therefore, has to be designed to minimize the results of errors, both big and small.

This section summarizes the results obtained from analyses of the performance of the various policies during oil shortfalls. All the cases analyzed in this paper assume a year-long oil supply interruption starting in 1982. The analyses describe the effects of each policy on inflation, employment, output, income distribution, and ease of administration.

In addition to the qualitative analysis, two shortfalls are simulated, using a large macroeconomic model: a large shortfall in which world markets lose 7.5 million barrels per day, and a short one in which 3.0 million barrels per day are lost. U.S. oil imports initially decrease by 2.5 and 1.0 million barrels per day, respectively. These figures represent slightly more than 40 percent and 15 percent of current U.S. imports, respectively. (By contrast, the 1973-1974 oil embargo cost the United States an average of 1.0 million barrels per day in imports, or 18 percent, for four months.) In response, oil prices rise from a baseline projection of $39 per barrel at the beginning of 1982 to $86 and $57 per barrel, again respectively. In the year following the shortfall, supply is restored and prices fall to $57 and $47, respectively.

The Data Resources, Incorporated (DRI) model of the U.S. economy was used to simulate the macroeconomic effects of an oil disruption under each policy. The results should be treated as illustrative of the type of impact that might occur, and not as forecasts of the course of the economy during the next oil shock. The rapid increase in oil prices during a disruption would produce income flows beyond the historical experience upon which the model draws. While these models can simulate mechanically the transfer of hundreds of billions of dollars between sectors, CBO cannot view the results as more than illustrative of the macroeconomic effects. At larger levels of disruption, minor model specifications and assumptions become quite important and may significantly influence the results. Nevertheless, these results are useful in conveying a sense of the magnitude of the income flows and the relative effects of alternative policies.

To test the effectiveness of the policy alternatives, rather than using the Strategic Petroleum Reserve, private stocks, or the spare capacity in OPEC, it is assumed that these price increases elicit no supply response, and that they do not open stocks held by governments or private individuals.

These price levels assume short-run elasticities of demand for crude oil in the -0.1 to -0.15 range. While many analysts feel that past demand has been that inelastic, future demand may be more responsive (certainly so

in the long run). If future demand is more elastic, then the world crude oil prices would rise less in response to a shortfall and the negative economic effects forecast here would overstate the actual consequences of an oil interruption. For example, with an elasticity twice as high, prices would rise only to $45 in the 1 million barrel per day case, and the economic impact would be proportionately reduced.

Since the results of the simulations are sensitive to monetary and fiscal policy assumptions, these are kept the same across policies and should not affect the relative effectiveness of the policies. All simulations assume constant nonborrowed bank reserves. To ensure that model results occurred because of the policy options and not from other changes in fiscal policy, it was assumed for all simulations that the incremental proceeds of the windfall profits tax were rebated one quarter later through income tax cuts, and that the proceeds of taxes, tariffs, and fees were rebated as collected through income tax reductions. The assumptions about receipts from the windfall profits tax are based on law in effect in July 1981.

Neutral Policy Option

Economic Effects. Under this option, the combination of oil shortage and price increase would have a recessionary impact on the economy, while simultaneously increasing inflation. The large shortfall would transfer an additional $232 billion from consumers to foreign and domestic oil producers and the federal government in the first year alone (see Table 2). This massive transfer of funds would result in significant oil price drag. When simulated with the DRI model, this income transfer resulted in an average constant dollar GNP loss of 4.3 percent for the first five quarters below the baseline projection in which economic conditions were identical, but in which no shortfall occurred (see Table 3).

Unemployment would also rise significantly. The large shortfall simulation resulted in a fifth quarter rise in the unemployment rate of 1.8 percentage points above the baseline of no shortfall. In this simulation, unemployment peaked one quarter after the shortfall had ended, even though oil prices were falling by that time.

In the small shortfall, the negative GNP effects would be countered by automatic stabilizers (unemployment compensation, food stamps, and so forth), which would tend to increase the federal deficit in the event of a recession. As the size of the shortfall increased, the windfall profits tax receipts would increase more rapidly than automatic expenditures, thus aggravating the decline in real output and employment. A program of

TABLE 2. ILLUSTRATIVE INCOME FLOWS OF ALTERNATIVE POLICIES (In billions of current dollars) a/

Options	Incremental Revenues: Foreign Oil Producers	Incremental Revenues: Domestic Oil Producers	Incremental Revenues: Federal Government	Total Incremental Consumer Expenditures b/	Tax Cut c/	Net Consumer Income Loss d/
Neutral Policy						
Small shortfall	28.6	21.5	53.8	103.9	33.3	70.6
Large shortfall	43.5	53.9	134.5	231.9	83.3	148.6
Unilateral Import Tariff						
Small shortfall	13.0	38.4	135.4	186.8	99.0	87.8
Large shortfall	-9.1	87.4	280.8	359.0	197.7	161.3
Multilateral Import Tariff						
Small shortfall	-9.9	28.0	121.6	139.7	95.0	44.7
Large shortfall	-34.0	66.2	261.8	294.0	198.8	95.2
Crude Oil Refining Fee						
Small shortfall	17.0	20.5	162.6	200.1	142.6	57.5
Large shortfall	-5.2	42.7	347.3	384.8	305.3	79.5
Gasoline Tax						
Small shortfall	20.7	20.6	150.0	191.3	129.9	61.4
Large shortfall	e/	e/	e/	e/	e/	e/

NOTE: The small shortfall is assumed to be 1 million barrels per day for the United States; the large is 2.5 million barrels per day.

a/ Fourth quarter 1982 extrapolated to an annual basis.

b/ Sum of incremental revenues of foreign and domestic oil producers and the federal government; numbers may not add to totals because of rounding.

c/ A tax cut was used in all simulations as the vehicle for refunding government receipts to consumers.

d/ Incremental consumer expenditures, minus tax cut.

e/ Not simulated.

TABLE 3. ILLUSTRATIVE MACROECONOMIC EFFECTS OF POLICY OPTIONS

Options	GNP Loss (Percent of projected GNP) a/	Fifth Quarter Increase in the Unemployment Rate (In percentage points)	Fourth Quarter Increase in the Price Level (In percents) b/	Eighth Quarter Increase in the Price Level (In percents) b/
Neutral Policy				
Small shortfall	1.6	0.7	3.1	1.9
Large shortfall	4.3	1.8	7.2	5.5
Unilateral Import Tariff				
Small shortfall	1.2	0.5	6.1	2.7
Large shortfall	4.3	1.9	13.0	7.6
Multilateral Import Tariff				
Small shortfall	1.0	0.4	5.0	1.7
Large shortfall	3.0	1.2	10.9	5.0
Crude Oil Refining Fee				
Small shortfall	0.8	0.4	6.4	3.0
Large shortfall	3.5	1.6	13.8	8.6
Gasoline Tax				
Small shortfall	0.6	0.2	5.7	3.0
Large shortfall	c/	c/	c/	c/

SOURCE: Data Resources, Inc. model of the U.S. economy.

NOTE: The small shortfall is assumed to be 1 million barrels per day for the United States; the large is 2.5 million barrels per day.

a/ Average constant dollar GNP loss for first five quarters.

b/ Percent change in GNP deflator relative to the baseline of no shortfall.

c/ Not simulated.

accelerated recycling into the economy of windfall profits receipts would be needed, therefore, just to counter the fiscal drag. Such a program was assumed, with a one quarter lag. Without this, the macroeconomic losses would be larger.

Inflation would also be aggravated by a curtailment. In the larger shortfall, the refinery acquisition price of oil would rise by roughly 120 percent with the result that oil product prices and other domestic energy prices would rise significantly. When simulated, the large shortfall resulted in an increase in the price level of 7.2 percent above the baseline in the fourth quarter and 5.5 percent in the eighth quarter, based on the GNP deflator.

Income Distribution Effects. As mentioned above, the shortfall would result in a large transfer of income to oil producers at home and abroad. The windfall profits tax and corporate income tax would ensure, however, that most of the domestic windfall would be captured by the government for redistribution. Of the total windfall produced, foreign producers would capture almost 20 percent and domestic producers, after all taxes, almost 25 percent. In the larger shortfall, net consumer income loss would be $148.6 billion; for the small one, $70.6 billion.

Administrative Ease. The federal bureaucracy can be presumed ready to handle present programs in the event of massive oil-induced dislocations. In the event of major downturns in the economy, many federal programs, like unemployment compensation and other transfer payments and entitlements, would be used much more intensively than is usual. In the 1974-1975 recession, these programs were able to increase their caseloads dramatically without significant deterioration in service. Since the windfall profits tax would increase federal revenues significantly, there would be ample funds available for these programs.

The central administrative problem with a neutral policy involves the rebate of the extra windfall profits tax revenues. In the large shortfall simulation, these totalled over $80 billion in the first year. The experience with tax cuts of this magnitude is quite limited. Furthermore, it might be difficult to achieve the political consensus needed to design a specific tax cut when sums of this size are involved.

Tax Options

Because of the very different nature of the various tax proposals, four different sets of simulations were performed: a unilateral import tariff, a multilateral import tariff, a crude oil refining fee, and a gasoline tax. They are analyzed together in this section.

This section first outlines the major assumptions used to simulate the effects of each tax policy:

- Unilateral Tariff. In this scenario, the United States alone imposes a tariff above the shortfall price increase, causing the world price to fall, but only by roughly one-third of the tariff. Thus, U.S. consumers have to bear the brunt of the tariff. If U.S. consumers bear an even larger share of the tariff, the benefits of a unilateral tariff would be further reduced. The net result of the unilateral tariff is that oil in the United States is more expensive, while oil in the rest of the world is less expensive and more available than under the neutral policy. On the other hand, the federal government is able to capture a portion of the shortage premium that would have otherwise been lost to foreign producers. In all tariff simulations, domestic producers are assumed to raise their prices to match the world level plus the tariff. The tariffs are all imposed for the duration of the shortfall after a one quarter delay. In the unilateral case, the tariff levels are $20 per barrel in the event of a small shortfall, and $49 per barrel for a large shortfall. The tariff revenues are used to reduce income taxes.

- Multilateral Import Tariff. In this scenario, IEA members impose tariffs high enough to conserve enough oil to eliminate a shortfall. For modeling purposes, the policy is assumed to be successful and world oil prices remain at preshortfall levels. To the extent that this policy is not successful, the benefits of the tariff would be reduced. The required level of tariff is $24 per barrel in the event of a small shortfall, and $60 per barrel for a large shortfall. The funds collected are used to reduce income taxes in all participating countries.

- Crude Oil Refining Fee. In this option, the U.S. government taxes all oil, both domestic and foreign, used by U.S. refiners. Imported refined products are taxed on an equivalent basis. World prices are assumed to rise, though not by as much as without any tax. In its effects on world prices and quantities, the crude oil refining fee appears to be very similar to the unilateral tariff. The main difference is the direct collection of more of the shortage premium from domestic producers with the fee rather than partial collection of less of the premium through the windfall profits tax under the tariff. The fee ends with the shortfall. The fee would range from $20 per barrel in the event of the small shortfall to $49 per barrel in the event of the large shortfall.

- Gasoline Tax. In order to place the entire burden of a large shortfall on gasoline, consumption would have to drop almost 40 percent. Because of this, a gasoline tax would not be an effective option in the event of a large shortfall. It is difficult to conceive of a tax program that could decrease gasoline consumption by 40 percent, nor, given present knowledge, could the estimates of the effects of such a program be viewed with much confidence. Therefore, gasoline taxes have been simulated only for the small shortfall. Because of the smaller base upon which to place the burden of the tax, the gasoline tax is set at $1.14 per gallon (or $48.3 per barrel), approximately twice the level of taxes on crude oil for the small shortfall. Like the import tariffs and the crude oil refining fee, the gasoline tax funds are used to reduce income taxes. No special assumptions have been made about the relative price sensitivity of the demand for gasoline versus other oil products. Gasoline demand, however, is assumed to be more elastic than crude oil demand. If gasoline demand is only as responsive as crude oil, the macroeconomic benefits of the gasoline tax are overstated. If gasoline demand is much more price sensitive, the economic benefits are understated.

In the various tax and tariff simulations, imposition of the tax is delayed by a quarter, because it is assumed that the government will not be able to implement a rebate mechanism immediately. If, however, the tax is imposed immediately (a preemptive tax) but the refunds delayed, the resulting fiscal drag will be much more severe than it would be under the neutral policy option. On the other hand, if prices are allowed to rise before the tax is imposed, many of the benefits of the tax (that is, the capture of the windfall) will be lost if prices stick at their higher level. Thus, policymakers face a tradeoff between exacerbating the macroeconomic effects of a disruption by imposing a preemptory tax before the rebate is ready, or risking the loss of the effects of a tax if prices do not drop.

Economic Effects. When simulated, the policies produce strikingly different effects on output and employment. Under a large shortfall, the unilateral tariff would result in an average real GNP loss of 4.3 percent for the first five quarters, identical to that of neutral policy, while a multilateral tariff would reduce this to a 3.0 percent loss. The unemployment rates exhibit a similar disparity. The unilateral tariff would result in a fifth quarter unemployment rate 1.9 percentage points greater than the baseline while the multilateral tariff would result in a fifth quarter increase of 1.2 percentage points. The inflationary effects of the import tariffs would be larger than those of a neutral policy. The larger shortfall would produce a fourth quarter price level increase of 13.0 percent with the unilateral tariff

and 10.9 percent if the United States was joined by other IEA members. Eighth quarter figures were 7.6 and 5.0 percent, respectively (see Table 3).

When the refining fee option was simulated, the model responded to the change in income flows. The average five-quarter real GNP loss was 3.5 percent under the large shortfall. The unemployment rate showed a peak increase of 1.6 percentage points. The refining fee would produce a price level increase of 13.8 percent over the base case in the fourth quarter and 8.6 percent in the eighth quarter.

When the gasoline tax was simulated for the small shortfall, the average real output loss was 0.6 percent, compared to 1.6 percent under a neutral policy. Unemployment was correspondingly reduced to 0.2 percentage points above the baseline, compared to 0.7 percentage points under a neutral policy.

Inflation, under the gasoline tax option, is much more complicated to measure than under the other options. The Consumer Price Index (CPI) is more gasoline intensive than is the economy as a whole, since private consumer purchases constitute the bulk of gasoline expenditures. Thus, individual consumers would feel the inflationary impact of the gasoline tax more than would the economy as a whole. Since a gasoline tax, unlike other policy options, enters the CPI directly, such a tax would increase benefits, such as Social Security, that are tied to the CPI. These second-round changes would increase the inflationary effects of the gasoline tax. A decision regarding the definition of the CPI in this circumstance might be necessary. Despite this, to make the gasoline tax simulation comparable to the other tax options, the measure of inflation used is the percent change in the GNP deflator. When the gasoline tax was simulated, the price level was increased by 5.7 percent after four quarters and 3.0 percent after eight (see Table 3).

Income Distribution Effects. With a successful multilateral tariff, the shortage premium would be retained by consumer nations to a greater extent than under neutral policy. Income flows to foreign oil producers would actually decrease under a successful tariff, more so with a multilateral tariff than with a unilateral one. However, under a unilateral tariff, most of the money retained would be transferred to domestic oil companies.

The primary impact of the refining fee would be to concentrate the bulk of the shortage premium in the hands of the government for use in stimulating the economy. Of the total increase of revenues raised from consumers, over 90 percent would end up in the hands of the government, as compared to less than 60 percent under neutral policy, which explains the decreased GNP loss. Domestic oil producers would also find their share of

the windfall was reduced from almost 25 percent to roughly 10 percent. This might reduce the marginal incentive to produce more oil.

The gasoline tax, like the unilateral tariff and refining fee, would reduce only U.S. demand. As a result, like the tariff or fee, it would have limited impact on world prices. (Like the unilateral tariff, the simulation assumes U.S. consumers bear the bulk of the gasoline tax.) If properly set, however, a gasoline tax might mitigate price increases and windfalls to domestic oil producers. Like the refining fee, the primary distributive impact of the gasoline tax seems to be that the gasoline tax would concentrate the windfall in the hands of the government. The government's refunding program would ensure that the windfall premium was relatively equitably distributed among consumers. The exact distribution of the windfall would depend on the details of the refunding program.

Administrative Ease. The two central administrative difficulties confronting a tax or tariff proposal are:

- Determining the correct tax level; and
- Recirculating the funds quickly enough so as not to create fiscal drag.

First, the elasticity of demand for oil and gasoline is not known with enough accuracy to set the tax or fee with confidence. Estimates of the short-term elasticity of demand for crude oil and gasoline vary from roughly -0.05 to -0.5. The appropriate tax level would be extremely different for each end of the range. For example, even in the relatively tight range of -0.1 to -0.15, the tax or fee required to decrease gasoline demand by 20 percent would vary considerably. If gasoline supply were to be constrained to 80 billion gallons per year (a figure roughly equivalent to a 20 percent shortage or about 1.3 million barrels per day), the difference in federal revenues between these two elasticity assumptions, which are equally defensible, would approach $90 billion. In addition, since the elasticity of demand also changes over time, the problem of setting the tax or fee level would be complicated because planners would be aiming at a moving target. This margin of error in elasticity estimates obviously could limit the potential effectiveness of a chosen policy.

While it is impossible to obtain precise information of this sort, absolute accuracy might not be needed. If the tax or tariff were set too low to achieve the desired decrease in demand, the world price could rise to compensate. The United States, alone or in conjunction with other IEA members, could then either raise the tax again to attempt to capture the additional windfall, or could allow foreign producers to keep the extra funds,

perhaps in exchange for political or economic concessions. If it did the latter, the output benefits of the tariff could be somewhat reduced, as income would be flowing to producers, but the inflationary impact would decrease as well. If the tax was set too high, either producer oil prices would drop below predisruption levels (although this would seem unlikely) or demand would be over-restrained, and again the GNP loss might be increased as might the inflationary impact. In such an event, the tax could be lowered, but this move would have uncertain effects as final product prices might remain at their higher levels. Although policymakers could change an incorrectly set tax, tariff, or fee, such a change could have major costs. A rise in the tax might very well stimulate short-term oil demand as consumers increased buying in anticipation of further price rises. It also might exacerbate perceptions of government incompetence.

No less a problem would be to recycle tax receipts fast enough so as not to induce further macroeconomic contractions. Without prompt reimbursement, the increased level of outlays could force families to cut back on all spending. If not reimbursed, the gasoline tax, for example, would represent an increase in federal taxes of 50 percent for the median family of four, under the small shortfall scenario.

The most commonly discussed plan to reimburse the tax, often called the "prebate" plan, would refund the money by decreasing the level of income tax withheld from paychecks. The amount withheld would be recomputed, using both tax and refund criteria. Since the tax, tariff, or fee would reduce the income tax on a dollar-for-dollar basis, the problem of fiscal drag resulting from delays in the rebates would be minimized, that is, the federal government would never receive additional revenues from the taxes.

Even though the prebate plan would avoid many of the macroeconomic problems associated with the tax options, it is not without its own drawbacks. The Internal Revenue Service (IRS) could serve as a rebate mechanism, but only with difficulty. The complexity of the tax schedules would be increased greatly. The IRS would have to inform and educate all the employers in the country about the changes in the tax system. Serving as the rebate mechanism would also increase the IRS' burden in keeping track of multiple jobholders, persons with changes in marital or job status, and so forth. The IRS auditing effort would also have to be increased substantially and might not be able to accomplish its mission effectively.

In the event of a substantial shortfall, the prebate system would largely replace the income tax system with a tax on crude oil and/or products. A tax designed to reduce gasoline consumption by a quarter, for

example, would produce revenues sufficient to compensate entirely for the income taxes of a family of four with a gross adjusted income of $20,000. In the event of a shortfall, this plan would call for adjustment of all the tax schedules, based on the first signs of trouble in the world oil market. The changes in the tax rates could not be set in advance, since they would have to vary with the situation.

Because the income tax system is quite complex and was built up over a period of years, substituting a new system imposed for emergency purposes might not be the optimal strategy. One possible alternative might be to set the tax/rebate system ahead of time. Thus, while the tax would not be designed for the specific shortage, and some of the shortage premium would be inevitably lost or overtaxed, the proposal would substantially reduce the administrative burden of the tax. In this way, the tax schedules could be publicized in advance and ad hoc adjustments could be avoided.

Any plan to rebate through the income tax system, however, would have to cope with the millions of persons who do not pay taxes, but rather live on various income maintenance programs. Since these persons would be paying, directly and indirectly, the higher oil product prices, induced in part by federal taxes or tariffs, they also should receive some rebate. This rebate might be distributed through temporary increases in recipients' benefit levels. Some mechanism would also have to be designed for persons missed by both the tax and benefit programs. It should be recognized that each addition to the rebate mechanism to make it more comprehensive and sophisticated would make it administratively more cumbersome. At some point, further attempts to achieve a perfectly just rebate program would not be worth the increased cost.

In addition to the generic tax and rebate problems outlined above, the gasoline tax would be vulnerable to some unique administrative problems. As mentioned above, the gasoline tax would feed directly into the CPI. Whether and how to adjust the CPI to reflect the fact that this tax is temporary and refunded is a matter of concern.

In point of fact, refineries are not sufficiently flexible to permit the entire shortfall loss to be taken out of gasoline production. In the event of a substantial disruption, however, up to 80 percent of the loss could be absorbed from gasoline production, depending on the actual amount and mixture of the crude oil lost. Providing refiners with the incentives to meet this goal could be difficult, since each refinery has a unique set of profit margins on different products and a different mix of crude oil types and so would respond differently to an identical set of circumstances. Thus while placing a tax of sufficient size on gasoline might reduce demand by the desired amount, refiners might choose to supply a different level of product.

This could create further problems, causing a longer adjustment period than other tax options.

Coupon Rationing

Since the administration of a rationing program would be difficult, it would probably not be imposed unless the shortfall was quite large. Coupon rationing is most useful for those extreme situations in which it would equitably distribute the oil shortage and price burdens and thus promote social cohesion.

Economic Effects. Since coupon rationing would involve government control of significant portions of the economy, the relationships underlying the conventional macroeconomic models would change, rendering the models useless for some purposes. Therefore, the coupon rationing policy was not simulated. In theory, a coupon rationing scheme would be equivalent to a refundable gasoline tax. Ideally, coupons and tax rebates could be distributed so that consumption and income distribution were similar. Therefore, the effects of a gasoline rationing system should be similar to those of a gasoline tax. In reality, however, there would be major differences. Of these, the most significant would be the potential for economic damage as the increased administrative burden caused administrative errors to multiply. Aggregate supply inevitably would be curtailed, thus decreasing the positive economic benefits of an equivalent tax scheme.

Income Distribution Effects. A coupon rationing program would keep the domestic part of the shortage premium in the hands of consumers. If domestic wellhead prices were held constant through controls, domestic producers should experience no windfall. The government would give the ration coupons away free, but would limit their quantity. The government could collect a small tax to pay for the administration of rationing, but this should not be significant.

Unless instituted with a tariff, however, a coupon rationing plan would not decrease the international income flows and might actually increase them. To prevent foreign producers from capturing more of the shortfall premium from consumers, the government might have to set a minimum price on coupons, perhaps through open market operations. If this were not done, foreign producers might raise their prices beyond that immediately suggested by the market. Since domestic prices would be controlled, consumers would face a weighted average of controlled and uncontrolled prices. Foreign producers could raise their prices until this weighted average equalled the price all oil would have commanded without controls. Because

of oil markets in other nations, it is unlikely that foreign producers could actually raise their prices to capture all the premium; still, part of the premium clearly would be vulnerable. Under such circumstances, without some floor price for coupons, the economic premium, rather than passing from domestic producers to consumers, would pass from domestic producers through consumers to foreign producers.

The entitlement conferred by coupons would be central to a rationing plan. Everyone who received a coupon would receive equal access to gasoline, highlighting the appearance of equity which might be absent from plans using higher prices and taxes to ameliorate shortfalls.

The current standby plan, which would allocate ration rights according to vehicle ownership, might be tilted slightly toward lower-income families. This would occur because lower-income families drive less while all vehicle owners would receive the same amount of coupons. (This would be offset to the extent that lower-income families have less fuel-efficient vehicles.) Assuming lower-income persons sold their extra coupons and all driving was decreased evenly from present consumption patterns, the plan would result in a slight net increase in the annual income of lower-income households, while upper-income households would have to spend more. Since the coupons would be, in effect, a second currency, the distributional impacts of the plan would be very sensitive to the allocation of ration rights.

Administrative Ease. The central administrative problem with coupon rationing is that, in effect, a second currency (ration coupons) would be introduced in a short period during a crisis. Currency now in circulation totals about $110 billion. Gasoline consumed in the United States has averaged about 100 billion gallons per year. Thus, in the event of a 20 percent shortfall, the government would have to put into circulation a second currency almost three-quarters the size of the currency now in place, assuming each coupon would be good for one gallon. Given the level of effort now required for maintaining order in U.S. currency, the size of this task should not be underestimated. In addition, the second currency would be distributed according to criteria different from the first. Major tasks confronting a coupon rationing program would include ensuring: (1) efficient distribution of coupons to consumers, (2) proper allocation of fuel among states, and (3) continued supplies of fuel.

Hoarding in anticipation of coupon rationing might also be a problem. This phenomenon should be transitory, but could result in a shaky beginning for the program. A greater problem would result from the uneven quality of different state motor vehicle registration files. If these files were used as they now stand, a significant fraction of the potential recipients could be missed. If even 1.0 percent were omitted, approximately 1.5 million vehicle

owners would be without coupons. Thus rationing might begin with several million individuals not having received their coupon checks.

Depending on the number of persons missed, the white market for coupons might be able to handle some of the initial disequilibrium. Persons who did not receive their coupon checks could purchase them from persons with extra coupons. When they did receive their coupons, they could sell them to recoup their expenses. If the number of persons missed were large, however, the market might not be able to provide coupons at a moderate price for all who desired them. Since the coupon market would not be fully established, market modalities would be unfamiliar to large numbers of people. The general atmosphere would be one of extreme uncertainty. Thus the initiation of the coupon market would likely be unstable. An influx of several million purchasers might precipitate panic buying of coupons, which would defeat the purpose of rationing.

An often-cited problem with the plan to distribute coupons to owners of registered vehicles is that it would encourage people to buy and register junk cars for their coupon value. Simply disallowing new registries would be counterproductive as it would further restrict whatever demand remained for the automobile manufacturing industry. Permitting case-by-case settlements on the basis of historical usage, as DOE has proposed, would be an administrative nightmare of countless hearings and appeals.

An additional issue is the imposition of wellhead price controls. The Administration plan, as announced last year, did not actually include, but only assumed, price controls. In the absence of wellhead and product price controls, coupon rationing would not keep oil companies from raising gasoline and other product prices sufficiently to capture any windfall. Coupon prices would then drop as product prices rose. Without price controls, therefore, rationing would lead to a situation similar to the neutral policy of allowing the market to allocate and price oil.

Similarly, without refinery mix and allocation controls, the amount of fuel in each state would not necessarily match the needs. A rationing plan would be premised on faith in its coupons. If supplies and demand in any given state did not match, lines would begin to grow, and this could defeat one of the purposes of the rationing plan: ensuring an orderly petroleum market. The government might, therefore, need to adjust the level of product stocks and mix to ensure that such shortages do not occur.

The President's budget proposals for fiscal year 1982 include elimination of the office responsible for the preplanning necessary for the institution of coupon rationing. Abolition of this office would, in effect, mean

that coupon rationing would be eliminated as a policy option. The preplanning is intended to reduce to one quarter the leadtime needed to institute coupon rationing. Without such advanced preparation, a much longer period would be needed. Indeed, a major crisis could come and go without a rationing plan being available. If the planning office was eliminated and a major crisis did occur, the Administration might find itself subject to myriad demands for action and relief without any tools at its disposal. Any actions it took in response to this political pressure would, of necessity, be ad hoc. Given past experience with ad hoc efforts, it is unlikely these would work smoothly.

CHAPTER V. POLICY TRADEOFFS AND IMPLEMENTATION

The macroeconomic tradeoffs among the options discussed in Chapter IV are fairly clear: some policies are less inflationary but sustain higher output loss, while other policies reduce output loss but are more inflationary. Tradeoffs also exist between macroeconomic considerations and the other goals of disruption policies: some policies are more equitable but less flexible, while other flexible policies are less equitable. Given these tradeoffs, there is no single best policy. The policy of choice will depend on the nature (for instance, size, expected duration, cause, and resolution) of the disruption. This chapter makes explicit the tradeoffs between the different policies and the situations in which they could be implemented with greatest advantage.

POLICY TRADEOFFS

Macroeconomic Tradeoffs

A tradeoff between inflation and GNP loss is possible. Since GNP loss causes unemployment, the tradeoff will also be between unemployment and inflation. In essence, the policies must accommodate a real loss to the economy. The tradeoff is among ways to take it. At lower levels of disruption, if real income is valued more highly than low inflation, then the multilateral tariff or a crude oil refining fee would be the preferred alternative. If other International Energy Agency (IEA) members did not cooperate, the options available would be a unilateral tariff, a refining fee, or a gasoline tax. If lower inflation is more valued, even at the cost of lower income, then a neutral policy would be the appropriate policy.

At 2.5 million barrels per day shortfall, if income losses are more important than inflation, the multilateral tariff would rate best, followed by a refining fee. If combating inflation is the central policy goal, then a neutral policy would be the appropriate course of action. (Since coupon rationing has not been simulated, including it in a discussion of macroeconomic tradeoffs is impossible.)

Tradeoffs Among Other Criteria

Macroeconomic considerations are not the only criteria to use in evaluating policy. Promotion of social cohesion and administrative ease

were previously singled out as being important, independent of their effects on macroeconomic variables.

At lower levels of disruption, both the crude oil refining fee and gasoline tax would produce similar GNP losses. Since the crude oil fee would not distort market allocation, it would be the policy of choice if only economic criteria were considered. A gasoline tax might serve to ease uncertainty in the transportation sector, however. Thus, policymakers might consider balancing some loss of economic efficiency against alleviating consumer fears of shortages. Similarly, there are tradeoffs between the flexibility of unilateral actions and the additional capture of the shortage premium that multilateral tariffs might bring.

In cases of larger disruptions, the social cohesion and perception of equitable distribution of the burden, which is the main benefit of coupon rationing, would be a tradeoff against the administrative difficulty such a plan would present. The rationing plan would have to be well-executed, however, in order to maintain intact its perceptions of equity.

POSSIBLE SCENARIOS FOR POLICY IMPLEMENTATION

The policy analyses of the previous chapter suggest that different policies might have a comparative advantage, depending on the characteristics of the shortfall. The most important of these characteristics are whether the curtailment and subsequent price rise are permanent or transitory and whether consuming nations coordinate activities or not. This section analyzes the implications of various policies when these characteristics are considered.

Temporary Interruptions

In the event of a small disruption (less than 1.0 million barrels per day), the ease and efficiency of a neutral policy would give it a natural advantage. As the size of the shortfall increases, however, and oil price drag might become more severe, some federal action might be required. In small to intermediate sized, but temporary, shortfalls, a gasoline tax might have a comparative advantage. At low levels of shortfall, the refunds would be manageable and need not involve complex tax changes that would be required at higher levels. Even if the shortfall was large enough to require a coupon rationing program, a gasoline tax might serve as a buffer during the period after the shortfall, but before the rationing program could take effect.

Of course, if U.S. policy for reduction of demand was coordinated with IEA efforts, the benefits of these programs would increase as some of the additional income flow to producer nations was reduced. The coordination with IEA members would not have to be accomplished only through a tariff. The gasoline tax or crude oil refining fee might also be imposed multilaterally to increase the benefits of both.

Somewhere above a shortfall of 2 million barrels per day, a shift to gasoline coupon rationing might be considered. Taxes would no longer remove much demand and the amount of money collected by the tax would become a significant fraction of total tax revenues, making rebates cumbersome. Although coupon rationing would also be cumbersome, it would have the advantage, at these larger levels of disruption, of limiting demand to the quantities available while minimizing GNP loss. Like the gasoline tax at lower levels, the coupon rationing plan would be most effective if implemented in conjunction with other nations' efforts to reduce demand. It should be noted, however, that in the event of a very large shortfall, the gasoline market might not be able to absorb the entire shortfall.

Permanent Declines in Petroleum Production

If the curtailment appeared to be permanent, or so long lasting as to result in long-term changes in the market, the principal purpose of policy would be to help the economy adjust to lower levels of oil consumption and higher prices. At low levels of disruption, neutral policy might provide as adequate an option as any. As the disruption increased, the shock would cause more disruption and oil price drag might be a problem. While with the temporary shortfall there would be an end to the income transfers, with a permanent oil loss, debilitating income transfers and low GNP growth might continue for several years if the consuming nations could not agree on a strategy to reduce demand. Policies to manage the long-run problems caused by oil imports are beyond the scope of this report, however. One such policy--a tariff on imported oil--is discussed in Appendix A.

APPENDIXES