main advantage of imposing temporary domestic controls on crude oil and product prices would be the resulting reduction in the transfer of income from consumers to domestic producers. Since domestic sources provide over 60 percent of U.S. oil consumption (although this percentage is expected to decline in the future), reduction of this income stream would significantly lower the income transfer that causes oil price drag and GNP loss.

On the other hand, price controls would have several disadvantages. They would lead to excess demand (the infamous gasoline lines) and less conservation since there would be no large price increases to dampen demand. This excess demand would exacerbate international income transfers and contribute to higher oil prices. It would be costly, both in terms of time lost in gasoline lines and of the social cohesion lost in the competition for remaining products. Presumably since rising world prices would increase the cost of imports, consumers still would have some incentive to conserve. In addition, even under the threat of price controls, no speculative oil inventories would be held since no profit could be realized on their sale. (Whether such inventories, other than government-sponsored, would ever be substantial is not clear, since, as discussed above, the carrying costs of oil inventories are large and, by definition, the return to a speculative stock is uncertain.)

Domestic wellhead price controls would also lower the effectiveness of a tariff. With domestic price controls, consumers would face a weighted average of uncontrolled world oil prices and controlled domestic oil prices. Since imports constitute roughly 40 percent of all oil consumption, consumers will only feel, at most, 40 percent of the tariff. Thus, if the Congress imposed both price controls and a tariff, the tariff, to be effective in reducing demand, would have to be much larger than would be the case without controls.

Finally, price controls are not the only way to reduce the flow of income to domestic producers. Windfall profits and corporate income taxes would probably capture most of the shortfall premium.

ANALYSIS OF POLICY OPTIONS

Each of these policy options was analyzed in light of the central aims of a shortfall policy:

- To reduce the adverse economic effects;
- To mitigate the negative effects on income distribution; and
- To ensure administrative ease and competence, especially in allaying panic and perceptions of inequity among consumers.

Reducing the adverse economic effects of a shortfall is the principal target of ameliorative policies. Insofar as oil shortfalls lower real GNP, there will be less income for all if a shortfall is allowed to run its full course. Policies should also be designed to ensure equitable income distribution and to promote efficient use of energy, but if consumer incomes decline, the nation as a whole loses. Though the physical shortage of oil is unavoidable, many of the macroeconomic and income distribution effects of a shortfall are not.

Proposed policies must also consider the government's ability to use the tools at hand. Reliable data, such as the response of demand to increased prices, is often not available, nor are effective bureaucracies easily established, especially in the crisis atmosphere of a large oil shortage. Programs that require new federal actions--such as taxes or rationing--must be prepared in advance to be ready for immediate implementation. Effective policies must also be sensitive to the size of the disruption and the possibility of errors reverberating through the system. If a clerical error or a significantly erroneous estimate of demand elasticity can cause damage to millions, then the system cannot be considered stable. A policy,