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ENERGY SECURITY

Analysis of Studies on Economic Consequences of an Oil Import Tariff

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The Honorable Philip R. Sharp
Chairman, Subcommittee on Energy
and Power
Committee on Energy and Commerce
House of Representatives

Dear Mr. Chairman:

On April 27, 1988, you requested that we analyze why recent studies reached apparently different conclusions about the economic consequences of a tariff on imported oil. Specifically, you asked us to compare the assumptions and methodologies of studies by the Department of Energy (DOE) and Harvard University's Energy and Environmental Policy Center so that the Subcommittee could better interpret their conclusions. We also compared the DOE and the Policy Center studies with others that are comparable. This briefing report contains the results of our work. We previously briefed your staff on our tentative findings.

In summary, these studies use largely the same cost-benefit approach and data but arrive at different conclusions as to the net economic impact of an oil import tariff. While DOE found that a $10-per-barrel tariff results in a net cost to the economy, the Policy Center study, under the same tariff scenario, indicates a net benefit to the economy. The DOE and the Policy Center studies reached different conclusions principally because their estimates of macroeconomic costs--the impact of the tariff on the Gross National Product (GNP)--were based on different assumptions. These assumptions concerned whether governmental actions, such as increasing the money supply or reducing other taxes, would occur and would modify the recessionary effect of an oil tariff. With this exception, the two studies are very similar. Neither study addressed the regional implications of an oil tariff.

Specifically, the DOE study assumes that there will be no change in the federal government's fiscal and/or monetary policy to alleviate the recessionary effect of imposing a sizable oil import tariff. Using this assumption, DOE estimates that the net effect on the economy would be a loss of $154 billion over an 8-year period. By comparison, for purposes of its study, the Policy Center study assumes that through the use of government fiscal and monetary

accommodation policies, the economy adjusts to higher oil prices within 1 year. Under this assumption, with other assumptions constant, the Policy Center study concluded that the net effect on the economy would range from a loss of $1 billion to a gain of $10 billion over an 8-year period.

Since the DOE and the Policy Center studies differed in this assumption, we found that it was difficult to assess if one study more accurately reflected the GNP effects. Therefore, we compared these studies with others by the Energy Modeling Forum at Stanford University and by Data Resources, Inc., an economic consulting firm. The work at Stanford showed estimates of macroeconomic costs of oil price shocks with and without accommodation policies and was therefore comparable to some degree with both the DOE and the Policy Center analyses of oil tariffs. The Data Resources analysis estimated the costs of a tariff with partial accommodation policies, incorporating recent changes in the economy, such as higher employment.

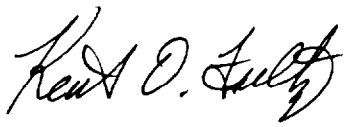
On the basis of these comparisons, it appears that DOE's conclusions about the duration and magnitude of GNP losses are within the range of estimates reported in those studies that do not use accommodation polices. On the other hand, the Policy Center study's estimates of GNP losses are smaller than studies that use similar assumptions of accommodation policies.

We have focused this report, as agreed with your office, on an assessment of the reasons why the two studies reached different conclusions as to the economic consequences of an oil import tariff. The DOE study, the Policy Center study, and this briefing report did not assess the full implications of imposing an oil import tariff. Such a study would require the analysis of many questions ranging from energy security and revenue effects to international trade issues, as well as a broad range of economic effects. We also comment on the assumptions and methodologies used in the studies, as appropriate, and compare the results with several other similar studies.

We conducted our work from June through August 1988. As requested, we did not obtain written agency comments on this report but discussed a draft with officials at DOE and the Policy Center. Their comments have been incorporated where appropriate.

Copies of this report are also being sent today to the Secretary of Energy and other interested parties. Major contributors to this briefing report are listed in appendix II.

Sincerely yours,



Keith O. Fultz
Director, Energy Issues

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ABBREVIATIONS

CBO	Congressional Budget Office
CRS	Congressional Research Service
DOE	Department of Energy
DRI	Data Resources, Inc.
EIA	Energy Information Administration
EMF	Energy Modeling Forum
FTC	Federal Trade Commission
GAO	General Accounting Office
GNP	gross national product
MIT	Massachusetts Institute of Technology
NPC	National Petroleum Council
OPEC	Organization of Petroleum Exporting Countries
RCED	Resources, Community, and Economic Development Division
RFF	Resources for the Future
SPR	Strategic Petroleum Reserve

SECTION 1

INTRODUCTION

-- WE WERE ASKED TO DETERMINE WHY APPARENTLY DIFFERENT CONCLUSIONS WERE REACHED IN RECENT STUDIES AS TO THE ECONOMIC EFFECTS OF AN OIL IMPORT TARIFF.

-- OUR EVALUATION FOCUSES ON EXPLAINING THE DIFFERENCE IN RESULTS OF STUDIES BY THE

  -- DEPARTMENT OF ENERGY AND

  -- HARVARD UNIVERSITY'S ENERGY AND ENVIRONMENT POLICY CENTER.

BACKGROUND

Following rapid oil price increases in the 1970s, the United States reduced its dependence on imports as additional oil supplies were developed, other energy sources were used, and energy efficiency improved in the 1980s. However, recent developments have reversed this trend toward reduced dependency. When world oil prices dropped dramatically in 1986, from about $27 per barrel to below $10 per barrel, U.S. production declined and oil imports increased. There is concern that a continuation of these trends could result in increased vulnerability to potential oil disruption in the 1990s.

A variety of proposals for dealing with these trends have been issued, many of which are designed to increase oil prices in some way. By raising oil prices, domestic producers will have incentives to expand exploration and production, while consumers' demand for oil will be constrained. One such proposal, and the focus of this report, is the imposition of a tariff on imports of crude oil and petroleum products, an "oil import tariff."

There are many issues to be considered regarding such a proposal, such as domestic economic effects, administrative feasibility, and international trade. One of the most important issues is the economic effect of a tariff. A tariff would result in additional revenues to the federal government through the collection of the tariff and increased tax revenues from domestic

oil production.[1] However, according to many studies, the tariff could also impose economic costs on the U.S. economy: higher prices, reduced economic growth, and potentially reduced international competitiveness.

OBJECTIVE

In an April 27, 1988, letter and in subsequent discussions with his office, the Chairman of the Subcommittee on Energy and Power, House Committee on Energy and Commerce, requested that we explain why apparently different conclusions were reached in recent studies as to the economic effects of an oil import tariff. Specifically, the Chairman asked us to review a study by the Department of Energy (DOE),[2] one prepared by Harvard University's Energy and Environmental Policy Center,[3] and others we believed were appropriate. He also asked us to compare and comment on the studies' assumptions and methodologies so that the Subcommittee could better interpret their results.

SCOPE AND METHODOLOGY

We identified 13 studies published within the last 6 years, listed in the bibliography at the end of this report, that provide analyses related to the economic effects of imposing an oil import tariff. The studies' methodologies included (1) cost-benefit analyses in which a dollar value was assigned to various impacts and a net effect on the economy was estimated, (2) estimates of the magnitude of changes in broad economic indicators, such as the gross national product (GNP) and inflation, although the results were not assigned a dollar value and a net effect on the economy was not derived, (3) a combination of these two approaches, and (4) a discussion of the likely economic impacts, with no attempt to estimate or quantify them. The studies also vary in the type of oil import tariff or price scenario considered. We have summarized in appendix I each study's primary method of analysis, the type(s)

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[1]Domestic oil production would be expected to increase in response to higher costs for imported oil.

[2]U.S. Department of Energy. Energy Security: A Report to the President of the United States. Washington, D.C.: Government Printing Office, Mar. 1987. Hereafter, the study will be referred to as the "DOE study."

[3]Hereafter referred to as the "Policy Center study." The study was sponsored by the Associates of the Harvard International Energy Program, Energy Security Policy, Inc., and the Mitchell Energy and Development Corporation. The views expressed are those of the authors, William W. Hogan and Bijan Mossavar-Rahmani, and not necessarily those of Harvard University.

of tariff or price increase considered, the economic variables estimated, and the key assumptions made.

Although we identified 13 studies that discuss the economic effects of imposing an oil import tariff, as requested, our evaluation focuses on 2 studies: the cost-benefit analyses of an oil import tariff in the DOE study and the Policy Center report. Further, the Policy Center study chose to rework the DOE analysis and thus lends itself to direct comparison. In analyzing the Policy Center study, we focused primarily on appendix C of the study because this is where the Policy Center quantitatively analyzed the economic effects of an oil import tariff. Although the DOE and Policy Center studies use the same cost-benefit approach and data, the DOE study concludes that the net impact of an oil import tariff on the economy would be negative, while the Policy Center study concludes it would generally be positive. We compared the results of the DOE and Policy Center studies with studies conducted by the Energy Modeling Forum at Stanford University and Data Resources, Inc. We selected these two studies for comparative purposes because they modeled oil price increases that were similar to the oil import tariff analyzed by DOE and the Policy Center and provided results for macroeconomic costs with and without accommodation policies. The Energy Modeling Forum study itself represents the conclusions of 13 models from various economic forecasting institutions and academia.

The DOE report compares the estimated costs and benefits of three different tariffs on imported crude oil and refined petroleum products: $5- and $10-per-barrel fees, and a variable fee that would establish a price floor at $22 per barrel.[4] Further, the DOE report examined the different tariffs under two scenarios--a low world oil price/high import dependence case and a high oil price/low import dependence case--that it felt bounded the likely future price of world oil and the level of the United States' dependence on imported oil. However, as the Policy Center study chose only to rework DOE's analysis of a $10 tariff under the low oil price/high import dependence case, we also limit our discussion to the same tariff scenario. Nevertheless, comparing one tariff scenario should provide a reasonable perspective on why the studies reach divergent conclusions on the economic effects of an oil import tariff. That is, since the studies' results hinge on several different fundamental assumptions, they would still reach different conclusions, given the nature of these assumptions, even if other tariff scenarios were considered.

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[4]The amount of a variable import fee levied would vary with the level of the world oil price. If the world oil price was below the target price, $22 per barrel in this case, the amount of the fee would be the difference between the two prices. However, if the world oil price was equal to or greater than the target price, the import fee would be waived entirely.

We have focused this briefing report, as agreed with the requester, on an assessment of the reasons why the two studies reached different conclusions as to the economic consequences of an oil import tariff. The DOE study, the Policy Center study, and this report briefing report did not assess the full implications of imposing an oil import tariff. Such a study would require the analysis of many questions, ranging from energy security and revenue effects to international trade issues, as well as a broad range of economic effects. We also comment on the assumptions and methodologies used in the studies, as appropriate, and compare the results with several other similar studies.

We conducted our review between June and August 1988. We discussed the information contained in this briefing report with the responsible officials at DOE and Harvard University's Energy and Environmental Policy Center, incorporating their comments as appropriate. However, as requested, we did not obtain written agency comments on a draft of this report.

SECTION 2

EXPLANATION OF THE DOE AND POLICY CENTER COST-BENEFIT METHODOLOGY

-- BOTH DOE AND THE POLICY CENTER USE COST-BENEFIT ANALYSIS.

-- THE ANALYSES CALCULATE THE COSTS AND BENEFITS OF THE TARIFF USING FOUR ECONOMIC MEASURES: (1) WELFARE LOSSES, (2) GNP, (3) SHARE OF THE TARIFF PAID BY PRODUCING COUNTRIES, AND (4) NATIONAL SECURITY EFFECTS, ASSUMING THAT AN OIL DISRUPTION OCCURS IN 1995. A NET IMPACT ON THE ECONOMY WAS THEN DERIVED.

-- OTHER MEASURES WERE DISCUSSED BUT NOT INCORPORATED INTO THE ESTIMATE OF THE NET IMPACT OF A TARIFF.

THE DOE AND POLICY CENTER COST-BENEFIT METHODOLOGY

DOE used statistical models to determine the effects of an oil import tariff on oil markets and the economy at large. The analyses assume that (1) a tariff is imposed in 1988, with economic consequences projected through 1995 and (2) a significant supply disruption--resulting in a 10-million-barrels-per-day net decrease in world oil supplies for 6 months[1]--occurs in the last year of the projection period. Results for both the costs and benefits are presented as a net present value estimate.[2] Since the Policy

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[1]The magnitude of this hypothetical disruption is extremely large. For instance, closing the entire Persian Gulf would reduce oil supplies shipped by tanker by about 7 million barrels per day.

[2]"Net present value" is a technique that allows meaningful comparison of dollar flows, either money received or money spent, that occur at different times. In general, revenues to be received in the future are worth less than equal revenues on hand today because money on hand can be invested to yield a higher amount in the future or, in the case of the federal government, it can reduce the amount borrowed today and repaid in the future. The farther into the future the expected revenues or costs are, the less value they have in today's dollars.

Center study reworks the DOE analysis, its analysis follows DOE's approach except as discussed in section 3.

This section describes the specific costs and benefits quantified by the two studies. In section 3, where we discuss why the studies differ, we also comment on the appropriateness of the methodology for some components of the analyses.

Costs Analyzed

DOE's analysis quantifies two types of costs resulting from an oil import tariff: welfare losses and macroeconomic costs. We discuss these costs below.

DOE analyzes welfare losses resulting from production and consumption decisions made in response to the higher domestic oil prices caused by the tariff. One component of welfare loss is reduced production efficiency. By raising the price that domestic producers receive for oil, the tariff induces increased domestic oil production that would not have occurred at the pre-tariff price. However, the economic resources (labor, capital, etc.) diverted to oil production could be more efficiently used to produce other products if the price of oil were not artificially high. This inefficiency is measured by the difference between the cost of importing oil and the cost of the additional oil produced domestically.

The second component of the welfare loss that DOE analyzes is the loss arising from the tariff-induced reduction in oil consumption. The higher price of oil makes consumers reduce their oil purchases both because other products that can be substituted for oil will appear (at least initially) relatively less expensive and because higher oil prices reduce consumers' purchasing power. Consistent with conventional economic reasoning, DOE assumes that consumers value the oil they purchase at least as high as its price. Because items are priced to sell to a market, most consumers generally value things they buy more than the price they must pay, thereby enjoying what economists call "consumer surplus." This surplus is the difference between the maximum amount that a consumer is willing to pay and its price. As consumers reduce oil purchases in response to the higher prices caused by the tariff, they lose some of this consumer surplus.[3] From estimates of the responsiveness of oil purchases to price changes, DOE estimates this loss in consumer surplus and adds this to the loss in production efficiency in estimating total welfare loss.

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[3]The tariff will also lead to welfare gains and losses because of changes in the consumption of other products. These gains and losses are very hard to estimate and were not analyzed by DOE.

The oil price shock that results from imposing a tariff also has ramifications for the entire economy. DOE analyzes macroeconomic costs resulting from higher domestic oil prices as a result of a tariff by estimating the effect on GNP. An oil import tariff causes GNP to be lower than what it would otherwise be because the tariff-induced oil price increase leads to underutilization of resources, including capital and labor as well as energy, and a reduction in aggregate demand because of a loss of consumers' purchasing power. DOE measures the loss in GNP by comparing forecasted levels of GNP without a tariff from 1988 through 1995 with estimates of GNP levels with a tariff during that period. DOE uses assumptions of GNP growth from its 1986 Annual Energy Outlook to forecast baseline GNP levels without a tariff. DOE estimates GNP levels with a tariff by first calculating the percentage increase in oil prices assumed to result from the tariff. Using this value, together with a historically derived estimate of the effect of oil price increases on GNP, DOE estimates GNP effects with a tariff. DOE treats the difference between these two GNP estimates as the loss in GNP due to the tariff.

Benefits Analyzed

Some components of the benefits measured by DOE depend on the tariff's having a suppressing effect on world oil prices. If the tariff does not reduce world oil prices, then most of the benefits measured in the DOE and the Policy Center studies are not generated. The studies quantify two benefits of an oil import fee--a reduction in import costs and a security benefit, which has three components. The security benefits also depend on a disruption occurring. If there is no disruption, there are no security benefits as defined by DOE. DOE's assumption that prices will be suppressed and the analyses of the benefits are discussed below.

The Tariff's Effect on World Oil Prices

Higher domestic prices for oil, as a result of the tariff, should reduce oil consumption. The DOE and Policy Center studies both assume that world oil prices would then fall because (1) U.S. consumption constitutes a large portion of free world demand (roughly one-third in 1985) and (2) DOE assumes that the Organization of Petroleum Exporting Countries (OPEC) absorbs the reduction in consumption. Lower U.S. demand in the world oil market puts downward pressure on world oil prices. Thus, U.S. consumers would actually pay less for imported oil, excluding the fee, because the price of imported oil rises by less than the full amount of the tariff.

However, energy economists disagree as to whether a tariff will actually lower world oil prices. For example, in a recent

analysis by a staff member at Resources for the Future (RFF),[4] two reasons are discussed as to why world prices may not drop significantly. First, the reduction in U.S. imports caused by the tariff will not be very large compared with total world consumption. Even if the tariff, for example, reduces U.S. imports by 2 million barrels per day, free world consumption is about 48 million barrels per day. Thus, the tariff reduces world consumption by about 4 percent. The RFF paper argues that such a change is unlikely to substantially affect world prices. Second, the price reduction argument also depends on world producers' output levels (particularly OPEC) being relatively insensitive to changes in demand. In other words, this argument assumes that producing countries target output levels more than prices and, therefore, they will let prices fall to maintain sales in the face of reduced demand rather than reduce production to maintain the pre-tariff prices. Alternatively, the more that producers reduce production in response to reduced demand, the less impact a tariff would have on prices. The RFF paper contends that OPEC producers, in particular, are quite able to react to changes in demand, thus reducing the tariff's impact on price.

The Tariff Reduces Import Costs

Using the premise that world oil prices will be suppressed by the tariff, the first benefit DOE calculates is the share of the tariff paid by producing countries. However, DOE calls this benefit, which occurs each year the tariff is in place, the "reduced import cost." For example, if a $10-per-barrel tariff decreases world prices by $2 per barrel, then domestic prices rise only $8 per barrel, and foreign producers pay $2, or 20 percent of the tariff. In this case, world prices might drop from $20 to $18, while U.S. prices rise from $20 to $28. Even though domestic prices rise $8, the government still collects its $10 tariff--$8 from U.S. consumers and $2 indirectly from foreign producers. The further world prices drop, the larger the share of the tariff paid by producing countries.

The Tariff Could Result in Security Benefits

The second benefit DOE calculates, as a result of the tariff, is a security benefit that has three components: reduced macroeconomic cost of the disruption from lower prices, savings on the oil that the United States imports, and reduced oil expenditures because the United States imports less oil.

The first component of the security benefit, reduced macroeconomic cost, depends on whether world oil prices follow a

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[4]Margaret Walls, "Welfare Cost of an Oil Import Fee," manuscript, Washington, D.C.: Resources for the Future, Aug. 1988.

lower price path because of the tariff. Since economic losses come from price increases, an import tariff would tend to reduce potential economic losses if a disruption occurs because prices do not rise as high as they otherwise would have. DOE defines the difference in macroeconomic costs with and without a tariff as a savings or benefit. The more the tariff reduces world oil prices, and the more important oil price changes are to economic performance, the larger the macroeconomic savings.

The second aspect of the security benefit is savings on the oil the United States imports. When a disruption occurs, prices will not rise as high as they otherwise might have and therefore less is paid by the United States to producing countries for imported oil. Had a tariff never been imposed, prices would have risen higher during the disruption, and there would be a larger income transfer from the United States to producing countries. DOE calculates this benefit by multiplying the volume of imports during the disruption (which they assume is 35 percent of normal imports) times the price savings. For example, if the United States imports 2 billion barrels per year, and prices are $2 lower than they would be if there had been no tariff, the savings are $4 billion.

DOE defines the final component of the security benefit of the tariff as "import bill savings," i.e., how much lower domestic expenditures are for foreign oil because the tariff reduces the amount of oil imported. For example, if a disruption raises oil prices by $20 and imports are 700 million barrels per year lower because of the tariff, then the tariff saves $14 billion. Payments from imports are viewed by some as a "leakage" of economic activity from the domestic economy because increasing consumer expenditures on imported products support employment and production abroad rather than in the United States. Thus, reducing the total U.S. import bill is seen as creating some benefits for the domestic economy. DOE calculates this benefit only during the disruption year, not for the years before the disruption.

NET IMPACT

DOE's and Policy Center analyses present a tariff's net impact on the economy as a comparison of the two cost components and the two benefit components. We comment on the derivation of a net impact in section 3, which discusses the comparability of microeconomic and macroeconomic effects.

OTHER COSTS AND BENEFITS

DOE also estimates the impact of a tariff on inflation, unemployment, and the federal deficit, all of which are important indicators of the health of the economy. However, since inflation and unemployment impacts are not assigned dollar values in the analysis, they are not incorporated into the estimate of the net

impact.[5] Although a dollar value is presented for the impact of the tariff on the federal deficit, this impact also does not enter into the estimate of the net impact. Further, the studies do not include regional or industry-specific impacts, which could be substantial.

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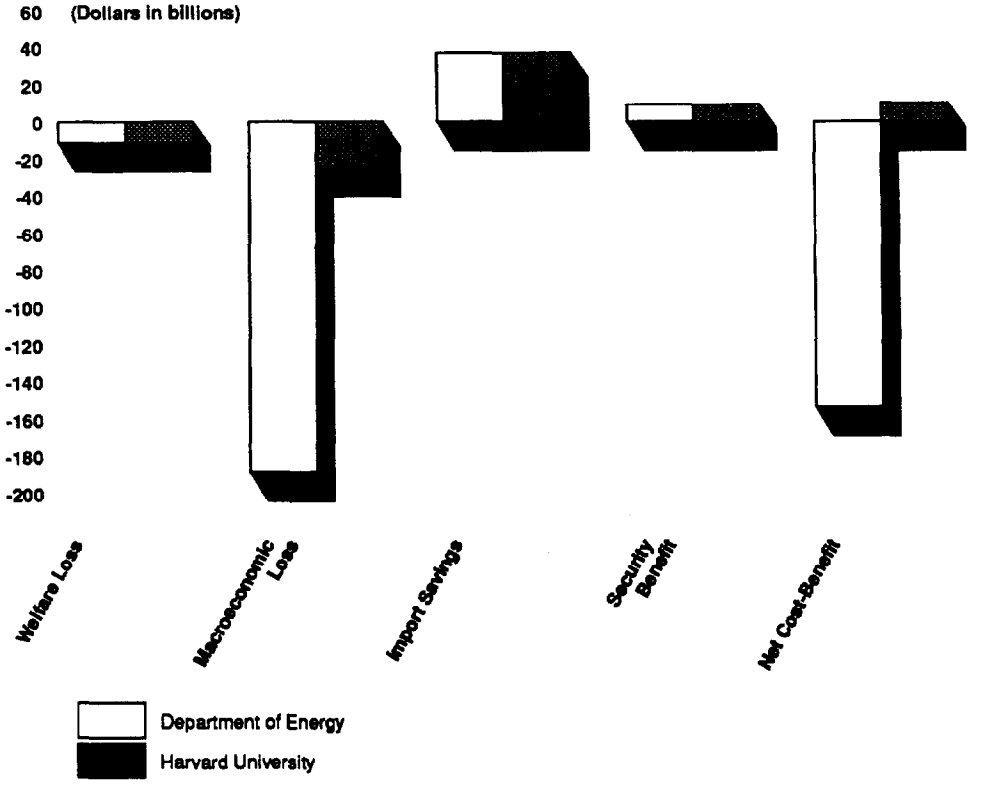
[5]Nonetheless, the increase in the unemployment rate is reflected to some extent in the calculation of GNP losses.

SECTION 3

THE TWO STUDIES' FINDINGS AND WHY THEY DIFFER

- -- THE DOE REPORT CONCLUDED THAT THE ECONOMIC COSTS OF AN OIL IMPORT TARIFF ARE GREATER THAN ITS BENEFITS, WHILE THE POLICY CENTER STUDY GENERALLY FOUND THE OPPOSITE.
- -- DOE AND THE POLICY CENTER ANALYSES REACH OPPOSITE CONCLUSIONS PRIMARILY BECAUSE THEY HAVE DIFFERING ASSUMPTIONS ABOUT HOW LONG HIGHER OIL PRICES, CAUSED BY THE TARIFF, WOULD HAVE A NEGATIVE IMPACT ON THE ECONOMY.
- -- THE ESTIMATES OF MACROECONOMIC COSTS HAVE A NUMBER OF LIMITATIONS, BUT THE OVERALL EFFECT OF THESE LIMITATIONS IS UNCLEAR.
  - -- STATISTICAL WEAKNESSES MAY BIAS LOSSES UPWARD.
  - -- DISPOSITION OF TARIFF REVENUES, WHICH MAY INFLUENCE GNP, IS NOT ADDRESSED.
  - -- TRADE LOSSES ARE NOT INCLUDED IN COST ESTIMATES.
  - -- SOME ASSUMPTIONS MAY OVERESTIMATE BENEFITS AND COSTS.

Figure 3.1: Comparative Cost-Benefit Analysis of a $10 Tariff: DOE and the Policy Center Studies
(Dollars in billions)



Note: All amounts reflect net present value in 1987, using 1985 dollars.

Source: The DOE and Policy Center studies.

THE DOE AND THE POLICY CENTER STUDIES REACH DIFFERENT CONCLUSIONS

As shown in figure 3.1, DOE found that a $10 tariff results in a net cost to the economy of about $154 billion over an 8-year period.[1] In making its estimate, DOE found that benefits from oil import bill savings and security benefits total about $46 billion. However, welfare losses of about $11 billion and macroeconomic costs of about $189 billion outweigh these benefits.[2] The Policy Center study, on the other hand, under the same tariff scenario, indicates a net benefit to the economy of $10 billion.[3] In its calculation, the Policy Center uses the same assumptions DOE uses in estimating benefits but uses different assumptions in estimating costs. As a result, the Policy Center's $10 billion net benefit calculation is based on the same $46 billion benefit estimate as DOE but is based on a significantly lower cost estimate of $36 billion. The Policy Center study divides costs into short-run and long-run macroeconomic costs. The $36 billion of costs consists of $11 billion in long-run macroeconomic costs, which is based on DOE's estimate of welfare loses of that size, and $25 billion of short-run macroeconomic cost as the economy adjusts to higher oil prices. Thus, the benefits in the Policy Center study outweigh the costs by $10 billion. Under an alternative methodology but using a similar tariff scenario, the Policy Center also presents results showing a net loss to the economy of $1 billion. As discussed later in this section however, neither study adjusts the benefits by the probability that a disruption would occur and thus the expected benefits could well be overstated.[4] The costs, however, would remain the same because they are the result of the imposition of the tariff and would not change even if a disruption did not occur.

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[1]All amounts reflect net present value in 1987 using 1985 dollars.

[2]As noted at the end of this section, welfare losses may already be included in the macroeconomic cost (GNP) and, therefore, should not be added again.

[3]The Policy Center analysis actually presents 12 different estimates of the net impact a tariff would have on the economy. These estimates vary in assumptions about the projection period, the discount rate, and the actual method used to calculate the GNP loss. We present here the principal estimate the study discusses within the text of the report, which is for an 8-year projection period, a discount rate of 10 percent, and the economy's adjustment to higher oil prices within 1 year.

[4]The Policy Center study provides a discussion of the optimal tariff given the probability of interruptions in its appendix B, but its assessment does not appear to be used to adjust the potential security benefits of a tariff quantified in appendix C.

DOE also estimates the impact of a tariff on the overall price level, unemployment, and the federal deficit. For example, a $10 tariff is estimated to cause a one-time increase in the overall price level of 2 or 3 percentage points and reduce nationwide employment by 280,000 jobs. In addition, the tariff would contribute about $69 billion toward reducing the deficit over the 8-year period, although there may be offsetting reductions in other tax revenues.[5] On the other hand, the Policy Center study does not present a detailed discussion of such impacts.

CHOICE OF ASSUMPTIONS ABOUT MACROECONOMIC IMPACTS RESULTS IN DIFFERENT CONCLUSIONS

As shown in figure 3.1, the studies reach different conclusions principally because of their estimates of macroeconomic costs, that is, the impact of an oil import tariff on GNP. In preparing its alternative estimates of the net impact, the Policy Center study does not change DOE's estimate of the import savings and security benefits from a tariff. The Policy Center study also uses DOE's estimate of welfare losses as an estimate of long-run macroeconomic costs. Its estimates of the net impact differ from those presented in the DOE analysis because its estimates of the short-run macroeconomic costs differs from DOE's macroeconomic cost estimate.

The difference between the two estimates of GNP losses hinges on differing assumptions about how long higher oil prices, caused by a tariff, will have a negative effect on the nation's overall economy. Economists generally believe that there could be two impacts, short-run and long-run, on GNP.[6] DOE believes both of these impacts would occur. DOE officials told us they distinguished between the short- and long-run impacts on GNP. However, in their analysis, they choose instead to use a simple measure, intended to reflect in summary fashion these two responses of the economy to oil price changes. This simplified measure, which does not distinguish between short- and long-run effects, is intended to represent the average response of GNP to

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[5]DOE believes an import tariff does not reduce the deficit by the full amount of fees collected because the resulting energy price increases reduce other tax collections and increase federal expenditures indexed to prices. Additionally, to the extent to which a tariff creates a recession in the economy, the deficit may increase because of a reduction in taxable income and an increase in transfer payments.

[6]A short-run effect on GNP is also known as a reduction in actual output, or a cyclical reduction in GNP. A long-run effect on GNP is also known as a reduction in potential output, or a deviation from GNP's baseline path.

the oil price change as a result of a tariff over the 8-year projection period.

The short-run effect of the tariff on GNP reflects the decline in the economy's output as it adjusts to the higher oil prices caused by a tariff. During this temporary adjustment period, the productivity of existing capital and labor is reduced, as resources are reallocated within the economy in response to the price increase caused by a tariff. DOE officials believe that this short-run effect on GNP will probably last more than 4 years. On the other hand, the Policy Center does not specify how long the short-run effect will last. However, in several places the study says that the effect will be small, considerably smaller than DOE's estimates of the macroeconomic cost. In estimating the short-run macroeconomic cost, the Policy Center study treats the tariff-induced price increase as equivalent to an unexpected increase in the world oil price. It also assumes, for purposes of estimating the short-run macroeconomic cost, that through fiscal and monetary policies the economy adjusts to higher oil prices within 1 year.[7] However, specific fiscal or monetary policies were not quantified in the Policy Center study. The DOE report assumes tariff revenue will be used to reduce the deficit and assumes no changes in fiscal or monetary policies to accommodate the short-run effects on GNP. It does not compare the tariff with other deficit policies, however.

According to both the DOE and Policy Center studies, an import tariff has long-run GNP effects as well. By raising energy prices, an oil import tariff decreases aggregate consumption spending and capital stock formation and therefore impedes the economy in reaching its full potential output. This inefficient allocation of resources reduces the potential output of the economy for as long as the tariff is imposed. As discussed above, DOE does not estimate this separately but instead presents one GNP loss estimate intended to reflect both short-run and long-run impacts. The Policy Center study, on the other hand, interprets DOE's estimate of welfare losses as a measure of the long-run macroeconomic cost.

Other Differences

Although the preceding section discusses the studies' results for comparable tariff scenarios, the Policy Center analysis questions two assumptions used in the DOE study. The Policy Center

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[7]Fiscal policy is aimed at influencing the economy by changing federal taxes and government spending. Monetary policy is aimed at influencing the economy by affecting key financial variables such as the money supply and interest rates. The Federal Reserve Board carries out monetary policy primarily by buying and selling Treasury securities.

study argues (and presents additional results) for the use of (1) a 5-percent discount rate instead of the 10-percent discount rate used by DOE and (2) a projection period longer than the 8-year period used in the DOE analysis to capture benefits that occur in later years. Nonetheless, even if these alternative assumptions were used in the DOE study, the two reports would still have reached different conclusions. That is, the studies' results are driven to a very large extent by the estimate of the macroeconomic cost of a tariff.

LIMITATIONS OF THE DOE AND POLICY CENTER STUDIES AND GAO'S COMMENTS

DOE's approach to calculating the macroeconomic cost has a number of limitations. First, statistical models used by DOE have several weaknesses that could bias the estimate of GNP losses upward. Second, although the DOE analysis assumes that any revenue generated by a tariff will go toward deficit reduction, the impact on GNP of reducing the federal deficit while imposing a tariff is not estimated. If the tariff revenue is not used for deficit reduction, the GNP losses may be biased upward. Third, one aspect of macroeconomic cost separate from the reported GNP losses--the potential trade loss--is not estimated, which could bias the overall macroeconomic cost downward. Because the Policy Center study chose to rework the DOE analysis, these limitations and biases--with the exception of assuming tariff revenue will go toward deficit reduction--apply to it as well. Because of the offsetting nature of these limitations, however, we are unable to determine the direction of their impact, if any, on the studies' estimation of GNP losses. In addition to these limitations, which DOE notes in its study, we provide additional commentary on some of these limitations as well as other key assumptions in the analysis.

Weaknesses in the Statistical Models

The DOE report notes several weaknesses in statistical models that may tend to bias estimated GNP losses upward. According to DOE officials we spoke with, however, these possible biases have marginal, if any, impact on the accuracy of its estimate. First, existing models for estimating the GNP loss as a result of oil price shocks are based on parameters estimated from a sample period that included the 1970s. Price control and rationing policies during this period exacerbated the adverse effects of oil price shocks, and DOE assumes these policies would not be reintroduced if a tariff were to be imposed today. Thus, the GNP losses calculated using parameters based on this sample period may be biased upward. Second, recent changes in the U.S. economy--lower overall oil intensity and increased fuel-switching capability--that may mitigate the impact of an oil price shock are not incorporated into the statistical models used to estimate the

GNP loss, and thus may also bias the calculation of GNP losses upward.

Another possible weakness of the statistical models, which is not acknowledged in the DOE analysis, may be that they do not differentiate between the unexpected price shock inflicted by a world oil supply disruption and the expected price shock caused by imposing an oil import tariff. Economic reasoning suggests that since the price shock of an oil import tariff is anticipated, decisionmakers may be able to negotiate wages and prices, as well as reallocate capital, in advance and thus mitigate some of the adjustment costs of an oil price shock.[8]

Impact of Deficit Reduction on GNP Losses

The DOE analysis assumes revenue generated from an oil import tariff will go toward reducing the federal deficit, but it does not take into consideration the feedback effect that deficit reduction would have on GNP. For example, reducing the deficit might reduce the real interest rates somewhat, thus stimulating additional private investment. This effect could reduce the macroeconomic cost of the tariff below DOE's calculation by increasing the estimate of GNP with a tariff. Similarly, if the tariff revenue were used to reduce taxes or increase government spending, the macroeconomic cost of the tariff might also be lower. Lowering taxes and increasing government spending generally have a positive effect on GNP that could offset some of the macroeconomic cost of the tariff.

Potential Trade Losses Are Not Estimated

Another potentially important impact of an oil import tariff is the potential trade loss. Higher energy prices brought on by a tariff change the position of U.S. exporting industries and other industries facing foreign competition relative to their competitors in countries without a tariff. Nonetheless, the precise overall trade impact is uncertain because it would depend on changes in exchange rates as well as relative production costs. Exchange rates may change because of macroeconomic implications of a tariff and any macroeconomic policy accommodation that might follow imposition of a tariff. In its analysis, DOE does not estimate the trade impact of an oil import tariff although it suggests that the potential trade loss could increase the macroeconomic cost beyond what it estimated. The Policy Center study suggests that significant trade effects may occur if companies producing energy-

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[8]See Hillard Huntington, "Should GNP Impacts Preclude Oil Tariffs?" The Energy Journal, Vol. 9, No. 2 (31-44), 1988, for an exposition of this reasoning.

intensive goods relocate their production operations outside of the United States to avoid the high energy prices caused by an oil import tariff. Moving production facilities outside of the United States would result in a loss in domestic GNP.[9]

A 1987 study by the Energy Modeling Forum (EMF) at Stanford University analyzed the economic effects of different oil price shocks.[10] It estimated that 70 percent of the total costs of an oil price shock were macroeconomic effects and the remaining 30 percent were trade effects. The terms of trade effects of an oil import tariff, such as the $10 tariff analyzed by DOE, would be likely to be larger than for a $10 oil price shock because only the United States would be paying more for oil. Therefore, by not reflecting these trade impacts, DOE's macroeconomic analysis may tend to understate the total cost to the economy.

In contrast, however, the terms of trade effects of an oil import tariff, at least in theory, may favor the U.S. economy. This could happen, for example, if the tariff causes oil producers abroad to substantially reduce oil prices, which would shift much of the burden of the tariff to the exporting countries by reducing the amount the United States pays for imported oil. But as discussed earlier, some energy economists question whether an oil import tariff will tend to lower world oil prices at all, let alone enough to cause the trade impacts of such a tariff to be positive.

GAO Commentary on
Other Key Assumptions

In addition to the above limitations, we also discuss several key assumptions in DOE's analysis that affect its results: (1) reducing the U.S. oil import bill during a disruption is assumed to have security benefits for the country, (2) a disruption will occur with 100-percent probability in 1995, and (3) microeconomic and macroeconomic costs may have been added together in determining a net economic effect from the tariff.

First, as noted in section 2, DOE assumes an import bill savings benefit will occur during the disruption year. But, as DOE has defined this benefit, it should exist each year of the tariff because the oil import bill is lower every year the tariff

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[9]If the DOE and Policy Center studies had estimated the trade impact of an oil import tariff, they probably would have estimated different values because the macroeconomic policy responses they assume would lead to different effects on exchange rates.

[10]Energy Modeling Forum, Macroeconomic Impacts of Energy Shocks: A Summary of the Key Results. Stanford: EMF, Stanford University Forum, EMF Report 7, Vol. 1, 1987.

is in place. Therefore, by including this savings for only 1 year, DOE appears to understate the savings on the import bill.

Despite this apparent underestimate, reducing the U.S. oil import bill before or during a disruption may not have security benefits for the country. This is because the security benefit of the tariff derives not from reducing the import bill, but from reducing total U.S. oil consumption. Although DOE recognizes that the macroeconomic consequences of the tariff are a function of the level of total oil consumption, not the level of imports, it includes the import bill reduction as a tariff security benefit. We question whether this is appropriate because, for example, even if the United States is self-sufficient in oil and imports are zero, a disruption would still affect the economy because rising world prices also raise U.S. prices. The U.S. economy is not insulated from disruptions because the oil market is worldwide and potential trade would raise U.S. prices to the world price.

In addition, even if one considered a reduction in the total import bill to be a benefit to the economy, a reduction in one component of imports, such as oil, implies nothing about the total U.S. import bill. Consumers may continue spending some of the savings from the oil import bill on other imported goods, such as imported fuel-efficient cars. At a minimum, it is unclear exactly how consumers will allocate the money they were previously spending on foreign oil between other foreign and domestically produced goods. Consequently, counting the entire reduction in the oil import bill as savings to the U.S. economy probably overstates the reduction in total U.S. imports, and thus overstates the benefits defined this way.

Further, DOE includes the reduction in the level of imports as a benefit even though it correctly points out earlier that reducing imports with a tariff generates welfare losses. It showed earlier that, through changes in consumption and production decisions, reducing the level of imports generates losses in the economy due to inefficient uses of labor and capital and the loss of consumer surplus from reduced purchases of oil. Thus, the lower import bill caused by the tariff is not a measure of increased national welfare, even though DOE uses it this way.

Second, in calculating the total security benefits of the tariff, DOE and the Policy Center assume, with 100-percent certainty, that a disruption occurs in 1995. However, benefits are typically discounted by the probability that uncertain events occur. DOE officials acknowledge that the probability of a disruption in 1995 is less than 100 percent. Consequently, the estimate of the security benefit is biased upward. For example, if the probability of a disruption in 1995 is 20 percent, the security benefits of the tariff are only 20 percent of those estimated. In commenting on a draft of this report, DOE officials told us they

used a 100-percent probability in order to maximize the energy security benefits of a tariff.

Finally, no consensus exists among economists as to the comparability of microeconomic (welfare) and macroeconomic (GNP) estimates. Welfare costs might be included in macroeconomic estimates of GNP losses and thus should perhaps not be added in addition to the GNP effects. Because the DOE and the Policy Center reports discuss the net impact of a tariff, including both welfare and GNP estimates, we report their estimates for the purposes of analyzing and comparing the results. However, while DOE officials acknowledged that the DOE report was unclear about whether all components could be added to compute the net impact of a tariff, they indicated that they questioned the technical validity of this approach. Adding together the microeconomic and macroeconomic costs presented in the DOE report may overestimate the economic losses by the amount of the welfare loss.

SECTION 4

DOE/POLICY CENTER ESTIMATES OF MACROECONOMIC COST COMPARED WITH ESTIMATES IN OTHER STUDIES

- -- TO PROVIDE A PERSPECTIVE ABOUT GNP LOSSES IN THE TWO STUDIES, WE COMPARED THEM WITH WORK BY THE ENERGY MODELING FORUM (EMF) AT STANFORD UNIVERSITY AND BY DATA RESOURCES, INC. (DRI).
  - -- THESE STUDIES WERE USED BECAUSE (1) THEY MODELED OIL PRICE INCREASES THAT WERE SIMILAR TO THE OIL IMPORT TARIFFS ANALYZED, (2) THE EMF WORK SHOWED MACROECONOMIC COSTS WITH AND WITHOUT ACCOMMODATION POLICIES, (3) THE EMF WORK IS THE MOST EXTENSIVE STUDY ON THE SUBJECT AVAILABLE AND PROVIDES A CONSENSUS VIEW ABOUT MACROECONOMIC COSTS RESULTING FROM A PRICE INCREASE USING 13 DIFFERENT MODELS, AND (4) DRI'S ANALYSIS ALSO ESTIMATES MACROECONOMIC COST WITH ACCOMMODATION POLICIES AND MORE RECENT ECONOMIC CHANGES SUCH AS HIGHER EMPLOYMENT.
- -- COMPARED WITH EMF AND DRI, DOE'S AND THE POLICY CENTER'S RESULTS ON THE DURATION AND MAGNITUDE OF GNP LOSSES INDICATE THAT
  - -- DOE'S CONCLUSIONS ABOUT THE DURATION AND MAGNITUDE OF GNP LOSSES APPEAR TO BE WITHIN THE RANGE OF OTHER STUDIES THAT ASSUMED NO ACCOMMODATION IN FISCAL AND MONETARY POLICIES.
  - -- THE POLICY CENTER'S RESULTS ON THE DURATION OF GNP LOSSES AND THEIR MAGNITUDE ARE LOWER THAN OTHER STUDIES THAT ASSUMED ACCOMMODATION POLICIES.

PERSPECTIVE ON THE DURATION AND MAGNITUDE OF GNP LOSSES

Since the DOE and Policy Center studies differ in their choice of assumptions about implementing fiscal/monetary policies, it is difficult to assess if one study more accurately reflects the GNP effects of a tariff. Therefore, we compared each study with other studies that make similar assumptions about such policies. In this regard, DOE's understanding of the duration of GNP losses because

of a tariff and its estimated cost appear to be within the range of results reported in other studies. Alternatively, the Policy Center study reports smaller GNP losses than studies that make similar assumptions.

The Studies Used for Comparative Purposes

In analyzing the GNP loss estimates reported in the DOE and Policy Center studies, we compared their results with studies by EMF and Data Resources, Inc. (DRI).[1] EMF's 1983 study examined the results of 13 different models of the U.S. national economy responding to an energy price shock.[2] The EMF modeling results can be compared to some extent with the DOE and Policy Center results, since the price shock caused by an oil import tariff is generally believed to have similar consequences, except for trade impacts, to those of a price shock caused by a disruption in the world oil market. Thus, this body of work provided some consensus at the time as to the possible economic effects of significant oil price increases.

In making its simulations, EMF analyzed the economic effects of increasing the price of oil, at $36 per barrel in 1983, by 20- and 50-percent price shocks. These price shocks correspond to $7.20- and $18-per-barrel price increases, respectively. Given the dramatic decline in oil prices between the period of EMF's and DOE's analyses, it is unclear which shock represents a better basis for comparison with a $10-per-barrel tariff applied to 1985 oil prices. In one case, the $10-per-barrel tariff applied to 1985 oil prices, as analyzed by DOE and the Policy Center is closer, in percentage terms, to a 50-percent price shock. However, in absolute terms, which may be relevant in expressing the change in oil prices relative to other prices in the economy, such as wages and the cost of capital, the $10 tariff is closer to a $7.20 price shock. Because it is unclear which EMF case more closely resembles the impact of the $10-per-barrel tariff, we present the results for both.

In addition to comparing similar price shock effects of an oil import tariff, the EMF study also performed its analyses with and without monetary and fiscal accommodation policies. We compared DOE's results with EMF simulations where no accommodation policies were considered. Alternatively, since EMF separately modeled various accommodation policies, we can compare these results with

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[1]Joyce Yanchar and Christopher Caton, "Energy Taxes: Still Not a Good Idea," Data Resources, U.S. Review (18-23), Mar. 1987.

[2]In total, the EMF work considered 14 models, but 1 model was of the Canadian economy and was not used for discussing the effects on the U.S. economy.

those of the Policy Center study. The 1987 DRI study also examines the GNP losses from a tariff with a partially accommodative monetary policy,[3] but examines only a $5-per-barrel fee. Another reason this study is used for comparison is that it provides more updated information about changes in the economy since the 1983 EMF report.

Only four of the other studies in appendix I attempted to assess the GNP losses associated with a tariff. These remaining studies, which estimate GNP losses, were excluded from the discussion for one of the following reasons: (1) in reworking DOE's GNP loss analysis, some assumptions regarding costs in that study are misinterpreted, (2) estimates of percentage deviations in GNP are presented but are not based on econometric modeling, and (3) results were derived by changing key assumptions of other studies and not from original quantitative analysis.

Duration of GNP Losses

The EMF study estimates GNP losses for oil price shock simulations with and without fiscal and monetary accommodations. The DRI study is limited to a partially accommodative monetary policy and a smaller tariff but reflects more recent changes in the economy.

Duration of Losses Without Accommodation Policies

In regard to the duration of GNP losses without accommodation policies, the EMF study emphasizes there are mixed views as to how rapidly the economy would recover. Nonetheless, virtually all of the models examined show that even by the fourth year (the last year examined) GNP, with the tariff in place, was still below the level it would have been at without the tariff. While most of the models showed GNP declining through the second year of an oil price shock, half of the models show the losses in real output beginning to diminish by the third year. While DOE's measure for GNP losses did not directly reflect such a recovery, officials told us their analysis assumes there would be a recovery over time.

Duration of Losses With Accommodation Policies

The results of the EMF study showed that the duration of GNP losses, even when using various fiscal or monetary accommodation policies, did not change. Under these simulations the economy still took several years to adjust to the price shock.

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[3]That is, the money supply was allowed to expand with the increase in prices that resulted from the tariff, but not enough to keep interest rates from rising.

Accommodation policies did, however, tend to lessen the magnitude of the GNP impacts (see discussion below). Similarly, the results of the DRI study, with a partially accommodative monetary policy and a tariff half as large, also showed significant GNP losses continuing in the fourth year. By the fifth year, however, GNP losses had begun to diminish somewhat, but GNP had not returned to the level that would have occurred had there been no tariff imposed. Therefore, the Policy Center's study assumption of a 1-year adjustment period for measuring short-run GNP losses, in light of EMF's and DRI's work, may not accurately reflect the duration of these losses.[4]

Finally, such accommodation policies also have significant ancillary effects on the economy. For example, the EMF report found that such response policies offset, to varying degrees, some of the effects of an oil price shock. However, it found that most of these policies involved a trade-off between either reducing the recessionary effects of a price shock at the expense of higher inflation or reducing the inflationary effects of the price shock at the expense of reduced economic growth. Moreover, the EMF study indicates that several of the policies could have significant effects on the federal budget.

The trade-offs noted in the EMF study for various monetary or fiscal policies are also supported by our previous analysis. In our report, Benefits and Limitations of Economic Policy Responses To an Oil Supply Disruption,[5] we found similar results for the likely benefits and limitations of accommodation policies in response to an energy price shock.

Magnitude of GNP Losses

The other aspect of GNP losses is their actual magnitude. DOE's estimate of the GNP losses of $189 billion as a result of a tariff appears to be in the range of results reported by EMF. For example, the median results of the EMF studies indicate GNP losses, without accommodation policies, ranging from $105 billion with a 20-percent price shock, to about $263 billion, with a 50-percent price shock over a 4-year period. The EMF estimate was limited to 4 years and would have probably been larger had the projection period been longer.

The Policy Center's estimate of the magnitude of GNP losses appears to be substantially lower than EMF's result, which assumed

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[4]As discussed in section 3, the Policy Center study does not specify that the short-run effect will last only 1 year, but for adjustment purposes it assumes a 1-year adjustment period in estimating the short-run macroeconomic cost.

[5](GAO/RCED-85-151, Aug. 8, 1985).

a change in monetary or fiscal policy to accommodate the recessionary effects of a tariff. The EMF study examined four different accommodation policies: monetary accommodation, income tax reduction, investment tax credit increase, and payroll tax reduction. Monetary accommodation was the most successful in reducing the GNP losses from a price shock, limiting them to a range of $41 billion to $104 billion from the 20- and 50-percent price shocks, respectively. However, such monetary accommodation has substantial inflationary impacts. A payroll tax reduction was the least successful in reducing the GNP losses, limiting the losses to a range of $71 billion to $177 billion for the two price shocks. Similarly, the 1987 DRI study found that GNP losses from a $5-per-barrel tariff (half the size of DOE's tariff) and partial monetary accommodation totaled $143 billion over a 5-year period.[6] In all cases, the Policy Center result of only $25 billion in GNP losses is substantially below the EMF and DRI results that incorporated accommodation policies.

The accommodation policy responses analyzed by EMF and DRI could have been implemented on a larger scale, which would have resulted in smaller GNP losses. For example, the monetary response could have been increased further, but at the expense of even higher inflation. Nonetheless, there is probably a practical limit to the size of these accommodation policies.

Finally, the EMF results are based on an economy in recession, characterized by high unemployment and underutilized resources. As EMF points out, a price shock occurring during full employment would be likely to cause a larger recession and greater increase in the price level because it would be more difficult to shift resources in response to higher energy prices. Thus, if EMF had simulated the economic effects of an oil price shock for the economy at or near full employment, such as we have today, the GNP losses and price level effects would probably be larger. On the other hand, domestic oil production might be better able to expand because of the recent contraction in the industry caused by the decline in oil prices.

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[6]The EMF and DRI results reflect reductions in actual GNP, measured in 1983 and 1982 dollars, respectively. The studies report their results as cumulative, undiscounted estimates. However, the results presented here are derived by GAO and represent net present value estimates (using a 10-percent real discount rate) in 1985 dollars to make them comparable with the DOE result. We used a 10-percent real discount rate to be consistent with DOE's methodology, although our discount rate policy would suggest a lower rate; this rate would be closer to the Policy Center's alternative discount rate of 5 percent.

SUMMARY OF OIL IMPORT TARIFF STUDIES

Elements	Studies					
	Walls	Huntington	Senate Cmmte. Energy & Nat. Res.	Policy Center	Senate Cmmte. Budget	Federal Trade Commission
Date	8/88	4/88	3/88	9/87	6/87	4/87
Primary analysis	Cost-benefit	Cost-benefit	Cost-benefit	Cost-benefit	Cost-benefit	Cost-benefit
Oil import policies analyzed	$5 tariff (C)	$10 tariff	$ 5 tariff $10 tariff $24 price floor	$10 tariff	$5 tariff	$ 5 tariff (C) $10 tariff (C) $ 5 tariff (C&G) $10 tariff (C&G) $ 5 tariff (G) $10 tariff (G)
Position toward tariff	Against	None	Support	Support	Support	Against
Disaggregation						
Welfare loss	X	a	X	X	X	X
GNP loss	a	X	X	X	a	a
Change in import bill	a	a	X	X	X	a
Security benefit	a	a	X	X	X	a
Trade impact	a	a	a	a	a	a
Tariff revenue[b]	X	a	a	a	a	X
Domestic producers	X	a	a	a	a	a
Other measures[c]	a	a	a	a	a	a
Key assumptions						
Accommodation measures	a	No	Yes	Yes	a	No
World oil price response to tariff	Insignificant	Decline	Decline	Decline	Decline	Varies
Projection period	6 years	4 years	8-years	8 year/infinite	8 years	1 year
Net present value	a	Yes	Yes	Yes	Yes	a
Discount rate	a	10%	5%	5%,10%	7%,10%	a
Disruption timing	a	1995	1988,1991,1995	1995	1995	a
Data source	EIA	Revises EMF & DOE analysis	Revises DOE analysis	Revises DOE analysis	Revises DOE analysis	FTC

APPENDIX I

Elements	DOE	DRI	National Petroleum Council	Congressional Research Service	Congressional Budget Office	Schmidt & Dunstan	EMF
Date	3/87	3/87	2/87	5/86	4/86	9/85	1983
Primary analysis	Cost-benefit	Aggregate impact	Qualitative	Aggregate impact	Aggregate impact	Aggregate impact	Aggregate impact
Oil import policies analyzed	$ 5 tariff $10 tariff $22 price floor	$ 5 tariff	Oil import fee	$ 5 tariff $10 tariff	$ 5 tariff (C) & $10 tariff (R) $ 5 dom./for. (C) & $ 5 for. (R) $.06/gal MF tax & $2.50 tariff (C&R)	$ 5 tariff	50% price shock 20% price shock
Position toward tariff	Against	Against	None	None	None	Against	None
Disaggregation							
Welfare loss	X	a	a	a	a	a	a
GNP loss	X	X	a	X	a	X	X
Change in import bill	X	X	a	a	a	a	a
Security benefit	X	a	a	a	a	a	a
Trade impact	a	X	a	a	a	X	a
Tariff revenue[b]	X	X	a	X	X	X	a
Domestic producers	a	a	a	a	a	a	a
Other measures[c]	X	X	a	X	a	X	X
Key assumptions							
Accommodation measures	No	Yes	a	No	No	No	Separate analysis
World oil price response to tariff	Decline	None	a	Decline	Decline	None	a
Projection period	8 years	5 years	a	5 years	5 years	3-1/4 years	4 years
Net present value	Yes	a	a	a	a	a	a
Discount rate	10%	a	a	a	a	a	a
Disruption timing	1995	a	a	a	a	a	a
Data source	DRI/MINMAC (EIA models)	DRI model	NPC/DOE/DRI	Other studies	CBO	MIT-Penn-SSRC model	13 models of the U.S. economy

Legend
C = crude
G = gasoline
MF = motor fuels
R = refined

Note: All tariffs are in dollars per barrel of crude and refined oil unless otherwise noted.

[a]Not applicable.
[b]Also includes those studies that assumed tariff revenue would be directed toward deficit reduction.
[c]Usually refers to indicators of the aggregate economy, such as inflation and unemployment.

APPENDIX I

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