

SJR

8

Senate Special Committee on Oil and Gas

Legislation Checklist

Bill number: SJR 8 Sponsor: Josephson
Date referred to committee: Further referrals: Resources,
Prior committee report: Finance
Back up from sponsor:
Fiscal note(s):
Agency: DNR Requested: Received:
Agency: DOR Requested: Received:
Position paper(s):
Agency: DNR Requested: Received:
Agency: Requested: Received:
Sectional Analysis:
Scheduled: 2/26 Heard: Reported out:
Items for committee packet:

To Testify:

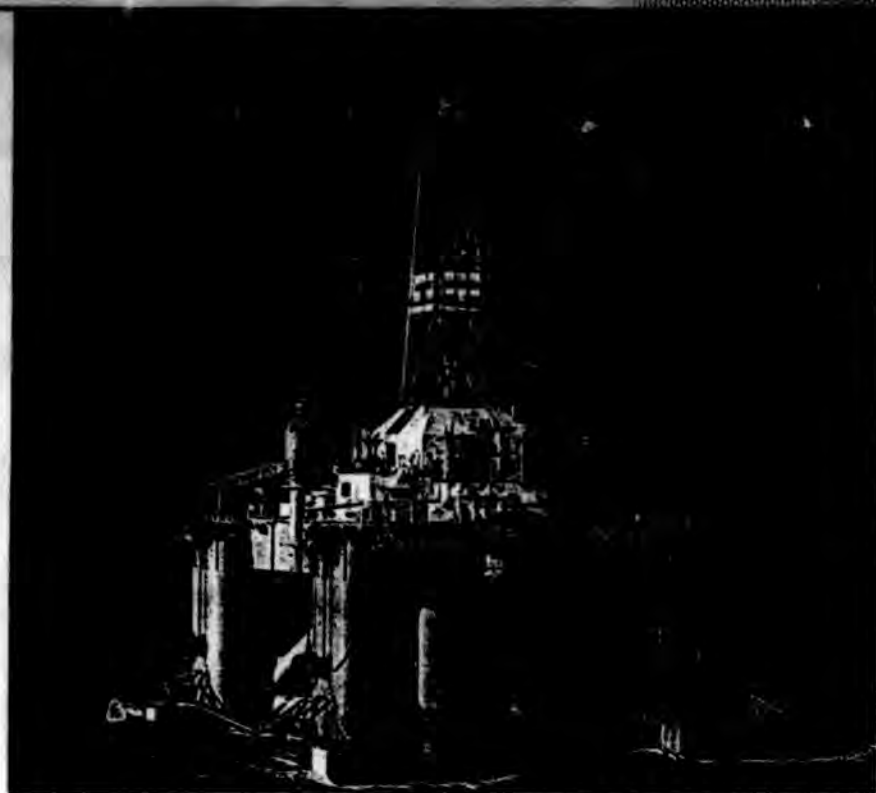
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Zane Barnes severe environment semisubmersible will go to work for Shell Oil Co. in the Gulf of Mexico in March under a multiyear contract. It is 370 ft long, 225 ft wide, and 170 ft high to the drilling floor. Derrick height adds 205 ft.

New generation rig to drill in gulf

Reading & Bates Corp. plans to place in service in March one of the world's largest semisubmersibles.

The Zane Barnes, a Trendsetter class rig, is capable of drilling to

30,000 ft in as much as 6,000 ft of water under normal weather conditions. It is designed to operate safely in such areas as the North Sea and off Alaska in severe weather.

The rig's mooring system makes it 35% more stable than earlier semisubmersibles, Reading & Bates said. A combined wire rope and chain system allows the rig to be anchored in as much as 4,921 ft of water.

A fully computerized rig management system checks and controls ballast, bilge, fuel, materials/equipment, water and electricity supply, fire, engine, and drilling equipment, and hull positioning. Variable deck load is 6,000 long tons, and the rig can accommodate a crew up to 122 persons.

Ishikawajima-Harima Heavy Industries Co. Ltd., Tokyo, constructed the semisubmersible in 19 months at its Aichi works. Designer is Friede & Goldman Ltd., New Orleans.

The rig is under tow by tugboat around the Cape of Good Hope. It is scheduled to arrive in the Gulf of Mexico next month.

The rig, with a gross weight of 19,928 long tons, consists of the main deck, two lower hulls, and five columns. A large diameter center caisson with buoyancy enables safe drilling work without being affected by floe.

The center caisson, 72 ft in diameter, also contains storage for riser pipes between its inner and outer shells. A moonpool within the inner shell facilitates handling of the riser and drill pipe. The unique shape of the lower hull improves hull oscillation characteristics against high waves.

NPC outlines policy options to curb oil imports

The recent increase in oil prices is not enough to reduce the likelihood that U.S. dependence on imports will continue to rise at alarming rates, says a draft report approved last week by the National Petroleum Council's committee on U.S. oil and gas outlook.

To boost drilling, says the report, industry needs more economic incentives, including oil prices above the current level of about \$18/bbl.

"Positive government energy policies that encourage, rather than discourage, domestic petroleum exploration and production will lead to a more stable, secure energy future for the U.S.," it reads.

"Tax incentives, decontrol of natural gas prices and markets, and opening unexplored federal lands are a few examples of such policies."

The draft final report, subject to considerable change before its submission to Energy Sec. John S. Herrington, is to be ready for presentation to the full NPC next month. An inter-

im report to Herrington was prepared by the committee last year (OGJ, Sept. 29, 1986, p. 36).

A dozen options. The committee report outlines advantages and disadvantages of 12 government policy options to reduce U.S. dependence on oil imports.

The policy options are:

- Greater access to federal lands and improve the lease terms.

- Removal of tax disincentives and use of positive incentives to maintain existing production and stimulate exploration/development.

- Stabilization of wellhead prices through the use of import fees at a level that will reduce consumption and stimulate production.

- Promotion of research and development in secondary and tertiary recovery methods and alternate fuels production technologies.

- Decontrol of gas prices and markets through repeal of Natural Gas Policy Act price controls and the Fuel Use Act.

- Reduction of demand by increasing oil prices through consumption and excise taxes.

- Creation of incentives and mandates to continue energy conservation efforts.

- Greater use of alternate fuels.

- Diversification of supply sources to reduce the likelihood that a disruption of a single source could precipitate a crisis.

- Implementation of diplomatic actions that could increase the interdependence of U.S. and Middle East exporting countries to make oil supply continuity beneficial to all parties.

- Increasing the strategic petroleum reserves to enhance the ability to limit the effects of supply shortages and price increases.

- Implementation of fiscal and monetary policies that could be developed to mitigate the effects of price shocks.

Although not specifically developed, another option is to guarantee a minimum oil price to producers.

NSC head to seek energy policy

By ANDREW MANGAN
The Associated Press

WASHINGTON — National security adviser Frank Carlucci views the rising level of imported oil as a threat to national security and will urge President Reagan to create a national energy policy to deal with the problem, a congressman said Wednesday.

Rep. Beau Boulter, R-Texas, said Carlucci told him and two other congressmen last week that he will recommend the president issue a national security decision directive to examine ways to deal with the problem, including the imposition of an oil import fee.

"What we were told by Carlucci is that he would see to it that there is a formal order signed by the president directing the NSC (National Security Council) to develop proposals and a national energy policy to deal with the national security threat posed by the high levels of imported oil," Boulter said.

Such an action would be the first formal recognition that the White House views rising imports as a serious threat to the nation's security.

Last week, Energy Secretary John Herrington told Boulter and Texas Gov. Bill Clements he was reviewing an 800-page Department of Energy draft report outlining options available to stem the flow of low-cost foreign oil into the United States.

"The indication is that Carlucci will start to work on the issue right after the DOE study is completed," Boulter said. The study is 95 percent complete, he said.

In his meeting with Carlucci, which was also attended by Reps. Mickey Edwards, R-Okla., and Dick Cheney, R-Wyo., Boulter said the national security adviser did not say whether he favored an oil import fee, tax credits or any other specific solution.

"We all pushed for an import fee by executive order. What he did say is that he is awash with studies and that now is the time to take action."

The level of Persian Gulf oil being imported into the United States grew from 6 percent of total consumption in 1985 to 15 percent last year, the highest percentage since 1981.



SJR 8

Anchorage Daily News

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Anchorage Daily News



Chairman Frank Carlucci

United Press International

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☐ Lynne Curry is management train

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Tesoro Petroleum Corporation

Low-Priced Oil or National Security? An Import-Fee Alternative

**Presented to Senator Richard G. Lugar, Chairman
Foreign Relations Committee
of the United States Senate
Washington, D.C.**

**by
Robert V. West, Jr.
Chairman,
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Remarks by Robert V. West, Jr.

Senator Lugar:

Thank you for affording me the opportunity to present my views to you and the Senate Foreign Relations Committee on the threat to U.S. national security of low-priced oil conditions now prevailing globally and to suggest a new approach to deal with that threat.

The only approach heretofore suggested has been one of a sliding-scale oil-import fee, whose purpose would be to protect economically the domestic oil industry and to bring U.S. crude oil prices back to a general level of \$20 per barrel or slightly more. It is perceived that a domestic crude oil price of this level could currently support an ongoing, although just barely viable, domestic petroleum industry.

The concept of an oil-import fee is so controversial that, regardless of its merits, it is unlikely that it would ever be adopted. The U.S. Administration has taken a strong stance against it. Certain U.S. industries who export their products into world markets and depend upon competitive petroleum prices for their survival oppose it. Even the petroleum industry itself has a divided attitude toward it. I believe that, because of the opposition of so many groups toward it and without extensive loopholes in it, the concept of an import fee won't be accepted, and that a different approach must be followed.

To have the national-security benefits inherent in a truly viable domestic petroleum industry, U.S. consumers must be willing to pay the slightly higher costs for petroleum products that higher crude oil prices would bring. Admittedly, educating consumers to the relationship between higher petroleum-product prices and U.S. national security will be difficult. Persuading the U.S. government that present low oil prices represent a threat to U.S. national security may be equally difficult.

Average consumers are gratified with low gasoline prices that have prevailed during the recent free-fall in world crude oil prices. They are comfortable with the fact that the gasoline they are buying costs only 70¢ to 80¢ per gallon, compared with prices double that during the last several years. Not long ago the President made a statement to the effect that it was good, for a change, to see the number of gallons on a gasoline pump meter go up faster than the number of

dollars as a consumer's tank was being filled. This emphasis on low petroleum prices represents an unrealistic, short-sighted attitude toward the future security of America.

Recently it has become popular in the press, in Wall Street and in economic circles to refer to crude oil and petroleum products as "just other commodities" and to think of them in that manner. The thrust of my views is to point out that this thinking is erroneous. Petroleum differs significantly from conventional commodities. It should not be compared in thinking or in treatment to soybeans, sugar or other pure commodities.

If petroleum has some commodity characteristics, it should be differentiated as a strategic substance vitally important to America's national security. Since the free-fall began in world oil prices 10 months ago, this fact has largely been ignored by the U.S. government. The Administration's emphasis has been on "freeing up the markets" - whatever that may mean - and letting the chips fall where they may with respect to the viability or demise of the U.S. petroleum industry.

The domestic availability of petroleum products in times of crisis is vital to America's security. In times of embargoes or other arbitrary petroleum cutoffs by foreign producers, the availability of a reasonable level of domestic supplies will be imperative. Our relatively small Strategic Petroleum Reserve will not begin to satisfy our potential needs.

Petroleum is not just another commodity, whose price should be permitted to seek its own level in competition with the global glut and the vast supply/demand imbalances now existing. Instead it is a substance with vital strategic importance to America. It must be recognized as such.

This recognition should not be partisan. Neither should it be regional. Instead it must be objective and far-reaching.

During the 130-year history of the petroleum industry in the U.S., the industry has been characterized by sharp swings in supply/demand balances. Unfortunately, this circumstance is inherent to the industry.

In the past, because petroleum was always recognized as a strategic substance, the U.S. government or state governments within our country were unwilling for very long to leave petroleum to the mercies of free commodity markets. Invariably during the history of the domestic industry there has been intervention to smooth out the peaks and valleys in supplies and prices of U.S. oil production. If

government intervention in domestic petroleum pricing and the defense of the viability of the U.S. petroleum industry do not recur again now, this lack of involvement will represent a wide departure from past U.S. practices.

In the early 1930's, with the discovery of the giant East Texas oilfield, the state of Texas utilized the oil and gas division of its then-existent Texas Railroad Commission to prorate the supply of Texas crude oil and to keep it in balance with state, national and international demands. In the process crude oil prices maintained a level that would permit ongoing exploration, development and production.

Before the imposition of Texas state proration rules for the East Texas oilfield, the price of crude oil in Texas dropped to as low as 10¢ per barrel. Even with the then-temporary glut of petroleum associated with that vast new field, that price level would not have permitted the maintenance of a viable domestic petroleum industry. At that time there was no threat to the U.S.'s being flooded with low-priced foreign oil or to our national security's being jeopardized by that flood - both as there are today.

Even so, the state of Texas took a bold step and instituted the concept of statewide oil proration. Supply was put back in balance with demand. Oil prices stabilized at a reasonable level.

Most other U.S. oil-producing states instituted their own regulatory and proration practices, generally following the pattern of Texas. As a result, for approximately 40 years, ending with the nationalization waves of Mid-East and South American countries in the 1960's and early 1970's, crude oil supply/demand balancing was achieved by proration of U.S. oil-producing states, by production restraints of international oil companies operating abroad or, later, by import controls in the U.S. and Canada.

In the process crude oil prices stabilized. These actions were not perceived as price-fixing or cartel-like by government officials and economists of those days. Rather they were perceived as necessary steps to preserve the viability of the U.S. domestic petroleum industry.

In the early 1980's the OPEC oil-producing nations attempted to restore supply/demand balances and price stability, which were largely destroyed by pricing and production practices - at unrealistically high price levels - by OPEC and non-OPEC nations alike during the past decade. However, petroleum consumers of the world came to expect that OPEC nations in general, and Saudi Arabia

in particular, would absorb all the excesses of global over-supply, and that these nations alone would subject themselves to self-imposed proration, while other oil-producing nations of the world produced in wide-open fashion, taking all of the global markets, internal and external, that their production capacities would permit.

Largely this attitude of "let OPEC prorate" is the result of consumer hostility toward OPEC nations. This hostility has its origin in the nationalization by OPEC countries of non-OPEC petroleum interests, including those of U.S. companies. Further it has its origins in the Arab oil embargo of 1973 and 1974 and in the sharp crude-oil price increases associated with that embargo. Also, it has its origin in the now seemingly false oil shortage resulting from the Iranian revolution in 1979 and the further sharp rises in petroleum prices associated with that revolution.

Thus world consumers in general, and those in the U.S. in particular, have little or no sympathy for OPEC and expect OPEC nations to bear the brunt of all proration necessary to maintain petroleum supply/demand balances under today's global-glut circumstances. Unfortunately this thinking is more emotional than practical. Actions of key OPEC producers since December 1985 and January 1986 prove that point.

The U.S. should put aside its emotional attitude toward OPEC and view realistically the situation as it is today. The U.S. is faced with the likelihood of losing the viability of its domestic petroleum industry and the paralyzing national security threat which that loss would represent.

I am not speaking as an advocate of OPEC, of any of its individual member states or of its production/pricing strategies. Instead I am trying to view the current global oil glut, and the solution to that glut, dispassionately and objectively.

I am an American, and I am vitally concerned about America's national security. I am speaking out because I am keenly aware of the devastating threat to that security, and I am trying to communicate my urgent concerns to you and other responsible U.S. government officials.

I look back to the early 1930's and to the imposition by the state of Texas of bold, far-reaching proration controls resulting from the oil surpluses of that day. Texas stepped forward, creatively and dispassionately, and mandated proration for all oil producers in the state. There was no expectation that one producer would bear the brunt of bringing supply and demand back into balance. Instead the

requirement was that all producers would be subjected to mandatory proration, on a predetermined objective basis.

I believe that a global proration approach similar to this is the only realistic solution to today's ominous oil supply/demand imbalances, and I believe that some system of worldwide proration must be adopted to deal with that imbalance. It is not realistic to expect that OPEC nations are for long going to permit non-OPEC producers to flow their wells at capacity, while some OPEC members prorate themselves to only 30% or 40% of their capacities.

Circumstances have shown that this condition is not acceptable to OPEC, and that the strategy of OPEC to continue it has changed completely. Whether countries such as the U.S. and the U.K. like it or not, OPEC nations feel that certain shares of global oil markets should be available to them, and they intend to take those shares by whatever means necessary.

The stark reality is that there has been only a temporary arrest in the worldwide price erosion of crude oil. This arrest may be short-lived, and global prices may free-fall again. OPEC nations in the aggregate will not be content for long with the nominal total production of 16 million barrels per day existing today.

Unfortunately for the U.S., most of its crude oil production is in the high-cost category, and its potential additional reserves - as yet undiscovered and unproven - will require huge sums for exploration and development. At today's levels, even with the small recent price recoveries, crude oil prices in the U.S. are far too low to encourage meaningful exploration and development.

This fact is borne out vividly by the decline in U.S. drilling rig activity, which reached an all-time low of 663 rigs during July of this year, and which is only about 750 now. By comparison, the rig count exceeded 4,500 just a few years ago. It should be at least 3,000 to sustain the viability of the U.S. domestic petroleum industry.

The U.S. is the most vulnerable major oil producer in the world. It has been producing oil for more than a century. It is the world's oldest oil-producing nation and has been highly explored. It is the home of the world's most costly oil production and the nation with the world's lowest reserve/life production ratio. It is vital for the U.S. to do something about this situation to protect itself and its own self-interest.

Right now many small U.S. oil explorers and producers are facing bankruptcy. Oil company employees are being terminated in droves. Oil-service companies have curtailed their activities dramatically, and

the personnel and business infrastructures of that industry segment are being lost. Major companies have sharply curtailed U.S. exploration budgets, mothballed most of their exploration and development rigs on the North Slope of Alaska and nearly ceased exploration in the Gulf of Mexico and elsewhere offshore.

The U.S. banking industry, with large loans to U.S. oil producers and to Latin American oil-producing nations, faces a difficult future. Current low oil prices are a serious threat to the Mexican economy, to Mexico's ability to repay debts to the U.S. banking system and to its internal political stability. The threat to the U.S. of social unrest in Mexico, attributable to low oil prices, is present and real.

The time is here - in fact, it is long overdue - for all of us to recognize that a truly viable U.S. petroleum industry is vital to America's national security. The time is here also for the U.S. and the world at large to face up to the fact that OPEC nations are not forever going to absorb all the world's proration disciplines necessary to maintain crude oil supply/demand balances and to permit other oil-producing countries, including the U.S., to retain viable domestic petroleum industries.

This brings me to my recommendation. Operating in conjunction with OPEC, the U.S. and other non-OPEC oil-producing countries of the world should create a modern-day, worldwide proration mechanism for crude oil production. Production should be shared in some equitable manner to maintain crude oil supply/demand balances and to permit prices to stabilize at levels acceptable both to oil-producing nations and to consumers, taking their contrasting desires into account.

Admittedly implementation of this recommendation would be a vast undertaking, surrounded by significant political and organizational problems. In spite of those difficulties, I believe the concept has fundamental merit, and that its implementation should be attempted. The U.S. must take the lead in such an effort. Doing so would put the global prestige of the United States behind the concept and give it substance and credibility.

Under a worldwide crude-oil proration mechanism, a price figure of at least \$22 per barrel should represent a target level now, gradually increasing over time, based on future conditions. OPEC has given indications that in the near term this level would be acceptable to it. Its more responsible producers recognize that earlier prices of \$30 per barrel or more are unrealistic in today's environment.

With respect to non-OPEC producers, and to the U.S. in particular, a crude oil price of \$22 per barrel is one that the industry could live with now and remain barely viable. That level would not represent a bonanza for U.S. producers and would not stimulate the necessary exploration and development drilling that the country desperately needs for long-term national-security purposes.

However, at present it should be high enough to provide temporary viability, and hopefully still low enough to be politically acceptable to consumers and the U.S. Administration. At a price of \$22 per barrel, gasoline in the U.S. would cost approximately \$1.05 to \$1.15 per gallon, compared to the prevailing level of 70¢ to 80¢ per gallon, and to the level 10 months or so ago of \$1.40 to \$1.50 per gallon.

With respect to degrees of non-OPEC proration, I would recommend levels substantially less severe than those that I mentioned earlier which certain OPEC producers are experiencing - i.e., 30% to 40% of capacity. The situations of those producers are different from those of the U.S. They do not have large internal consumption of their own, and in general their national-security requirements are minimal - in many cases because the U.S. provides security umbrellas over them.

Accordingly, I would not suggest that the U.S. - or the U.K., Norway, Egypt, Canada or Mexico - enter into worldwide proration arrangements which would prorate all countries evenly in relation to their potential producing capacities. Instead I would suggest that the U.S. and other non-OPEC producers agree to a proration of their individual producing amounts of approximately 10% each or to a level of 90% of recent production capacities. It is worthwhile to note that on September 10, 1986 Norway voluntarily stated its intention to cut its production 10% to help alleviate world supply/demand imbalances.

If the necessary calculations are made, it can be shown that if all non-OPEC producers cut their production by 10%, OPEC in the aggregate could be allocated 18 to 19 million barrels per day of crude oil production now, compared to the 16 million barrels per day to which it recently agreed to cut back during September/October 1986. In the process of these 10% proration initiatives, hopefully the global price of crude oil would rise to about \$22 per barrel. With an aggregate production of 18 to 19 million barrels per day, and with a current price of \$22 per barrel, again hopefully OPEC nations individually and collectively would be satisfied with their

petroleum-export revenues and would honor the supply/demand agreements.

If the U.S. were voluntarily to cut its production by 10%, that cut would represent an aggregate decrease of about 900,000 barrels per day from the 9.0 million barrels per day level which the U.S. was producing 9 or 10 months ago. However, associated with that decrease would be a price increase, a degree of restored viability to the domestic petroleum industry and a much greater level of national-security comfort.

Numerous forecasts indicate that, without some solution for the problems of the U.S. domestic petroleum industry, America's producing level will erode to 6.0 million barrels per day or so in the next few years. This erosion will occur as a result of the shut-in of stripper and other marginal wells, normal production declines of non-marginal wells and the lack of economic incentive for additional exploration and drilling. Accordingly, the U.S. as a nation would be far better off under the suggested global proration program than under the continuation of existing circumstances.

Many of the necessary agencies to implement a global proration program now exist. In this regard I refer to the International Energy Agency, the U.S. Department of Energy, the state regulatory bodies in the individual producing states of the U.S. and to OPEC. Even though the state regulatory bodies no longer have influence on global supplies, they still exist and function. They could be utilized by the U.S. government to implement a global proration mechanism, on an individual state-by-state basis or in conjunction with the U.S. Department of Energy.

Economists might say that this recommended global proration approach just represents an extension of cartel-like conditions to the petroleum industry worldwide, and that it contradicts free-market principles. I suggest that if this is the perception, it would not be unique to the petroleum industry. What this approach would recognize is that petroleum markets are truly international, not regional or national.

The mandatory limited access of Japanese automobiles to the U.S. represents an indirectly comparable situation. Under this mandatory limit the U.S. recognizes that the automobile market is an international one. With the limit, the U.S. is forcing proration of Japanese automobile manufacture and at the same time imposing proration on U.S. automobile manufacturers by permitting the importation of Japanese and other foreign automobiles in the first place.

With the weight of its worldwide prestige, the U.S. must be the leader for a global crude-oil-proration mechanism to succeed. By leading, it would demonstrate to the world that the U.S. recognizes its own national-security needs for a viable domestic petroleum industry but at the same time recognizes the imbalances and inequities that OPEC nations feel with respect to their global market shares.

If the U.S. takes the lead with sufficient resolve, demonstrating its understanding, objectivity and fairness, there is reasonable hope that in addition to Norway, the U.K. and other non-OPEC producers would adopt similar attitudes. Too there is hope that major OPEC producers would welcome those leads and work conscientiously on a global basis to alleviate supply/demand imbalances.

High-level conversations on global proration should begin immediately in order that an early determination may be made whether or not the approach has a chance of political success. The U.S. government must emerge from its role of doing nothing to protect the viability of the domestic petroleum industry. It needs to understand the future national-security implications of that do-nothing policy. It needs to step forward into a role of pro-active leadership and do something to stabilize volatile, chaotic world oil markets.

The moment for action is here, and the time is short. With this thought in mind I strongly recommend the approach I have outlined for your consideration and that of your colleagues. Thank you again for affording me the opportunity to present my views to you and to the U.S. Senate Foreign Relations Committee.

October 2, 1986





International Gas Technology HIGHLIGHTS

Volume XVII

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No. 20

IEA ENERGY USE WAS ALMOST UNCHANGED IN 1986

The International Energy Agency's 1986 review of the energy policies and programs of its 21 member countries reports that their total primary energy requirements (TPER) rose only 0.4% to 3531.5 million tons of oil equivalent (about 140 quadrillion Btu) in 1986.

In Europe, TPER went up 1.3% to 41 quads while in the Pacific region requirements grew 1.2% to 19 quads. However, North American energy demand declined 0.3% to 71 quads. Oil demand increased 2.7% in the entire IEA to about 60 quads, including a 3.3% increase in the U.S. Oil imports jumped 11.8% to 31 quads, including a 23.1% rise to 11 quads in the U.S.

The IEA forecasts that its members' total primary energy requirements will increase from 3881.2 million tons of oil equivalent in 1985 (151 quadrillion Btu) to 4652-5083 million toe (185-202 quads) by the year 2000. The lower projections assume that world oil prices stay at the \$28-\$30/bbl level of 1985; the higher forecast assumes prices fluctuate between \$15 and \$20/bbl (\$17.50 average) for the rest of the century. The economic growth rate is assumed to average 3%/year through 1990 and 2.5%/year from 1990 to 2000.

As the table shows, oil's share of TPER would remain around 42% in the \$17.50/bbl scenario and would be lower if prices were higher. The share of gas is also inversely linked to the price of oil, though not to the same extent. Solid fuels, nuclear, and renewable resources would have higher

shares when oil prices are high and vice versa.

Oil consumption in the 24 countries of the Organization for Economic Cooperation and Development is projected to grow from 34 million bbl/day in 1985 to 37-39 million bbl/day in 1990 and then remain at this level until the end of the century. Domestic production is expected to decline from 16.9 million bbl/day in 1985 to 15.5-16.5 million bbl in 1990 and 13.5-14.5 million bbl/day by 2000. Total world petroleum consumption, excluding the centrally planned economies, is estimated to rise from 45.6 million to 50.4-52.6 million bbl/day in 1990 and 53.2-56.8 million bbl/day by the year 2000. OPEC's production, 17.2

million bbl/day in 1987, will rise to 21.7-24.2 million bbl in 1990 and to 25.5-29.5 million bbl/day by 2000, according to the IEA.

The IEA report recommends that, given the prospects for tightening energy markets in the 1990s, attention should be given to: the development of alternatives to oil, especially for electricity generation; a review and possible abolition of remaining price controls; the application of new technologies for energy production and use; government review of incentives for conservation; a removal of barriers to international trade in energy; and resistance against such protectionist barriers as import fees.

Long-Term OECD
Energy and Oil Demand Growth

CASE:	\$30 Reference		\$17.50 in 1989 to \$30 in 1999		\$17.5 Constant	
	1985-90	90-2000	1985-90	90-2000	1985-90	90-2000
Demand Growth (per cent per annum)						
TPER	1.4	1.3	2.5	0.8	2.6	1.6
Oil	0.6	0.3	3	-	3.2	1.1
	1985	2000	2000		2000	
TPER (Mtoe)	3 811.2 ¹	4 652	4 685		5 083	
Market Share (per cent of TPER)						
Oil	42.5	36	38		42	
Gas	19	17	18		17	
Solid Fuels	24.5	28	27		25	
Nuclear	7	10	9		8.5	
Hydro/Renewables	7	9	8		7.5	

1. Note that this figure includes bunker oil demand as well as TPER for OECD Member countries who are not also members of the IEA (Finland, France, Iceland). It therefore differs from the figure for TPER in 1985 shown in Appendix D.

Source: IEA Secretariat

October 5, 1987

JAPAN PASSES U.S. IN GOVERNMENT SPENDING ON ENERGY RD&D

According to the International Energy Agency's 1986 review of the energy policies and programs of its 21 member countries, for the first time Japan surpassed the United States in total government expenditures on energy research, development, and demonstration. As the table shows, last year Japan spent \$2.31 billion on energy RD&D, up 2.4% from 1985, compared with \$2.26 billion for the U.S., a 7.0% decline. (All figures are in 1986 U.S. dollars.) U.S. RD&D funding peaked at \$5.30 billion in 1979. Overall, IEA RD&D expenditures fell 6.3% to \$7.13 billion — down from the \$10.21 billion peak in 1979.

Italy came third with \$761 million, a 1.2% rise, followed by West Germany \$566 million (a 30% drop), the United Kingdom \$378 million (-13%), Canada \$336 million (-7.4%), and The Netherlands \$161 million (up 3.6%).

The area with the largest budget remained conventional nuclear, where overall IEA spending totaled \$2.69 billion in 1986, down 3.3% from 1985. Japan was the leader with \$1.11 billion, followed by the U.S., \$753 million and Italy, \$324 million. Advanced nuclear RD&D received \$1.82 billion in funding, with Japan spending \$661 million, the U.S. \$381 million and Italy \$334 million.

1986 Government Expenditure on Energy RD&D Per Unit of Gross Domestic Product

(including nuclear)	
Country	RD&D/GDP (per mille) 1986(1981)
Italy	1.99(1.52)
Japan	1.73(1.39)
Netherlands	1.29(1.00)
Canada	0.98(1.05)
Belgium	0.94(1.02)
Germany	0.91(1.43)
United Kingdom	0.85(1.05)
Sweden	0.79(1.28)
Switzerland	0.75(0.54)
USA	0.59(1.31)
Norway	0.51(0.60)
Greece	0.46(0.79)
Spain	0.41(0.37)
Denmark	0.25(0.48)
New Zealand	0.16(0.70)
Turkey	0.05(0.03)
Australia	n.a.(0.52)
Austria	n.a.(0.38)
Ireland	n.a.(0.43)
Portugal	n.a.(0.22)

IEA Government Energy RD&D Budgets in 1986 United States Dollars¹
(Millions)

	1975	1977	1979	1980	1981	1982	1983	1984	1985	1986	1987
Canada	221.9	248.8	302.0	282.2	332.4	343.5	393.7	447.1	363.6	336.3	1,389
United States	2,317.0	4,187.0	5,302.8	5,229.2	4,023.7	3,106.3	2,916.2	2,433.0	2,432.0	2,261.3	1,000
Australia	n.a.	30.4	49.3	63.4	72.1	n.a.	83.6	n.a.	n.a.	n.a.	1,496
Japan	820.8	1,018.9	1,376.7	1,987.2	2,114.5	2,116.9	2,127.9	2,146.6	2,256.7	2,310.9	168,500
New Zealand	4.5	4.5	7.6	12.9	11.0	9.9	9.3	11.1	10.3	3.9	1,917
Austria	8.4	26.7	28.2	30.5	28.4	31.0	29.3	32.0	29.4	n.a.	15,270
Belgium	144.0	116.3	97.5	121.6	105.6	97.2	87.8	93.3	85.8	74.1	44,690
Denmark	13.8	22.8	36.8	27.0	17.7	17.0	16.6	15.1	14.1	14.4	8,089
Germany	817.5	878.3	1,032.1	1,049.9	1,130.8	1,442.4	848.4	847.3	804.4	565.8	2,172
Greece	n.a.	1.1	5.3	37.3	31.3	7.2	6.6	8.4	11.1	13.3	139,480
Ireland	2.0	3.3	6.7	8.1	9.5	8.0	5.1	2.0	2.9	n.a.	747
Italy	n.a.	277.9	383.7	397.7	677.1	520.5	609.5	605.2	751.8	761.0	1,491,000
Netherlands	96.4	141.3	153.2	155.6	160.7	132.8	132.5	114.0	155.4	161.1	2,450
Norway	22.9	31.8	44.7	41.0	35.0	31.1	25.8	24.6	24.5	28.9	7,392
Portugal	n.a.	n.a.	n.a.	5.0	3.9	3.9	4.9	7.8	7.3	n.a.	148,170
Spain	82.4	52.3	74.5	87.1	82.1	75.1	171.2	176.4	53.0	70.3	139,970
Sweden	70.7	80.3	133.1	127.5	177.1	141.8	127.0	112.9	104.1	79.4	7,124
Switzerland	20.0	43.3	67.6	71.9	67.5	63.8	65.7	64.5	69.2	69.6	1,798
Turkey	n.a.	n.a.	n.a.	2.8	1.2	1.9	2.8	2.4	2.3	2.5	669,000
United Kingdom	457.8	393.1	476.0	474.6	507.6	461.5	492.2	456.9	435.1	378.4	682
IEA Total	5,080.2	7,555.7	9,577.6	10,212.4	9,589.2	8,611.8	8,155.7	7,800.6	7,513.4	7,133.3	
EC	n.a.	161.2	218.4	335.7	235.9	426.2	458.2	389.3	492.0	468.7	1,025

¹ Values in Table 3 have been derived from those presented in Table C2 (government energy RD&D budgets expressed in 1986 national currencies), by using 1986 average exchange rates to the United States dollar calculated from those provided by the OECD Secretariat. Caution should be used when assessing trends in United States dollars, due to considerable recent exchange rate fluctuations.

Source: Country submissions

The IEA research budget for electricity RD&D totaled \$692 million in 1986, down 4.5%. Coal RD&D spending amounted to \$677 million, down 2.3% and less than half the 1981 peak of \$1.46 billion. U.S. spending on coal fell from \$980 million in 1980 to \$256 million in 1986, though it remained in first place. Expenditures on conservation RD&D in the IEA declined 4.3% to \$466 million and renewables research 13.1% to \$484 million. The only area where an increase occurred was oil and gas RD&D, which rose 26.9% to \$312.7 million, mainly due to increases in Canada and Japan. In the U.S., however, government spending dropped 15.4% to \$38 million.

The IEA notes that, along with a continued decline in government funding of energy RD&D, private sector support, particularly in the oil industry, is being severely cut as a result of lower oil prices. "Future government RD&D funding will need to be assessed in light of the implications of this situation for medium- and long-term energy security."

For the second year in a row, the U.S. ranked tenth in government spending on research, development, and demonstration as a percentage of gross domestic product. As the second table indicates, U.S. government RD&D expenditures accounted for 0.059% of its 1986 GDP — the same as in 1985 (IGT Highlights, December 29, 1986). However, other IEA countries showed significant increases: Italy devoted

0.199% of its GDP to government energy RD&D spending, up from 0.160% in 1985; Japan 0.173% (0.134%); The Netherlands 0.129% (0.093%), and Belgium 0.094% (0.078%).

HARVARD STUDY REITERATES NEED FOR TARIFF ON IMPORTED OIL

A new study by Harvard University calls for a \$5/bbl tariff on oil imports that would reduce our rapidly rising dependence on imported oil, help maintain downward pressure on world oil prices, and encourage conservation and domestic production. The \$10 billion in revenues from such a tariff could be used to increase the size of the Strategic Petroleum Reserve and to build up stockpiles of products.

Nearly a year ago, another Harvard study recommended the immediate imposition of a \$10-\$11/bbl import fee to reduce levels to the point where the costs to society of importing an incremental barrel of oil would just balance the benefits (IGT Highlights, December 1, 1986).

In the new 99-page report, *Energy Security Revisited*, authors William Hogan and Bijan Mossavar-Rahmani of Harvard's Energy and Environmental Policy Center write that "the flare-up in the Iran-Iraq tanker war and the escalating U.S. involvement — both political and military — serve as stark reminders of the fragility of Persian Gulf oil supply flow." They concede

that the Administration's laissez-faire approach to energy markets is 'difficult to attack when oil prices are low and supplies are plentiful and also given the problems created by previous government intervention. But just because consumers feel comfortable is no reason to squander opportunities to launch policies that will bear fruit later. "The forces are in motion to shift the balance and time is short."

The authors charge that energy security policies based exclusively on the SPR are "myopic," since the SPR does not solve the problems created by rising dependence on imports. A tariff, on the other hand, forces the market to "recognize and internalize the true cost of imported oil." In estimating the size of a tariff, the researchers take into account two sets of market imperfections that comprise the oil import premium: 1) the economic component, which reflects the fact that the price the U.S. pays for oil is affected by its own level of demand and the effect of oil price changes on U.S. macroeconomic performance, and 2) the security component which reflects external costs that stem from sudden, unexpected, and large changes in the world price of oil.

They estimate that, if the price is \$27/bbl, the optimal tariff would be \$11.03/bbl; with oil at \$15/bbl, it would be \$12.55/bbl. However, they concede that a figure of \$5/bbl is politically more realistic and almost as beneficial, since it would compel the market to internalize the true cost of imported oil. Additionally, it would help maintain downward pressure on world oil prices, foster investment in capital equipment with flexibility in fuel usage, and would counteract negative effects on the nation's trade balance.

Hogan and Mossavar-Rahmani said that the Dept. of Energy's *Energy Security* report (IGT Highlights, April 6, 1987) overestimated the costs of a tariff to the nation's economy, which it put at \$200 billion over the next decade. But DOE assumed that the economy is perpetually shocked by a tariff and never adjusts. "If these assumptions are replaced with a view

of a more flexible economy and of government policies designed to avoid recession, the quantifiable benefits of a tariff indeed exceed the costs," says the Harvard study.

MIDCON WANTS TO CHARGE CUSTOMERS FOR MAINTAINING FIRM SUPPLIES

Natural Gas Pipeline Co. of America, a subsidiary of MidCon Corp., asked the Federal Energy Regulatory Commission for authorization to levy a 55¢/1000 CF Inventory Holding Charge on its utility customers to recover the cost of maintaining firm gas supplies to meet their service requirements. The charge would go into effect November 1 and be recalculated annually. On a monthly basis, customers would be assessed the costs associated with reserving the gas they do not actually purchase, minus volumes they purchase directly from producers for which NGPL receives take-or-pay credit.

NGPL said the charge would reflect future costs charged by producers for gas that is ordered but not purchased. The pipeline noted that, because of increasing spot-market purchases by utilities and other large gas users, its sales have declined from about 1 trillion CF/year to 200 billion CF/year, while average sales have fallen from historic levels of 3 BCF/day to 100 million CF/day in March and April and to 300 million CF/day at the present time.

NGPL's filing with FERC noted that, although its customers are buying small amounts of gas, they continue to nominate large volumes of gas as "insurance" against spot market shortages. "... If interstate pipelines are to be called upon to 'backstop' distributor requirements with firm supply, they must be permitted to assess charges which adequately reflect the costs of maintaining such a supply," said the filing. "Customers should not have to pay a charge for the pipeline to maintain a gas inventory they do not want. Conversely, however, pipelines cannot reasonably be expected to maintain a supply adequate to meet maximum

daily and annual obligations if their customers are unwilling to pay the costs."

Last month, NGPL asked FERC for permission to convert 20% of its service obligations from sales to firm transportation (IGT Highlights, August 10, 1987). The pipeline said it will soon file with FERC a plan to recover other gas-supply-related costs.

DOE CHOOSES 4 TEAMS FOR "MILD GASIFICATION" RESEARCH

The Dept. of Energy has chosen 4 private-sector teams to negotiate contracts to investigate "mild gasification" processes — coal conversion processes that operate at relatively low temperatures (1100-1500°F) and at near-atmospheric pressures to produce liquid and solid coproducts in addition to gases. The contracts could be worth as much as \$13.5 million over three years.

DOE notes that, while mild gasification techniques have been known since the early 1800s, recent advances in coal chemistry have resulted in processes that could increase production of liquid fuels and improve their quality. The capital cost of a mild gasification plant is expected to be relatively low compared with conventional gasification technology, because the number of processing steps is reduced and lower-cost alloys could be used in the reactor vessel.

The teams are headed by IGT, working with Peabody Holding Co., Bechtel National Inc., and Caterpillar, Inc.; the Western Research Institute, whose team comprises AMAX Inc. and Riley Stoker Corp.; the University of North Dakota Energy and Mineral Center, heading a team that includes Foster Wheeler Development Corp., Solar Turbines, Inc., and Southwest Research Institute; and the University of North Dakota Energy and Mineral Center, with a team consisting of AMAX, Inc., and J.C. Sinor Consultants.

In an initial 5-month phase, each of the 4 teams will examine the technical feasibility of various mild gasification processes and assess the industrial markets that could use the prod-

ucts. Based on the data, DOE will then select one or more of the concepts for the second-phase construction of small-scale experimental systems. If the processes selected prove technically feasible, DOE would fund a third phase, in which a larger development unit integrating all the process steps would be designed and built and a 1000 ton/day demonstration plant designed and economically evaluated.

To explore one application of a "mild gasification" product, DOE also awarded a \$100,000 grant to United Coal Company Research Corp., the Commonwealth of Virginia, and CSX Railroad Corp. to determine whether a liquid fuel produced from "mild gasification" can be burned in a diesel locomotive engine.

REPORT URGES CANADA TO BECOME WORLD LEADER IN HYDROGEN TECHNOLOGY

A report by the Advisory Group on Hydrogen Opportunities prepared for the Canadian government recommends that Canada adopt a national mission to be "first into the hydrogen age" and develop and own technologies for hydrogen production, distribution, and use, especially the use of neat hydrogen as a transportation fuel.

The report begins by noting that the world is steadily evolving toward the increased use of hydrogen and in the long term will see electricity and hydrogen dominate as energy currencies derived from a number of sustainable sources. Canada has an opportunity for leadership because of its high demand for hydrogen to upgrade products from heavy crudes and bitumen, its large reserves of natural gas, and its large electricity generating capacity which, coupled with a water electrolysis industry, will allow the production of non-fossil-derived hydrogen.

The report recommends that Canada develop and own the best technologies for the economic production of hydrogen from fossil and sustainable sources and for hydrogen purification, distribution, and storage. Suggested development areas include improving the energy efficiency of steam reforming; improving the reliability of partial oxidation; reducing the capital cost of water electrolysis, beginning with construction of a 100-MW demonstration plant; and achieving efficient hydrogen liquefaction, distribution, and storage.

The report also says that Canada must aggressively develop improved technologies for using hydrogen in the production of conventional fuels and chemicals from heavy crudes, bitumen, coal, and possibly biomass. This is the first step towards the more comprehensive integration of multiple energy sources; for example, coprocessing coal and oil, incorporating electrolytic hydrogen and oxygen into heavy oil upgrading, and mobilizing Canada's electricity generating capacity for the production of fuels and chemicals.

Canada must also develop technologies and products that use neat hydrogen. As a first step, the report recommends developing, demonstrating, and evaluating hydrogen fuel-cell locomotives, hydrogen-fueled urban road vehicles, and patrol aircrafts.

The group suggests that program be coordinated by a Canadian Hydro-

gen Authority that offers guidance and enlists the nation's scientific, engineering, business, labor, and entrepreneurial talents, but is not a "performer." The panel recommends that \$50 million in funding be allocated for an initial 5 years to the Authority which would report at the Ministerial level.

As for costs, the report notes that over the next 20 years, hydrogen will be more expensive than conventional fuels: probably 1.6 times the price of natural gas based on current methane steam reforming (SMR) technologies and about 1.2 times the price of crude oil. However, with improved MSR technologies and favorable site-specific circumstances for hydrogen derived from sustainable resources, its cost would be about the same as gasoline and other petroleum-derived fuels. Technologies must be specially developed to exploit the unique properties of neat hydrogen, which would improve its competitiveness.

In the U.S., the House Science, Space, and Technology Committee's Subcommittee on Energy Research and Development heard testimony on legislation to promote a hydrogen R&D program. T. Nejat Veziroglu, president, International Assn. for Hydrogen Energy, called for a national policy to convert from the present fossil fuel system to a hydrogen energy system over the next 50-60 years. In the U.S., the cheapest hydrogen can be produced from coal near mines and then transported by pipeline, he said.

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oil import fee

Harvard study another important reminder of U.S. energy dilemma

The U.S. last week received another important reminder that its energy situation is serious and getting more so with each new barrel of imported crude oil. The reminder came in a study, "Energy Security Revisited," by William W. Hogan and Bijan Mossavar-Rahmani of Harvard University's Energy and Environmental Policy Center.

The study will receive as much attention as supporters of its centerpiece proposal can muster. It calls for a \$5/bbl fee on imported crude oil and products. And the more attention, the better.

Opponents of an oil tariff—including the Reagan administration and a majority in Congress—should not dismiss the new Harvard study because of what it prescribes for a serious problem. It is, in fact, a clear statement of that problem, a statement that must be repeated until someone in government hears and acts.

The study happens also to be a strong argument for an oil tariff, which it says would "force the market to recognize and internalize the true cost of imported oil." This touches the heart of the issue. Something is cockeyed about a policy that funnels billions of dollars to protection of Middle Eastern oil and even risks war, yet spends nothing for domestic petroleum development. The U.S. may have better alternatives than an oil tariff. But before it rejects any option it must acknowledge all costs of the foreign oil it is consuming at rapidly rising rates.

For the moment, political arithmetic rules. Most voters and their representatives, blind to the costs of import addiction, see a tariff as a way to make oil consumers bail out the oil industry. They want no part of it. This the Harvard researchers understand. They prefer the \$10/bbl tariff proposed earlier by a colleague but figure their \$5/bbl alternative stands a better chance.

That the Harvard study gives life to the otherwise fading oil tariff discussion is one of two reasons for the oil industry to welcome it. The tariff discussion deserves more than the Reagan administration's free market cold shoulder. Perhaps more important, the Harvard study stokes the fire under a simmering national dilemma that has been studied beyond the point of meaningful analysis and officially ignored.

Given political realities, the industry might do well to pin its hopes for help at least as much

on the Harvard study's premise as on its proposal for an import fee. Other recent studies disagree on the proposal but agree on the general view of the problem: that the U.S. has a growing energy problem and that the government must do something about it.

If not an oil tariff, however, what?

The government can take great strides toward solving the nation's energy problem by quit being such a big part of it. More specifically, it can make energy policy a consideration of some priority when it deals with taxes and the environment. Against the scenario depicted by the Harvard study—steadily rising U.S. oil imports and demand, flagging domestic production—the continued existence of an excise tax on oil production seems absurd. So does legislated erosion of the producing industry's ability to recover capital and virtual elimination, by way of the alternative minimum tax, of current year expensing of intangible drilling costs.

Even more preposterous is what government does to national energy health in the name of environmentalism. Federal land management has made most remaining exploration frontiers off limits to drilling. The Environmental Protection Agency wants to stiffen regulation of drilling wastes. Air and water quality proposals would multiply costs of refining in pursuit of marginal environmental gains.

Energy policy, meanwhile, concentrates on what to do in an emergency and ignores what should be done to prevent one. Its solo achievement: a strategic crude oil stockpile. So the government fills its emergency reserve and blithely proceeds with tax and environmental actions that make the U.S. more vulnerable to the emergency that's certain to come.

That's why the U.S. is in the energy predicament to which the Harvard researchers and others point with such legitimate alarm. And that's what must change if the U.S. is to avert another oil supply disaster. If the U.S. can't encourage energy development, it should at least quit discouraging it. The government must quit ignoring what the Harvard study calls "the true cost of imported oil" and start doing something about its energy policy equivalent, the true benefit of domestic supply.



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Senate Rejects Plan to Keep Oil Imports From Exceeding 50% of Domestic Use

By MONICA LANGLEY

Staff Reporter of THE WALL STREET JOURNAL

WASHINGTON—The Senate, continuing work on trade legislation, rejected a measure designed to prevent oil imports from exceeding 50% of U.S. consumption.

The senators voted 55-41 to delete from the trade package the so-called "energy security" provision. Lawmakers will continue voting next week on amendments to the trade bill—including a provision to require companies to give advance notice of plant closings and one to provide relief to domestic industries battered by imports.

Lawmakers opposing the measure said it was an attempt to help domestic oil companies. "It is special interest legislation at its worst," said Sen. Howard Metzenbaum (D., Ohio). "It seeks to prop up the domestic oil industry at the expense of every one else."

The oil-import measure had been cleared by the Senate Finance Committee in May. Sponsored by Finance Chairman Lloyd Bentsen (D., Texas), it would have required the president each year to submit to Congress a three-year projection of U.S. oil production, demand and imports. For

any year in which oil imports would be projected to exceed 50% of demand, the president would have been required to propose a corrective plan that could include tax incentives to increase domestic drilling or a fee on oil imports.

Sen. Bob Packwood (R., Ore.) attacked the measure, calling it "an effort to impose an oil import fee." He noted that the Senate had twice rejected such a fee.

After the Senate rejected the provision, Sen. Bentsen said the vote nevertheless represented "quite a dramatic change" in sentiment concerning an oil import fee. Last year, he said, only 15 senators voted for such a fee. He said he was considering offering a weaker version of the measure.

In arguing for the provision, Sen. Bentsen said the growing U.S. dependence on oil imports threatens national security. "There has probably never been a time in our history when the dangers of dependence on oil from the Persian Gulf are more apparent," the Texas Democrat said. "There is a war in the gulf and ships are being attacked."

The Reagan administration opposed the

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The Better Way to Tax Oil

Virtually all fiscal analysts agree that more revenue is needed to reduce the Federal budget deficit. Now Richard Gephardt joins Gary Hart in proposing to raise the money with a tariff on imported oil. Could this be the beginning of a trend among Democratic Presidential candidates, and others?

As taxes go, an oil tariff would engender the least political resistance. Oil states like the idea because their producers would profit behind the tariff. Many economists approve because it would slow the shift toward dependence on oil from the Persian Gulf. Labeled a "energy security fee" rather than a tax, it could even offer President Reagan a face-saving way of raising revenue.

If the choice were between an oil import tax and no tax at all, then tax it should be. But there are less costly ways of raising revenue that offer as much protection against OPEC. The most sensible would be to tax all oil, domestic and foreign.

According to a new study by the Energy Department, a \$10-a-barrel import fee would funnel about \$30 billion a year to the Treasury by 1995. It could stimulate domestic production by 400,000 barrels a day, while imports would be cut by 1.6 million. The annual oil import bill would fall by \$24 billion. But there are catches.

The Energy Department argues the big increase in oil prices would push up inflation by two to three percentage points. That, in turn, would reduce the gross national product by tens of billions, more than offsetting the benefits of greater self-sufficiency and lower import bills. Perhaps. But the department's analysis ignores the cost of not raising taxes. Without some credible deficit reduction, the dollar will almost certainly fall further, raising im-

port prices and disrupting world trading patterns.

More questionably, the tariff wouldn't deliver much production bang for the buck. Much of the extra \$22 billion a year going to domestic oil producers would amount to a windfall on oil that would have been pumped at lower prices. Consumers would, in effect, pay an extra \$22 billion for just 146 million barrels — nearly \$150 for each additional barrel produced.

There are diplomatic concerns, too. If Mexico, Venezuela and Canada were exempted from an oil tariff, both the revenue and efficiency gains would be halved. If they weren't, hemispheric alliances would be sorely tested.

A better way would be to increase the tax on gasoline. A 25-cent-a-gallon tax would yield about \$25 billion a year and cut the import bill by as much as \$9 billion — and with roughly half the inflationary impact of the \$10-a-barrel import fee. Unfortunately, the burden of a gasoline tax varies enormously among families and regions. Rural and suburban residents would take the biggest hit.

The arguably fairer approach would be to tax all oil products. A 10-cent-a-gallon tax spread over all oil consumers would raise the same revenue as a 25-cent gasoline tax on drivers. The oil tax would also be more efficient than an oil import fee, offering incentives for conservation without diverting billions into the production of high-cost domestic oil. Some poor people would feel the sting of higher heating costs; they could be compensated at relatively minor cost to the Treasury.

Oil and gasoline conservation taxes are unlikely to find favor along the oil belt, or among consumers. But good policy rarely coincides with political ease. The test of leaders — and those who would like to lead — is their capacity to sell unpopular ideas that make sense.



ALASKA STATE LEGISLATURE

SENATE SPECIAL COMMITTEE ON OIL AND GAS

Senator Bettye Fahrenkamp
Chairman
Senator Jack Coghill
Senator Paul Fischer

P.O. Box V, State Capitol
Juneau, Alaska 99811
(907) 465-3834

M E M O R A N D U M

TO: Members, Senate Special Committee on Oil and Gas

FROM: Committee Staff

RE: Committee Meeting, February 26, 1987

DATE: February 25, 1987

On Thursday, February 26, at 3:30 pm in the Beltz Room, the Senate Special Committee on Oil and Gas will hear SJR 8, Relating to a federal tax on imported oil.

SJR 8 urges the U.S Congress to impose a federal tax on imported oil. There are currently at least two oil import fee proposals before the U.S Congress (S 302 and S 460).

Supporters of the legislation claim that by imposing a tariff on imported oil we could reduce the national budget deficit, protect our national security, and maintain the viability of our domestic oil industry. The resulting rise in domestic oil prices would likely result in a windfall to our state treasury. Economists from the Division of Oil and Gas predict that an oil import tariff would increase state revenues by at least \$450 million a year. A flat fee of \$10 per barrel on imported oil would increase state revenues by as much as \$1.5 billion a year.

Any oil import tariff would result in increased costs to consumers. Representatives from consuming states are generally opposed to the concept. The fee is also opposed by some members of the oil industry. Certain U.S. industries such as steel, aluminum and petrochemicals would also be hard hit by increased oil prices.

Testimony will be heard via teleconference from national figures such as: U.S Senator David Boren, Tim Dowd, Chairman of the Interstate Oil Compact Committee, Ray Plank, Chairman of Apache Corporation and the Energy Security Policy Group, Dr. Robert West, Chairman of Tesoro Petroleum Corporation, and a representative of Governor Clements, Texas.

BY JOSEPHSON, KELLY, HALFORD
AND STURGULEWSKI

1 IN THE SENATE

2

SENATE JOINT RESOLUTION NO. 8

3

IN THE LEGISLATURE OF THE STATE OF ALASKA

4

FIFTEENTH LEGISLATURE - FIRST SESSION

5

Relating to a federal tax on imported

6

oil.

7 BE IT RESOLVED BY THE LEGISLATURE OF THE STATE OF ALASKA:

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WHEREAS rapidly fluctuating oil prices create an unstable environment

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in Alaska and the United States for business planning and investment and

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threaten the stability of the domestic petroleum exploration and develop-

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ment industry, the stability of which is vital to the national security;

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and

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WHEREAS the continuation of energy conservation measures and further

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development of alternative energy technologies could be jeopardized by

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sharp declines in oil prices; and

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WHEREAS the federal government needs additional revenue to reduce the

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federal deficit and the threat of another period of high inflation; and

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WHEREAS Americans face the prospect of significant budget reductions

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in federal programs that are vital to the health, education, and welfare of

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many Americans, but the imposition of an oil import tax would moderate the

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severity of these reductions; and

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WHEREAS a precipitous decline in oil prices results in major reduc-

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tions in revenue to oil-producing states, subjecting them to undue hard-

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ships in providing the governmental services and infrastructure support

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needed to continue the production of domestic oil at the same time that

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these states are being given expanded responsibility as a result of dimin-

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ishing federal participation through revenue-sharing and similar programs;

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BE IT RESOLVED that the Alaska State Legislature encourages the United

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States Congress to impose a federal tax on imported oil, the revenue to be

Federal study indicates energy crisis likely

Journal Empire 2/20/87

By LEE A. DANIELS

THE NEW YORK TIMES

NEW YORK — Declining domestic crude oil production and the growing dependence of the United States on petroleum imports could lead to an energy crisis in the 1990s far worse than those experienced in the 1970s, according to the draft report of a federal advisory committee.

The study, conducted by the National Petroleum Council at the request of Energy Secretary John S. Herrington, warns that current conditions pose a serious threat to the viability of the American oil and gas industry — and to national security and economic stability.

The council, made up of experts from outside the government, is an official advisory body to the energy secretary. The draft report reaches conclusions similar to those of several other recent studies that warn that a severe oil shock could be just a few years away.

The final version of the council report is to be delivered to Herrington on Tuesday after a meeting of the council in Washington. A copy of the draft report was obtained by The New York Times. Several members of the council said that the final report was not likely to substantially differ from the draft report.

The council study, begun last spring when crude oil prices had plummeted \$19 in six months and were still falling, found that by 1995 as much as 60 percent of the nation's oil needs would have to be supplied from foreign sources, up from 27 percent in 1985.

The study states that even under a "best case" outlook, the level of imports was likely to reach 48 percent by 1995, about 10 percentage points higher than during the 1979 oil shock. Using the "best case" scenario, the import level in 1990 was predicted to be the same as it was just before the 1979 oil shortage.

The study contends that by the early 1990s the members of the Organization of Petroleum Exporting Countries, particularly those in the Persian Gulf, will probably be exerting greater control over the world oil market than they did in the 1970s.

"It makes it very clear that we've entered into that cycle that led to the oil shocks of 1973 and 1979," said George P. Mitchell, a member of the committee that prepared the report.

"The country could have very serious problems within a short period of time," said Mitchell, who is chairman, chief executive and president of the Mitchell Energy and Development Corporation of Houston.

John H. Lichtblau, president of the Petroleum Industry Research Foundation and a member of the committee, said that the report's message is that "the period of declining oil prices and declining U.S. dependence on foreign oil has come to an end."

He continued: "We are going to be much more dependent on foreign oil, and our national energy policy has to take that into account."

The study found that each of the 1970s oil shocks pushed the economy into a recession, causing the value of goods and services produced to fall

as much as 3.5 percent, unemployment to rise by up to 2 percentage points and inflation to rise by 3 percentage points. It said that the potential of an equal or greater impact increases in tandem with the country's dependence on imports.

Committee members said the study is the most comprehensive to date on the domestic ramifications of the crash in world crude oil prices that began in November 1985. At that time, West Texas Intermediate, the major American crude oil, was priced near \$32 a barrel. In late summer of 1986, the price bottomed out at \$9.75 and has since risen to around \$17 or \$18.

The council's report lists 13 general options that it says the government and the public should consider. The options include opening more federal lands to exploration for oil and natural gas; revising tax policies to encourage exploration and production; imposing a tariff on imported oil; de-controlling natural gas prices, and adding crude oil to the

nation's strategic petroleum reserves as a supply buffer.

The report also lists methods of encouraging energy conservation, including increased taxes on fuels, particularly gasoline and heating oil, and greater use of alternative fuels.

"The Congress, the administration, and the public must realize something has to be done," said Michel T. Halbouty, another committee member, and the chairman and chief executive of the Michel T. Halbouty Energy Co.

"Sure, some of these options are controversial," Halbouty said.

The draft report was called disappointing by one outside expert, Christopher Flavin, senior researcher of Worldwatch Institute, an environmental research organization.

After the report's list of options was read to him, Flavin said: "It sounds like a fairly tired old laundry list of options. Among all those things, I don't see a single one that strikes me as being new and innovative."

OIL IMPORT TARIFF

The case for a tax on imported oil

WASHINGTON — A new federal tax on all imported crude oil and petroleum products — a concept often debated but never adopted by Congress in recent years — may be an idea whose time has come.

Within the petroleum industry, support for an import tax generally has been limited to independent producers in the Southwest. They would reap a financial bonanza from such a levy because they could increase the price of their domestic oil to match the post-tax price of imports.

When the American Petroleum Institute recently held its annual meeting in Houston, however, API Chairman George M. Keller called for an oil import fee or a similar mechanism to establish a "minimum floor price" that would provide "disaster insurance."

In addition to heading the industry's main trade association, Keller is chairman of Chevron, the nation's third largest oil company.

Like other integrated, multinational firms with domestic and offshore crude oil reserves, Chevron long has adamantly opposed any government intervention in petroleum pricing.

Keller, speaking for his company but not API, suggested that an oil import tax of \$2 to \$4 per barrel could revive the financially devastated domestic oil industry.

In Washington



by
Robert
Walters

Sen. Gary Hart, D-Colo., has proposed an import tax of \$10 per barrel. He would also provide rebates to the low-income consumers who would be most adversely affected by price increases.

(Each \$1 increase in the price of a 42-gallon barrel of crude oil is equivalent to 2.3 cents in the cost of a gallon of gasoline.)

After global oil prices collapsed late last year, a barrel of crude oil plunged from \$32 to less than \$10 before recovering to the current price of about \$15.

That has led to what George P. Mitchell, one of the country's leading independent producers, has described as "a severely reduced U.S. production capacity and greater dependence upon foreign producers."

Indeed, petroleum imports during the first nine months of this year averaged 5.94 million barrels per day compared with 4.85 million barrels daily during the same period last year — an increase of 22.5 percent.

Hart is among those who argue convincingly that the higher post-tax price would encourage conservation. Mitchell, head of the Mitchell Energy & Development Corp., notes that the proposed levy would provide a needed stimulant to "our country's faltering energy productivity."

President Reagan is firmly opposed to the tax because of his antipathy to both increased taxes and government intervention in the free market.

But when the Senate convenes next year under Democratic leadership, two key committees will be chaired by legislators from leading oil-producing states who enthusiastically support an oil import tax.

Sen. Lloyd Bentsen of Texas will head the Finance Committee, while Sen. J. Bennett Johnston Jr. of Louisiana will lead the Energy and Natural Resources Committee.

Thus, industry and political pressure could surmount White House opposition to an idea that is eminently sensible, especially if domestic producers are willing to make a sacrifice in return for the financial windfall they will receive.

Specifically, they should relinquish unjustified tax benefits from accelerated depreciation allowances and immediate write-offs of intangible drilling costs.

BUSINESS

Economists See Faults in Oil Import Fee

By John M. Berry and Anne Swardson
Washington Post Staff Writers

Imposition of an oil import fee—which is actively under consideration by some Reagan administration officials and members of the Senate Finance Committee—would reverse some or all of the economic growth and lower inflation and interest rates generated by the current decline in oil prices, many economists say.

These economists, who range from conservative to liberal, question whether it would be worth paying that price to boost federal revenue—particularly if the purpose of the fee is to replace the revenue lost from lowering personal income tax rates by a greater amount and increasing corporate taxes by a smaller amount than proposed in the House-passed tax revision bill pending before the committee.

Moreover, such a fee does not seem to be

the first choice of many economists because it would raise business costs and make American products less competitive on world markets.

Many economists also see falling oil prices as a special boon this year when the inflationary impact of the declining value of the U.S. dollar on foreign exchange markets is expected to be felt. Some analysts fear that the Federal Reserve Board could decide to tighten credit conditions and slow economic growth if inflation begins to accelerate. The oil price decline is seen as reducing that possibility.

Perhaps surprisingly, most segments of the oil industry oppose such a fee. Not only are major companies such as Exxon Corp., Mobil Corp. and Chevron Corp. against it, but so is the Independent Petroleum Association of America, whose members are small drilling and producing companies. "... Taxes, tariffs, fees or quotas on im-

ported crude oil or petroleum products would be counterproductive to the national interest at this time," a recent IPAA policy statement said.

A \$5-a-barrel fee, the most commonly mentioned figure, would be equal to about 12 cents a gallon and raise about \$8 billion a year if imports of crude oil and refined products remained at last year's levels.

Imports account for less than 30 percent of U.S. petroleum use. If their cost were raised by a fee, the price of domestically produced crude oil and natural gas liquids also would go up, and the U.S. oil industry's revenue would increase by about \$20 billion.

A portion of that increase would be taxed away through the federal crude oil windfall profits tax as the price of oil rose, and through the corporate and personal income taxes as well. How much additional federal revenue those taxes might yield would depend on a number of things, including how

higher oil prices affected the overall economy, economists say.

There also could be some increase in natural gas and coal prices—or at least less of a decline than otherwise would occur—if oil prices are propped up by an import fee.

Altogether, the direct increase in the cost of petroleum products, if passed through entirely to users, would approach \$30 billion and be equal to about 0.7 percent of this year's gross national product, which is expected to be about \$4.2 trillion.

It probably would take about two years for the higher prices to work their way through the economy, according to economists who have studied the situation.

At the moment, oil prices are falling while the import fee is still only a proposal, albeit apparently a serious possibility, according to Senate Finance Committee Chairman Bob Packwood (R-Ore.). That timing difference led economist Alan

Greenspan of Townsend-Greenspan & Co. to caution the committee last week. "There is somehow an assumption it is politically easy" to impose a fee, Greenspan said. "There is almost never a way to time such a tax so that prices don't fall and then rise again when it is put on."

Greenspan's point was that whatever restraining influence falling oil prices may have on various price indexes will have occurred already by the time an import fee could be imposed. Then, when the higher oil prices begin to show up in the indexes, the additional inflation will be highly visible, he predicted.

The Finance Committee is considering the fee for several reasons, including providing some price support for the sagging domestic oil industry and for bankers who have risky loans to it. But the principal concern is to find added revenue to offset other

See OIL TAX, F8, Col. 1

Oil Import Fee Questioned

OIL TAX, From F1

tax cuts that President Reagan and members of the committee want to make as part of the massive tax revision bill passed late last year by the House of Representatives.

Several committee members are backing legislation to enact a fee. Sen. Malcolm Wallop (R-Wyo.) wants a sliding fee to capture any decline in crude prices below \$22 a barrel. Sen. David L. Boren (D-Okla.) is pushing a \$5-a-barrel fee that would begin to phase out if the price rose above \$25 a barrel and would disappear after the price reached \$30 a barrel.

Both proposals include a higher fee on imported refined products to provide additional protection for U.S. refiners. Wallop would add \$3 a barrel; Boren, \$10 a barrel. Sen. Lloyd Bentsen (D-Tex.) is a cosponsor of both bills. Senate Majority Leader Robert J. Dole (R-Kan.) also favors an import fee, as does ranking committee Democrat Russell B. Long (D-La.).

All the sponsors are from oil-producing states. Committee members from other parts of the country generally oppose the idea. For example, Sen. George Mitchell (D-Maine) said, "It's an incredible windfall for the domestic oil producers. I don't see what benefit there is to the nation in that. And it would be extremely inflationary."

This split mirrors the different economic impact a fee would have in various regions. Areas such as New England that are heavy users of oil products would pay higher prices but get little of the benefits flowing to the domestic oil industry. Oil-producing areas in the Southwest also are heavy oil consumers, but they would share in the gains of the domestic producers.

Greenspan, a former chairman of the Council of Economic Advisers, noted that a fee on oil imports would raise the cost of chemical products made from oil, of which the United States is a substantial exporter. Higher oil prices could have a significant impact on many lower-cost products, he said.

Nevertheless, Greenspan believes that the fee ought to be looked at as a possible revenue source. "It is the least worst of the available political decisions," he declared. "Whether it's desirable is another question."

Another former CEA chairman, Murray L. Weidenbaum of Washington University, who also testified before the Finance Committee last week, said he would not impose an oil import fee because it would worsen the U.S. competitive position.

John Makin, a tax economist at the American Enterprise Institute, opposes the proposal. "I really think the energy tax is just a habit of thought," he said. "There was a lot of talk about it in the late 1970s. People have reports and studies, and they dust them off. I don't think that's a good way to go."

Charles L. Schultze of the Brookings Institution, Weidenbaum's predecessor at the CEA, flatly opposes an oil import fee. Falling oil prices "will take some or all of the sting out of the falling dollar," he said. Putting on a fee "would undo some of the good things" that lower prices will produce.

A \$5-a-barrel fee would generate about \$10 billion in additional revenue, Schultze estimated. "If that was the last \$10 billion needed for a decent budget package [to reduce the deficit], I'd hold my nose and buy it, but I would not advocate it," he said.

However, the Senate Finance Committee is looking at a fee primarily as a way of making Reagan-backed changes such as reducing the top personal income tax rate from a proposed 38 percent to 35 percent—it is now 50 percent—and increasing the current \$1,080 personal exemption to \$2,000 for all but the highest-income taxpayers.

Other changes Reagan is seeking include a corporate income tax rate of 33 percent instead of the 36 percent



members also want to reduce depreciation allowances on business investments in new plants and equipment significantly less than did the House.

Harvard University economist Martin Feldstein, another former CEA chairman, strongly advocates reducing investment incentives by less than what the House has proposed. In order to do that, while still keeping the tax revision measure from generally neither raising more or less revenue than current law, Feldstein would use the fee. "It's a good tradeoff," he said, adding, "It would be better still to have a combination of an oil import fee and a gasoline tax, with heavier weight on the gasoline tax." Feldstein is much less enthusiastic about using part of the revenue from an import fee to offset revenue lost by reducing the top marginal rate for individuals from 38 percent to 35 percent.

Most of the discussion in recent months about an oil import fee has been in the context of raising revenue to reduce the large continuing federal budget deficits. It was in that vein that President Reagan included a \$5-a-barrel fee on both imported and domestic oil in a contingency tax package he proposed in early 1983. That package—which he later let be known he did not want to have passed—would have gone into effect only if several conditions were met, including prior enactment of major spending cuts.

Recent public statements by some of the major oil companies, including a Mobil Corp. advertisement in today's Washington Post, generally oppose the fee as a way of cutting deficits. Mobil calls the fee "a dud" because of its inflationary and competitive consequences for the American economy.

An Exxon Corp. statement declares, "These additional fees, which are in effect taxes, would increase consumer prices, increase inflation and reduce real gross national product. In addition, they would distort competition among fuels, place energy-intensive U.S. manufacturing industries at a competitive disadvantage against foreign competition and fall inequitably on different regions of the country . . ."

"If it is determined that tax increases are necessary, however, they should be as broad-based as possible."

Former Treasury tax economist Harvey Galper has been invited by the Finance Committee to testify this week on the impact of taxes on international competition and capital formation. Galper said he plans to tell the committee that the most solid way to improve America's competitive position and to increase capital formation is not by providing larger investment incentives through the tax code—especially if the price is imposition of an oil import fee—but rather to increase national saving. And he said that the best way to increase the amount of savings available for investment is to reduce federal bud-

Tax Oil to Save Oil

As surely as rising oil prices taught Americans to conserve energy, lower prices will lead them to forget. That would be a national tragedy, and a foolish security risk. Prices are falling because we conserved. Now that the price is not incentive enough to save, add a tax.

No new oil price shock is in sight. But the world's affordable supplies are still being depleted, and the risk of upheaval in the Middle East is ever present. As long as they last, lower prices mean greater consumption the world over.

Homeowners won't tear out insulation bought when heating costs soared; new energy-efficient buildings won't be razed. But the pressure to spend money for more conservation is being lost.

Just think about automobiles, which burn more than half the oil we consume. At less than \$1 a gallon, drivers lose their incentive to slow down and tune up, and they stop caring about mileage ratings on new cars. They drift back into larger models, and Government can't resist relaxing the regulations that made the biggest '86 cars more efficient than the smallest in 1973.

America consumed 17.5 million barrels of oil a day in 1973. Today, in an economy one-third larger, consumption has fallen below 16 million. Dependence on foreign oil has also declined, from 36 percent of consumption in 1973 to 30 percent, and, significantly, the decline is much sharper for Persian Gulf oil.

The Reagan Administration wants only to reap the disinflation benefits. It favors more off-shore domestic drilling and, rightly, more deregulation of natural gas. But it is blindly rushing past this chance to build up the Strategic Petroleum Reserve at bargain prices. For transient budget benefit, it would even sell off three naval reserve fields. And it has unwisely relaxed the pressure on Detroit's car designers.

Federal fuel standards and other regulation would be less necessary if we turned to a tax to encourage more conservation. With prices falling, we

could conserve by paying ourselves instead of Middle East potentates.

What's the best form of tax? On alternate days, President Reagan offers to consider a tax on oil imports — provided it's called a "fee" and is used to finance tax-law revisions. Congress, too, seems to prefer an import fee to a tax on gasoline or all energy. An all-energy tax, in any case, would have no special impact on oil consumption. The choice comes down to taxing imported oil and refined products or taxing gasoline at the pump.

An import fee would reduce dependence on foreign sources and encourage domestic production. The oil patch likes the idea because raising the price of foreign oil would let American producers charge more for domestic oil. The consuming states of the Northeast and West Coast and Florida balk at the idea and would, at the least, insist on taxing away the domestic producers' windfall. So taxing imports would lead to taxing all oil.

That would raise the cost of living, retard growth and damage friendly suppliers, like Mexico and Canada, which might need exemptions. The petrochemical industry, too, would want exemption, and who knows who else. The administrative complexity is offset by the political attraction: the public wouldn't much notice an import fee.

A gasoline tax would be highly visible even if it only held prices at prior levels. But it would be simple to administer atop the existing Federal tax of 9 cents a gallon. And it would not discriminate against any region.

Either tax could be shaped to yield as much as \$100 billion over five years — \$8 a barrel on imports combined with a 50 percent "windfall" profits tax, or 20 to 25 cents a gallon on gasoline. The revenue could help balance the Federal budget and thus improve the economy.

The main and lasting benefit of either tax would be in conservation and national security. An oil conservation tax is good policy any time. It is more easily achieved now that prices are down.

HARVARD STUDY URGES OIL IMPORT FEE

A study by Harvard Univ. economists Harry Broadman and William Hogan, both with the Energy and Environmental Policy Center, calls for the immediate imposition of a \$10-\$11/bbl fee on imports of crude oil and products in order to halt the nation's rising dependence on imports. They argue that such a tariff could reduce U.S. import levels to the point where the costs to society of importing an incremental barrel of oil just balance the benefits.

The market price paid for imported

oil does not reflect its true cost, which includes what the economists call an "economic component" and a "security component." The greater the volume of oil imported into the U.S., the higher the price, which means that, as demand rises, all importers must pay a higher price. Rising oil prices also have an adverse effect on the U.S. economy and the trade balance.

As for the security component, the U.S. is vulnerable in the event of a price run-up to an increased transfer of wealth abroad with all the attendant costs, and this vulnerability is a direct function of the volume of imports. Also, the larger the value share of oil in the economy at the time of a disruption, the greater the macroeconomic costs from the price shock.

In order to calculate the optimal premium, Broadman and Hogan developed a model that maximizes the

expected net social benefits of oil imports for normal and disrupted periods and allows for the simultaneous estimation of the premium's individual components. The table shows their estimates of the optimal tariff and the costs of continuing a free-market policy.

The authors consider 3 optional forms of tariff: a simple fixed fee, a variable fee, and a fee defined in proportion to the price of oil. They prefer the first on the grounds that it provides approximately the right incentives at the margin and the closest approximation to the optimal tariff calculations revealed by their analyses, and avoids the difficulties of managing the macroeconomic costs during an interruption.

The authors note that while the redistribution of resources throughout the economy will have both "winners" and "losers," the winners' gains are likely to be larger than the losers' costs.

Copies of the study are available from Nancy Kingston, Energy and Environmental Policy Center, Harvard Univ., 79 John F. Kennedy St., Cambridge, MA 02138. Price: \$10.



International Gas Technology HIGHLIGHTS

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No. 24

OPTIMAL TARIFF AND COST OF FREE MARKET POLICY PROBABILITY DISTRIBUTIONS

High price case (\$27)

	\$/bbl			
	Lower 25%	Median	Upper 25%	Expected Value
Economic Tariff	\$ 1.95	\$ 2.85	\$ 3.90	\$ 3.14
Security Tariff	3.63	5.64	8.52	6.44
Combined Tariff (\$ per barrel)	7.00	8.96	11.26	9.58
Cost of Free Market Policy (\$billion/year)	4.64	8.24	13.18	10.60

Low price case (\$15)

	\$/bbl			
	Lower 25%	Median	Upper 25%	Expected Value
Economic Tariff	\$ 4.03	\$ 5.68	\$ 6.87	\$ 5.86
Security Tariff	2.80	4.20	6.65	5.23
Combined Tariff (\$ per barrel)	8.71	0.81	1.89	11.09
Cost of Free Market Policy (\$billion/year)	11.72	7.90	27.93	22.44

Coghill
BPE

3:38
STR 8, Oil Import Fee

~~Joe~~ supporting statement.

~~Cody~~

Problems in domestic industry 7/85

1985 ~~48%~~ 25%

1987 40% foreign
1500% increase

70% of world's production is controlled
by Governments

San Bander - peril point.

Pres report to Cong on level of import
12 + 24 months

if rise above 50% — propose to
Congress how to reduce level

Resolution helps

Texas Railroad Commission says 46%
imports

Sen Chafee - R.I. willing to work

TOM BURNS

no industry wide consensus.

Chevron - raise public awareness.

tellor point out to public that a problem exists -

Studies - API
NPC
DOE
Harvard

Security premium.

Establish price - floor.

- 1) what level necessary for survival
- 2) consensus what kind of program.
- 3) put program into place.

Important - easiest to administer -
no need for exemptions

direct nat gas

ANWR

eliminate unfulfilling

OCS development

Oil if wait to 50% — too late.
affects
GDP

3 times the effect of auto industry

Minimum floor price —

gives confidence to lenders, etc.

eliminate economic risk.

Bob Anderson

AK district had budget for
UNOCAL

3/20/86

down 700,000/day from 1986

highest 36%

1977

47% ?

2.1

lost stripper oil, enhanced recovery
Guares River - terminated.

Dryport fee - bring M. line Prod.
Cook Inlet.

~~De~~

\$24 floor?.

Fin Dond

29 states

go-go effect from OPEC

6/86 wty in Arch

2 resolution - 1 support tariff
1 support AMR

Consumer states - energy
help plan costs

Ray Plank

Natural security issue

- 1) stable price
- 2) at adequate level — to help security
thinking necessary

\$18 not enough,
\$24

dropped \$30,000/day.
by 1990 reach 50%

finding cost $\frac{1}{3}$ price of product,

24 = \$/barrel finding cost

18 wouldn't do much good.

reserves = 27 billion

long lead times. —

Harvard Study. Kennedy school dept Briggs +
Burr

U.S. has costs that other nations don't.

U.S. Navy escorting foreign flags -
Costs of -
Taxpayers pay this cost.

Unemployed lost trades, = social costs
as revenue base declines
+ loan losses to banks = 70 billion

foreign oil doesn't pay these costs -

Harvard estimates these cost = \$10/barel
forgets OPEC

OPEC wants to keep at allow our "starvation level"
other social cost

170 billion Trade deficit

Get message to S.C. -

~~Do~~
Industry division?

~~Plank~~

Personal - Exxon, Royal Dutch, Shell, Mobil
gas

is in favor of it — Public against it —
free market does not exist

Industry coming together.

Minerals — support higher prices —

to encourage alternative energy.

Also — neutral to positive —

Ed Phillips

→ letter from West Coast's Assoc.

Support trap tariff —

benefits to Alaska —

- 1) higher price — more drilling —
higher level of throughput.
more total recovery from reservoirs.
- 2) further exploration in Alaska.
time lines + costs are higher
reduce risks
- 3) at \$18 ANWR + West Sak Sands
not viable.

De AMR - w/o price floor

BF/ \$1 = 2.3¢ / gallon. to consumer.

Dillard Hunt - State Energy Advisor
for Gov. Clements.

Clement and w/ Reagan yesterday -
#1 was tariff -

- 1) no free market
60% controlled by gov'ts
- 2) Sec of Int Trade - long lines
- 3) Sec Harington - supports tariff.

26 states = 30 million people in EEC - support
Energy pooling

Present ^{18/bushel} and Texas 1/2 production

4/21 to survive

24 to invest in new projects

Get the countries to join

- 2) conference of nations
- 3) depend on full profit tax.
- 4) 1 billion for enhanced recovery research
having 100% in ground -
technology but there.

DOE only 27% oil } on R&D
7.7% on coal }

1 IN THE SENATE

BY JOSEPHSON, KELLY, HALFORD
AND STURGULEWSKI

2

SENATE JOINT RESOLUTION NO. 8

3

IN THE LEGISLATURE OF THE STATE OF ALASKA

4

FIFTEENTH LEGISLATURE - FIRST SESSION

5

Relating to a federal tax on imported

6

oil.

7 BE IT RESOLVED BY THE LEGISLATURE OF THE STATE OF ALASKA:

8 WHEREAS rapidly fluctuating oil prices create an unstable environment
9 in Alaska and the United States for business planning and investment and
10 threaten the stability of the domestic petroleum exploration and develop-
11 ment industry, the stability of which is vital to the national security;
12 and

13 WHEREAS the continuation of energy conservation measures and further
14 development of alternative energy technologies could be jeopardized by
15 sharp declines in oil prices; and

16 WHEREAS the federal government needs additional revenue to reduce the
17 federal deficit and the threat of another period of high inflation; and

18 WHEREAS Americans face the prospect of significant budget reductions
19 in federal programs that are vital to the health, education, and welfare of
20 many Americans, but the imposition of an oil import tax would moderate the
21 severity of these reductions; and

22 WHEREAS a precipitous decline in oil prices results in major reduc-
23 tions in revenue to oil-producing states, subjecting them to undue hard-
24 ships in providing the governmental services and infrastructure support
25 needed to continue the production of domestic oil at the same time that
26 these states are being given expanded responsibility as a result of dimin-
27 ishing federal participation through revenue-sharing and similar programs;

28 BE IT RESOLVED that the Alaska State Legislature encourages the United
29 States Congress to impose a federal tax on imported oil, the revenue to be

1 used to reduce the federal deficit.

2 COPIES of this resolution shall be sent to the Honorable Ronald
3 Reagan, President of the United States; the Honorable George Bush, Vice-
4 President of the United States and President of the U.S. Senate; the Honor-
5 able Jim Wright, Speaker of the U.S. House of Representatives; the
6 Honorable Robert Byrd, Majority Leader of the U.S. Senate; and to the
7 Honorable Ted Stevens and the Honorable Frank Murkowski, U.S. Senators, and
8 the Honorable Don Young, U.S. Representative, members of the Alaska delega-
9 tion in Congress.

*down
700,000 bbls
from last year.*

[Signature]

FEBRUARY 26, 1987

Senate Special Committee on Oil and Gas

SJR 8, Relating to a federal tax on imported oil

TELECONFERENCED TO FAIRBANKS AND ANCHORAGE

TO TESTIFY:

Senator Josephson, Sponsor

→ (Cody Graves, Legislative Assistant fro Energy and Environmental Affairs, for: ←
U.S. Senator David Boren, Sponsor of S 302, Oil Import Tariff —

→ Mr. Tim Dowd, Chairman of the Interstate Oil Compact Committee, Alaska is a member

Mr. Raymond Plank, Chairman and CEO of Apache Corporation,
Founder and Chairman of the Energy Security
Policy Group.

→ Mr. Dillard Hammett, Representing Governor Clements, Texas. ← *San Francisco*
→ *TOM BURNS, Manager, Economic Dept. CHEVRON*

Dr. Robert West, Chairman of Tesoro Petroleum Corporation
HE JUST CANCELLED, BUT WRITTEN TESTIMONY HAS BEEN DISTRIBUTED.

Mr. Robert Anderson, representing UNOCAL *Union Oil* ← *if unchecked would be alarming*

and Ed Phillips, Petroleum Economist, Division of Oil and Gas, DNR ←

QUESTIONS:

Why is there so much disagreement among oil companies on this concept?

What would the effect on consumers be? (Each one dollar increase in the price of a barrel equates to roughly 2.3 cents per gallon of gasoline) *(rule of thumb)*

→ *Dr* Joseph Stanislaw from Cambridge Energy Research Associates indicated yesterday that he was unsure whether even \$24 oil would stimulate domestic production. Comments?

He also indicated that support for a fee might change in Congress if the level of imported oil rises above 50%.

21 to survive
24 to prosper -
other consumers to join with other nations

Secretary Harrington - agrees but does not stand up
& push for what is right for the U.S.

26 states endorsed taxing on oil export
30 million people have stood up & said we should
support a tax -
* 18 oil will cut Texas production in half.

Just met with President Reagan -
there is no free market for oil
never will be as long as 80% is produced
in 1 area

* DELIVER TO: LTCCGTG
*
* ORIGINAL
* SENT: 02/26/87 TIME: 16:39
* FROM: LIOCAN
* SUBJECT: NEW SITE
* PRINT DATE: 02/26/87 TIME: 16:39

Immediate
consequence of
consumer
nations

Repeal windfall tax

stop leaving 60%
of oil in the ground

GLENN FROM DAVID:

MR. HAMMETT HAS JOINED US FROM TEXAS.

DJ State Energy Advisor - Texas

\$ 70 billion dollar losses in loans alone
Top priority in future generations

130 ships attacked

Last year

Social cost rise as resource is declining

Energy
Security
Policy Group
National Security
Council
→

Harvard Study
Kennedy School
Energy & Environment
Study - 10 years
import fee

Variable import fee
stable
& adequate levels to continue
US production
agree with 24-
objectives of OPEC is
to get the US market

US reserves \$30,000 per day drop

Prices would quickly rise
1800 is US standard line
170 billion trade dipper

Dr. R. R. R. R.

- continue to
import production
- only way to counter
attack from your generation
is something like SPR

Supports development
by Norway - not
feasible below
\$ 24 level for
price of oil
even 10/8 would
give some
stability -

Tim David Oklahoma

29 oil + gas
producing
states

Raymond Plank Denver

Chernobyl survival - most are too cumbersome & be workable
what type of gov effort - investors
+ producers lead time

continuing deregulation
Anwar
semi-wildfire / projects -
50% level estate.

1974 - 36%
1977 - 42%

Anchorage 40
Fairbanks 40

Ed Phillips Anchorage
Tom Burns San Francisco
Sen Boren's Office - (Codie Graves)
Bob Anderson - Anchorage
John Lund

On Line

STATE OF ALASKA 1987 LEGISLATIVE SESSION FISCAL NOTE

File

REQUEST:

Bill Version: SJR 8

Publish Date: _____

Revision Date: February 24, 1987

Agency Affected: Natural Resources

Title: Federal tax on imported oil

BRU: Petroleum Management

Sponsor: Josephson, Kelly, Halford, Sturgelews

Components: Petroleum Management

Requestor: _____

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY 87	FY 88	FY 89	FY 90	FY 91	FY 92
PERSONAL SERVICES						
TRAVEL						
CONTRACTUAL						
SUPPLIES						
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	-0-	-0-	-0-	-0-	-0-	-0-

CAPITAL						
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REVENUE		*	*	*	*	*
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FUNDING: (Thousands of Dollars)

GENERAL FUND						
FEDERAL FUNDS						
OTHER						
TOTAL						

POSITIONS:

FULL-TIME						
PART-TIME						
TEMPORARY						

ANALYSIS : (Attach a separate page if necessary)

* SEE ATTACHED

Prepared by: James E. Eason

Phone: 762-4241

Division: Oil and Gas

Date: February 24, 1987

Approved by Commissioner: William J. Simpson, Deputy

Date: 2/25/86

Agency: Natural Resources

Distribution (by preparer):

Legislative Finance

Legislative Sponsor

Requestor

Office of Management and Budget

Impacted Agency(ies)

Senate Secretary

It is not anticipated that a federal import tax on imported oil would generate increased expenditures from either the operating or capital budgets. The tax would increase income to the state treasury by increasing the wellhead price of Alaska oil. Actual monetary benefits will depend upon the actual amount of the proposed tariff and the projected wellhead price. At this time it is not known if the wellhead price of Alaskan crude could adjust to match the tariff increase. Thus, all that can be said is that for every one dollar increase in wellhead price, between \$135 million and \$150 million would annually accrue to the state treasury as a result of increased royalties and severance taxes. Assuming a ten dollar per barrel tariff and a full corresponding adjustment to wellhead prices, at current production levels, the state would receive about \$1.35 to \$1.50 billion dollars annually.

By raising the wellhead price of domestic oil, and in effect, creating a floor price for domestic oil, the federal tariff would also encourage (1) more intensive drilling and production in existing reservoirs; (2) development of marginal fields near Prudhoe Bay, such as offshore Lisburne, Pt. Thompson, and Gwyder Bay; and (3) exploration in more remote, wildcat areas.

Low-Priced Oil or National Security?
An Import-Fee Alternative

Presented to Senator Richard G. Lugar, Chairman
Foreign Relations Committee
of the United States Senate
Washington, D.C.

by
Robert V. West, Jr.
Chairman,
Tesoro Petroleum Corporation

October 2, 1986

Low-Priced Oil or National Security? An Import-Fee Alternative

Remarks by Robert V. West, Jr.

Senator Lugar:

Thank you for affording me the opportunity to present my views to you and the Senate Foreign Relations Committee on the threat to U.S. national security of low-priced oil conditions now prevailing globally and to suggest a new approach to deal with that threat.

The only approach heretofore suggested has been one of a sliding-scale oil-import fee, whose purpose would be to protect economically the domestic oil industry and to bring U.S. crude oil prices back to a general level of \$20 per barrel or slightly more. It is perceived that a domestic crude oil price of this level could currently support an ongoing, although just barely viable, domestic petroleum industry.

The concept of an oil-import fee is so controversial that, regardless of its merits, it is unlikely that it would ever be adopted. The U.S. Administration has taken a strong stance against it. Certain U.S. industries who export their products into world markets and depend upon competitive petroleum prices for their survival oppose it. Even the petroleum industry itself has a divided attitude toward it. I believe that, because of the opposition of so many groups toward it and without extensive loopholes in it, the concept of an import fee won't be accepted, and that a different approach must be followed.

To have the national-security benefits inherent in a truly viable domestic petroleum industry, U.S. consumers must be willing to pay the slightly higher costs for petroleum products that higher crude oil prices would bring. Admittedly, educating consumers to the relationship between higher petroleum-product prices and U.S. national security will be difficult. Persuading the U.S. government that present low oil prices represent a threat to U.S. national security may be equally difficult.

Average consumers are gratified with low gasoline prices that have prevailed during the recent free-fall in world crude oil prices. They are comfortable with the fact that the gasoline they are buying costs only 70¢ to 80¢ per gallon, compared with prices double that during the last several years. Not long ago the President made a statement to the effect that it was good, for a change, to see the number of gallons on a gasoline pump meter go up faster than the number of

dollars as a consumer's tank was being filled. This emphasis on low petroleum prices represents an unrealistic, short-sighted attitude toward the future security of America.

Recently it has become popular in the press, in Wall Street and in economic circles to refer to crude oil and petroleum products as "just other commodities" and to think of them in that manner. The thrust of my views is to point out that this thinking is erroneous. Petroleum differs significantly from conventional commodities. It should not be compared in thinking or in treatment to soybeans, sugar or other pure commodities.

If petroleum has some commodity characteristics, it should be differentiated as a strategic substance vitally important to America's national security. Since the free-fall began in world oil prices 10 months ago, this fact has largely been ignored by the U.S. government. The Administration's emphasis has been on "freeing up the markets" - whatever that may mean - and letting the chips fall where they may with respect to the viability or demise of the U.S. petroleum industry.

The domestic availability of petroleum products in times of crisis is vital to America's security. In times of embargoes or other arbitrary petroleum cutoffs by foreign producers, the availability of a reasonable level of domestic supplies will be imperative. Our relatively small Strategic Petroleum Reserve will not begin to satisfy our potential needs.

Petroleum is not just another commodity, whose price should be permitted to seek its own level in competition with the global glut and the vast supply/demand imbalances now existing. Instead it is a substance with vital strategic importance to America. It must be recognized as such.

This recognition should not be partisan. Neither should it be regional. Instead it must be objective and far-reaching.

During the 130-year history of the petroleum industry in the U.S., the industry has been characterized by sharp swings in supply/demand balances. Unfortunately, this circumstance is inherent to the industry.

In the past, because petroleum was always recognized as a strategic substance, the U.S. government or state governments within our country were unwilling for very long to leave petroleum to the mercies of free commodity markets. Invariably during the history of the domestic industry there has been intervention to smooth out the peaks and valleys in supplies and prices of U.S. oil production. If

government intervention in domestic petroleum pricing and the defense of the viability of the U.S. petroleum industry do not recur again now, this lack of involvement will represent a wide departure from past U.S. practices.

In the early 1930's, with the discovery of the giant East Texas oilfield, the state of Texas utilized the oil and gas division of its then-existent Texas Railroad Commission to prorate the supply of Texas crude oil and to keep it in balance with state, national and international demands. In the process crude oil prices maintained a level that would permit ongoing exploration, development and production.

Before the imposition of Texas state proration rules for the East Texas oilfield, the price of crude oil in Texas dropped to as low as 10¢ per barrel. Even with the then-temporary glut of petroleum associated with that vast new field, that price level would not have permitted the maintenance of a viable domestic petroleum industry. At that time there was no threat to the U.S.'s being flooded with low-priced foreign oil or to our national security's being jeopardized by that flood - both as there are today.

Even so, the state of Texas took a bold step and instituted the concept of statewide oil proration. Supply was put back in balance with demand. Oil prices stabilized at a reasonable level.

Most other U.S. oil-producing states instituted their own regulatory and proration practices, generally following the pattern of Texas. As a result, for approximately 40 years, ending with the nationalization waves of Mid-East and South American countries in the 1960's and early 1970's, crude oil supply/demand balancing was achieved by proration of U.S. oil-producing states, by production restraints of international oil companies operating abroad or, later, by import controls in the U.S. and Canada.

In the process crude oil prices stabilized. These actions were not perceived as price fixing or cartel-like by government officials and economists of those days. Rather they were perceived as necessary steps to preserve the viability of the U.S. domestic petroleum industry.

In the early 1980's the OPEC oil-producing nations attempted to restore supply/demand balances and price stability, which were largely destroyed by pricing and production practices - at unrealistically high price levels - by OPEC and non-OPEC nations alike during the past decade. However, petroleum consumers of the world came to expect that OPEC nations in general, and Saudi Arabia

in particular, would absorb all the excesses of global over-supply, and that these nations alone would subject themselves to self-imposed proration, while other oil-producing nations of the world produced in wide-open fashion, taking all of the global markets, internal and external, that their production capacities would permit.

Largely this attitude of "let OPEC prorate" is the result of consumer hostility toward OPEC nations. This hostility has its origin in the nationalization by OPEC countries of non-OPEC petroleum interests, including those of U.S. companies. Further it has its origins in the Arab oil embargo of 1973 and 1974 and in the sharp crude-oil price increases associated with that embargo. Also, it has its origin in the now seemingly false oil shortage resulting from the Iranian revolution in 1979 and the further sharp rises in petroleum prices associated with that revolution.

Thus world consumers in general, and those in the U.S. in particular, have little or no sympathy for OPEC and expect OPEC nations to bear the brunt of all proration necessary to maintain petroleum supply/demand balances under today's global-glut circumstances. Unfortunately this thinking is more emotional than practical. Actions of key OPEC producers since December 1985 and January 1986 prove that point.

The U.S. should put aside its emotional attitude toward OPEC and view realistically the situation as it is today. The U.S. is faced with the likelihood of losing the viability of its domestic petroleum industry and the paralyzing national-security threat which that loss would represent.

I am not speaking as an advocate of OPEC, of any of its individual member states or of its production/pricing strategies. Instead I am trying to view the current global oil glut, and the solution to that glut, dispassionately and objectively.

I am an American, and I am vitally concerned about America's national security. I am speaking out because I am keenly aware of the devastating threat to that security, and I am trying to communicate my urgent concerns to you and other responsible U.S. government officials.

I look back to the early 1930's and to the imposition by the state of Texas of bold, far-reaching proration controls resulting from the oil surpluses of that day. Texas stepped forward, creatively and dispassionately, and mandated proration for all oil producers in the state. There was no expectation that one producer would bear the brunt of bringing supply and demand back into balance. Instead the

requirement was that all producers would be subjected to mandatory proration, on a predetermined objective basis.

I believe that a global proration approach similar to this is the only realistic solution to today's ominous oil supply/demand imbalances, and I believe that some system of worldwide proration must be adopted to deal with that imbalance. It is not realistic to expect that OPEC nations are for long going to permit non-OPEC producers to flow their wells at capacity, while some OPEC members prorate themselves to only 30% or 40% of their capacities.

Circumstances have shown that this condition is not acceptable to OPEC, and that the strategy of OPEC to continue it has changed completely. Whether countries such as the U.S. and the U.K. like it or not, OPEC nations feel that certain shares of global oil markets should be available to them, and they intend to take those shares by whatever means necessary.

The stark reality is that there has been only a temporary arrest in the worldwide price erosion of crude oil. This arrest may be short-lived, and global prices may free-fall again. OPEC nations in the aggregate will not be content for long with the nominal total production of 16 million barrels per day existing today.

Unfortunately for the U.S., most of its crude oil production is in the high-cost category, and its potential additional reserves - as yet undiscovered and unproven - will require huge sums for exploration and development. At today's levels, even with the small recent price recoveries, crude oil prices in the U.S. are far too low to encourage meaningful exploration and development.

This fact is borne out vividly by the decline in U.S. drilling rig activity, which reached an all-time low of 663 rigs during July of this year, and which is only about 750 now. By comparison, the rig count exceeded 4,500 just a few years ago. It should be at least 3,000 to sustain the viability of the U.S. domestic petroleum industry.

The U.S. is the most vulnerable major oil producer in the world. It has been producing oil for more than a century. It is the world's oldest oil producing nation and has been highly explored. It is the home of the world's most costly oil production and the nation with the world's lowest reserve/life production ratio. It is vital for the U.S. to do something about this situation to protect itself and its own self interest.

Right now many small U.S. oil explorers and producers are facing bankruptcy. Oil company employees are being terminated in droves. Oil service companies have curtailed their activities dramatically, and

the personnel and business infrastructures of that industry segment are being lost. Major companies have sharply curtailed U.S. exploration budgets, mothballed most of their exploration and development rigs on the North Slope of Alaska and nearly ceased exploration in the Gulf of Mexico and elsewhere offshore.

The U.S. banking industry, with large loans to U.S. oil producers and to Latin American oil-producing nations, faces a difficult future. Current low oil prices are a serious threat to the Mexican economy, to Mexico's ability to repay debts to the U.S. banking system and to its internal political stability. The threat to the U.S. of social unrest in Mexico, attributable to low oil prices, is present and real.

The time is here - in fact, it is long overdue - for all of us to recognize that a truly viable U.S. petroleum industry is vital to America's national security. The time is here also for the U.S. and the world at large to face up to the fact that OPEC nations are not forever going to absorb all the world's proration disciplines necessary to maintain crude oil supply/demand balances and to permit other oil-producing countries, including the U.S., to retain viable domestic petroleum industries.

This brings me to my recommendation. Operating in conjunction with OPEC, the U.S. and other non-OPEC oil-producing countries of the world should create a modern-day, worldwide proration mechanism for crude oil production. Production should be shared in some equitable manner to maintain crude oil supply/demand balances and to permit prices to stabilize at levels acceptable both to oil-producing nations and to consumers, taking their contrasting desires into account.

Admittedly implementation of this recommendation would be a vast undertaking, surrounded by significant political and organizational problems. In spite of those difficulties, I believe the concept has fundamental merit, and that its implementation should be attempted. The U.S. must take the lead in such an effort. Doing so would put the global prestige of the United States behind the concept and give it substance and credibility.

Under a worldwide crude-oil proration mechanism, a price figure of at least \$22 per barrel should represent a target level now, gradually increasing over time, based on future conditions. OPEC has given indications that in the near term this level would be acceptable to it. Its more responsible producers recognize that earlier prices of \$30 per barrel or more are unrealistic in today's environment.

With respect to non-OPEC producers, and to the U.S. in particular, a crude oil price of \$22 per barrel is one that the industry could live with now and remain barely viable. That level would not represent a bonanza for U.S. producers and would not stimulate the necessary exploration and development drilling that the country desperately needs for long-term national security purposes.

However, at present it should be high enough to provide temporary viability, and hopefully still low enough to be politically acceptable to consumers and the U.S. Administration. At a price of \$22 per barrel, gasoline in the U.S. would cost approximately \$1.05 to \$1.15 per gallon, compared to the prevailing level of 70¢ to 80¢ per gallon, and to the level 10 months or so ago of \$1.40 to \$1.50 per gallon.

With respect to degrees of non-OPEC proration, I would recommend levels substantially less severe than those that I mentioned earlier which certain OPEC producers are experiencing - i.e., 30% to 40% of capacity. The situations of those producers are different from those of the U.S. They do not have large internal consumption of their own, and in general their national security requirements are minimal - in many cases because the U.S. provides security umbrellas over them.

Accordingly, I would not suggest that the U.S. - or the U.K., Norway, Egypt, Canada or Mexico - enter into worldwide proration arrangements which would prorate all countries evenly in relation to their potential producing capacities. Instead I would suggest that the U.S. and other non-OPEC producers agree to a proration of their individual producing amounts of approximately 10% each or to a level of 90% of recent production capacities. It is worthwhile to note that on September 10, 1986 Norway voluntarily stated its intention to cut its production 10% to help alleviate world supply/demand imbalances.

If the necessary calculations are made, it can be shown that if all non-OPEC producers cut their production by 10%, OPEC in the aggregate could be allocated 18 to 19 million barrels per day of crude oil production now, compared to the 16 million barrels per day to which it recently agreed to cut back during September/October 1986. In the process of these 10% proration initiatives, hopefully the global price of crude oil would rise to about \$22 per barrel. With an aggregate production of 18 to 19 million barrels per day, and with a current price of \$22 per barrel, again hopefully OPEC nations individually and collectively would be satisfied with their

petroleum export revenues and would honor the supply/demand agreements.

If the U.S. were voluntarily to cut its production by 10%, that cut would represent an aggregate decrease of about 900,000 barrels per day from the 9.0 million barrels per day level which the U.S. was producing 9 or 10 months ago. However, associated with that decrease would be a price increase, a degree of restored viability to the domestic petroleum industry and a much greater level of national security comfort.

Numerous forecasts indicate that, without some solution for the problems of the U.S. domestic petroleum industry, America's producing level will erode to 6.0 million barrels per day or so in the next few years. This erosion will occur as a result of the shut-in of stripper and other marginal wells, normal production declines of non-marginal wells and the lack of economic incentive for additional exploration and drilling. Accordingly, the U.S. as a nation would be far better off under the suggested global proration program than under the continuation of existing circumstances.

Many of the necessary agencies to implement a global proration program now exist. In this regard I refer to the International Energy Agency, the U.S. Department of Energy, the state regulatory bodies in the individual producing states of the U.S. and to OPEC. Even though the state regulatory bodies no longer have influence on global supplies, they still exist and function. They could be utilized by the U.S. government to implement a global proration mechanism, on an individual state-by-state basis or in conjunction with the U.S. Department of Energy.

Economists might say that this recommended global proration approach just represents an extension of cartel-like conditions to the petroleum industry worldwide, and that it contradicts free-market principles. I suggest that if this is the perception, it would not be unique to the petroleum industry. What this approach would recognize is that petroleum markets are truly international, not regional or national.

The mandatory limited access of Japanese automobiles to the U.S. represents an indirectly comparable situation. Under this mandatory limit the U.S. recognizes that the automobile market is an international one. With the limit, the U.S. is forcing proration of Japanese automobile manufacture and at the same time imposing proration on U.S. automobile manufacturers by permitting the importation of Japanese and other foreign automobiles in the first place.

With the weight of its worldwide prestige, the U.S. must be the leader for a global crude-oil proration mechanism to succeed. By leading, it would demonstrate to the world that the U.S. recognizes its own national-security needs for a viable domestic petroleum industry but at the same time recognizes the imbalances and inequities that OPEC nations feel with respect to their global market shares.

If the U.S. takes the lead with sufficient resolve, demonstrating its understanding, objectivity and fairness, there is reasonable hope that in addition to Norway, the U.K. and other non-OPEC producers would adopt similar attitudes. Too there is hope that major OPEC producers would welcome those leads and work conscientiously on a global basis to alleviate supply/demand imbalances.

High level conversations on global proration should begin immediately in order that an early determination may be made whether or not the approach has a chance of political success. The U.S. government must emerge from its role of doing nothing to protect the viability of the domestic petroleum industry. It needs to understand the future national-security implications of that doing nothing policy. It needs to step forward into a role of pro-active leadership and do something to stabilize volatile, chaotic world oil markets.

The moment for action is here, and the time is short. With this thought in mind I strongly recommend the approach I have outlined for your consideration and that of your colleagues. Thank you again for affording me the opportunity to present my views to you and to the U.S. Senate Foreign Relations Committee.

October 2, 1986

Council at odds over tariff

By GUY DARST
The Associated Press

WASHINGTON — A tariff to raise prices of imported oil remains a controversial question in the oil industry, and a report from the National Petroleum Council suggests one reason why: Low oil prices are good for the economy.

A council report Tuesday said

the United States would become increasingly vulnerable to supply interruptions as long as domestic production is falling and imports are taking a larger share of the market.

But the council, an advisory group, made no recommendations because it could not get

See Page E-6, **TARIFF**

E6 Anchorage Daily News

Thursday, February 26, 1987

TARIFF: Controversy spreads

Continued from Page E-1

agreement on all its ideas, said Ralph Bailey, the council chairman and chairman of Conoco Inc., the DuPont Co.'s petroleum subsidiary.

In particular, tariffs leave the industry "badly divided," he said.

Domestic producers, who saw 150,000 jobs evaporate in the oil price collapse of 1986, favor tariffs. Many major companies with overseas operations do not. Refining and marketing companies generally do not.

The council approved the report without dissent, but discussion of the cover letter to Energy Secretary John Herrington led Bailey to seek and get authority to redraft it to reflect "some of the urgency I think I detect."

Several speakers said the letter should make specific recommendations, and some called for action to guarantee the industry a price of around \$25 a barrel.

The council asked the forecasting firm of Data Resources Inc. to predict the economy under low oil prices — \$12 in 1986 and increasing 4 percent a year faster than general inflation — and high prices, starting at \$18 and increasing 5 percent faster than inflation. The low-price scenario puts oil at \$21, in

terms of 1986 buying power, in the year 2000; the high-price case carries it to \$36.

The lower price:

- Adds 0.1 percentage point to the average growth rate in the economy, making it 2.6 percent instead of 2.5 percent per year.

- Adds 0.3 percentage point to average annual growth in industrial production, 2.8 percent instead of 2.5 percent

- Cuts average annual inflation by half a percentage point, making the change in the Consumer Price Index average 4.5 percent instead of 5.0 percent.

- Cuts the annual federal budget deficit from \$140 billion to \$120 billion and the trade deficit from \$42 billion to \$15 billion.

A tariff would raise inflation, cut growth and cause a decline in tax collections from non-energy companies and their employees, the report said.

"This could ultimately offset the increase in taxes collected from the oil industry," it added.

Additional arguments against a tariff include:

- It would lead to a "politically troublesome" dependence on imported heating oil in some parts of the country.

- It would violate the General Agreement on Tariffs and Trade.

f. leary 2/26/87

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* ORIGINAL
* CREATED: 02/26/87 TIME: 17:13
* SUBJECT: OIL AND GAS TELECONFERENCE
* PRINT DATE: 02/26/87 TIME: 17:28
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DANNY CONSTANTINE:

ATTACHED IS A LIST OF OBSERVERS IN FAIRBANKS FOR TODAY'S OIL AND GAS TELECONFERENCE. ALSO ON LINE WERE:

1. BOB ANDERSON - ANCHORAGE
2. TOM BURNS - SANFRANCISCO
3. ED PHILLIPS - ANCHORAGE
4. CODY GRAVES - WASHINGTON D.C.
5. TIM DOWD - OKLAHOMA
6. RAYMOND PLANK - DENVER
7. 21 OBSERVERS - JUNEAU
8. NOONE ATTENDED IN THE ANCHORAGE LIO
9. DILLARD HAMMETT - AUSTIN

GLENN GRAY
JUNEAU LIO

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* ORIGINAL
* SENT: 02/26/87 TIME: 17:17
* FROM: LTCCFBX
* SUBJECT: 02/26/87 S.SPEC.CMTE.O&G T/C
* PRINT DATE: 02/26/87 TIME: 17:17
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FINAL STATS

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DATE: FEBRUARY 26, 1987
SITE: FAIRBANKS
SPONSOR: SENATE SPECIAL COMMITTEE ON OIL & GAS
SUBJECT: PUBLIC HEARING: SJR 8, TAX ON OIL
MODERATOR: MELBA J. OESTER

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TESTIFY:

NAME\REPRESENTING	ADDRESS	PHONE #
1.) -0-		

OBSERVE:

NAME\REPRESENTING	ADDRESS	PHONE #
1.) FRED PRATT, PO BOX 72981, FBKS., 99707		452-3061
2.) SALLY WELLS, 1012 SUMMER ROSE DR., FBKS., 99709		457-2730
3.) JO SWARNER, 515 7TH AVE., #130, FBKS., 99701		452-4882

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TESTIFIED: 0 TIME START: 3:30 PM
OBSERVED: 3 TIME END: 4:47 PM
TOTAL: 3

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ALASKA STATE LEGISLATURE

SENATE SPECIAL COMMITTEE ON OIL AND GAS

Senator Bettye Fahrenkamp
Chairman
Senator Jack Coghill
Senator Paul Fischer

P.O. Box V, State Capitol
Juneau, Alaska 99811
(907) 465-3834

For further information contact:
Daniel Consenstein
(907) 465-3834

MEDIA ADVISORY
February 25, 1987

OIL IMPORT TAX MEETING TO BE HELD

On Thursday, February 26, the Senate Special Committee on Oil & Gas will conduct a teleconference to hear testimony on Senate Joint Resolution 8 and the oil import tax in the Beltz Room.

In addition to having Anchorage and Fairbanks Legislative Information Offices open for the teleconference, the following individuals will provide testimony on this state and national issue:

Senator Joe Josephson - Prime sponsor of SJR 8

U.S. Senator David Boren (Oklahoma) - Sponsor of S.302, advocating for a oil import tax.

Mr. Tim Dowd - Chairman of Interstate Oil Compact Committee, of which Alaska is a member.

Mr. Raymond Plank - Chairman & CEO of Apache Corporation and Founder & Chairman of the Energy Security Policy Group. (The Energy Security Policy Group commissioned Harvard University to do a study regarding the oil import tax. The results have been publicized nationwide recently.)

Mr. Dillard Hammett - Representing Governor Clements, Texas.

~~Mr. Robert V. West, Jr.~~ - Chairman of Tesoro Petroleum Corporation

TOM BURNS (MORE)

Mr. Robert Anderson - Representative for Unocal
Corporation

Mr. Ed Phillips, Petroleum Economist, Division of
Oil & Gas

Still unconfirmed for testimony are the following:

U.S. Senator Frank Murkowski
U.S. Congressman Richard Gephardt
Mr. James Eason, Director, Division of Oil & Gas

TESTIMONY RE: TAX ON IMPORTED OIL

State Senator Joe Josephson to give introduction to SJR 8.

U.S. Senator David Boren (D-Oklahoma) or legislative assistant, Cody Graves, to testify following State Senator Josephson's introduction of SJR 8 before the committee. Will be calling from Washington, D.C. (Must testify before 4:00 pm, has another appointment.)

Mr. Tim Dowd, Chairman of Interstate Oil Compact Committee (IOCC), of which Alaska is a member. He is located in Oklahoma City, Oklahoma. (Must testify before 4:15 pm, has another appointment.)

Mr. Raymond Plank, Chairman and CEO of Apache Corporation, an independent oil company headquartered in Denver, and founder and Chairman of the Energy Security Policy Group, who commissioned Harvard University to conduct a just completed study on the tax of imported oil. (Must testify following Mr. Dowd, due to an appointment he has within the next 30 minutes.)

Mr. Dillard Hammett, Special Assistant to Governor Clements of Austin, Texas. Governor Clements has come out strongly in favor of the oil import tax and has made it a priority. (He will testify following Mr. Plank.)

Unknowns:

U.S. Senator Frank Murkowski, R-Alaska
U.S. Senator Bennett Johnston, D-Louisiana
U.S. Congressman Richard Gephardt, D-Missouri

HARVARD STUDY URGES OIL IMPORT FEE

A study by Harvard Univ. economists Harry Broadman and William Hogan, both with the Energy and Environmental Policy Center, calls for the immediate imposition of a \$10-\$11/bbl fee on imports of crude oil and products in order to halt the nation's rising dependence on imports. They argue that such a tariff could reduce U.S. import levels to the point where the costs to society of importing an incremental barrel of oil just balance the benefits.

The market price paid for imported

oil does not reflect its true cost, which includes what the economists call an "economic component" and a "security component." The greater the volume of oil imported into the U.S., the higher the price, which means that, as demand rises, all importers must pay a higher price. Rising oil prices also have an adverse effect on the U.S. economy and the trade balance.

As for the security component, the U.S. is vulnerable in the event of a price run-up to an increased transfer of wealth abroad with all the attendant costs, and this vulnerability is a direct function of the volume of imports. Also, the larger the value share of oil in the economy at the time of a disruption, the greater the macroeconomic costs from the price shock.

In order to calculate the optimal premium, Broadman and Hogan developed a model that maximizes the

expected net social benefits of oil imports for normal and disrupted periods and allows for the simultaneous estimation of the premium's individual components. The table shows their estimates of the optimal tariff and the costs of continuing a free-market policy.

The authors consider 3 optional forms of tariff: a simple fixed fee, a variable fee, and a fee defined in proportion to the price of oil. They prefer the first on the grounds that it provides approximately the right incentives at the margin and the closest approximation to the optimal tariff calculations revealed by their analyses, and avoids the difficulties of managing the macroeconomic costs during an interruption.

The authors note that while the redistribution of resources throughout the economy will have both "winners" and "losers," the winners' gains are likely to be larger than the losers' costs.

Copies of the study are available from Nancy Kingston, Energy and Environmental Policy Center, Harvard Univ., 79 John F. Kennedy St., Cambridge, MA 02138. Price: \$10.



International Gas Technology HIGHLIGHTS

Volume XVI

December 1, 1986

No. 24

OPTIMAL TARIFF AND COST OF FREE MARKET POLICY PROBABILITY DISTRIBUTIONS

High price case (\$27)

	\$/bbl			
	Lower 25%	Median	Upper 25%	Expected Value
Economic Tariff	\$ 1.95	\$ 2.85	\$ 3.90	\$ 3.14
Security Tariff	3.63	5.64	8.52	6.44
Combined Tariff (\$ per barrel)	7.00	8.96	11.26	9.58
Cost of Free Market Policy (\$billion/year)	4.64	8.24	13.18	10.60

Low price case (\$15)

	\$/bbl			
	Lower 25%	Median	Upper 25%	Expected Value
Economic Tariff	\$ 4.03	\$ 5.68	\$ 6.87	\$ 5.86
Security Tariff	2.80	4.20	6.65	5.23
Combined Tariff (\$ per barrel)	8.71	0.81	1.89	11.09
Cost of Free Market Policy (\$billion/year)	11.72	7.90	27.93	22.44



International Gas Technology HIGHLIGHTS

Volume XVII

February 9, 1987

No. 3

IPAA IS CONCERNED OVER LARGEST DROP IN U.S. OIL OUTPUT IN HISTORY

According to the Independent Petroleum Assn. of America, average U.S. crude oil production last year fell from a high of 9.18 million bbl/day in February to 8.35 million bbl/day in December — the largest and most rapid fall in production ever recorded. As the figure shows, the decline offset 4 years of production gains.

This decline was more serious than expected, notes the IPAA. Earlier, the Energy Information Administration had estimated production would decrease 231,000 bbl/day from January to December. The EIA's revised estimate puts the decline at 773,000 bbl/day through September.

"In less than one year, manipulation of crude oil prices by the dominant Arab OPEC producing countries has offset all of the production gains realized between 1982 and 1985," commented IPAA chairman Raymond Hefner. "We are optimistic that EIA's revisions will send a message to the Reagan Administration and the U.S. Congress that the situation is more serious than originally thought."

OIL IMPORTS ROSE 26.5% IN 1986, BUT THEIR VALUE DECLINED 28%

The Commerce Dept. reports that U.S. imports of crude oil and products averaged 6.58 million bbl/day in 1986 — up 26.5% from the 1985 average of 5.20 million bbl/day. The value of these imports, however, declined 28.1% from \$52.36 billion to \$37.64 billion, reflecting a drop in oil prices from \$27.55/bbl to \$15.66/bbl in 1986. This prevented the record trade deficit of \$169.8 billion from being even higher.

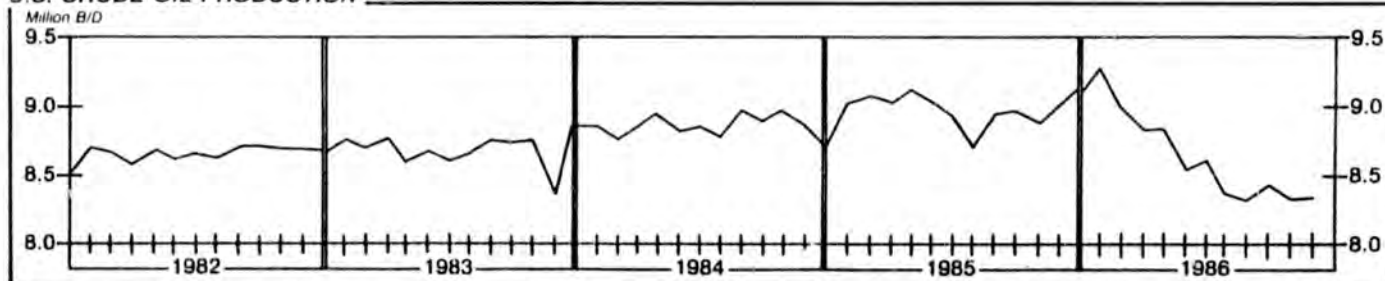
Imports peaked at 8.03 million bbl/day in September, and for three months last year were higher than 7 million bbl/day. In December, however, they fell to 6.2 million bbl/day. Crude oil imports alone averaged 4.48 million bbl/day in 1986; crude prices averaged \$14.79/bbl, compared with \$27.07 in 1985. The U.S. imported an average 378,300 bbl/day of gasoline in 1986, up 7.3% over 1985; 820,258 bbl/day in December were imported. Residual fuel imports jumped 27.9% to 753,926 bbl/day, and reached 850,258 bbl/day in December.

ARAMCO AGREEMENT WITH SAUDIS SEEN AS SUPPORTING \$18/BBL OIL

Exxon Corp., Chevron Corp., Texaco Inc., and Mobil Corp. reportedly signed a multi-year agreement to buy Saudi Arabian crude oil at a fixed price. The companies are shareholders in the Arabian American Oil Co. (Aramco). The agreement was widely interpreted as helping to stabilize oil prices at around \$18/bbl, which the Saudi finance minister recently called "a reasonable and sustainable price."

Aramco announced only that the companies had agreed on the volumes of crude to be delivered during the first 5 months of the multiyear contract, with adjustments to be made after this period. While volumes were not specified, in the past the Aramco partners were taking about 1 million bbl/day, nearly a quarter of Saudi Arabia's total output. The oil is to be sold at the official government price, which is \$17.52/bbl for Arabian Light.

U.S. CRUDE OIL PRODUCTION



API HEAD WARNS OF NEW, WORSE ENERGY CRISIS

Speaking to the National Press Club in Washington, Chevron Corp. chairman George M. Keller, who is chairman of the American Petroleum Institute, warned that the U.S. could face a major energy crisis in the next few years and that time is running out to do something about it.

Keller told the journalists that last year's oil price collapse — the worst in 50 years — led to widespread cutbacks in oil exploration and development projects and the shutdown of thousands of marginal wells in the U.S. As a result, domestic crude production dropped some 800,000 bbl/day from February to December 1986, the first such decline in several years; total U.S. oil consumption rose nearly 500,000 bbl/day; and oil imports increased by more than 1 million bbl/day to an average 6 million bbl/day in 1986 — the highest level since 1980.

"We're now facing a much more unstable energy future that will include a sharp dependence on America's dependence on foreign oil," said Keller. "Within 3 or 4 years, the combination of declining domestic production and rising imports could make our nation extremely vulnerable to another major energy crisis." The potential crisis could be significantly worse than the oil shock of 1973-74, he added, since there are no major non-OPEC discoveries awaiting development to provide additional oil production.

While there are no quick or painless remedies, Keller said the first step is for the Administration and Congress to recognize the urgency of the problem and try this year to review and modify all government policies which discourage domestic production. Among his suggestions were development of the Arctic National Wildlife Refuge and the California Outer Continental Shelf; repeal of the windfall profits tax, which he termed a "tremendous deterrent to drilling"; and incentives to encourage oil and gas exploration. Keller continued to favor a price floor in the \$14-\$17/bbl range,

and said that while he isn't yet ready to support an oil import fee, ultimately this may be "the only answer."

RIG COUNT DECLINE SLOWS DOWN, BUT WORLDWIDE DRILLING NEARS RECORD LOW

According to the latest report on rotary rig activity by Hughes Tool Co., the rate of decline in drilling is slowing down. The 826 rigs making hole the week ending January 30 were only 11 less than the previous week. This compares with 1594 rigs active a year earlier. However, the recent decline compares with a drop of 77 rigs for the same week in 1986.

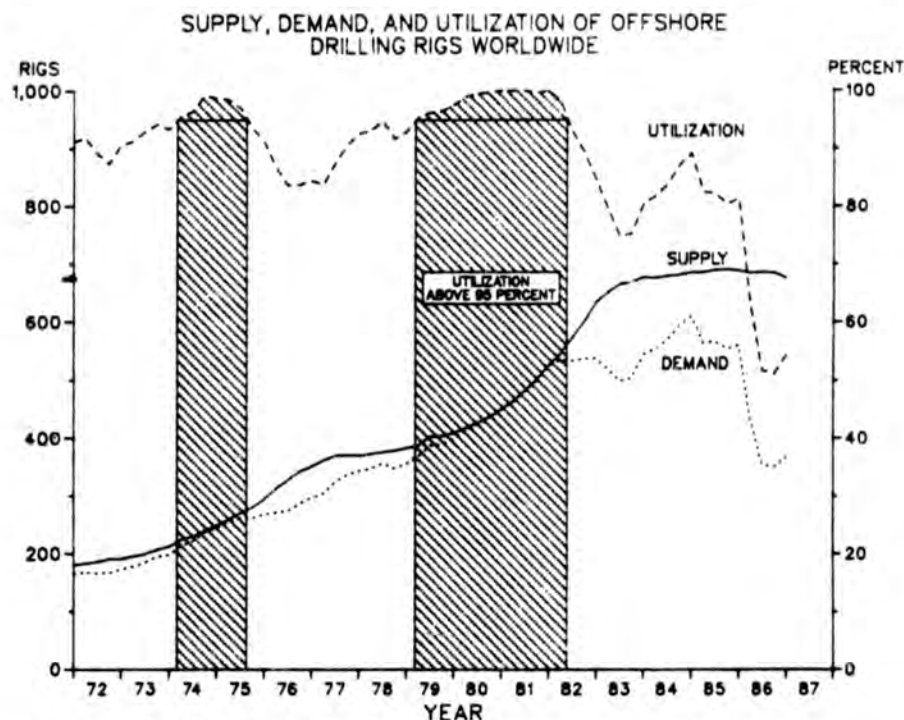
By state, increases were reported for Ohio, Mississippi, Oklahoma, Arkansas, Michigan, New Mexico, Utah, Wyoming, and New York. States reporting declines included Texas, Colorado, Nebraska, Pennsylvania, Alabama, and Florida.

The decline in drilling activity has been more pronounced in Canada, where only 139 rigs were working the last week of January, compared with 178 rigs the previous week and 324 a year earlier.

Worldwide, the utilization rate for offshore mobile rigs is 54%, approaching the all-time low, with only 367 rigs working out of a total fleet of 676. According to E.F. Hutton, at the beginning of 1986 the utilization rate stood at 81%, while in two past periods — from 1973 to mid-1976 and from mid-1975 to 1979 — it exceeded 95%, as the figure shows. The supply of rigs rose from just over 200 in 1974 to nearly 700 in 1983 and has remained constant since then. "The offshore drilling industry continues to struggle through the worst crisis in its history," comments E.F. Hutton.

MAJORS DRASTICALLY CUT INVESTMENT IN ALTERNATIVE ENERGY PROJECTS IN 1985, BUT RAISE R&D SPENDING SLIGHTLY

An Energy Information Administration report, *Performance Profiles of Major Energy Producers 1985*, notes that 22 major U.S. energy companies cut their domestic investment in alternative energy by nearly 80% to \$131.5 million in 1985 — only 10% of the 1982 level. Overall, the companies' net income declined 18.3% to \$17.4



SOURCE: OFFSHORE DATA SERVICES, INC.
NOTE: SUPPLY AND DEMAND (LEFT SCALE), UTILIZATION (RIGHT SCALE).

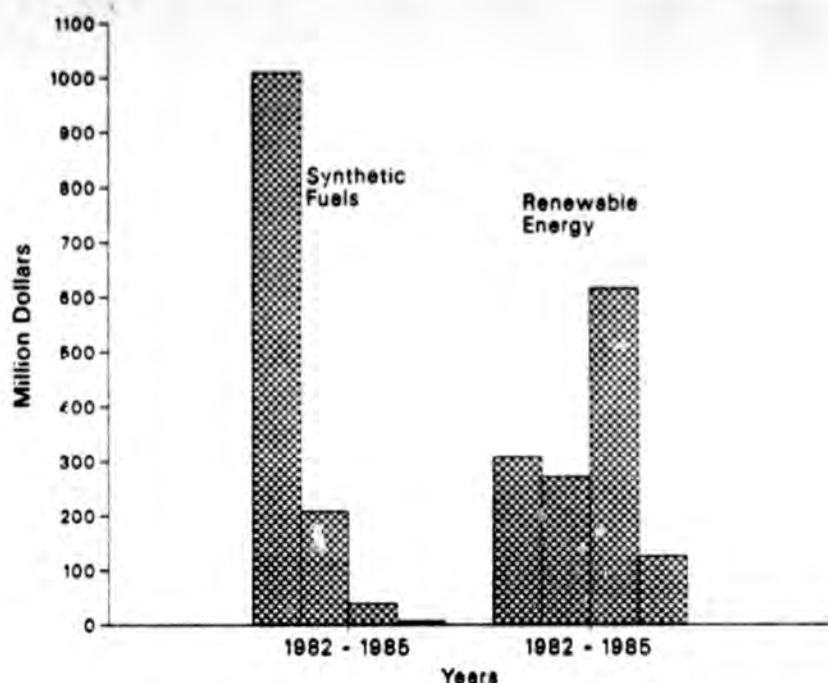
billion, the lowest level since 1978.

Domestic spending on synthetic fuels projects showed the steepest decline: Investments in oil shale, coal gasification/liquefaction, and tar sands projects totaled only \$6.5 million in 1985, compared with \$38.6 million in 1984, \$208.4 million in 1983, and \$1.01 billion in 1982. Spending on geothermal, solar, and other alternative energy sources dropped from \$303.9 million in 1982 to \$131.5 million in 1985 (after peaking at \$613.2 million in 1984 because of the acquisition of geothermal assets by Unocal and Phillips). The figure shows the relative importance of alternative energy investments in the U.S. by the 22 reporting companies.

Total foreign investments were off 1% to \$163.4 million. Funding of Canadian tar sands projects went up slightly from \$123.8 million in 1984 to \$125.2 million in 1985, but other foreign investments declined 21.3% to \$38.1 million.

Despite declining income, the companies spent slightly more on research and development in 1985 than in 1984. Their R&D spending rose 1.1% to \$4.11 billion, mainly due to increased investment in petroleum and nonenergy areas. Oil and gas recovery R&D funding rose 15.7% to \$801.4 million, higher than any of the 3 previous years. Other spending increases were reported for tar sands research, up 19.8% to \$32 million; coal gasification and liquefaction, up 14.1% to \$116.7 million; and solar and geothermal, up 43.7% to \$78.3 million. However, declines were reported for other petroleum R&D, down 12.7% from 1984 to \$536.2 million, and oil shale R&D, down 35.4% to \$68.8 million. Nonenergy R&D investments increased 2.5% to \$2.21 billion in 1985.

The 22 companies which file Form EIA-22 with the EIA's Financial Reporting System each year, are Amerada Hess Corp., American Petrofina Inc., Amoco Corp., Ashland Oil Inc., Atlantic Richfield Co., Burlington Northern Inc., Chevron Corp., Coastal Corp., E.I. du Pont de Nemours and Co., Exxon Corp., Kerr-McGee Corp., Mobil Corp., Occidental Petroleum



Source: Form EIA-28

Additions to PP&E in Domestic Alternative Energy for FRS Companies, 1982-1985

Corp., Phillips Petroleum, Shell Oil Co., Standard Oil Co., Sun Co., Tenneco Inc., Texaco Inc., Unocal Corp., Union Pacific Corp. and United States Steel Corp.

EVEN SHARING OF TAKE-OR-PAY COSTS RECOMMENDED BY FERC HEAD

According to *Inside F.E.R.C.*, Federal Energy Regulatory Commission Chairman Martha Hesse has proposed that pipelines and their customers share evenly the costs of removing take-or-pay liability. The proposal, circulated to the other 5 commissioners on January 23, is part of the "comprehensive gas strategy" announced last month (*IGT Highlights*, January 26, 1987). A timetable has reportedly not been set for a decision on take-or-pay. A group of major producers is seeking input into policymaking.

Hesse's proposal is said to involve the levy of separate charges on customers for 3 kinds of take-or-pay expenses: contract buyouts, contract buy-downs, and future inventory carrying costs. The first two would be allocated on the basis of customers' historical purchases. Future supply reservation

costs would be allocated on the basis of the difference between anticipated and actual takes.

A critical part of the new policy will be the method of recovering the costs from customers. Historical sales customers that are still buying gas from the pipeline could be billed directly through the demand charge or the commodity charge. However, the proposal apparently recommends against passing through costs in the commodity charge, an approach supported by Reps. John Dingell and Philip Sharp and by some state commissioners.

CONSUMERS, DOW FINALIZE AGREEMENT TO CONVERT MIDLAND PLANT TO GAS

Consumers Power Co. and The Dow Chemical Co. have signed agreements to convert the \$4.1 billion mothballed nuclear power plant at Midland, Mich., to a natural gas combined-cycle cogeneration plant. The two companies agreed to this in principle on September 17 (*IGT Highlights*, October 6). They also moved to end their 3-year-old litigation.

Under the agreement, Dow's subsidiary Rofan Energy Inc. invested \$115

million for a minority interest in the project; Consumers Power, through its subsidiaries, will contribute about \$1.5 billion of its assets at Midland in return for 49% equity and interest-bearing notes totaling \$1.27 billion. Consumers Power also has the option of receiving a \$103 million payment from the partnership and will receive \$16 million/year for the first 9 years after commercial operation begins. Other equity participants will be announced this spring.

Fluor Daniel and Dow Engineering Co. are preparing bids for the engineering/construction work. Design work is scheduled to begin in April and site work in late 1987. Eight of 12 combined-cycle turbines and heat-recovery steam generators to support the conversion of Unit I of Consumer Power's existing plant will be installed in 1989 and 1990. Electricity generation and steam production is expected to begin by early 1990. The project will provide the electricity and steam requirements for Dow's plant at Midland for 25 years. The rest of the generating capacity will be available to Consumers Power.

GAMA REPORTS INCREASES IN SHIPMENTS OF MAJOR GAS APPLIANCES IN NOVEMBER

The Gas Appliance Manufacturers Assn. reports increases in shipments of several categories of major appliances last November and in the first 11 months of 1986.

In November, shipments of gas water heaters rose 2.0% to 293,919 units, compared with a 5.4% decline to 253,895 electric water heating units. Gas range shipments went up 6.7% to 172,890 units. Shipments of central heating units rose 9.2% to 224,872, due to a 11.6% gain in gas furnace deliveries to 202,080. For the first 11 months of the year, GAMA reports a 5.8% increase in gas water heater shipments, a 5.8% boost in sales of gas ranges, and a 14.7% hike for central heating units.

Heating systems for recreational vehicles rose 9.6% to 14,685 units shipped in November, but residential gas wall

furnace deliveries declined 16.6% to 20,800. Shipments of gas unit heaters and gas duct furnaces decreased by 13.1% and 5.1%, respectively, to 19,706 and 2216 units.

VALUE OF CANADA'S FUEL PRODUCTION FALLS SHARPLY IN 1986 DUE MAINLY TO CRUDE OIL PRICE DROP

Energy, Mines and Resources Canada reports that the value of Canada's petroleum production declined 47.2% to \$9.72 billion in 1986 (Canadian \$), although the actual production volume was down only 0.7%, reflecting last year's sharp drop in oil prices.

The value of natural gas fell 16.2% to \$6.74 billion, with a 9.5% drop in actual output; the value of natural gas byproducts dropped 35.0% to \$1.83 billion, with a 3.9% production decline; while the value of coal declined 7.0% to \$1.72 billion, with actual output down 4.4%. Overall, the value of energy commodities fell 35.7% from \$31.1 billion in 1985 to \$20 billion in 1986.

IGT SEEKS PAPERS FOR 6TH GAS ODORIZATION SYMPOSIUM

IGT has issued a call for papers for its 6th quadrennial gas odorization symposium to be held August 24-26 in Chicago.

Technical subjects include proper-

ties of odorants, commercial odorant systems, selection of odorants and odorization level, methods of odor addition, measurement of odorant levels, factors affecting odorant stability, human olfactory response to gas odorants, and current odorant research. Legal issues include documentation for odorization, the need for judicious sampling and analysis after a gas fire and explosion, and response to odorization-related incidents.

Abstracts 150-250 words in length should be sent by March 10, 1987, to Amir Attari, IGT.

IGT WILL HOLD 3RD SYMPOSIUM ON PC USE IN THE GAS INDUSTRY JUNE 22-24

IGT will hold its third annual symposium on Personal Computer Applications in the Gas Industry June 22-24 in St. Charles, Ill.

Papers will be presented on applications in 3 areas: regulation, management, and accounting; marketing and market analysis; and engineering and operations. Specific topics include gas supply and dispatching optimization, life cycle analysis, and the development of expert systems. All papers and software presented at the 3-day symposium will reflect the latest advances in information, data control, and system operation within the gas industry.

For more information, contact Susan Robertson, IGT: 312/567-3881.

IGT

INTERNATIONAL GAS TECHNOLOGY HIGHLIGHTS

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F. SJR 8
Alaska State Legislature

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April 13, 1987

Mr. Tom Burns
Manager, Economic Department
Chevron U.S.A., Inc.
3001 "C" St.
Anchorage, AK 99503

Lobo

Dear Tom:

Thank you for participating in the February 26 hearing before the Senate Special Committee on Oil and Gas. Your testimony on SJR 8, relating to a federal tax on imported oil, provided the kind of national perspective we often lack in our state deliberations.

The problems that oil producing states are currently experiencing as a result of low oil prices are serious and must be thoughtfully addressed. Imposition of a tariff on imported oil may be a positive step in providing solutions. I hope we can continue to work together in developing additional approaches to solving problems that are of mutual concern to all of us.

For your information, I have enclosed a copy of the minutes from the hearing. Currently, SJR 8 is under consideration by the Senate Finance Committee.

Thank you again, Tom, for your important contribution to our hearing.

Sincerely,

Bettye Fahrenkamp
Chairman

BF:dc

Enclosure

File - mail
disk - work
origa

Testimony given by:

33 Cody Graves, Legislative Assistant
Energy & Environmental Affairs
U.S. Senator David Boren
Russell Senate Office Building
Washington, D.C. 20510

2960 gir 8

34 Tim Dowd, Executive Director
Interstate Oil Compact Committee
900 Northeast 23rd Avenue
Oklahoma City, OK 93105

2195

35 Raymond Plank, Chair
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6114

36 Dillard Hammett, State Energy Advisor
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(907) 277-4419



WHILE IN JUNEAU
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JUNEAU, ALASKA 99811
(907) 465-4525

March 4, 1987

Mr. Raymond Plank, Chair
Apache Corporation
1700 Lincoln Street, Suite 4900
Denver, Colorado 80203-4549

Dear Mr. Plank,

I would like to extend to you my sincerest appreciation for your participation in Alaska's Senate Special Committee on Oil & Gas. I was very pleased with the collective support for my Senate Joint Resolution 8 and the oil import tax.

Your testimony provided the Committee and me with needed information regarding a very critical issue.

Having representatives from Chevron and Unocal testify in support of a tariff is progress itself. It was only a year ago when I attempted to have a similar meeting and heard opposition, at worst, or silence, at best, from the "majors". Being the chairman of a domestic or "independent" oil company, I'm sure you can appreciate the difficult decision-making process it took for these companies to change their position.

I also would like to thank you for sending to my office copies of the recent Harvard University study entitled "Oil Tariff Policy In An Uncertain Market". It will be a valuable and important resource and one in which the Senate Special Committee on Oil & Gas will be happy to review. In addition, my office has requested committee minutes from the hearing. They should be completed soon, at which time I will forward a copy to Mr. Gene Trumble and you.

Again, Mr. Plank, thank you for your time and contribution to our important hearing.

With best wishes, I am

Sincerely,

A handwritten signature in cursive script that reads "Joe P. Josephson".

Joe P. Josephson
State Senator

J- STR 8

MAY 8 1987

CORPORATE HEADQUARTERS
SUITE 4900 ONE UNITED BANK CENTER
1700 LINCOLN STREET/DENVER, CO 80203-4549

NRM



Chairman and Chief Executive Officer 303/831-6597

[303] 831-6500

May 1, 1987

Senator Bettye Fahrenkamp
Chairman, Oil and Gas Committee
Alaska State Legislature
515 7th Avenue, Suite 130
Fairbanks, Alaska 99701

Dear Bettye:

It was a pleasure to participate in your February 26 hearing. Thank you for writing me and enclosing the minutes.

If I can be of assistance in the future, please let me know.

Very truly yours,

A handwritten signature in cursive script that reads "Raymond".

Raymond Plank

RP/ek



Official Business

Alaska State Legislature

Senate

f- OAW SJR 8
FEB 9 1987

Pouch V
State Capitol
Juneau, Alaska 99811

February 9, 1987

The Honorable Bettye Fahrenkamp
Chair
Senate Special Committee on
Oil and Gas
Alaska State Senate
P.O. Box V
Juneau, Alaska 99811

Dear Bettye:

I would like to bring to your attention the enclosed article which appeared in your local newspaper, the Fairbanks Daily News Miner, stating that Senators Stevens and Murkowski have supported Congressional legislation to impose a fee on imported oil.

As you know, I have introduced SJR 8 which supports a federal tax or fee on imported oil. SJR 8 has been referred to your Committee. Especially because Alaska's Congressional delegation in the U.S. Senate now supports this issue, I feel it would be in our best interests to express our endorsement for this proposal.

It is both in the national interest and Alaska's interest to keep the price of oil from falling below a point where conservation no longer makes sense and domestic producers no longer have incentives to develop oil resources. An oil import tax would maintain a higher price for domestic oil which has obvious implications for Alaska's revenues.

As you can observe, there is a growing interest, nationally, in an oil import tax. This issue needs our support and I respectfully request that hearings be scheduled on SJR 8 so discussion of the topic can be commenced in the Alaska Senate.

With best wishes, I am

Sincerely,

Joe Josephson
Joe P. Josephson
State Senator

JPJ:rak
Enclosure

Alaska delegation's legislation aims for fee on imported oil

News-Miner Bureau

WASHINGTON—Alaska Sens. Ted Stevens and Frank Murkowski have joined in legislation to impose a fee on imported oil.

The bill, which is aimed at boosting the domestic petroleum industry, would impose a \$4 per barrel fee on crude and refined oil products.

Under the bill, the fee would begin to phase out when the price of oil reaches \$18 a barrel. The fee would end when the world price of oil reaches \$22 per barrel.

Murkowski noted that the U.S. now imports nearly 40 percent of its domestic needs.

"Energy security is what the legislation is all about," he said. "Although we currently enjoy reasonably priced oil supplies sufficient to meet our daily needs, our proven oil reserves are shrinking and our dependency on foreign supplies of crude oil is growing each and every day."

ALASKA STATE SENATE

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(907) 465-4525

January 30, 1987

The Honorable Bettye Fahrenkamp
Chair
Senate Special Committee On Oil and Gas
P.O. Box V
Juneau, Alaska 99811

Dear Senator Fahrenkamp:

On January 20, I introduced Senate Joint Resolution 8, which relates to a federal tax on imported oil. This Resolution was referred to your committee. I would be grateful if you would consider scheduling this measure for a committee meeting in the near future. I take the liberty of suggesting a meeting between February 15 and March 1; I have asked for the recommendations of our Alaska delegation in Washington, D.C. and should have responses by then. I feel that this proposal is clearly in the interest of Alaska and Alaskans and a matter the Legislature should address this session.

If you need any information or should have any questions regarding SJR 8, please do not hesitate to contact my office.

With best wishes, I am

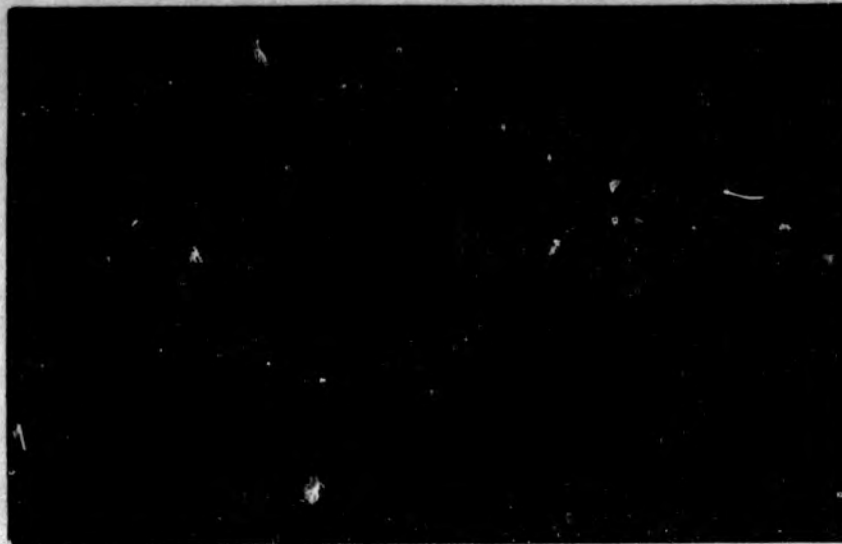
Sincerely,


Joe P. Josephson
State Senator

JPJ:mas

✓-OAG - SJR 3

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Series**

**John F. Kennedy School of Government
Harvard University**



OIL TARIFF POLICY
IN AN UNCERTAIN MARKET

HARRY G. BROADMAN
WILLIAM W. HOGAN

NOVEMBER 1986

E-86-11

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ACKNOWLEDGEMENTS

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Harry G. Broadman
William W. Hogan
November 1986

EXECUTIVE SUMMARY

Rising U.S. dependence on imported oil poses a renewed threat to the country's energy security and economic stability. U.S. oil imports are averaging over 5 million barrels a day — the highest level since 1981 — as lower prices have led to increases in overall consumption and decreases in domestic production. Unchecked, these trends could expose the United States to the risks of future price disruptions in the world oil market, triggered by events in the volatile Middle East.

Imposition of a large fixed fee on imports of both crude and refined oil would greatly enhance U.S. energy security. The study estimates that the tariff required to bring about a "socially optimal" level of U.S. oil imports is between \$10 and \$11 a barrel.

The price paid by the U.S. for imported oil in the world market does not reflect the true, or social, cost to the nation of dependence on insecure sources of supply; given this gap between social cost and market price, more oil is consumed in the U.S. than is optimal. In other words, there are market imperfections associated with U.S. oil imports, just as there are market imperfections associated with the pollution created from burning high-sulfur coal. Collectively, these market imperfections give risk to an "oil import premium," which reflects the additional amount that society should be willing to pay above the world price for imported oil.

There are two sets of market imperfections that comprise the premium. One of these is the "economic component" of the premium. Because the United States is such a large purchaser in the world oil market, the price paid for foreign oil is not independent of how much the country imports. In particular, the greater the volume imported, the higher the price, and vice versa. Importantly, this means that, within the U.S., a given increase in demand for

oil imports leads to a higher price that all pre-existing importers must pay. Moreover, rising world oil prices adversely affect both our macroeconomic performance and trade balance. Yet, individual U.S. purchasers of foreign oil do not pay a price that fully reflects these costs.

The "security component" of the premium reflects costs that stem from sudden, unanticipated, and large changes (i.e., disruption), in the price of oil in the world market. The U.S. economy is vulnerable, in the event of an oil price run-up, to an increased transfer of wealth abroad and its attendant costs. This vulnerability is a direct function of the volume of oil imports prior to a disruption. Another element of the security component of the premium is a function of the importance of oil per se in the economy. The greater the value share of oil in the economy at the time of a disruption and the greater the economy's inability to shift quickly away from oil in the face of a change in its price, the greater the macroeconomic costs from the price shock. It is well-known that these macroeconomic costs are substantial.

A model is developed to quantify the sources of market failure which prevent private actors from recognizing the true costs of the marginal barrel of U.S. oil imports and to derive the appropriately-sized tariff that closes the gap between social cost and market price. Sensitivity analyses are conducted to test how the estimate of the optimal tariff changes with alternative assumption and judgments about oil prices, the probability and size of disruptions, and so on. While the resulting tariff estimates are sensitive to assumptions about market conditions, this sensitivity is much less than is commonly believed. The size of the optimal tariff is large; our preferred set of assumptions set the optimal tariff at between \$10 and \$11 per barrel.

The form of a U.S. tariff on imported oil could vary across a range of alternatives, including a simple fixed fee, a variable fee designed to establish a floor price, or a fee defined in proportion to the price of oil. We argue that the fixed fee is the simplest and most effective tariff form. In addition, we note that the granting of exemptions or exceptions, either to a

special category of foreign suppliers or to a special category of U.S. consumers, would reduce the economic savings produced by a tariff.

Finally, although a tariff on imported oil will result in a real saving for the nation as a whole, it will redistribute resources throughout the economy, creating "winners" and "losers." But because the gains enjoyed by the "winners" are larger than the costs suffered the "losers," the tariff will produce positive net benefits for the nation in the aggregate.

OIL TARIFF POLICY IN AN UNCERTAIN MARKET

I. INTRODUCTION

OIL TARIFF

A \$10 to \$11 per barrel tariff on U.S. oil imports is justified by the special characteristics of oil and oil markets. Unlike other commodities, oil production and prices have been manipulated successfully by foreign producers for protracted periods. Moreover, unlike most other products, the price and availability of oil significantly affect macroeconomic variables such as our trade balance, the rate of inflation, and aggregate level of economic activity. And, more than most commodities, oil is crucial to our national security. For these reasons, the full cost of U.S. oil imports is not reflected in the price we pay in the world market. The gap between the true cost of oil to the nation and the market price justifies imposition of an offsetting tariff.

This paper examines the issues raised by current proposals for restrictions on U.S. oil imports through the use of a tariff. The discussion reviews the general policy arguments, describes a framework for estimating the costs to the United States of its free market policy in oil, estimates the size of optimal U.S. oil import tariff with special attention to world oil price uncertainty, compares the efficacy of different tariff instruments, and appraises the most salient issues that arise in implementing a tariff policy.

ENERGY SECURITY POLICY

Energy policy has returned to the national agenda. Unlike the last decade, however, when disruptions in the world oil market meant shortages and high prices, today the "crisis" is a supply glut and low prices. And whereas

before, consumers were the losers and producers the winners, now these positions have been reversed.¹

But one thing has not changed: government action is being advocated as a solution to a problem in the energy marketplace. Beleaguered domestic oil producers have called for a tariff on imported petroleum supplies.² Such a protectionist measure would, in effect, provide them with price guarantees in the face of soft market conditions. Behind the producers' argument is the belief that world oil prices will remain low for a sustained period of time and that, as a result, there will be an appreciable decline in U.S. exploration, development, and production activity, posing a major threat to the future viability of the U.S. oil industry.

The effects of the drop in oil prices have been widely reported. The general expectation is that with lower prices there will be an increase in the demand for oil but also a reduction in the level of output from high-cost domestic wells. The result will be growth in the volume of oil imported into the United States and a corresponding decrease in the market share of indigenous supplies.³

The most recent data available for the United States confirm these forces are very much at work.⁴ Total demand for petroleum is projected to in-

1 For a survey of the data and a history as well as analysis of the price collapse, see Dermot Gately, "The 1986 Oil Price Collapse: What Happened and What Did We Learn?", Economics Department, New York University, August 28, 1986.

2 They are supported by those anxious to find new sources of revenue to reduce Federal budget deficits.

3 For the most recent assessment and summary of the effects of sharply lower prices, see Conoco Corporation, World Energy Outlook Through 2000, September 1986.

4 The following data are taken from the U.S. Department of Energy, Energy Information Administration, Short-Term Energy Outlook October, 1986

crease by about 3 percent in 1986. Domestic production of crude is projected to fall off by 150,000 barrels a day. Imports of crude and refined products will rise by about 18 percent, averaging over 5.0 million barrels a day (mmbd), the highest level since 1981. Total imports will thus reach about 32 percent of U.S. demand this year. Persistent soft market conditions will exacerbate these trends. Substantial reductions in drilling activity — the domestic rig count has dropped from approximately 4500 in October 1981 to about 800 in October 1986 — should result in continuing declines in U.S. crude production in the years ahead.

To be sure, the dramatic fall in the price of oil points to the need to reconsider U.S. energy security policy. However, the message implied by the current turn of events is not so much that public policy may need to be revised simply because now oil prices are low, but rather because they can be low. In other words, the critical question is how should government respond to a world oil market characterized by prices which move down as well as up.

The focus of U.S. energy security policy has been the development of the Strategic Petroleum Reserve (SPR), a large inventory of oil under government control that can be brought quickly to replace lost supplies. Previous analyses of the SPR reinforce its importance and point to the need to add oil to the inventory.⁵ In addition, these same analyses highlight the value of other, complementary policies, including an oil tariff, that could enhance energy security.

⁵ Thomas J. Teisberg, "A Dynamic Programming Model of the U.S. Strategic Petroleum Reserve," Bell Journal of Economics, Volume 12, Number 2, Autumn, 1981; and William W. Hogan, "Oil Stockpiling: Help Thy Neighbor," Energy Journal, Vol. 4, Number 3, July 1983.

Notwithstanding the development of the (SPR), U.S. government response to the problem of energy security since the late 1970s has been primarily one of laissez faire. The roots of this free market policy lie partly in the costly experience with price controls in the early and mid 1970s, and with good reason. The result is, in many analysts' view, a myopic energy security policy: placing all of our energy security eggs in one basket — the SPR — is too narrow an insurance policy for the nation.

The re-emergence of volatility in oil prices has rekindled this concern and renewed the search for policy instruments to supplement the SPR. An import tariff has been the most frequently mentioned one. In this regard, a tariff has been advocated as a way for the United States to maintain downward pressure on otherwise rising oil prices; as a way to foster investment in capital equipment that has flexibility in fuel usage, and thus to make the economy more resilient to oil price shocks; and as a way to counteract deleterious effects on our trade balance with oil exporters. All of these rationales for a tariff are independent from its effect on protecting domestic oil producers in a soft market. Indeed, such arguments were advanced when oil prices were high.⁶

6 See, for example, Harry G. Broadman, "Review and Analysis of Oil Import Premium Estimates," Discussion Paper D-82C, Energy and National Security Series, Resources for the Future, Washington, D.C., December 1981; and William W. Hogan, "Import Management and Oil Emergencies," in Energy and Security, David Deese and Joseph S. Nye, eds., (Cambridge, MA: Ballinger, 1981); and James L. Plummer (ed.), Energy Vulnerability, (Cambridge, MA: Ballinger, 1982).

II. THE OIL IMPORT PREMIUM: A CONCEPTUAL FRAMEWORK

The idea of applying a tariff to U.S. oil imports is not new.⁷ However, the usual argument made by economists in support of such a policy does not derive from the notion of protecting the U.S. oil industry, but rather the objective of insuring that the United States consumes the "optimal" level of imported oil, i.e., where the nation's benefit from oil imports is maximized.

At the core of this argument is the fact that a large fraction of the free world's oil reserves are concentrated in a few volatile regions and that, as a result, oil prices are exposed to an appreciable risk of being disrupted. This feature of the world oil market, together with the fact that the United States is a large purchaser of oil and thus, the volume of its oil imports directly affects the market price, suggests that the price paid by U.S. oil consumers does not fully reflect the true national cost of imported oil. In other words, there are market imperfections associated with U.S. consumption of imported oil — just as there are some associated with the pollution created from burning high-sulfur coal.⁸ To the extent these oil market imperfections — commonly thought of as collectively giving rise to an "oil import premium" — are not incorporated into the purchase price of imported oil by, say, imposing a tariff, U.S. consumption of oil imports will exceed the optimal level.

7 Use of a U.S. oil import tariff actually dates back to the 1930s. See our discussion of the tariff's history below.

8 Nordhaus used the analogy to environmental pollution in proposing a \$10 tariff on oil imports. Nordhaus, William, "Put a Tax on Oil Pollution," New York Times, April 18, 1982.

The oil import premium concept suggests, then, that a tariff could be used to reduce U.S. oil import levels to the point where the costs to society of importing the incremental barrel of oil just balance the benefits. Importantly, the premium notion implies that the optimal level of U.S. oil imports may not be zero. In other words, the idea that the United States should strive to eliminate completely its consumption of imported oil is bad public policy.⁹

Another important implication of analyzing U.S. energy security policy in terms of the oil import premium is that support for a tariff need not directly hinge on whether oil prices are low or high. Rather, from this perspective, a tariff is seen as an instrument — in addition to the SPR — that addresses imperfections that are endemic to the world oil market. As long as volatile regions continue to account for a large fraction of world oil reserves, and as long as the volume of foreign oil purchased by the United States influences the market price, an oil import premium exists for the United States. Thus, while transitory variations in market conditions — gluts as well as shortages — will alter the magnitudes and signs of individual components of the premium, the total value of the premium need not vary appreciably.

The oil import premium implies that the full cost of imported oil is not incorporated into private consumption and production decisions. Thus, individual consumers will pay too low a price and use more imported oil than is

9 This, of course, was the original objective of Project Independence, introduced by President Nixon. See, for example, Douglas R. Bohi and Milton Russell, Limiting Oil Imports: An Economic History and Analysis (Washington, D.C.: Resources For the Future/Johns Hopkins University Press, 1978).

optimal, and domestic oil producers will face a return below the true value of the incremental barrel of oil and produce too little. In theory, then, the premium reflects the additional amount that society should be willing to pay above the world price for imported oil (or its substitutes). Alternatively, the premium can be interpreted as a measure of the net social benefits of reducing the consumption of imported oil. Or, to take another example, the premium serves as a guide for how much the nation should be willing to pay for military protection of oil supplies.

It should be clear that the oil import premium provides a systematic framework for analyzing energy security problems beyond ways in which the currently low level of oil prices threatens the viability of domestic producers. Rather than viewing a tariff as a short term policy prescription, the premium framework takes the long run view. It recognizes that the energy security problems we face today are, in fact, not fundamentally different from those that have been present for the past decade or are likely to arise in the next decade. The "energy crisis" is not one of high prices, or low prices. It is instead, one intrinsic to the nature of oil — where it is found and its role in the economy — and in the structure of the world oil market. The challenge for public policy is to deal with an energy security problem that is chronic and large.

COMPONENTS OF THE OIL IMPORT PREMIUM

There are two sets of market imperfections that comprise the premium. One of these is the "economic component" of the premium. The economic component reflects imperfections arising from the fact that the price the United States pays for oil on the world market is affected by the level of U.S. import demand, and from the fact that systematic changes in oil prices directly

influence U.S. macroeconomic performance. The other portion of the premium is the "security component." The security component reflects the market imperfections associated with the total costs of oil supply disruptions and with the risks arising from vulnerability to such disruptions.

The Economic Component

Because the United States is a large oil purchaser in the world market, the price we pay for oil imports is not independent of how much we buy. The greater the volume of oil imports, the higher the price, and vice versa. Importantly, this means that a given increase in U.S. demand for oil imports leads to a higher price that all pre-existing U.S. oil importers must pay. Thus, not only does the party responsible for the increase in oil import demand cause it to face a price that is higher than what it otherwise would pay, but also its contribution to demand affects the price that must be paid by all other U.S. oil importers.

This element of the economic component of the premium can be illustrated using a simple numerical example. Suppose U.S. oil imports stand at 4 mmbd and the world price is \$18.00 per barrel. Now assume that if U.S. oil import demand was to increase by 1 mmbd, the price would rise to \$20.00 per barrel. The total oil import bill for the United States would increase from \$72 million to \$100 million per day. The total cost to the United States of each of the additional one million barrels would be \$28.00 per barrel. However, the private cost of the marginal barrel would be only \$20.00, the market price. Thus, in effect, the United States pays a premium of \$8.00 for the last barrel imported.

This is akin to pricing in a market structure characterized by "monopsony" (i.e., buyer market power), where the buyer faces an upward slop-

ing input supply curve for oil import purchases. It can be depicted graphically, as in Figure 1. At a level of Q_0 oil imports into the United States, the price paid per barrel is P_0 . An increase in demand, which results in imports rising to Q_1 , increases the per barrel price to P_1 . The entire shaded area represents the total increase in the social cost of oil imports due to the rise in demand. (Alternatively, it depicts the total social benefits of reducing oil imports from Q_1 to Q_0 .) Area B shows the portion of the additional social costs that is borne by the marginal importer. Area A shows the portion borne by other U.S. oil importers.

An important corollary of the notion that the supply curve for U.S. oil imports is upward sloping is that the social costs generated by a rise in import demand increase disproportionately with the level of imports. This proposition is illustrated in Figure 2. The increase in imports between Q_0 and Q_1 is less than the increase between Q_1 and Q_2 ; the increase between Q_1 and Q_2 is less than the increase between Q_2 and Q_3 ; and the increase between Q_2 and Q_3 is less than the increase between Q_3 and Q_4 . On the other hand, the increase in price between P_0 and P_1 is equal to the increase between P_1 and P_2 ; between P_2 and P_3 ; and so on. Now, note that whereas the increase in social costs generated by a rise in imports from Q_0 to Q_1 is area D + area H, the increase in social costs associated with a rise in imports from Q_1 to Q_2 is area C (=area D) + G (>area H). Analogously, the increase in social costs associated with imports rising from Q_2 to Q_3 is area B (=area C) + area F (>area G). And, the increase in social costs generated by a rise in imports from Q_3 to Q_4 is area A (=area B) + area E (>area F).

Since the social costs created by a rise in import demand increase disproportionately with the level of imports, this means that the difference between the marginal social cost and the market price of a barrel of oil im-

FIGURE 1

Private Purchases Increase National Costs

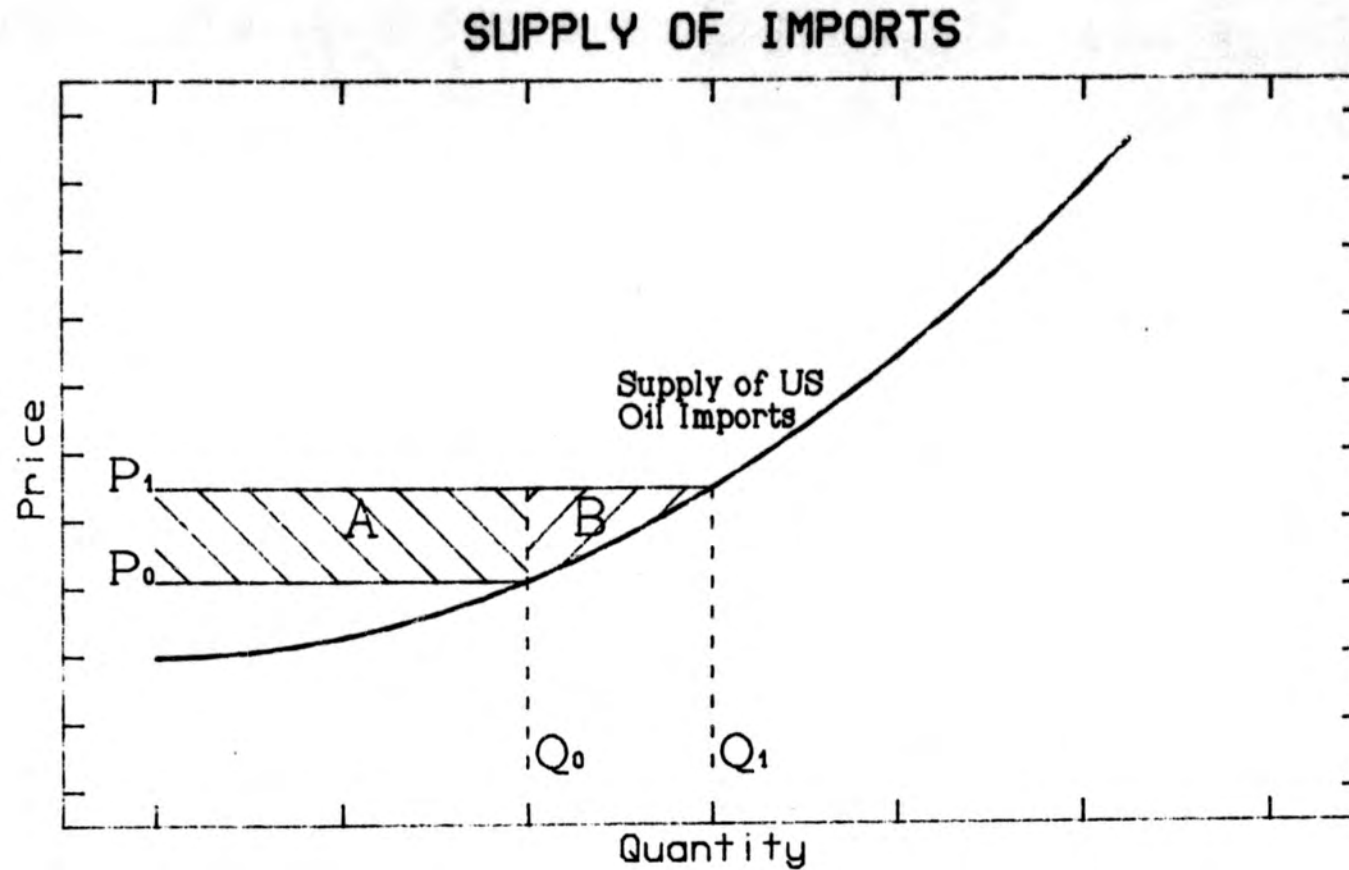
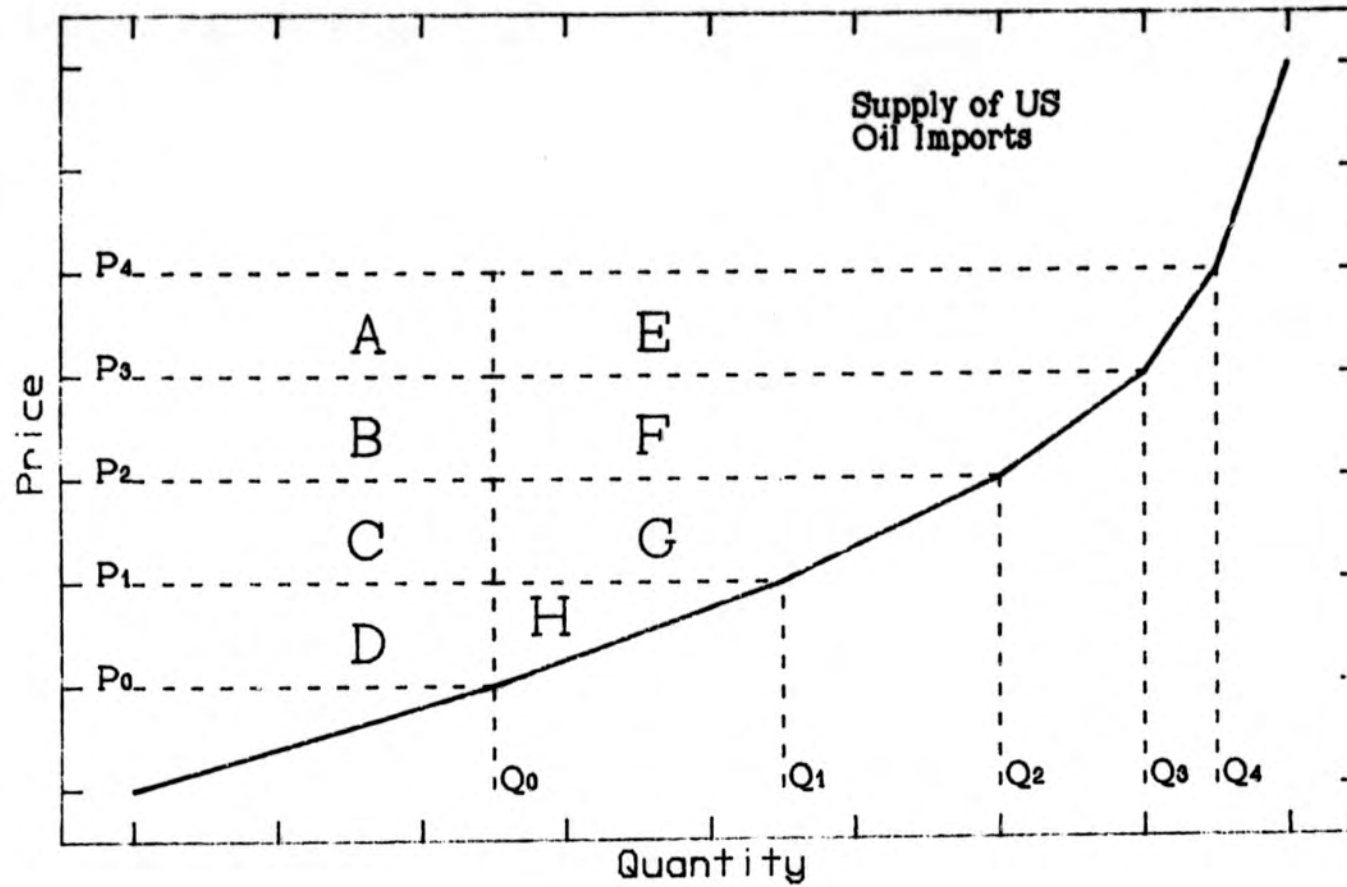


FIGURE 2

Marginal Cost of Oil Rises with Import Levels



ported into the United States increases with the level of imports; this is illustrated in Figure 3. This implies that in general the magnitude of the "monopsony wedge" element of the premium varies directly with the import volume. With low oil prices and rising import demand — the present market situation — it implies that the gap between the marginal social cost and the market price of oil imports is relatively large. Overall, given that there are variations in import demand, it is important in designing a policy instrument aimed at eliminating the market imperfection represented by this element of the premium to develop one which accounts for such changes.

The idea that a premium exists on U.S. oil imports implies that reducing U.S. consumption of imported oil, say, by imposing an appropriately-sized tariff¹⁰ will result in a real cost saving for the United States. To be sure, a tariff will redistribute resources throughout the economy, creating winners and losers. But the status quo has winners and losers as well. Indeed, the existence of a premium means that the market price of imported oil does not fully reflect social costs and, therefore, marginal consumers of that oil are effectively being subsidized by all other consumers. In this regard, by incorporating the premium into the price of oil imports, the U.S. economy would be "internalizing" costs that are already being borne.

Figure 4 formalizes this argument graphically. At Q_0 there is a difference between the marginal social costs and marginal social benefits of U.S. oil imports, represented by the distance between A and B; this distance is (a portion of) the premium.¹¹ It should be clear that as import levels are

10 Defining and estimating the "optimal tariff" are precisely the core tasks of this paper.

11 Area AB represents only a portion of the premium because it doesn't account for terms of trade and inflationary elements of the economic component (see below); nor does it account for the market imperfections that give rise to the

FIGURE 3

Gap Between Public and Private Cost Grows with Import Volume

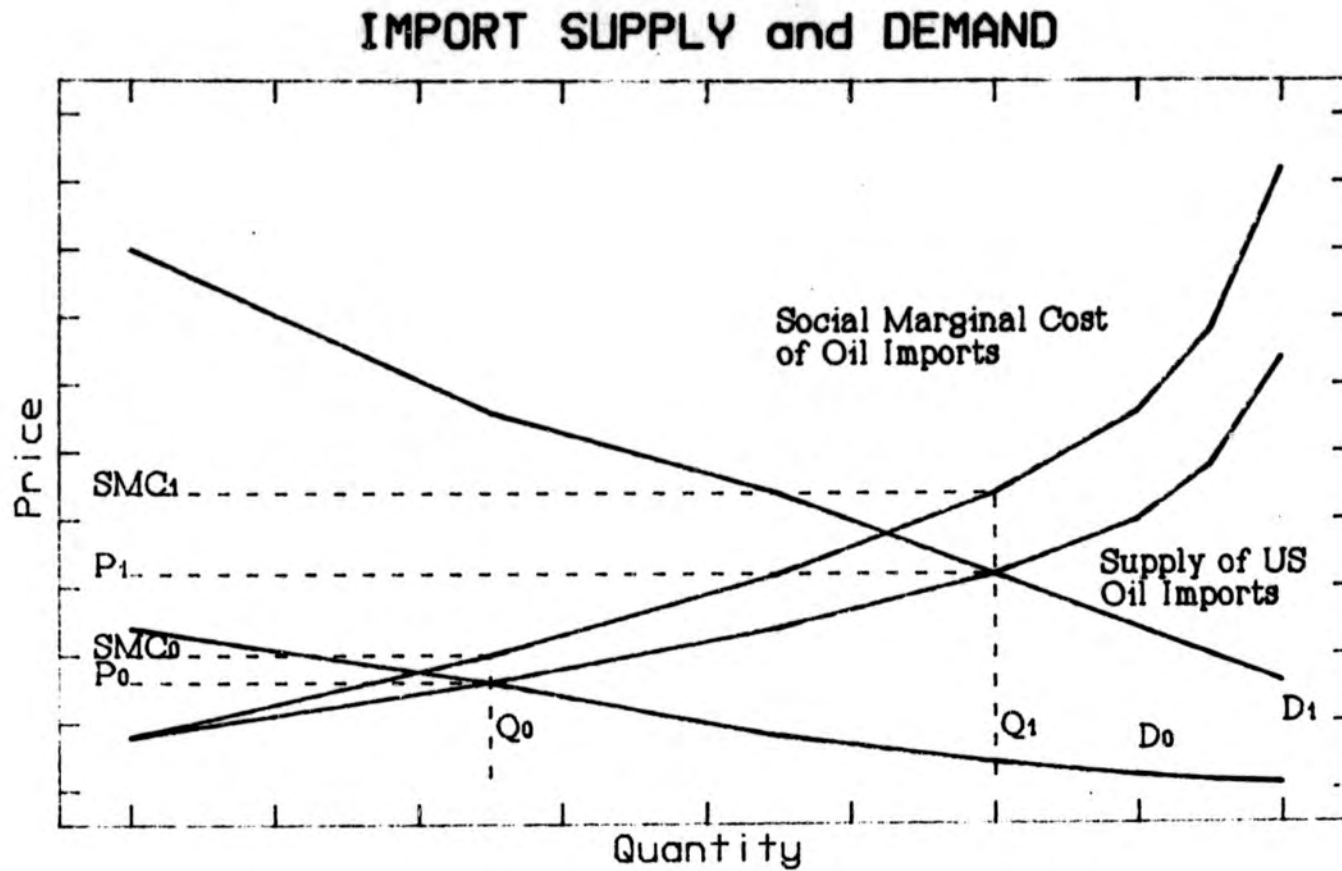
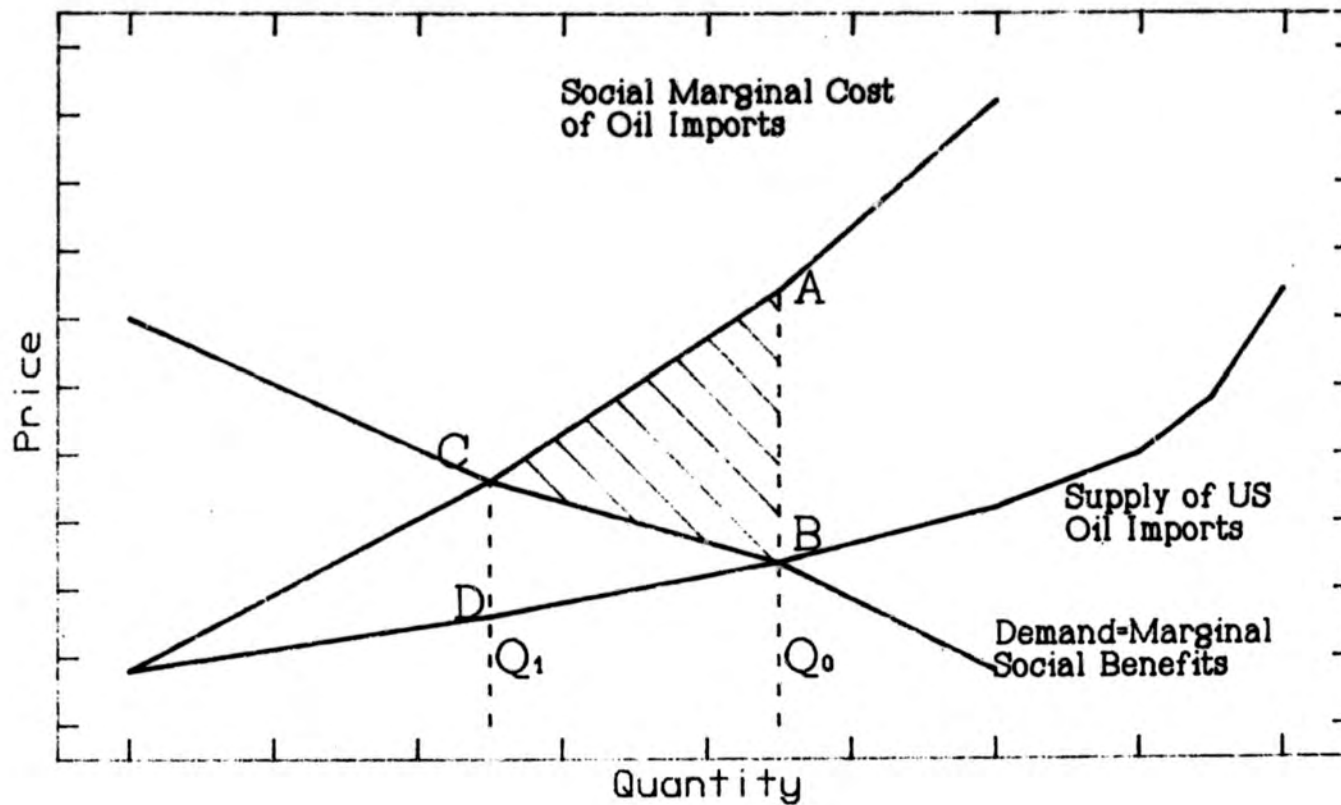


FIGURE 4

Optimal Tariff Balances Total Costs And Benefits

IMPORT SUPPLY and DEMAND



reduced towards Q_1 , the difference between marginal social costs and marginal social benefits is reduced. Since at Q_1 the marginal social costs and marginal social benefits of imported oil are equal, the shaded area ABC reflects the total benefits, or avoided costs, of reducing oil imports from Q_0 to Q_1 . An alternative interpretation of area ABC is that it depicts the total cost of a free market policy of consuming Q_0 barrels of imported oil. As we will show more fully below, in order to achieve a level of import reduction that results in Q_1 imports, a tariff the size of CD would be required.

In addition to the monopsony wedge element, there are two other elements that comprise the economic component of the oil import premium. The first is perhaps the most obvious. Changes in the price of a commodity like oil, so central to an industrial economy, will have a direct effect on the general price level, all other things equal. A long-run trend of rising (falling) oil prices will increase (reduce) the rate of inflation. To the extent that large reductions (increases) in GNP are needed to reduce (increase) inflation, purchases of imported oil generate "externalities"; that is to say, buyers of imported oil do not pay a price that recognizes that their purchases impose macroeconomic costs. The magnitude of these externalities depends on how oil import volumes and changes in oil prices affect the underlying, or "inertial," rate of inflation, and on the response to this inflation by macroeconomic policy makers.

If oil prices followed a smooth trend over time, then increases (or decreases) might be anticipated and incorporated in the underlying rate of inflation. Moreover, given full anticipation, there could be complete accom-

security component of the premium.

modation by policy makers and thus no loss in aggregate output. But as we have seen, oil prices follow an erratic path, both up and down.¹² This means that only some of the price changes are incorporated into the underlying inflation rate and that policy makers can provide for only partial accommodation. As a result, some fraction of oil-induced increases in inflation is removed by deliberately constricting output in the economy; therefore, inevitably, "external" macroeconomic costs are associated with U.S. purchases of imported oil.

The other element of the economic component of the premium arises from effects created because changes in the relative price of imported oil result in transfers of wealth abroad. The specific consequence of higher oil imports will be a deterioration in the U.S. terms of trade. To maintain our trade balance in the face of an increase in the total payment for imported oil, either an increase in U.S. export earnings or a decrease in U.S. import expenditures on non-petroleum products would be required. Accordingly, the dollar exchange rate would adjust, making U.S. exports more competitive on the world market and imports more expensive for U.S. consumers. Since at equilibrium total imports available to the U.S. economy would be reduced and U.S. exports would increase, domestic consumers are made unambiguously worse off. The purchaser of the incremental barrel of imported oil does not fully consider this "terms of trade" effect, which is diffused across the economy.

The magnitude of this in terms of trade externality is determined by two factors. First, many of our major trading partners are also oil im-

12 For an analysis of oil price paths and uncertainty, see William W. Hogan and Paul N. Leiby, "Oil Market Risk Analysis," EEPD Discussion Paper, Harvard University, December 1985.

porters. To the extent they are similarly affected by higher oil prices, the dollar exchange rate for their currencies will not change and that portion of our trade will not be affected. Second, the size of the externality will depend on how quickly the foreign dollar holdings of oil exporters are respent on U.S. goods and services, restoring the balance of trade.

The Security Component

At the most fundamental level, the security component of the premium reflects external costs that stem from sudden, unanticipated and large changes — in a word, disruptions — in the relative price of oil. For this analysis, it is important to think of disruptions in the world oil market not so much in terms of embargoes, production cutbacks, or other disturbances (such as wars and revolutions), but in terms of the price effects of these actions. We focus on disruptions created by price increases in a fully employed economy.

There are two elements of the security component. The first might best be thought of as reflecting the extent to which the economy is exposed, or vulnerable, to an increased transfer of wealth abroad and its attendant macro-economic and trade balance costs. This vulnerability is directly a function of the volume of imports prior to a disruption. The larger the import level at the disruption's start, the greater the externalities associated with the wealth transfer for any given price rise. In measuring this vulnerability component, the uncertainties in the duration, timing, and intensity of prospective disruptions must be taken into account.

Whereas vulnerability to the wealth transfer effects is related to the importance of imported oil both in absolute terms and relative to our total

oil supplies, the other element of the security component is a function of the importance of oil per se to the economy. The greater the value share of oil in the economy at the time of a disruption and the greater the economy's inability to shift quickly away from oil in the face of a change in its relative price, the greater the macroeconomic costs from the price shock. Empirical studies of previous oil price disruptions show quite clearly that these macroeconomic costs are substantial.¹³

To be sure, given these sizeable costs, private agents adjust their investment plans to disruption risks. Thus, investment decisions by households to purchase oil-using durable goods, and by firms to purchase oil-using equipment and processes, will incorporate — either implicitly or explicitly — expectations about the probability of a disruption occurring, about its magnitude and duration, and about the path that disrupted prices will take. This is because once such investments are made, a major alteration of oil consumption patterns due to a change in relative prices can be very costly. This suggests that in light of the tremendous volatility in oil prices a natural incentive exists for consumers and firms to select investments in oil-using goods and services that enhance flexibility in fuel usage; in economic terms, this means investing in a capital stock that makes the short-run demand for oil more elastic. An example of such an investment is a multi-fired boiler which allows for instantaneous fuel-switching.

The problem is, however, that an insufficient amount of these types of precautionary "shockproofing" investments is made from a societal perspective

13 Michael Bruno and Jeffrey Sachs, "Import Price Shocks and the Slowdown in Economic Growth: The Case of U.K. Manufacturing," Review of Economic Studies, vol. 49, no. 5 (1982):679-706.

and thus the short run demand for oil remains very inelastic. In part, this is because disruption costs are largely macroeconomic in nature and, as a result, the benefits of shockproofing are not appropriated solely by those making the investments. That is to say, these types of investments have "public good" characteristics.

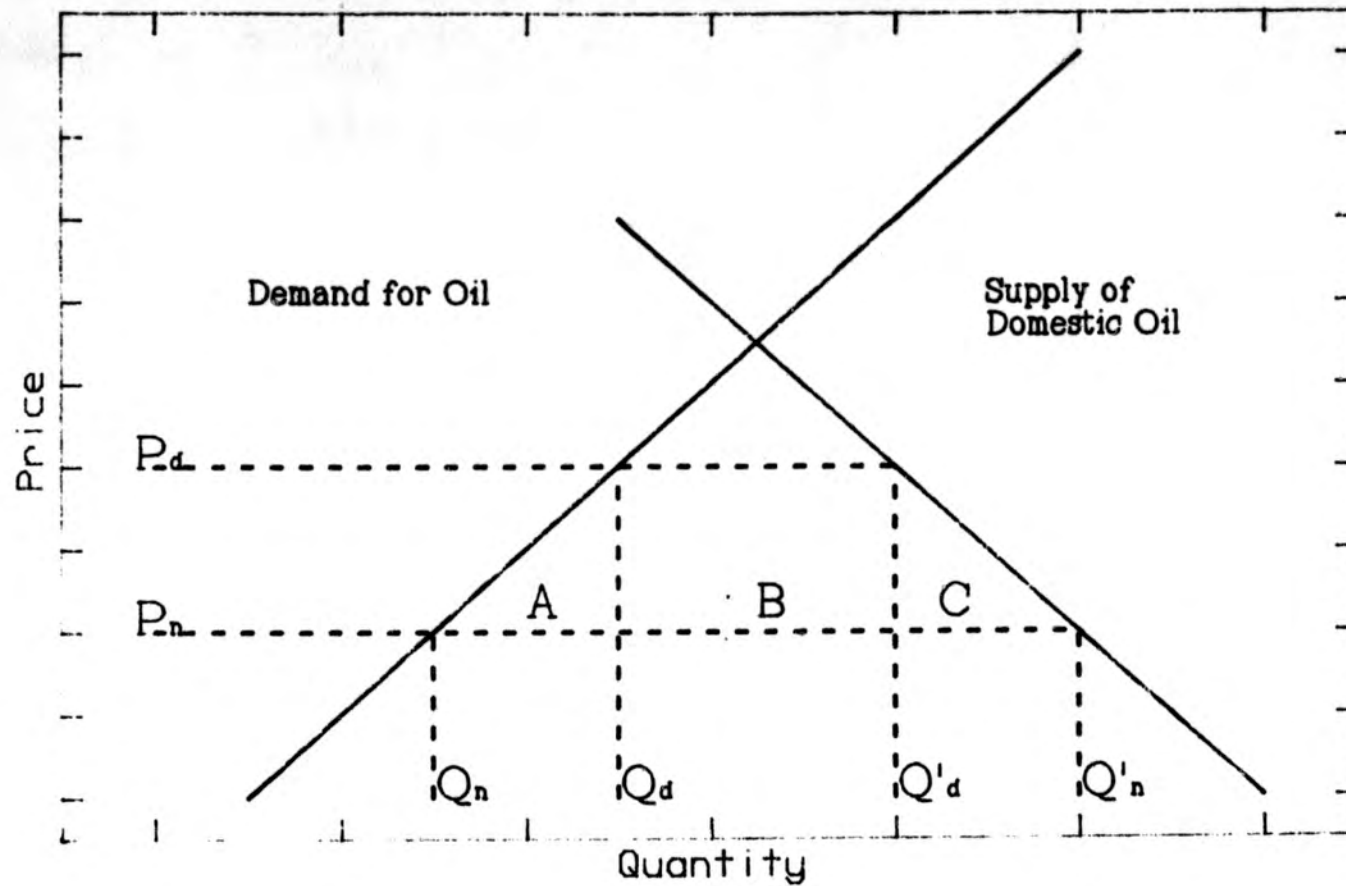
If there is one attribute common to the two elements of the security component, it is that the costs associated with oil supply disruptions arise because of the economy's failure to adjust smoothly to such price shocks. Empirical research on the macroeconomic effects of disruptions generally concludes that the costs of adjustment tend to increase disproportionately with the severity of disruptions and their duration.¹⁴

It is useful to illustrate graphically how in the aggregate a change in the relative price of oil in a disruption imposes costs on the economy. In Figure 5, P_N is the world oil price in "normal" periods, and P_D is the price during a disruption. At P_N , total U.S. oil consumption is Q'_N , of which Q_N is supplied by domestic producers and $Q'_N - Q_N$ is imported. At P_D , total oil consumption falls to Q'_D , domestic supplies increase to Q_D , and imports fall to $Q'_D - Q_D$. The total net social cost to the U.S. economy from the higher price is the sum of areas A, B, and C. Area C reflects a direct loss in our social surplus: the reduction in consumption of $Q'_N - Q_D$ barrels of oil means there is a decline in GNP corresponding to the value of goods and services that otherwise was being produced with that oil. Area A also reflects a GNP loss. It is a measure of the real resources the economy must transfer away from producing other goods and services to produce a commodity that is other-

14 See George Horwich and David Weimer, Oil Price Shocks, Market Response, and Contingency Planning (Washington, D.C.: American Enterprise Institute, 1984) for a review of the relevant studies.

FIGURE 5

Disruptions Create Real Costs and Wealth Transfers



wise cheaper to import. Area B reflects an increase in our oil import bill. For each of the $Q'_D - Q_D$ barrels of oil we import after the disruption, we must pay an extra $P_D - P_N$ dollars. Thus, Area B shows a transfer of wealth from U.S. oil consumers to foreign oil producers.

The Total Premium

As the preceding discussion shows, the magnitudes of the economic and the security components of the premium are both influenced by the level of oil imports. Therefore, the two components are interrelated. For example, if consumers and firms were to anticipate correctly the prospects for and the effects of a disruption, and incorporate these expectations into their investment decisions, the size of the security component would decline; however, as a result, normal period imports would also be reduced, reducing the magnitude of the economic component (recall that the gap between the marginal social cost of oil imports and the market price varies directly with import volumes). To take a reverse example, imposing a tariff designed to exploit the monopsony-wedge element of the economic component will induce consumers and firms, now faced with higher oil prices, to reorient their investment plans in such a way that prospective disruption costs will be lower than they otherwise would be; consequently, the security component would be reduced.

The message here should be clear. The size of the total premium is not the simple sum of its individual components. Therefore, in estimating the magnitude of the total premium, the sizes of the various components should be determined simultaneously, taking into account the interactions and complementarities between them.

TOTAL COST ANALYSIS OF USING THE PREMIUM AS A POLICY INSTRUMENT

Using a simple comparative static framework, the aggregate implications of using the oil import premium as a guide for policy making are illustrated in Figure 6.

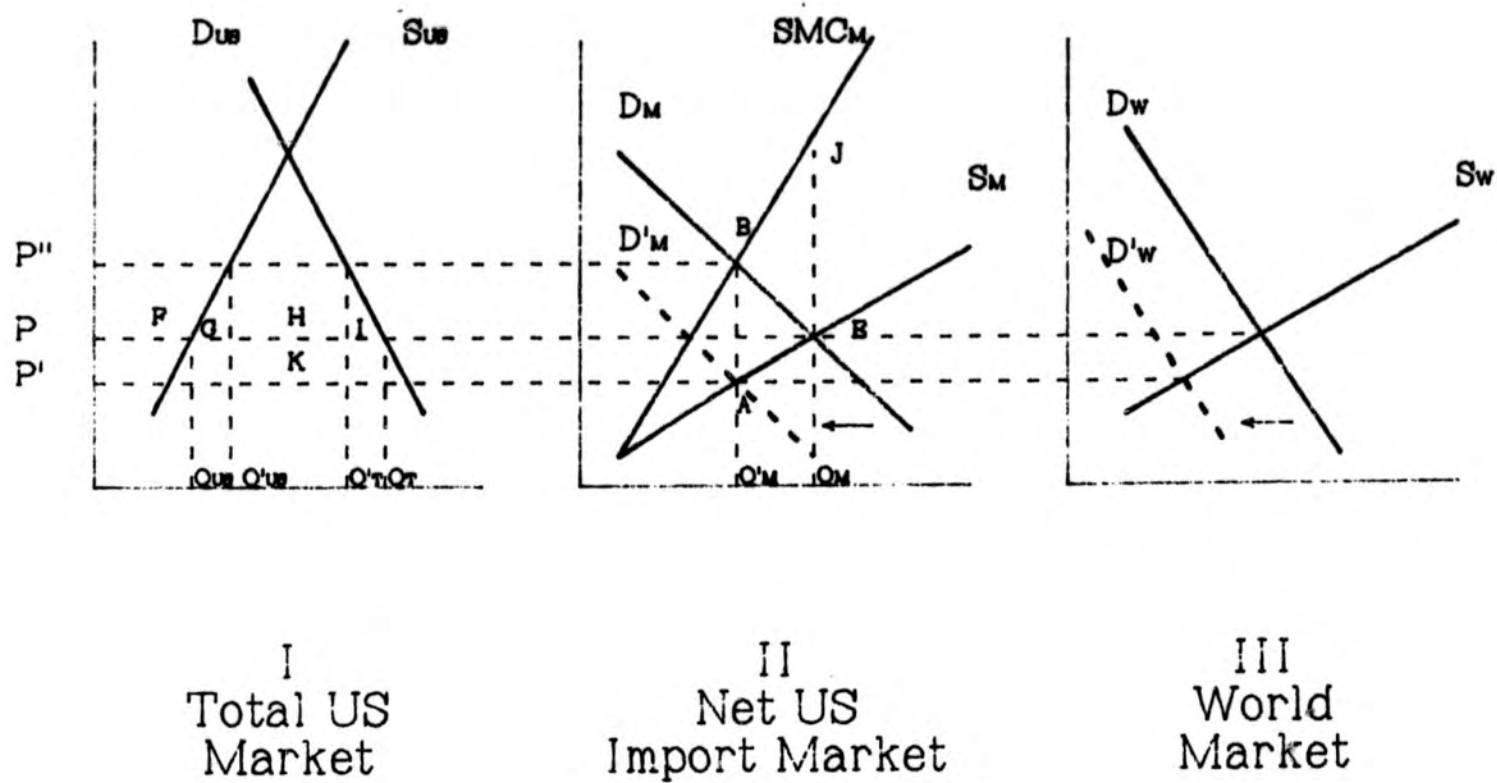
Three panels comprise Figure 6. The first depicts the total U.S. oil market; the second, the market for U.S. oil imports; and the third, the world oil market. The premium is illustrated in the second panel, where the social marginal cost of oil imports (SMC_M) exceeds the market price at an increasing rate as the quantity of oil imports supplied (S_M) rise. At a world price of P , U.S. production is Q_{US} and U.S. imports are $Q_T - Q_{US}$ in panel number I; note Q_M in Panel number II is equal to $Q_T - Q_{US}$. At Q_M level of imports, the premium is equal to the difference in height between J and E ; in other words, at Q_M the social cost of the incremental barrel of oil imported into the United States is greater than the market price by $J - E$ dollars. This means, that at Q_M the United States is overconsuming imported oil.

One way to internalize this premium is to impose a tariff on imported oil, where the size of the tariff is equal to $B - A$. Implementing a tariff of this magnitude reduces U.S. demand for oil imports from D_M to D'_M . The decline in U.S. oil import demand results in lower demand in the world market and thus there is a reduction in the world price of oil from P to P' .¹⁵ With a downward shift in U.S. oil import demand, the level of U.S. oil imports declines from Q_M to Q'_M in panel number II; this decline is equivalent to the difference between $[Q_T - Q_{US}]$ and $[Q'_T - Q'_{US}]$ in panel number I. Domestic oil consumers now face a price of P'' rather than P . It is important to note that this means that U.S. consumers do not bear the full burden of the tariff,

15 Note that in this simple analysis we assume oil exporters do not retaliate, say, by imposing an export tariff.

FIGURE 6

Total Cost Analysis of Oil Tariffs



which is equal to $P'' - P'$. Oil exporters, on the other hand, no longer receive P , but rather P' ; hence they share the burden of paying the tariff. As this demonstrates, ex post a tariff creates a wedge for the United States between the world price of oil (P') and the domestic price of oil (P'').

Let us be more specific about the distribution of the gains and losses. In panel number I the area denoted by F reflects the gain in "producer surplus"; it represents a transfer from U.S. consumers to U.S. oil producers and U.S. suppliers of non-oil energy resources. (Note that some of the transfer accruing to domestic oil producers is actually returned to consumers under the Windfall Profits Tax.) Area G reflects the real resource costs of producing more domestic oil supplies and non-oil energy substitutes. Area I is a deadweight loss; it reflects the decline in social surplus associated with our reduction of oil consumption as a result of the tariff. The sum of areas H and K is the tariff revenues accruing to the United States Treasury. Area H is the portion directly paid by U.S. oil consumers. Area K is what oil exporters in effect pay: without the tariff, oil exporters would receive P dollars for each of the $Q_T' - Q_{US}'$ barrels of oil imported into the US; with the tariff, they receive only P' dollars. Note that although area K is what U.S. consumers actually pay to the Treasury (in addition to area H), because it is what otherwise would have been paid to oil exporters, it is in effect a tariff payment by the latter.

Overall, then, what are the social benefits and costs of pursuing such a policy? The costs to the United States are given by areas G and I ; areas F and H are simply intra-country transfers. The benefits to the United States are given by area K , the effective subsidy provided to the Treasury by oil exporters.

To be sure, as this analysis shows, imposing a tax to correct for

market imperfections is never costless. But to the extent that at the margin the benefits engendered are greater than the costs, there is little question about the soundness of such a policy. Thus, the objective for public policy is to select the optimally-sized tax, i.e., one that maximizes the net social benefits. In this particular example, the optimal tariff is one that maximizes the area $[K - (G + I)]$.

III. ESTIMATION OF THE OPTIMAL U.S. OIL IMPORT TARIFF

Since the late 1970s, there have been a number of attempts to estimate quantitatively the magnitude of the premium on U.S. oil imports. Since a detailed review of the seventeen most prominent estimates is presented elsewhere,¹⁶ only a brief summary is required here.

Previous estimates of the total premium span a wide range, from as low as \$2.00 per barrel to as high as \$124.00 per barrel. However, most of the analytically supportable estimates fall between \$2.00 per barrel and \$15.00 per barrel. In part, the high-end estimates reflect extreme assumptions about world oil market behavior or oil supply and demand parameters. To take an example of the former, several estimates are predicated on the assumption that changes in the demand for oil imports by the United States are matched by other oil-importing industrial countries; not surprisingly, this produces a rather large estimate of the economic component (because it magnifies the effect of the United States exercising its monopsony power.)

But the upward bias in some of the estimates is also due to a serious conceptual flaw, namely calculation of the total premium as the simple sum of its individual components, rather than incorporating some type of interaction effect. It should be noted that this weakness is not unique to the estimates at the high-end; in fact, most of the estimation methodologies have this problem.

16 See Harry G. Broadman, "The Social Cost of Imported Oil," Energy Policy, June 1986. A new estimate is presented in Frederick M. Murphy et al., "An Integrated Analysis of U.S. Oil Security Policy," The Energy Journal, July 1986, pp. 67-82. See also Henry S. Rowen and John P. Weyant, "The Oil Price Collapse and Growing American Vulnerability," Working Paper, Stanford University, September 1986.

The foregoing analysis suggests that what is required to empirically calculate the premium correctly is a model that maximizes the expected net social benefits of oil imports for normal and disrupted periods and that allows for simultaneous estimation of the premium's individual components. To be sure, this is easier said than done, given the many uncertainties that exist about key parameters. For example, how should the behavior of oil exporting countries be characterized in such a model? Similarly, what assumptions should be made about the way U.S. energy and macroeconomic policy makers respond to oil price shocks? And, how should the responses of our oil importing allies be incorporated in such a model?

These problems notwithstanding, we have developed such a model, albeit a relatively simple one. A detailed description of its structure, assumptions made about its parameter values, and estimation procedure is contained in the appendix. Here we present a summary of the estimates obtained.

The basic model provides simultaneous estimates of the optimal tariff, prices, and oil import volumes. Since implementation of this model requires assumptions about a range of inputs whose values are uncertain, we first establish a base case of most likely values, and then examine modifications that seem of most interest in light of current oil market conditions. In short, we prepare sensitivity analyses to examine the likely range of alternative tariff estimates.

The first sensitivity analysis focuses on a base case and the implications of changes in prices. The second sensitivity test examines the importance of the security component by calculating the optimal tariff under the assumption of a secure world oil market with no threat of interruption. Finally, the uncertainties surrounding the full range of inputs enter in a risk analysis that calculates the probability distribution for the optimal

tariff.

Estimating the optimal tariff requires assumptions about use of the SPR since the size of the optimal tariff depends on SPR drawdown policy during the interruption. Studies of the use of the SPR suggest both the complexity of an optimal drawdown policy in particular disruption scenarios and the wisdom of a general rule of thumb. If there is a reasonable possibility that a disruption will last for more than one year, then part of the SPR should be used immediately and part should be held for contingencies. Furthermore, given the value of the SPR for later emergencies, part of the disruption should be met with reductions in demand. Our rule of thumb for using the SPR is to draw it down to either meet half the total interruption or half the size of the reserve.

Calculating the optimal tariff allows us to measure the cost of a free market policy, i.e., the cost to the United States of ignoring the premium associated with our consumption of imported oil. As we noted earlier (Figure 4), since the premium measures the difference between price and social cost, the oil import supply curve plus the premium captures the full social cost of imported oil. We also noted that the demand curve measures the corresponding social value of imported oil. This means that once we know the optimal level of oil imports (and thus the optimal tariff), we can calculate the total cost that the economy bears at a market-determined level of oil imports.

BASE CASE

The base case includes nominal assumptions for each of the input parameters specified in the development of the model. The most likely values draw on the literature and the authors' judgment. These values provide the first estimate of the optimal tariff and the cost of a free market policy.

In addition to these parameters, the base case specifies the probability distribution for oil supply interruptions over possible interruption sizes. For purposes of the sensitivity analysis, we consider four different views of the probability of one-year long interruptions of 1 mmbd, 3 mmbd, and 6 mmbd for the United States. In Table 1, we characterize the decade probabilities of one or more such interruptions for each of these world views.

TABLE 1
DECADE PROBABILITIES
ONE YEAR INTERRUPTIONS¹⁷

<u>World View</u>	<u>1 mmbd</u>	<u>3 mmbd</u>	<u>6 mmbd</u>
W0	.0	.0	.0
W1	.50	.10	.05
W2	.75	.30	.05
W3	.95	.50	.20

Hence, under world view one (W1) there is a 50 percent chance of at least a 1 mmbd interruption to the United States. Since the United States would face only a portion of the world loss of supply, this corresponds to a loss of from 2 to 3 mmbd in the world. The chance of the very large interruption, 6 mmbd for the United States and 12 to 18 mmbd for the world is 5 percent over the same decade. This 5 percent probability over a decade is the same as predicting an average of one such large interruption every 200 years.

The last three world views correspond to increasingly pessimistic views of the likelihood of oil supply interruptions. The zero case (W0) pro-

¹⁷ Values correspond to disruption sizes before use of the SPR is taken into account.

vides a benchmark from which to separate disruption effects from the other constituents of the oil import premium. The nominal assumptions adopt world view two (W2).

HIGH PRICE

The combination of these base case assumptions produce estimates of the optimal tariff and the cost of a free market policy. Using a price of \$27 per barrel to represent the high price case, estimates are:

Economic Tariff:	\$ 3.25
Security Tariff:	\$ 7.78
<u>Combined Tariff:</u>	<u>\$11.03/barrel</u>

Cost of free market policy: \$12.44 billion/year

LOW PRICE ESTIMATION

The first sensitivity test takes the base case parameters but changes the assumption for oil prices. Specifically, we assume that imports are supplied for \$15 rather than \$27 per barrel. Starting at this new price level, which implies that, under the model, the market is at a disequilibrium, we solve for the equilibrium levels where domestic demand, domestic supply and import supply balance. The solution produces a higher tariff and a higher cost of a free market policy:

Economic Tariff:	\$ 5.48
Security Tariff:	\$ 7.07
<u>Combined Tariff:</u>	<u>\$12.55/barrel</u>

Cost of free market policy: \$25.77 billion/year

The lower price increases demand, which in turn raises the expected level of imports, and increases the economic component of the premium more than it decreases the security component. Hence, although some of the costs are reduced with the lower oil price, under the base case assumptions the effect of lower oil prices is to raise the size of the optimal tariff.

SECURE IMPORTS

The estimate of the optimal tariff includes both economic and security components of the premium. Naturally a reduction in the risk of oil supply interruptions should have a beneficial effect for oil consumers and, thereby, lower the optimal tariff. However, as argued above, changes in the size of one element of the premium can change the size of the other elements. There is a feedback effect. The interaction may cause the various elements to shift so that the aggregate change in the optimal tariff is less than the change in its individual components.

The total optimal tariff under the condition of no oil supply interruptions is larger than the economic component of the tariff in the base case. With the high price case and the extreme assumption of no threat of supply interruptions, the estimate of the optimal tariff, and the cost of the free market policy, would change to:

Economic Tariff:	\$ 5.08
Security Tariff:	\$ 0.00
<u>Combined Tariff:</u>	<u>\$ 5.08/barrel</u>

Cost of free market policy: \$ 2.43 billion/year

It is clear that the simultaneity and complementarity between the economic and security components of the premium imply a significant optimal

tariff even if security problems are eliminated.

RISK ANALYSIS ESTIMATION

These few sensitivity tests illustrate the principal responses of the optimal tariff calculation to changes in the input assumptions. The high and low oil price cases, or the secure world oil market scenario, produce changes in the estimate of the optimal tariff. However, the optimal tariff still continues to be a large fraction of the price of oil and large relative to any tariff that might be considered politically acceptable. Unfortunately, the few sensitivity tests do not exhaust the major uncertainties that could affect the size of the optimal tariff. Higher or lower assumptions about inflation could have a significant impact on both the quantity of oil imported and the estimate of the optimal tariff. Similarly, changes in elasticity estimates, alternative views about the probability of interruptions, or uncertainties in any of the other parameters could alter the optimal import tariff estimate.

It is not possible to examine all potential combinations of the long list of important input parameters. The number of scenarios would quickly exhaust our capacity to absorb the data. As an alternative, therefore, a "risk analysis" of the optimal tariff estimate captures a range of possible tariff policies that should be considered, given our uncertainty in the input parameters.

Under risk analysis, the analyst specifies the uncertainties in terms of probabilities for different values of the input parameters. For instance, we assume the most likely estimate of the aggregate demand elasticity is 0.5. This demand elasticity reflects the estimates from a variety of studies, some of which produce higher values and some of which produce lower values.¹⁸ For

18 See, for example, Douglas R. Bohi, Analyzing Demand

purposes of the sensitivity analysis, it is easy to argue that there is a significant chance that the elasticity could be as high as 0.7 or low as 0.3. A wider range is possible, but in our view highly unlikely: the principal range of uncertainty should be captured by these values. The probability that the elasticity will be as high as 0.7 or as low as 0.3 is not as great as the probability that the most likely case is correct. Using our judgment, we assign probabilities of 30 percent to the elasticity of 0.7, 50 percent to the elasticity of 0.5 and 20 percent to the elasticity of 0.3. A similar probabilistic analysis across the range of possible values for the other key inputs establishes a probability distribution for all of the uncertain parameters; see Figure A.1 in the Appendix.

Table 2 shows the probability included using this risk analysis and focusing on the key sensitivity test between low and high oil prices.

TABLE 2**OPTIMAL TARIFF AND COST OF FREE MARKET POLICY PROBABILITY DISTRIBUTIONS****High price case (\$27)**

	Lower 25%	Median	Upper 25%	Expected Value
Economic Tariff	1.95	2.85	3.90	3.14
Security Tariff	3.63	5.64	8.52	6.44
COMBINED TARIFF (\$ per barrel)	7.00	8.96	11.26	9.58
COST OF FREE MARKET POLICY (\$billion/year)	4.64	8.24	13.18	10.60

Low price case (\$15)

	Lower 25%	Median	Upper 25%	Expected Value
Economic Tariff	4.03	5.68	6.87	5.86
Security Tariff	2.80	4.20	6.65	5.23
COMBINED TARIFF (\$ per barrel)	8.71	10.81	11.89	11.09
COST OF FREE MARKET POLICY (\$billion/year)	11.72	17.90	27.93	22.44

SUMMARY

The optimal import tariff balances all the costs and benefits of oil imports. Although any operational estimate of the tariff will depend upon an array of assumptions and judgments, it is possible to make these judgments and organize them in an internally consistent set of calculations. These estimates quantify the several possible sources of market failure which pre-

vent private actors from recognizing the true costs of the marginal barrel of oil imports. The resulting tariff estimates are sensitive to the assessment of market conditions, but this sensitivity appears to be much less than is commonly believed. There is a significant amount of interaction among the tariff components. A change in assumption which reduces one element tends to produce a compensating increase in others, and the whole is less sensitive than the parts.

This complementarity and the numerical results provide a guide for action. The size of the tariff is large. Our preferred set of assumptions sets the optimal tariff at between \$10 and \$11 per barrel. Under the High Price case, there is a 75 percent chance that the optimal tariff is at least \$7 per barrel. And under the Low Price case, this estimate to an optimal tariff of at least \$8.70 per barrel. When compared with the usual political discussions, where an adventuresome conversation involves tariffs that are half this range, the direction of policy is clear: higher tariffs can be justified. Based on the estimates of market failure, a figure in the range of \$7 per barrel and \$9 per barrel is as low as can be supported by the analysis and the judgments on the range of uncertainty in the parameters.

IV. POLICY ISSUES

COMPARISON OF TARIFF INSTRUMENTS

The form of a U.S. tariff on imported oil could vary across a range of alternatives. Several issues should be discussed in this regard. Perhaps the most important is whether the tariff should be set as (i) a simple fixed fee, (ii) a variable fee, or (iii) a fee defined in proportion to the price of oil. Other issues having to do with the form of a tariff concern the relationship between crude and product tariffs and adjusting the magnitude of a tariff to changes in the general price level.

Fixed versus Variable versus Ad Valorem Tariffs

A fixed tariff is the simplest instrument. Given a political decision on the optimal level of oil imports and the optimal tariff, we establish a fixed price as the tariff, say \$10 per barrel. Each purchaser of a barrel of imported oil pays a \$10 fee in addition to the price. If the price of oil goes up or down, the tariff stays the same. Hence, as a percentage of the price of oil, the tariff will vary as the price of oil varies. However, the tariff is simple to understand and explain and, with the reasonable estimation of the size of the tariff, can capture most of the long run benefits.

The principal alternative to a fixed dollar amount is a fixed percentage tariff. Here the tariff might be set as 60 percent of the price of oil. If the price of oil rises, the absolute value of the tariff would increase. And as the price of oil fell, the absolute value of the tariff would fall. The chief advantage of the fixed percentage tariff, sometimes known as the ad valorem tariff, is in preserving the incentives for foreign oil producers. Faced with a constant percentage tariff, producers would not see any incentive

to raise the price of oil, because this would raise the tariff and more than proportionately decrease demand. Conversely, lowering the price of oil would lower the absolute tariff and compensate for the lost revenue by increasing demand more than proportionally than the tariff change.

Although the long run incentives are right for the ad valorem tariff, it carries with it a special problem during interruptions.¹⁹ In the face of a sudden loss of supply, with a sharp increase in price, the optimal short-run policy would be to reduce or eliminate the tariff. Yet it is difficult to imagine the administrative system responding rapidly enough to adjust the size of a tariff during an interruption. The danger of the ad valorem tariff is that we would see an automatic increase in the size of the tariff at just the time when such change would do the greatest macroeconomic damage. Compared to the fixed tariff, therefore, the ad valorem tariff does a poor job of approximating the optimal policy during interruptions. Furthermore, our sensitivity analysis suggests that the size of the optimal tariff, although not constant in real dollar terms, is far from constant in percentage terms. As a simplified approximation to the sensitivity analysis of different oil prices, therefore, we conclude that the fixed tariff would be preferred to the ad valorem tariff.

A third variant of the type of tariff often proposed is to create what is known as a "variable" tariff that sets a target price for domestic oil.²⁰ By

19 Note the change in argument from William W. Hogan, "Import Management and Oil Emergencies," in Energy and Security, David Deese and Joseph S. Nye, eds., (Cambridge, MA: Ballinger, 1981); and William W. Hogan, "Oil Gluts and Oil Tariffs," Discussion Paper #H-82-04 (Cambridge, MA: Energy and Environmental Policy Center, May 1982), which neglected the problems of the different tariff instruments during an interruption.

20 The case for the variable tariff appears in S. Fred Singer, "The Case for a Variable Import Fee on Oil,"

this argument, there is an optimal domestic price, say \$25 per barrel, which will provide adequate development of domestic supply and provide some protection against insecure imports. The tariff would be set at the difference between this target price and the world price. Hence, if the price of oil is \$15 on the world market, and the target price is \$25, then the tariff would be set at \$10. If the world price rose to \$20, the tariff would fall by \$5, and so on.

Although this proposal has an appeal if the purpose of the tariff is to protect domestic suppliers and guarantee them a minimum price, it is inconsistent with the general argument about externalities of oil imports developed in this paper. The problem is not any particular level of domestic supply; the problem is to internalize the costs of oil imports. As our sensitivity analyses show, this externality or optimal premium for oil imports does not fall dramatically as prices rise, nor does it rise dramatically as prices fall. Hence the variable tariff as proposed, with the price threshold, works only when prices are well below the threshold.

The second difficulty with the variable tariff is in deciding on the optimal threshold. There is no framework for selecting the tariff except that provided by a view of promoting or protecting domestic suppliers. With the optimal tariff framework, however, protection of domestic suppliers is incidental to the analysis, not the direct purpose.

A third difficulty with the variable tariff is the perverse incentive provided to oil suppliers in the world market. To the extent that foreign producers can manipulate the market in order to extract higher rents, the var-

liable tariff guarantees no penalty for raising prices. Higher world prices result only in a reduction in the size of the tariff, not in a reduction in the price paid by the domestic market. Hence, higher world prices result in no reduction in demand by the United States. To the extent that this protection of the market removes the constraints on producers, it tends to promote and subsidize higher world oil prices for all customers. The incentives, therefore, work exactly against the reduction of cost for the United States. Despite the simplicity of its preference for domestic production, the variable tariff works at the margin to reduce the welfare of the United States. Depending upon the final reaction of foreign oil producers, and the aggregate size of the tariff, therefore, the variable tariff may provide significantly lower benefits than the ad valorem or fixed fee alternatives.

On balance, therefore, the simplest and most straightforward approach is to levy a fixed fee on each barrel of imported oil. This provides approximately the right incentives at the margin, provides the closest simple approximation to the optimal tariff calculations revealed by our sensitivity analyses, and avoids the difficulties of managing the macroeconomic costs during an interruption.

Product Tariffs and Inflationary Adjustments

Of course, even this approach is not without its details that gradually erode the simplicity of the concept. For example, in a world of high inflation, the fixed tariff should be set in real terms, indexed to adjust with the level of inflation. Furthermore, a tariff on crude oil implies the necessity for a corresponding tariff on imported products. The tariff on products should reflect the increased costs of crude oil to avoid creating incentives for importers to switch from crude to products but not change the total

volume of oil imports. Hence, the product tariff should reflect the increase in crude oil costs implied by the crude oil tariff. These and other modifications would be found in any real tariff proposal, but the basic arguments remain. The fixed fee appears to be the best combination of simplicity and close approximation of the optimal tariff policy.

TARIFFS AND FREE TRADE

The struggle to reduce trade barriers and promote world economic growth through expanded trade flows has been a hallmark of modern economic policy. Despite the many continuing barriers to trade, the presumption in favor of free trade has been a central component of official rhetoric. Practical experience with excessive trade limits and the theoretical arguments of comparative advantage all point to the economic benefits available through expanded trade.²¹ It follows, therefore, that any argument for a U.S. oil tariff must bear a heavy burden of proof:

"A majority of economists have consistently favored letting nations trade freely with few tariffs or other barriers to trade. Indeed, economists have tended to be even more critical of trade barriers than have other groups in society, even though economists have taken great care to list the exceptional cases in which they feel trade barriers can be justified. Such consistent agreement is rare within the economics profession."²²

21 For a review of the unhappy history of general trade restrictions and the theory of economy health through free trade, see any of the standard texts, e.g., Peter H. Lindert and Charles P. Kindleberger, International Economics, Richard D. Irwin Company, Homewood, Illinois, (7th edition), 1982; or R. E. Caves, World Trade and Payments, Little, Brown and Company, Boston 1981.

22 Peter H. Lindert and Charles P. Kindleberger, International Economics, Richard D. Irwin Company, Homewood, Illinois, (7th edition), 1982, p.111

Despite the nearly universal assumption in favor of free trade, theorists in international economics have long recognized that exceptions to the rule of free trade may exist for particular commodities and countries. The subject of the 'optimal tariff' has a long history:

"The theoretical literature on this subject is vast, and the lineage is ancient."²³

Although aggregate world economic welfare may be lessened by tariffs or other trade restrictions, the welfare of an individual country may be expanded through the pursuit of such policies. The exceptions are unusual and depend on a number of special circumstances, but the exceptions are an integral part of the theory of international trade. They center on the existence of market imperfections such as externalities and monopolistic or monopsonistic market structures. When such imperfections exist, uninhibited trade may not maximize the welfare of the country. Hence there can be an unrecognized cost of following a free market trade policy. Intervention in the market to restrict trade could lower or eliminate these costs.

Examples of such imperfections in the literature on international trade are many, including everything from arguments for protecting the development of infant or strategic industries to the use of trade restrictions to compensate for market distortions created by the actions of other countries. In fact, arguments in support of free trade build on the notion that if one country restricts trade in a particular commodity then other countries can be expected to respond. If the market is not operating according to the competitive ideal, an opportunity is created for individual countries to increase their aggregate economic welfare by intervening in the free trade of that com-

23 W. M. Corden, Trade Policy and Economic Warfare, Clarendon Press, Oxford, 1978, p. 159.

modity.

Notable in the international trade literature is that the principal example of an exception to the rule of free trade is the case of oil. Oil markets have violated the general proposition that producers acting collectively cannot long restrict output and capture significant rents. By now, standard international trade texts cite oil as the principal commodity where a tariff may well be in the interest of the consuming countries. For example, Lindert and Kindleberger argue that

"OPEC has gained far more than John D. Rockefeller's Standard Oil Company or any other monopoly or cartel ever did. This judgment would stand even if OPEC were to break up tomorrow and start slashing its prices competitively."²⁴

"No other cartel has yet approached the resounding success of OPEC. Before OPEC, the average life expectancy of cartels had been so short that the economic analysis of cartels tended to stress the inevitability of their collapse. The usual analysis has correctly pointed to pressures that tend to make cartel power erode, as some cartel members defect and turn competitive and as some buyers find ways of avoiding purchases from the cartel. One of the central tasks of international economics is to reconcile this presumption that cartels inevitably fail with OPEC's continuing success."²⁵

"If the United States could force the members of the OPEC oil cartel or some other potentially hostile foreign suppliers to sell at a lower price by imposing a tariff, then the tariff is in the U.S. national interest."²⁶

24 Peter H. Lindert and Charles P. Kindleberger, International Economics, Richard D. Irwin Company, Homewood, Illinois, (7th edition), 1982, p.6

25 Peter H. Lindert and Charles P. Kindleberger, International Economics, Richard D. Irwin Company, Homewood, Illinois, (7th edition), 1982, p.190

26 Peter H. Lindert and Charles P. Kindleberger, International Economics, Richard D. Irwin Company, Homewood, Illinois, (7th edition), 1982, p.150

Clearly, the received literature recognizes that an opportunity may exist for a welfare-improving tariff on U.S. oil imports. Still, the pursuit of such a policy requires greater justification. What characteristics, more or less unique to oil and oil markets, warrant departure from the economists' preference for free trade? First, as we have argued above, oil is an important enough commodity to affect our balance of trade, the path of inflation, and if supply is interrupted, the welfare of our citizens and our national security. For the past decade, oil has constituted about 26 percent by value of imports, and total consumption of oil and closely related products amounted to about 9 percent of GNP.²⁷ Second, as the premium analysis demonstrates, significant externalities are associated with the importation of oil. If the price of imported oil reflected true social costs, there might be no need for government to intervene in the market. But as we have seen, the (private) price and the social cost of imported oil differ. The larger this difference, the greater the cost of the current free market policy in U.S. oil trade. The greater the cost of this policy, the more compelling the case for intervention through the imposition of an oil tariff.

TARIFFS AND THE LIMITS OF POLICY

Even accepting the special nature of the oil market, objections to a U.S. oil tariff may flow from conflicting policy goals, criticism that the market analysis is overly simplistic, or practical political limitations. The principal objections fall into three general categories: (i) oil market imperfections are relatively small and, therefore, there is no significant saving

27 U.S. Department of Energy, Annual Energy Review, various years.

by trying to correct them; (ii) other trading arrangements will be compromised and, therefore, there are costs created elsewhere despite gains in the oil market; and (iii) government programs to intervene in a market often go awry and an oil tariff will be part of this pattern, i.e., such a tariff will produce more costs than benefits.

Each of these arguments has merit. The first, dealing with the measurement of market imperfections, is the subject of much of this paper. The bulk of our analysis points to significant imperfections and large external costs associated with the current U.S. free trade policy in oil. However, to the extent that there is disagreement with these estimates, a demanding standard is created for the objectors, given the robustness of our results. While there is room for debate here, the strongest case against a U.S. oil tariff lies elsewhere.

The second objection emphasizes linkages between U.S. oil trade policy and U.S. trade policy in general. Even if there are significant market imperfections associated with oil imports, opponents of a U.S. oil tariff argue that adoption of such a tariff would trigger a reaction in the trade policies of other countries. Foreign oil producers will respond by lowering production and raising prices, despite falling demand, and traders in other goods will use the precedent of a U.S. oil tariff to support similar restrictions on, for example, lumber, computers or automobiles.

"The orthodox optimal trade argument is concerned about maximizing national income; world income as a whole is reduced, but at the same time is redistributed towards the trade-restricting country... The simple model assumes that foreign tariffs are given and that foreign governments will happily stand by and allow income to be redistributed against them... one might assume that if our country does not impose a tariff the foreign country will not do so either, but that the adoption of orthodox optimum tariff policy by us will provoke foreigners to embark on the same policy. Thus we we would start with free trade, and once we abandon it

would provoke the reaction process...There is an element of 'retaliation', the foreign country retaliating by initiating the reaction process."²⁸

There is a danger here. If oil trade policy has a significant effect on all trade policies, then the cost of the current U.S. free market policy in oil may be the price we have to pay for free trade in other goods. A few of our oil trading partners have substantial additional trade with us. For example, a large percentage of U.S. non-oil imports come from Canada. If this trade would be adversely affected by a tariff on oil imports, then the linkage may be important. In this case, there will be pressures for exemptions from the tariff for certain producers.

If foreign oil producers respond to shrinking markets by raising prices or retaliating in other ways, then our oil trade policy faces still another market imperfection that may balance the cost calculations of a free market policy discussed above. Such a response by foreign oil producers has been suggested:

"Such a vociferous demand for the imposition of trade restrictions, on account of low prices, as is currently prevalent, could constitute an invitation to producers to raise prices again, to restore them to their former levels."²⁹

But to the extent that use of an oil U.S. tariff can be made to be seen only as a response to the initial restrictions on oil trade by foreign producers and the special instability of world oil supplies, and U.S. oil trade

28 W. M. Corden, Trade Policy and Economic Warfare, Clarendon Press, Oxford, 1978, p. 172-173. (emphasis in the original)

29 Ahmed Zaki Yamani, "Oil Markets, Past Present and Future", speech delivered at Harvard University, Energy and Environmental Policy Center Symposium in conjunction with the 350th Anniversary celebrations, September 4, 1986.

policy can be separated from other U.S. trade decisions, then the argument for a tariff based on measured external costs should prevail. The determination of whether such a separation of oil trade policy from general trade policy can be achieved involves a largely subjective judgment and one that is crucial to choosing the correct U.S. policy toward oil imports. But the danger of adverse consequences in other markets, even if it materializes, does not dispose of the argument for an oil tariff. Such a reaction is merely one of the costs of an oil tariff, to be weighed against its benefits.

The final, and oft repeated, criticism of an oil tariff raises the specter of policy implementation that falls far short of the lofty ideals of policy design. As we discuss more fully below, an oil tariff would have a significant impact on the economy. There would be wealth transfers from domestic consumers to domestic producers of oil. Industries dependent on oil as a feedstock would face higher costs and more difficult competitive pressures in the world market. Each of these affected groups could be expected to ask for special consideration. There would also be requests for tariff exemptions for particular oil suppliers, especially secure suppliers in the Western Hemisphere.

In general, the more exceptions, the less the negative impact of a tariff. But, too, the more exceptions the less the economic saving produced by a tariff. The induced adjustments in consumption and production are the source of the economic benefits of a tariff and, therefore, any policy which exempts consumers and producers from making adjustments will correspondingly reduce these savings.

From a strongly ideological perspective, these arguments about the pressures for exemptions and exceptions generalize into a presumption that the bureaucratic detail of a tariff will create too many opportunities for special

interests — in other words, government cannot implement such a policy without causing more harm than good. Or the intervention now will create a precedent for other interventions later, repeating the drama of the mid 1970s when price controls subsidized oil imports. Although there is certainly truth to the position that the tariff instrument actually employed would not match the pristine ideal suggested by our analysis, this judgment must be tempered in part by size of the optimal tariff and the magnitude of the savings from avoiding a free market policy. If the optimal tariff is large and the savings are significant, then a less than perfect implementation should still produce net economic benefits.

Nevertheless, the possibility of extensive exemptions and exceptions raises a significant problem. Our analysis of the optimal tariff assumes these special appeals will go unheeded.³⁰ A large number of exemptions and exceptions or a very small tariff, would result in little gain for the economy as a whole. In that case, the fear of the costs of the impact of such a precedent on broader trade policy might carry the day. The challenge is to implement a tariff without avoiding the economic adjustments that a tariff is intended to achieve. If by assumption this adjustment process is simply too hard in the real world of the politics of special interests, then by assumption the tariff is a bad policy.

30 Any exemption program involves a transfer of rents which may reduce the overall welfare of the nation. But it is possible to design the exemptions to preserve most of the incentives at the margin, thereby preserving the benefits of lower exposure to macroeconomic problems and oil supply interruptions. The key feature would be to limit the exemptions to inframarginal oil imports.

COSTS AND BENEFITS

The most obvious effect of an oil tariff would be to raise the price of oil to domestic consumers. How could an increase in the price of an important product result in a net economic benefit for the country as a whole? This is a reasonable question and a major obstacle to those who argue in favor of an oil tariff. In addition to raising the cost of oil to domestic consumers, an oil tariff could produce major shifts in income flow between consumers and oil producers, both domestic and abroad. These major transfers could be significantly larger than the aggregate change in the total cost for the economy. Recognizing these effects, it is important nevertheless to separate out the real resource costs from the change in the wealth position of different groups in the economy.

Domestic Distribution

The market imperfections reflected by the oil import premium create real resource costs. Higher levels of inflation, greater economic disruptions, and so on, are economic factors that have a significant impact on the general economic well-being of the country. However, almost by definition, these imperfections are invisible to the individual consumer. The consumer sees the price paid directly for the oil but does not see the impact on macroeconomic performance or changes in the overall costs of oil supply interruptions. If the consumer did see these costs, they would be internalized, and then there would be no premium. Hence, any argument for market intervention and a reduction in total cost through the use of a tariff is inherently involved in the trade-off between the visible cost of the price paid for the oil and the invisible but real costs of the premium.

The import premium framework takes the perspective of maximizing the

economic benefit to the nation as a whole and recognizes that an increase in the price of oil from imposing a tariff has several effects. The price increase has the direct effect of reducing the economic welfare of the ultimate consumer. There is a transfer payment to domestic oil producers which increases their economic welfare. And there is a macroeconomic effect wherein output is expanded and the balance of trade is improved, both to the benefit of producers and as well as consumers. Our calculation of the optimal tariff suggests that the direct cost to consumers is less than the direct benefit to producers plus the indirect benefit to the economy as a whole. As members of the larger economy, consumers enjoy the indirect benefits. To the extent that consumers are beneficiaries of the higher profits of the oil industry, either through their role as taxpayers — the higher profits flowing to the government in increased tax payments — or through their ownership position (either directly or through intermediate vehicles such as pension systems), consumers receive the benefits that flow to producers. In the aggregate, of course, producers and consumers are the same people. Hence the transfer payments net out and the increase and the indirect benefit of moving from the free market policy expands the economic welfare of the nation as a whole.

In our estimation of the optimal premium we calculate this indirect benefit, the difference between the social and private costs of imported oil at the margin. On average, the costs for oil imports will be significantly lower than the calculation at the margin. Hence, in estimating the total net benefit of abandoning a free market oil import policy, the analysis must account for changes in the optimal premium at different levels of oil imports. Our calculations suggest that the aggregate benefit to the economy of imposing the optimal tariff could be substantial. In the high price case, i.e., at \$27 a barrel, when oil imports are relatively low, the benefits of moving to the

optimal tariff are approximately \$12 billion dollars per year. In the low price case, i.e., at \$15 a barrel, when oil imports tend to be high, the benefits of the optimal policy are about \$26 billion dollars per year. Hence, by imposing the optimal tariff, the United States will realize a savings that is one-third to one-half of the expenditures it makes on imported oil.

International Distribution

Imposing the optimal oil import tariff increases the net economic welfare of the United States. Part of the increase in welfare comes from the improvement of the performance of the macroeconomy during normal times and during interruptions. The tariff, by inducing lower oil imports, lessens the impact of higher oil prices and thereby avoids the pressures to maintain a depressed economy in order to wring out the pressures of inflation. Similarly, reducing oil imports in advance of an interruption lowers the impact of the disruption with the attendant economic recession that imposes such great costs on the nation.

These macroeconomic savings are a straight plus. The benefits accrue to the United States, but they do not come at the expense of other nations. The improved U.S. economic performance flows a more efficient and fuller use of our capital stock and labor force, and this improved performance can only help bolster general economic health in the world. Hence, the avoidance of the costs of disruptions is a positive sum game.

Of course, not all the benefits flow with no costs to others. A significant part of the savings from a tariff comes from a reduction in the payments to oil exporters. In short, both the lower volume of purchases and the expected reduction in the world price contribute to the reduction in total cost to the United States, but at the expense of oil exporters. For many oil

exporters, their share in the reduced oil market, at lower prices, will present a significant economic problem. From one perspective, these losses represent only a twist in the competition for economic rents. After all, major exporters are interfering in the market by constraining production and inflating the world price of oil. The rents they would be losing are only the profits of their oligopolistic game. Consumers merely play the same game in the use of a tariff to constrain demand and depress the world price. Morality and fair play provide little guidance in the economic competition for rents. If the ability to exercise market power exists and is used by others, why not shift the losses back on the exporters restricting production?

However, given the broad interests of the United States in dealing with many of the oil exporting countries, ranging from Saudi Arabia to Mexico or even Canada, these losses may be unacceptable. If this is true, then the high payments to oil exporters must be viewed as a benefit to the United States. Or at least the cost must be justified, much like other defense or foreign aid expenditures, as worth the pursuit of larger goals and values. In this case, much as with the support for subsidizing domestic consumers, it might be better to make these payments an explicit part of our foreign policy rather than support the inefficient use of oil imports.

The international redistribution of wealth does not stop with oil exporters. Other importers of oil share in the costs paid by U.S. consumers. The higher the level of oil imports in one country, the greater the cost everywhere. Hence, the Europeans and Japanese are paying the cost of part of our oil imports, and we are paying the cost of part of their oil imports. If the United States imposes an oil import tariff, and reduces its demand, prices will fall for all oil importers. Hence Europe and Japan will enjoy a free ride on our account. This fact has often inhibited progress in capturing the

benefits of reduced oil imports. Apparently out of a sense of fair sharing of the burden, there have been arguments that the United States should not further reduce its imports without comparable action by other oil importers. But with cooperation among oil importers, our analysis would support an even larger tariff. A combined oil-importer tariff may well be twice as high as calculated above. However, because of a lack of agreement, no such action is possible, at least at present.

Although it is easy to understand the motivation for resenting the free riders, it is wrong to conclude that we should do nothing without a sharing of the burden. Our analysis of the optimal oil import tariff assumes that the United States acts alone. If it is in our interests to reduce our oil imports, it should not concern us that it helps others as well. In fact, since the other major oil importers are our allies in many other respects, we might view their free ride as an added benefit of our oil import reductions.

For those who fear that we might go too far in imposing an oil import tariff, an analysis of the effects of tariff policies in other countries only reinforces the analysis here. As shown in elsewhere,³¹ oil import tariffs in other countries tend to decrease the world price of oil and, therefore, to increase the demand for oil in the United States. Hence, the larger the tariff in other oil importing countries, the larger the optimal tariff for the United States. Consideration of the interactions with other oil importers only raises the estimate of the optimal tariff already at the bounds of political possibility. Hence the fact that other consumers gain something should not stand in the way of the pursuit of the optimum U.S. policy.

31 H.P. Chao and S. Peck, "Coordination of OECD Oil Import Policies: A Gaming Approach," Electric Power Research Institute, 1980.

Of course, it should be pointed out that many of our allies already have in place price instruments which reduce significantly their oil consumption, for example, steep gasoline consumption taxes. In this regard, they are ahead of any U.S. policy that imposes a tariff on imported oil.

Other Oil Reduction Policies

Given the existence of the premium, to the extent that the actual tariff falls short of the optimal level, there is room for additional policies to reduce the demand for imported oil.³² Conservation regulations, such as the automobile efficiency standards, or domestic subsidies for production of new (non-oil) energy technologies, may well be justified. To the extent that oil demand reductions or non-oil supply expansions cost less than the market price plus the premium, there is a case for government intervention to promote reduced oil import demand. The most direct route would be through the tariff, but to the extent that politics and institutions block the way, other approaches should be pursued, to the extent that they are demonstrably cost effective.

32 This discussion assumes the existence of an optimally-sized SPR, i.e., one devised in line with the premium.

V. IMPLEMENTATION ISSUES

Whatever tariff instrument is selected by the Congress and the President, there will be a variety of issues related to the best way to implement it. The most directly affected parties will raise a large number of questions in this regard. In an effort to anticipate these questions, we review the principal issues: the effect of a tariff on the U.S. competitive position, exemptions, transition costs, and use of the collected revenues.

COMPETITIVE POSITION

The most energy- and oil-intensive industries in the United States will face increased raw material costs following the imposition of a tariff. For example, petrochemical plants which depend upon oil as a primary feedstock will see a significant increase in the costs of their inputs. The increase in costs will reduce or eliminate any competitive advantage that these companies have in the international market. If producers of the same petrochemical products in other countries do not face a similar tariff, then they can sell their products at prices that will be lower than those that could be charged by U.S. petrochemical producers.

This evident fact will be characterized as a loss of competitive position for the United States. While true, the description of this as a "loss of competitive position" disguises the true problem. If these oil-intensive industries are now purchasing oil and paying a private cost which is less than the social cost, then the difference, — the oil import premium — amounts to a subsidy from society as a whole to this particular industry. In short, if a company is buying oil at \$15 and producing products which are competitive at \$15, but the cost to the country for the same oil is \$20 or \$25, then this is

a bad business for the nation as a whole.

In the process of internalizing the external social costs, the country will reduce the use of crude oil and related products. This will come in part because goods and services produced with those products are not worth the cost that has been internalized. As painful as this will be for the industries that need to adjust, the adjustment is part of the problem of eliminating the subsidy and lowering the total cost to society. Hence, proposals for granting exceptions for U.S. manufacturing exporters who face suddenly higher crude oil costs amount to no more than a request that the implicit subsidies for those exports now be made explicit. As a matter of national policy the country may decide to continue these subsidies. But it is better to make these subsidies explicit for the targeted industries rather than to continue the subsidies for all.

EXEMPTIONS FOR FOREIGN SUPPLIERS

U. S. oil imports come from a variety of sources. Not all sources of supply are equally vulnerable to disruption. Furthermore, many oil producing countries are our allies and depend heavily on oil revenues. It stands to reason, therefore, that there will be proposals to exempt certain sources from paying an import tariff to the United States. These separate arguments, the difference in supply security among foreign oil producers and the economic interests of these producers, have separate implications for the design of a U.S. oil tariff.

The differences in supply security matter relatively little. Oil is a fungible good. Hence, the particular source of supply to the United States has little impact on the cost or security of oil imports at the margin. Even if the United States had no direct imports from unstable sources of supply,

and all imports came from countries which would continue to produce no matter what the state of the market, the problem of security would remain. During an oil supply interruption the oil produced in secure countries would be diverted to other countries to replace oil lost as a result of the disruption. At the margin, therefore, all sources of supply in world trade can be thought of as subject to the same security risk. Hence, from the security perspective, all sources of supply should be subject to the same import tariff.

Although the security argument cuts against exempting certain suppliers from an oil tariff, the economic rent transfer argument could work the other way. To the extent that oil prices drop as a result of a fall in U.S. consumption, induced by a tariff, all oil in world trade would be affected by the imposition of a tariff. This transfer of wealth, in fact, is part of the gain for the United States. For many producers, this transfer of wealth could be significant, and it could create problems for the United States.

The effect of granting certain oil producing countries an exemption would be to transfer income from the United States to these countries. Foreign oil suppliers exempted from the tariff become similar to domestic oil suppliers.

Foreign suppliers favored with tariff-exempt oil would see the value and the price of that oil in the U. S. market rise to include the world price plus the tariff. Hence, just as domestic oil producers would enjoy higher prices and a transfer of wealth, so, too, would the exempt supplier to the import market. Since part of this transfer has been counted as a net gain to the United States, it is clear that any exemptions alter the calculation of the optimal tariff.

From one perspective, if we think of the transfer to the favored foreign supplier as a cost to the United States, the exemption reduces the bene-

fits of a tariff and correspondingly lowers the size of the optimal tariff. On the other hand, presumably the reason for the exemption is to transfer a benefit to the foreign supplier. In this case, the exemption is similar to starting with a lower assumed level of oil imports. In either case, however, the net effect of the exemption is to reduce the size of the optimal oil tariff. In the extreme case, where the exemptions are so large as to replace all oil imports, the tariff is ineffective. With smaller, inframarginal exemptions, there would be little effect on the measurement of the tariff at the margin.

As we noted above, our calculation of the optimal tariff assumes there will be no exemptions. Introduction of exemptions lowers the benefits of a tariff and creates problems in its implementation. But our analytic framework has the advantage of being able to accommodate such exemptions, and to provide guidance as to the necessary adjustments in the optimal tariff.

TRANSITION COSTS

Our calculation of the optimal U.S. oil tariff is a comparative static analysis. The calculations compare the average economic and security conditions with and without a tariff. Hence, the analysis focuses on long-run conditions and is silent on the transition. But imposition of any tariff will create costs during the process of adjustment to the selected tariff level. The addition of a tariff to the price of oil creates a one-time shock to the aggregate price level. Hence, although a lower level of oil consumption may reduce the impacts of higher oil prices on inflation in the long run, the tariff itself increases the effect of oil inflation in the short run.

The adjustment of consuming industries could lead to transition costs in the form of (unwanted) unemployment. If the petrochemical industry is not

competitive even at variable cost, then workers in that industry will be searching for new jobs. Our optimal tariff calculation makes the usual heroic assumption of a frictionless adjustment in which these workers find employment quickly and their wages reflect their productivity. Perhaps they shift to meet the expanding demand for labor in the domestic oil industry that will experience transition benefits in addition to long-run benefits that accrue from a tariff. Nonetheless, these costs are real and will create significant political pressures for modification of a tariff or exceptions as noted above. However, they are one-time costs as opposed to the continuing costs of a free market oil trade policy. Hence, the assumption underlying our analysis is that these transition costs are modest compared to the long-term benefits of a tariff.

In the short run, comparison with what might have been today may be less relevant than comparison with what was only yesterday. Given the natural tendency to compare current oil prices against those of the past, and not against foregone opportunities, this period of low prices offers the best moment to adopt a significant oil import tariff. With oil prices at a low level, and the economy adjusting to the change from higher prices, there should be relatively little transition problem if a tariff is imposed before oil prices would start to rise again. In the circumstances which motivate this appraisal of imposing a tariff, transition costs are a less significant problem than in previous years where the objection carried the day despite similar analysis about the long-run oil import premium.³³

33 See Harry G. Broadman, "Review and Analysis of Oil Import Premium Estimates," Discussion Paper D-82C, Energy and National Security Series, Resources for the Future, Washington, D.C., December 1981; and William W. Hogan, "Import Management and Oil Emergencies," in Energy and Security, David

REVENUES

Taxes and tariffs have an important revenue-raising function in addition to their policy impacts. For the most part, the assumption is that taxes and tariffs have negative incentive effects which should be moderated but nonetheless are necessary in order to raise revenues. Interpretation of the present analysis suggests that an oil tariff has the advantage of raising revenues and promoting optimal policies for maximizing the welfare of the United States. Hence, the revenues from such a tariff are an added benefit that can be applied to a variety of uses.

The sources and magnitudes of possible revenues present a separate, complicated analysis of the impacts of an oil import tariff. Such a tariff would raise tax payments of domestic oil producers, reduce tax payments of oil-consuming industries, cause shifts in employment patterns which would have short- and long-run effects on social security and other transfer payments, and so on. There are a number of possible uses for the revenues raised. One possibility is to finance further purchases of oil for the SPR. Another is to help alleviate U.S. federal budget deficits. The latter has generated the greatest interest.

Estimates of how much revenue would be raised for the federal budget have been the subject of several detailed studies. For example, the Congressional Budget Office prepared an extensive analysis of a \$5 and \$10 oil import tariff that could have been applied starting in 1982.³⁴ More recently, in light of the changed economic conditions and lower world oil prices, the CBO

34 Congressional Budget Office (CBO), "Oil Import Tariff's: Alternative Scenarios and Their Effects," Staff Working Paper, Washington DC, April 1982.

prepared a new analysis of these same revenue effects.³⁵ These studies suggest that a tariff could raise a significant amount of revenue. However, the total amount would be much less than might be expected. For example, with approximately 6 million barrels per day of oil imports and a \$10 tariff, we might expect that this would produce about \$22 billion per year, by multiplying the tariff times the volume of imports. However, as estimated by the CBO, the net revenue benefits for the federal budget come after deducting other compensating effects and impacts on transfer payments. As a result, net revenue would be in the range of about \$8 billion to \$12 billion.³⁶

Overall, our analysis is silent on the use of tariff revenues. They are included as part of the aggregate welfare calculation, and the implicit assumption is that they will be used in the best interests of the country.

35 Congressional Budget Office, The Budgetary and Economic Effects of Oil Taxes, April 1986. See also the Department of Energy, The Impact of Lower World Oil Prices and Alternative Energy Tax Proposals on the U.S. Economy, Energy Information Administration, April 18, 1986.

36 Congressional Budget Office, The Budgetary and Economic Effects of Oil Taxes, April 1986, p.15.

VI. HISTORY OF U.S. OIL TARIFF POLICY

U.S. imports of oil actually have been subject to a tariff for more than fifty years.³⁷ In 1932, to raise general federal revenues, Congress passed the Revenue Act.³⁸ Among the taxes introduced into the Internal Revenue Code by the Act was a flat "excise tax" of \$0.21 per barrel of all imported crude oil.

In 1940 a crude oil quota system was established that was linked to the excise tax schedule. This reflected a trade agreement with Venezuela, which reduced the tax on crude to \$0.105 per barrel, provided that imports did not exceed a quota of 5 per cent of the previous year's refinery runs. Above the quota, the \$0.21 per barrel rate still applied. This quota system prevailed through 1942.³⁹

Beginning in 1943, as a result of a trade agreement with Mexico, the tariff rate on crude oil was reduced to a simple \$0.105 per barrel. This lasted until 1950, when the quota system employing a rate of \$0.21 per barrel on imports above 5 percent of the prior year's refinery runs was reintroduced. In late October 1952 another trade agreement was reached with Venezuela, which established a two-tier tax rate: for crude with an API gravity below 25°, it was \$0.0525; for crude with a rating above 25° (so called "high test" crude)

37 See Bernard Gelb and Salvatore Lazzari, "Oil Import Taxes: Revenue and Economic Effects," Report #86-572E, U.S. Congressional Research Service, Library of Congress, Washington, D.C., May 28, 1986.

38 Public Law 154.

39 William H. Peterson, American Enterprise Association, The Question of Governmental Oil Import Restrictions, 1959, pp. 14-17.

the rate remained at \$0.105.⁴⁰ It should be noted that following such trade agreements the revised tax rates were applicable to virtually all oil exporting nations under "most favored nation" clauses.

The two-tiered tax on crude oil of \$0.105 above 25°, and \$0.0525 below 25°, remained unchanged until the Kennedy Round of trade agreements and the resultant Trade Expansion Act of 1963. As part of a general reorganization of the U.S. tariff schedules that occurred during this period, the taxes on crude imports were replaced by customs duties. The customs duties were the same as the previous tax rates.⁴¹

Crude oil import duties remained unchanged until President Nixon, by Presidential proclamation, eliminated the Mandatory Oil Import Program in the spring of 1973 and suspended crude oil duties.⁴² A system of license fees was introduced in their place. These fees began at \$0.105 per barrel, and in gradual steps, were increased to \$0.21 per barrel by May 1975. It should be noted, however, that this policy was a de facto reduction in the applicable duties.⁴³ The license fee system initially excluded all crude for which quota allocations still existed, the legacy of the MOIP. Only crude imported above

40 National Petroleum Council, Report of the National Petroleum Council Committee on Petroleum Imports, May 5, 1956, p.12.

41 See Douglas R. Bohi and Milton Russell, Limiting Oil Imports: An Economic History and Analysis (Washington, D.C.: Resources For the Future/Johns Hopkins University Press, 1978), p.231.

42 Message to Congress (April 18, 1973) and Proclamation 4210 (April 18, 1973) (Federal Register vol. 38, p. 9645, April 19, 1973). The MOIP began in 1959. See Douglas R. Bohi and Milton Russell, Limiting Oil Imports: An Economic History and Analysis (Washington, D.C.: Resources For the Future/Johns Hopkins University Press, 1978).

43 "Nixon's Energy Medicine: Will It Cure the Patient?" Oil and Gas Journal, April 30, 1973, pp.81-85.

outstanding quota allocations incurred a fee. Previously every barrel imported was dutiable. Hence the net effect, at least until a gradual phase out of exempt allocations could be completed, was a reduction in the duties paid.

In 1975 President Ford added a supplemental oil import fee to the existing license fees. The supplemental fee began at \$1.00 per barrel in February 1975 and was scheduled to increase in steps to \$3.00 by April 1975.⁴⁴ As a result of a court challenge, however, a \$2.00 per barrel supplemental fee was instituted in June instead. Following the passage of the Energy Policy and Conservation Act in December 1975, the supplemental fee was removed.⁴⁵

In April 1979, President Carter temporarily suspended the license fees and customs duties on crude oil. In their place he instituted an import quota regime which restricted imports to the 1977 level. However, since that limit was never exceeded, the quotas were never effectively binding. Early in 1980, citing energy and national security reasons, Carter issued an Executive Order⁴⁶ imposing an import fee of \$4.62 per barrel. A suit by members of Congress, however, resulted in a court decision voiding the Order.⁴⁷

Since July 1980 only the two-tiered customs duty (\$0.0525 per barrel below 25° and \$0.105 per barrel above 25°) has been applicable. While a license is still required to import crude oil, no license fees are currently

44 Petroleum Intelligence Weekly, February 3, 1975, p.12.

45 Bohi and Russell (1978), p.235.

46 Presidential Proclamation 4744, April 2, 1980.

47 INDEPENDENT GASOLINE MARKETERS COUNCIL, INC., et al., Plaintiffs, v. Charles W. DUNCAN, Jr., Secretary, Department of Energy, et al., Defendants; MARATHON OIL CORPORATION, Plaintiff, v. James Earl CARTER, President of the United States, et al., Defendants., Cit. A. Nos. 80-1116, 80-1181., United States District Court, District of Columbia., 492 F. Supp. 614, May 13, 1980; As Amended May 14, 1980.

has ranged between 3 and 30 percent of the import price. By comparison, current tariff proposals of \$5.00 to \$10.00 per barrel would account for between 30 and 65 percent of today's price (of \$15.00 to \$18.00 per barrel).

TABLE 3
US OIL TARIFFS AND IMPORT PRICES

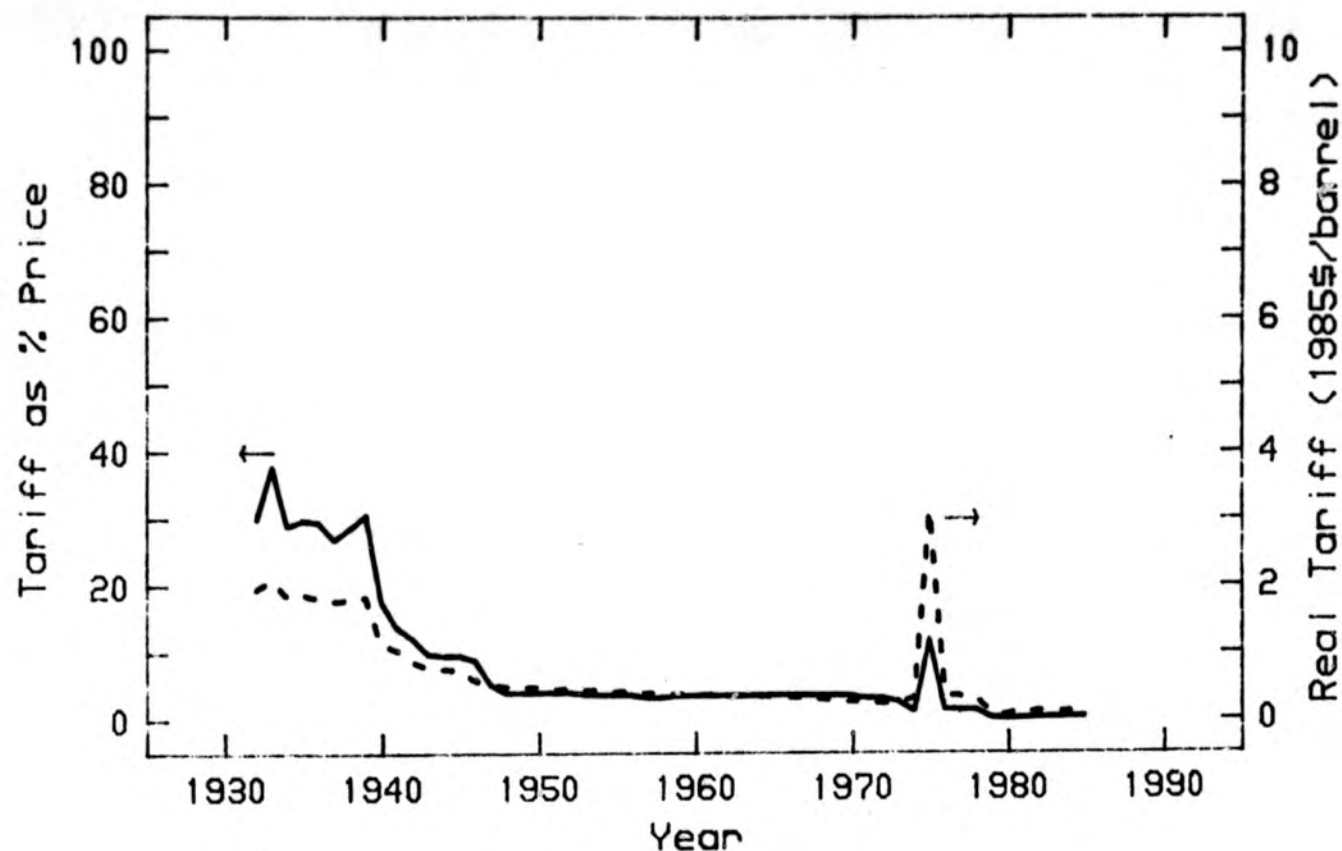
Year	Real ^a Tariff \$/bbl	Real ^b Price \$/bbl	Year	Real ^a Tariff \$/bbl	Real ^b Price \$/bbl
1932	\$1.96	\$ 6.505	1959	\$0.39	\$10.662
1933	\$2.10	\$ 5.550	1960	\$0.38	\$10.397
1934	\$1.86	\$ 6.407	1961	\$0.38	\$10.358
1935	\$1.88	\$ 6.295	1962	\$0.37	\$10.140
1936	\$1.83	\$ 6.174	1963	\$0.36	\$ 9.966
1937	\$1.79	\$ 6.615	1964	\$0.36	\$ 9.763
1938	\$1.81	\$ 6.302	1965	\$0.35	\$ 9.439
1939	\$1.84	\$ 6.009	1966	\$0.34	\$ 9.201
1940	\$1.15	\$ 6.457	1967	\$0.33	\$ 9.097
1941	\$1.05	\$ 7.516	1968	\$0.31	\$ 8.580
1942	\$0.88	\$ 7.174	1969	\$0.29	\$ 7.865
1943	\$0.78	\$ 7.874	1970	\$0.28	\$ 7.872
1944	\$0.77	\$ 7.971	1971	\$0.26	\$ 7.985
1945	\$0.74	\$ 7.589	1972	\$0.25	\$ 7.740
1946	\$0.60	\$ 6.672	1973	\$0.25	\$ 9.210
1947	\$0.53	\$ 9.747	1974	\$0.32	\$25.921
1948	\$0.50	\$12.322	1975	\$3.13	\$26.234
1949	\$0.50	\$12.095	1976	\$0.37	\$23.858
1950	\$0.49	\$11.729	1977	\$0.35	\$24.096
1951	\$0.47	\$11.244	1978	\$0.33	\$22.554
1952	\$0.46	\$11.096	1979	\$0.08	\$30.781
1953	\$0.45	\$11.552	1980	\$0.07	\$44.185
1954	\$0.45	\$11.830	1981	\$0.12	\$44.002
1955	\$0.43	\$11.352	1982	\$0.12	\$37.486
1956	\$0.42	\$11.071	1983	\$0.11	\$31.539
1957	\$0.40	\$11.839	1984	\$0.11	\$29.835
1958	\$0.39	\$11.316	1985	\$0.11	\$27.030

^aWeighted tariffs on imported crude oil in constant 1985 dollars.

^bCrude oil price in constant 1985 dollars: 1932-1946 is FOB price; 1947-1967 is US wellhead price; 1968-1985 is US Refiner's Acquisition Cost of imports.

FIGURE 7

US Oil Tariffs Have Been Low



APPENDIX

OIL IMPORT TARIFF CALCULATION

A SUMMARY

This appendix summarizes a model for the oil import tariff calculation. Evaluating the critique in Broadman¹, which examined at least seventeen different analyses of the oil import premium, we conclude that the approach developed in Hogan² is as complete a taxonomy of the premium components as is necessary to capture the main direction of oil tariff policy. We summarize the arguments of that analysis and borrow the model, with minor extensions, as the framework for our revised estimate of the optimal oil import tariff. The model addresses the case of a long-run tariff imposed to correct oil market imperfections, including the effect of oil supply disruptions.

In this model there are five channels of market failure that add to the social cost of U.S. oil imports. Here we characterize each of

1 Broadman, H. G., "Review and Analysis of Oil Import Premium Estimates," Discussion Paper D-82C, Energy and National Security Series, Resources for the Future, Washington DC, December 1981. H.G. Broadman, "The Social Cost of Imported Oil," Energy Policy, June 1986.

2 Hogan, W., "Import Management and Oil Emergencies," in Energy and Security, D. Deese and J. Nye (eds.), Ballinger Publishing Company, Cambridge MA, 1981.

these elements of the oil import premium, the gap between social cost and the market price. The premium consists of two main categories, the "economic component" and the "security component."

ECONOMIC COMPONENT

Market imperfections associated with oil imports arise for both traditional economic reasons and as a result of the special problems posed by supply interruptions. The economic component of the premium, that which would exist even in the presence of a secure supply of oil, reflects the contribution of oil to inflation, the attendant shifts in the balance of trade and the judgment that a change in U.S. oil demand could have a significant effect on the world price of oil.

Inflation

Control of inflation has been a persistent problem in the United States. Even in the mid-1980's, with inflation at relatively low levels, there is a fear of higher inflation and the restrictive monetary or fiscal policies that would follow. Nordhaus³ was the first to observe that the impact on inflation might be a significant externality associated with

3 William D. Nordhaus, "The Energy Crisis and Macroeconomic Policy," Energy Journal, Vol.1, No. 1, January 1980.

oil price movements.

According to the conventional wisdom⁴, the high cost of controlling inflation arises from the combination of market rigidities in the economy and the difficulty of predicting the course of prices, especially oil prices. With perfect anticipation of prices and complete flexibility, the economy could adjust to any level of inflation, in the long run. But in the short run, with price shocks and inflexibility, the economy adjusts slowly. The policy response is to constrain the economy in order to wring out part or all of the inflation. The cost of this adjustment can be substantial.

Our characterization of the cost of adjustment combines two rules of thumb from macroeconomics. The first is the short run Phillips curve, which relates the change in 'inertial' inflation to the change in unemployment above the 'full employment', or 'natural', rate. Inertial inflation refers to the anticipated rate of inflation that gets built into contracts and pricing policies. Without shocks, the economy can sustain a given inertial rate, but price shocks can change the inertial rate, and induced unemployment is the policy tool for moving from one inertial rate

4 The analysis of the high cost of inflation follows from the summary of the arguments and evidence presented by William D. Nordhaus and Paul A. Samuelson in Economics, Twelfth Edition, 1985, pp. 437-439. The principal dissent from this analysis comes from the 'rational expectations' school which argues that macroeconomic policy is fully anticipated and recessions results from voluntary unemployment. Nordhaus and Samuelson summarize the dissent as well as the conventional theory.

to another. Although the estimate is uncertain, the consensus is that it takes two points of increased unemployment for a year to eliminate one point from the inertial rate of inflation⁵.

The second rule of thumb, known as Okun's law, summarizes the changes in operations that affect output and are correlated with a change in the level of unemployment. Firms take many other steps before or in conjunction with changing their number of employees, e.g. altering the use of over time. These other actions have effects on output, at the margin, that imply that each percentage point change in the unemployment rate has more than a one point impact on the level of output. Again, there is some uncertainty. In the 1960's, "Okun's law" was as high as three points of GNP lost for each point of unemployment⁶. The more recent estimates put the ratio at closer to two to one.⁷

With a short run Phillips curve implying a two to one link between unemployment and inflation, and Okun's law implying a two to one link between unemployment and output, there is a four to one link between output and reduction of inertial inflation. In a \$4000 billion economy, the cost of eliminating one point from the inertial rate of inflation would be \$160 billion. Nordhaus and Samuelson estimate the range as between \$100 and

5 Nordhaus and Samuelson, 1985.

6 Sherman J. Maisel, Macroeconomics, W.W. Norton Company, New York, 1982, p. 447.

7 Nordhaus and Samuelson, 1985.

\$270 billion!⁸

The price of oil is determined by the price of oil imports. Because oil is an important commodity, a long-run trend of rising (falling) oil prices will increase (reduce) the general inflation rate. The large reduction (increase) in GNP needed to reduce (increase)⁹ inflation is an externality not recognized by individual buyers of imported oil. Hence it adds a (potentially) significant externality to the use of imported oil. The size of this externality depends on how the level of imports and changes in the price of oil affect the inertial rate of inflation, and on how much of the inertial rate is accommodated (removed) by expansionary (contractionary) macroeconomic policy.

If oil prices follow a smooth upward (downward) path, then virtually all of the increase (decrease) should be anticipated and incorporated in the inertial rate of inflation. However, because of full anticipation, we could assume that there would be full policy accommodation, and therefore, no change in GNP. But if oil prices follow an erratic path, both up and down, some of the price changes will be incor-

8 Nordhaus and Samuelson, 1985.

9 Of course, the policy would not be to increase inflation when oil prices fall. But falling oil prices would eliminate the need to reduce inflation caused by other shocks. Assuming that in the dynamic economy there are plenty price shocks, the directional effect of policy will be to expand output and increase inflation from what it would have been otherwise, whenever blessed with falling oil prices.

porated in the inertial rate and the policy response will allow for only partial accommodation. Therefore, in the case of rising prices, only a fraction of the oil induced addition to inflation will be removed from the inertial rate through induced unemployment.

The history of oil prices has been one of erratic price movements, usually associated with unexpected shocks to the system. The future will be no different, with a volatile market disguising an uncertain long run trend.¹⁰ In this world, the ups and downs of price will not be neutral, and policy can be expected to constrict the economy to remove part of the oil induced inflation. An approximation to the sequence of short run responses is to calculate the long run impact on inertial inflation, assuming full anticipation and accommodation, and then apply a judgment as to the percentage of incremental oil inflation that will be eliminated from inertial inflation through macroeconomic policy actions.

Long-run inflation in the price of oil will create similar inflation in the price of natural gas and other oil substitutes. If the policy is to accommodate the inflation, the resulting impact on the general price level will be in proportion to the value share of oil and related products. Let:

10 For a review and analysis of uncertainty in the oil market, see William W. Hogan and Paul N. Leiby, "Oil Market Risk Analysis", Discussion Paper, Energy and Environmental Policy Center, Harvard University, December 1985.

- r = oil inflation rate in real (nominal - inertial) terms,
- s = oil import price,
- q_d = domestic oil demand (millions of barrels per day, mmbd),
- q_n = domestic demand for oil substitutes (mmbd),
- q = oil import level (mmbd),
- p = domestic price of oil and its substitutes,
- t = $(p-s)$ the implicit tariff,
- w = value share of oil and its substitutes,
- π = inflation impact from oil.

Then the contribution to inflation from oil is

$$\pi = r(s/p)w.$$

Now,

$$w \approx pQ(0.365)/\text{GNP},$$

where

$$Q = q_d + q_n.$$

Therefore,

$$\pi = rs(Q(0.365)/\text{GNP}).$$

The change in the inflation trend caused by a change in the level of oil imports is

$$\frac{\delta \pi}{\delta q} = (0.365/\text{GNP}) \left[\frac{\delta r}{\delta q} sQ + r \frac{\delta s}{\delta q} Q + rs \frac{\delta Q}{\delta q} \right]$$

Our Phillip's curve ratio (estimated above as requiring two points of unemployment for one year to eliminate one point of inflation) is uncertain and is treated as a parameter ϕ . Similarly, Okun's law (requiring two points in output lost for each point of unemployment) is denoted by the parameter β .

As Nordhaus¹¹ observed, full accomodation of this inflation is not likely; nor is no accomodation at all. The former would impose politically unacceptable burdens, for example, in the redistribution of wealth. The latter would cause a great reduction in real output. This is essentially a policy matter, without a clear empirical guide. If we let U represent the fraction of inflation that will be eliminated through real output reductions, then the loss in real output per barrel of incremental imports is

$$t_1 = \phi \beta U \left[(r's + rs')Q + \frac{\delta Q}{\delta q} rs \right],$$

where,

11 Nordhaus, 1980.

- ϕ = Phillip's curve ratio of unemployment to inflation reduction,
- β = Okun's law ratio of output loss to unemployment,
- U = unaccommodated portion of inflation,
- r = oil inflation rate in real terms,
- r' = $\delta r / \delta q$,
- s = oil import price,
- s' = $\delta s / \delta q$,
- Q = domestic demand for oil and for oil substitutes (mmbd),
- q = oil import level.

The large costs of this inflation come from the unsought redistribution of income and from government attempts to prevent the redistribution by slowing economic growth and dampening the price increases. As long as the policy response to high inflation is to induce unemployment and a slack economy, we cannot ignore this expensive costs of oil imports.

Balance of Payments

Higher oil imports at higher prices increase the need to export goods and services or to receive investment payments in anticipation of future exports. The change in the balance of payments will lead in part to a change in the terms of trade through adjustments in exchange rates,

which impose a real economic burden on each oil importing country.

Whether or not a significant externality arises turns on a number of factors. For example, if oil exporters immediately recycle all their funds in the form of increased purchases of our products, or investments in our assets, then there is no externality.

Following Nordhaus (1980) we assume that an increase in oil imports will lead to a partial increase in exports as foreign oil producers recycle their revenues and a partial depreciation of the dollar to restore a balance of payments. Let:

P_d = domestic price level;

P_f = foreign currency price level;

e = exchange rate (P_f/P_d);

s = dollar price of imported oil;

X = quantity of exports

M = quantity of nonoil imports;

q = quantity of oil imports in (MMBD);

n_E = price elasticity of exports demand;

n_I = price elasticity of imports demand.

A balance of payments (with units on a daily basis) requires,

$$P_d X(P_d e) - (P_f/e) M(P_f/e) - sq = 0.$$

At a given aggregate price level¹², and with perfectly elastic supply functions, the change in the balance of trade caused by a change in the exchange rate, Δe , is

$$P_d \frac{\delta X}{\delta(P_d e)} \cdot P_d \Delta e + (p_f/e) \frac{\delta M}{\delta(p_f/e)} (p_f/e^2) \Delta e + (p_f/e^2) M \Delta e - \frac{\delta s}{\delta e} \Delta e q.$$

Suppose that B percent of any increase in oil import payments is returned by oil foreign producers through higher U.S. export purchases. Then, at the margin the change in exchange rates must satisfy $\Delta e = (\delta e / \delta q)$ and the unrecycled oil payments must just balance the shift in the balance of payments for other goods, i.e.,

$$P_d \frac{\delta X}{\delta(P_d e)} \cdot P_d \frac{\delta e}{\delta q} + (p_f/e) \frac{\delta M}{\delta(p_f/e)} (p_f/e^2) \frac{\delta e}{\delta q} + (p_f/e^2) M \frac{\delta e}{\delta q} - \frac{\delta s}{\delta e} \frac{\delta e}{\delta q} q - (1-B) \left[s + \frac{\delta s}{\delta q} q \right] = 0.$$

or

$$[n_E P_d X + (n_I + 1) P_d M] \frac{\delta \ln e}{\delta q} - \frac{\delta \ln s}{\delta \ln e} \frac{\delta \ln e}{\delta \ln q} s - (1-B) \left[s + \frac{\delta s}{\delta q} q \right] = 0.$$

The first term is the change in imports and exports valued at the domestic dollar price. The last term is the real resource cost of incremental oil

12 Assuming a fixed dollar price level in the United States, then changes in the price of foreign goods must be accompanied by changes in other domestic real prices in order to adjust relative prices and maintain the same price level.

imports (excluding the percent recycled immediately and not adding to the balance-of-payments deficit). The middle term, therefore, is the balance-of-payments externality, which consists of the elasticity of real dollar oil prices as a function of the exchange rate and the elasticity of the exchange rate as a function of import levels.¹³

From this last equation we obtain

$$\frac{\delta \ln e}{\delta \ln q} = \frac{(1-B) \left[s + \frac{\delta s}{\delta q} q \right] q}{n_E p_d X + (n_I + 1) p_d M - \frac{\delta \ln s}{\delta \ln e} q s}$$

Hence, if the elasticity of demand for exports or imports is high, or B is close to 1, then the elasticity of exchange rate with respect to import quantity is low. But if B, n_E , and n_I are small, then the reverse holds true.

The elasticity of the price of oil with respect to the exchange rate is uncertain. If oil producers are willing to fix the price of oil in dollars or to make purchases only in the United States, possibly later, then this term should be near 0. If oil producers' dollars are converted

13 We have ignored the second-order effect of partial recycling.

to other currencies, and producers wish to maintain the purchasing power of their oil, then this elasticity is -1.

In summary, the balance-of-payments import externality per barrel is

$$t_2 = sn_{se}n_{eq},$$

where,

$$n_{se} = \frac{\delta \ln s}{\delta \ln e} = \text{elasticity of oil import price to the exchange rate,}$$

$$n_{eq} = \frac{\delta \ln e}{\delta \ln q} = \text{elasticity of exchange rate to oil import level.}$$

According to these definitions, we assume that (1-B) of the marginal oil revenues end up in the Eurodollar market where they cause a marginal devaluation of the dollar. The decrease in the exchange rate of other currencies for the dollar affects the balance of trade in other goods and services, and presents a problem to oil producers because the oil they sell is priced in dollars. The elasticity n_{se} summarizes a subjective judgment about producer response in terms of the effect on the price of oil.

Price Reduction

As we've argued in the text, for a country like the U.S. that purchases a significant volume of oil on the world market, the price of those purchases will depend in part on the volumes taken. Thus, the U.S. can affect the world oil price by changing the volume of its oil purchases. Since the resulting price difference would be paid on all oil imported into the U.S., the true cost of the incremental barrel to the nation as a whole is higher than the market price.

The direct cost of oil imports purchased by the U.S. is simply the import price times the import volume, or

$$sq .$$

Given the sizable share enjoyed by the U.S. in the world oil market, an increase in the volume of import purchases, over the long run, will change this direct cost by the amount

$$s + s'q .$$

The first term is just the price, s , which is the private cost. The incremental buyer of imported oil will pay this cost directly and thus internalize one component of the increased oil import bill. But the incremental buyer does not see how its purchase increases the cost for everyone else. The second term reflects this market imperfection and

enters the calculation of the economic component of the premium as

$$t_3 = s'q.$$

SECURITY COMPONENT

When an interruption comes, the damage to our economy will depend in part on the level of oil imports. Even if changing the preinterruption level of imports has no effect on the size of the shortage during the interruption, the burden of suddenly higher oil prices and the attendant shocks on our economy will be reduced if imports are lower. Here we separate the security component of the premium into two elements. The first captures the economy's vulnerability to damage for a given oil price shock. The second captures the link between imports and the size of the price shock. For both of these contributions to the security component of the premium, the use of a Strategic Petroleum Reserve can reduce the effective size of the supply interruption and lower the optimal tariff.

Vulnerability

The long-run level of imports defines a reference point for short-run supply and demand curves in an interrupted market. Following the analysis in Hogan¹⁴, we incorporate a model of short-run macroeconomic

14 Hogan, W. "Oil Stockpiling: Help Thy Neighbor," Energy Journal, Volume 4, Number 3, July 1983.

shock that employs a GDP elasticity with respect to sudden increases in the price of oil.

Let,

q_t = quantity of oil imports that would be demanded with reduced GDP and no price change,

q_s = quantity of oil imports during interruption.

We assume that the real GDP during an interruption is

$$GDP = GDP_0((\Delta p + p)/p)^{-u},$$

where,

GDP_0 = the normal GDP at price p ,

Δp = shock induced change in domestic oil price,

u = elasticity of GDP with respect to oil price,

and the unemployment caused by higher oil prices is spread uniformly across the economy. We assume that this shock-induced unemployment will

reduce the demand for oil in the same percentage as the reduced GDP, and this will be a principal (expensive) means of adjusting to the oil shortage.

Therefore,

$$q_t = q - q_d u \Delta p / p .$$

We assume the interruption lasts for one year. The short-run supply function during an interruption is determined by the size of the interruption, s , and a short-run response relative to the import price, s . The short run supply of imports is very inelastic; a large change in price produces a small increment in curtailed supply. We further assume that the tariff implied by the pre-interruption price difference, $p - s$, is maintained during the interruption; hence, the short-run supply curve with slope b is

$$q_s = q - s + b \Delta p ,$$

where,

s = ex ante size of the disruption, and

b = slope of the linear short-run import supply curve,

The short-run import demand curve for quantity q_r at price w , relative to pre-interruption price $p(q)$ and quantity q , is assumed to be linear with slope c ; that is

$$q_r = q_t - c\Delta p.$$

where,

c = slope (minus) of the short-run oil demand curve.

These short run supply and demand equations yield the shock to oil prices, up to linear approximation, as

$$\Delta p = s/[b+c+q_u u/p] .$$

With these definitions, the market clearing quantity during an interruption is q_u . Hence, the social cost of interruption is equal to

$$(q_t - q_u)[.5\Delta p + (p - s)] + q_u\Delta p + uGDP(\Delta p/p) .$$

Taking the derivative with respect to the oil import level yields the change in the social costs as a function of the import level:

$$\begin{aligned} & [(q_t - q_u)(p' - s') - uGDP(\Delta p)p'/(p^2) + .5(\Delta p(\delta(q_t - q_u)/\delta q)] + \\ & [(.5(q_t - q_u) + uGDP/p)\delta(\Delta p)/\delta q] \end{aligned}$$

The terms in the first set of brackets capture the social cost given a price shock Δp . These costs reflect the vulnerability to economic disruption caused by a given level of imports. The terms in the second set of brackets capture the impact of a possible change in the size of the

interruption and the resulting price shock.

Focusing on the first, the size of the externality depends in part upon the probability of a supply interruption of given size. Hence, the first element of the security component is

$$t_4 = \sum v^j [(q_t^j - q_u^j)(p' - s') - uGDP \Delta p^j p' / (p^2) + .5(\Delta p^j (\delta(q_t^j - q_u^j) / \delta q)] .$$

where,

v^j = probability of disruption state j .

Price Shock

Reducing the level of oil demand during normal times is likely to leave excess capacity in the total oil market, capacity that could be brought to market during an oil interruption and lessen the effective size of the supply loss. The extent to which any one country can count on this gain is problematic. Adjustments in capacity over time, sharing of benefits under the International Energy Program (IEP) formulas, or the possibility of losing capacity as well as production all mitigate against the efficacy of reducing oil imports as a means of lowering the size (or likelihood) of an oil supply interruption.

Hence there are several judgmental parameters that must be in-

cluded in the analysis to capture the possibility of reducing the size of an interruption and, therefore, reducing the size of the price shock. With the adjustments described above for dealing with macroeconomic costs of a disruption, this second element of the security component is

$$t_5 = \sum v^j [(.5(q_t^j - q_s^j) + uGDP/p) \delta(\Delta p^j) / \delta q] .$$

In order to calculate this element of the premium, we need to provide

$\delta s / \delta q$ = the change in interruption size induced by a change in imports.

In Hogan [1981], the likely range for this value is established as .13 to .48. With proportional IEA sharing of shortages according to demand, and a complete elimination of a barrel of shortage for each barrel of reduced demand, we would have for the United States $\delta s / \delta q = 0.33$.¹⁵

Finally, in calculating several of the derivatives we will need the fact that

15 The United States consumed an average of 15.9 mmbd out of a world consumption of 47.2 mmbd between 1980 and 1983. Hence, with proportional sharing of disruptions, each barrel reduction in the short run demand for imports would have a 33% impact on the size of the effective disruption.

$$\delta q_d / \delta q = n_d q_d / (n_d q_d - n_s (q_d - q)) ,$$

where,

n_s = long-run elasticity of domestic supply.

Hence, the change in the price shock induced by a change in the level of imports is

$$\frac{\delta \Delta p}{\delta q} = \frac{s}{[b+c+q_d u/p]^2} \left[\frac{\delta q_d}{\delta q} (u/p) - q_d (u/p^2) \frac{\delta p}{\delta q} \right] + \frac{\delta s}{\delta q} \left[\frac{1}{[b+c+q_d u/p]} \right]$$

STRATEGIC PETROLEUM RESERVE

Oil supply disruptions create substantial costs for the economy. The principal protection from these losses, short of preventing the disruption per se, would be to provide substitute supplies of oil. This fact suggests the need for a substantial supply of oil that can be injected in the market in large volumes on short notice, i.e., for a strategic petroleum reserve. Every analysis of energy security problems has pointed to the need for a substantial oil reserve.¹⁶ Its prompt use would be the

16 For example, Teisberg, T.J., "A Dynamic Programming Model of the U.S. Strategic Petroleum Reserve," Bell Journal of Economics, Vol. 12, No. 2, Autumn 1981, presented an analysis of the link between a strategic oil supply and a tariff. Although partial substitutes, the optimal result

most effective means for mitigating the damages of a supply interruption.

Whatever the size of the such a reserve, however, the volume of imports will affect the economic cost of a disruption. The greater the volume of oil imports at the start of the interruption, the greater the cost of the interruption. It follows that a tariff, which would reduce the volume of imports, and a strategic oil reserve, which would substitute for the lost supply, are complementary. The larger the reserve, the smaller the optimal tariff, but the need for a tariff remains. Our purpose is to capture the effects of a significant reserve on the size of the optimal tariff.

For a given size of the U.S. Strategic Petroleum Reserve, the size of the optimal tariff depends on the use of the SPR during an interruption. The studies of the best use of the SPR suggest both the complexity of the optimal drawdown policy in particular disruption scenarios and a reasonable general rule of thumb for purposes of the present analysis.¹⁷

called for both a large reserve and a significant tariff. See also Alm, A. and E. Krapels, "Building Buffer Stocks in a Bear Market: Policy Choices for Emergency Reserves," Discussion Paper Series, H-82-01, Energy and Environmental Policy Center, Kennedy School of Government, Harvard University, March 1982. Chao, H.P. and S. Peck, "Coordination of OECD Oil Import Policies: A Gaming Approach," Electric Power Research Institute, Palo Alto CA, September 1980. National Petroleum Council, Emergency Preparedness for Interruption of Petroleum Imports into the United States, Washington DC, April 1981.

17 See Teisberg (1981) and Hogan (1983).

If there is a reasonable possibility that a disruption will last for more than one year, then part of the SPR should be used immediately and part should be held for contingencies. Furthermore, given the value of the SPR for later emergencies, part of the disruption should be met from the SPR and part should be met with demand reductions. Our rule of thumb is to meet the disruption up to half the total interruption or half the size of the SPR. The drawdown from the SPR reduces the effective size of the disruption, s , and the resulting price increase and economic loss. Therefore, we set

$$s = \text{MAX}\{0.5s_{\text{ex ante}}, s_{\text{ex ante}} - 0.5(\delta s / \delta q)(\text{SPR}/365)\},$$

where $s_{\text{ex ante}}$ is the interruption size expected without the use of the SPR. Since the use of the SPR will benefit everyone in the world market, the drawdown affects the interruption only in proportion to the assumed derivative of the interruption size for each barrel change in the size of import demand.

COMBINED PREMIUM

As we argued in the text, the individual components of the premium are not additive. Moreover, we have argued that, taken together, they are equivalent to the optimal tariff only at the optimal level of the premium; that is, for the premium associated with the level of oil imports that internalizes all externalities. As shown in Hogan (1981), the optimal premium can be found by maximizing an appropriate objective function over

the total level of oil imports. This objective function combines the annualized benefits of oil use, cost of inflation and balance of payments adjustments, payment for oil imports, and the expected loss during oil interruptions. Using linear approximations for several derivatives, the objective function is:

$$\begin{aligned} \text{OBJ} = & \int_0^q [p(x) \delta x] - (t_1 + t_2)q - sq \\ & - \sum v^j [(q_t^j - q_u^j)(.5\Delta p^j + (p-s)) + q_u^j \Delta p^j + u \text{GDP} \Delta p^j / p] . \end{aligned}$$

The solution to the optimization of OBJ over q yields

$$W(p - s) = t_1 + t_2 + t_3 + t_4 + t_5 ,$$

where W is a scaling factor that adjusts for losses in tariff payments during an interruption:

$$W = 1 - \sum v^j [\delta(q_t^j - q_s^j) / \delta q] .$$

Therefore, we refer to the five elements of the economic and security components of the premium, $p-s$, as

$$T_k = t_k / W ,$$

$$k = 1, 2, \dots, 5.$$

These equations can be solved numerically to identify the five elements of the optimal oil import tariff. The basic model includes constant elasticity long-run supply and demand curves, with linear short-run supply and demand curves with a traditional analysis of consumer and producer surplus to calculate welfare changes. Disequilibrium during an interruption reduces GDP and the demand for oil. And the long-run inflation and balance of payment contributions are incorporated simultaneously in the solution of the model. Hence, we impose consistency of assumption across the premium components and recognize the interaction in the quantitative estimates of the total optimal premium and optimal tariff.

AGGREGATE COST SAVING

An estimate of the combined premium allows a further estimate of the aggregate cost of oil market imperfections. Since the premium measures the difference between price and social cost, the import supply curve plus the premium captures the full social cost of oil imports. The demand curve measures the corresponding social value of the same imports. At the market level of imports — with no tariff — the social cost is above the social value. At the optimal level of imports — by definition at the optimal tariff — marginal social cost just equals marginal social value. Hence the excess of cost over value, as imports increase from the optimal to the market level, is cost of the oil import externalities.

(See Figure 4 in the text.)

Let q^* be the optimal level of imports and q_0 be the market level. Let T^* be the premium at the market level. Then the aggregate net cost of oil import market imperfections, or the saving engendered by imposing the optimal tariff, is given by

$$C = T^*(q_0 - q^*)/2 .$$

Calculation of C requires only that we estimate the premium and import volume at the market level, where $p = s$, and at the optimum import level, where $T^* = p - s$.

OPTIMAL TARIFF ESTIMATES

With this technical summary complete, we can turn to the quantification and sensitivity analysis. An estimate of the optimal oil import tariff depends upon many assumptions. In Broadman¹⁸ there is a discussion of the uncertainties that result in a very wide range of estimates from \$2 to \$124 per barrel. To be sure, this range encompasses all arguable values for input assumptions. However, we can narrow it considerably by choosing more plausible parameter values. For present purposes we will not discuss all possible combinations of parameters. Ra-

18 Broadman (1986).

ther, we shall establish a base case of most likely values, and then examine excursions that seem of most interest in the light of the nature of the oil market in 1986.

Base Case Parameters

The basic model provides simultaneous estimates of the optimal tariff, prices, and oil import quantity. Implementation of this model requires assumptions about a range of inputs. One of the principal difficulties in preparing optimal tariff estimates is the uncertainty surrounding the parameters. Many of the essential elements, such as demand elasticities and behavioral responses of suppliers, are not known with certainty. In order to proceed, therefore, it is important to prepare sensitivity analyses to examine the likely range of alternative tariff estimates.

The first sensitivity analysis focuses on a base case and the implications of changes in prices. The second sensitivity test examines the importance of the security component by calculating the optimal tariff under the assumption of a secure world oil market with no threat of interruption. Finally, the uncertainties surrounding the full range of inputs enter in a risk analysis that calculates the probability distribution for the optimal tariff.

The base case includes the nominal assumptions for each of the inputs specified in the development of the model. The most likely values

draw on the literature and the authors' judgment. These most likely values provide the first estimate of the optimal tariff and the cost of a free market policy. The base case assumptions include:

- U = 30%, unaccommodated portion of inflation;
- r = 3%/yr, oil inflation rate in real terms. The rate of real price increase between 1970 and 1985 averaged 6.9%/yr. At 3%/yr, the real price would double in 24 years;
- r' = 0.1%/mmbd, derivative of oil inflation rate with respect to changes in the level of imports. According to the usual theory of depletable resources, r is the same as the nominal interest rate, independent of the level of oil production or imports. Even under the opposite extreme case of production targets, r is independent of oil imports. For our sensitivity analysis, we assume that imports have a small effect on the rate of oil price change, implying a small, positive value for r'. For our base case assumptions, we take r = 3% and r' = 0.1%;
- ϕ = 2, Phillips curve derivative ratio of excess unemployment to inflation, as described in Nordhaus and Samuelson, 1985;
- β = 2, Okun's law, ratio of lost output to unemployment, as described in Nordhaus and Samuelson, 1985;
- p = \$27/bbl, base domestic oil price,
- s = \$27/bbl, base oil import price;
- s' = \$.50/bbl/mmbd, derivative of normal oil import supply curve;

- q_d = 16 mmbd, base domestic oil demand, approximately the level in 1985;
- q_n = 5.4 mmbd, domestic demand for oil substitutes, the level in 1985;
- q_s = 10 mmbd, base domestic oil production, the level in 1985;
- n_d = -0.5, long-run elasticity of US demand for oil. Estimates drawn from the Department of Energy and an independent analysis of the data imply a long run elasticity of -0.9 with respect to the crude oil price¹⁹. The lower value used here is intended to capture an approximation of the decade long horizon reasonable for design of tariff policy;
- n_s = 0.5, long-run domestic oil supply elasticity. The Department of Energy's oil market model uses an elasticity of 0.9.²⁰ Again, the smaller value used here reflects the average over a decade;
- n_{se} = -1., elasticity of oil import price to the exchange rate;
- B = 25%, fraction of marginal oil revenues recycled to US;
- n_x = -2., elasticity of demand for exports;
- n_m = -1.5, elasticity of demand for imports other than oil. This figure and the elasticity for exports are drawn from the surveys reported in Corden, Caves and Evans²¹;

19 Hogan and Leiby, 1985.

20 Hogan and Leiby, 1985.

21 W.M. Corden, Trade Policy and Economic Welfare, Clarendon Press, Oxford 1974, pp. 183-184; R. E. Caves, World Trade and Payments, Little, Brown and Company, Boston 1981, p. 283; M. K. Evans, Macroeconomic Activity, Harper and Row, New York, 1969, pp. 227-228.

- X = \$227. billion, value of exports, the value in 1985;
- M = \$285. billion, value of imports other than oil, the value in 1985;
- GDP_0 = \$4525. billion, the normal GDP, the value in 1985;
- u = 0.05, elasticity (minus) of GDP with respect to oil price shock. Several studies have used similar estimates drawn from the analysis of past supply interruptions and simulation with more detailed macroeconomic models²²;
- $\delta s/\delta q$ = 0.36, the change in interruption size induced by a change in long-run import demand, based on the evaluation of the U.S. share of the world market, see Hogan²³;
- A_d = 0.1 adjustment rate for domestic oil demand²⁴;
- A_s = 0.1 adjustment rate for domestic oil supply²⁵;
- $\eta_{i:short}$ = 0.1 short-run imported oil supply elasticity;
- SPR_Size = 500 million barrels.

In addition to these parameters, the base case specifies the probability distribution for oil supply interruptions over the possible interruption sizes, s . For purposes of the sensitivity analysis, we consider

22 See Murphy et al 1986; Rowen and Weyant 1986.

23 Hogan 1981.

24 Hogan and Leiby, 1985.

25 Hogan and Leiby, 1985.

four different views of the world about the probability of one-year long interruptions of 1 mmbd, 3 mmbd, and 6 mmbd, for the United States. For each of these world views we characterize the decade probabilities of one or more such interruptions:

Table A.1

Decade ProbabilitiesOne Year Interruptions²⁶

World View	1 mmbd	3 mmbd	6 mmbd
W0	.0	.0	.0
W1	.50	.10	.05
W2	.75	.30	.05
W3	.95	.50	.20

The last three world views correspond to increasingly pessimistic views of the likelihood of oil supply interruptions. The zero (W0) case provides a benchmark from which to separate the disruption effects from the other constituents of the oil import premium. The nominal assumptions adopt world view two (W2).

²⁶ Values for ex ante, i.e., before use of the Strategic Petroleum Reserve.

High Price Estimation

The combination of these base case assumptions produce estimates of the individual components of the premium and the optimal tariff as well as the cost of the free market policy. Using a price of \$27 per barrel to represent the high price case, the estimates are:²⁷

27 Calculation of the optimal tariff includes a number of intermediate calculations. For the high price case, for instance, these include:

Hi Price Case \$27

OPTIMAL TARIFF CALCULATION INTERMEDIATE CALCULATIONS

q:base	6.00 base oil import level
b	0.022 derivative of the short run import supply curve
c	0.048 derivative (minus) of short run import demand curve
$\delta q_d / \delta p$	-0.19 derivative of long run domestic demand for oil
$\delta q_s / \delta p$	0.185 derivative of long run domestic supply of oil
n_d :short	-0.05 short-run elasticity of US demand for oil
n_s :short	0.05 short-run domestic oil supply elasticity
n_{eq}	-0.03 elasticity of exchange rate to the oil import price 1e
$\delta Q / \delta q$	0.53 derivative of Q with respect to q
p'	-2.66 derivative of domestic inverse demand curve
W	0.97 scale factor for tariff loss during interruption

OPTIMAL TARIFF CALCULATION INTERRUPTION WORK CALCULATIONS

Decade_p	Prob_j	GDP_j	s_j	Δp_j	$\delta \Delta p / \delta q_j$
0.75	0.129	4478	0.75	8.42	3.82
0.30	0.035	4388	2.75	30.79	3.29
0.05	0.005	4300	5.75	64.33	2.49

**OPTIMAL TARIFF CALCULATION High Price Case
(\$/Barrel)**

s		25.08	IMPORT PRICE	
T ₁	1.45			
T ₂	0.69			
T ₃	1.11			
		3.25	ECONOMIC PREMIUM	
T ₄	2.82			
T ₅	4.96			
		7.78	SECURITY PREMIUM	
T		11.03	TOTAL PREMIUM	
P		36.10	DOMESTIC PRICE	
q:d	13.84	DEMAND		
q:s	11.69	SUPPLY		
q	2.15	IMPORTS		
	Optimum	Economic Tariff	3.25	
		Security Tariff	7.78	
		Combined Tariff		11.03
	Base	Economic Premium	7.31	
		Security Premium	10.40	
		Combined Premium		17.71
	Cost of Free Market Policy			34.07
		(\$million/day)		

Low Price Estimation

The first sensitivity test takes the base case parameters but changes the assumption for oil prices. We continue to assume that the benchmark level for energy demand is 16 mmbd at \$27 per barrel, with a 10 mmbd domestic supply, implying a 6 mmbd demand for imports. However, now we assume that imports can be supplied for \$15 per barrel. Starting at this new price, we solve for the equilibrium levels where the domestic demand, domestic supply and import supply balance. The solution produces

a higher premium, a higher tariff and a higher cost of a free market policy:

OPTIMAL TARIFF CALCULATION Low Price Case
(\$/Barrel)

s	11.76	IMPORT PRICE	
T ₁	0.98		
T ₂	0.68		
T ₃	3.82		
	5.48	ECONOMIC PREMIUM	
T ₄	1.77		
T ₅	5.30		
	7.07	SECURITY PREMIUM	
T	12.55	TOTAL PREMIUM	
p	24.32	DOMESTIC PRICE	
q:d	16.86	DEMAND	
q:s	9.33	SUPPLY	
q	7.53	IMPORTS	
Optimum	Economic Tariff	5.48	
	Security Tariff	7.07	
	Combined Tariff	12.55	
Base	Economic Premium	11.24	
	Security Premium	9.16	
	Combined Premium	20.40	
	Cost of Free Market Policy	70.60	
	(\$million/day)		

The increased demand, associated with the lower price, raises the expected level of imports and increases the economic component of the premium more than it decreases the security component, leading to a higher cost for a free market policy. Hence, although some of the externalities are reduced with lower oil price, under the base case assumptions the effect of lower oil prices is to raise the size of the premium and the cost

timal tariff.

Secure Imports Estimation

The estimate of the optimal tariff includes both economic and security components of the premium. Naturally a reduction in the risk of oil supply interruptions should have a beneficial effect on oil consumers and, thereby, lower the optimal tariff. However, as we argued above, changes in one element of the premium can change the size of the other elements. There is a feedback effect. The interaction may cause the various elements to shift so that the aggregate change in the optimal tariff is less than the change in the individual components of the premium.

The optimal tariff under the condition of no oil supply interruptions is larger than the economic component of the tariff in the base case. With the high price case and the extreme assumption of no threat of supply interruptions, the optimal tariff, the premium and the cost of a free market policy, would change to include:

OPTIMAL TARIFF CALCULATION Secure Imports Case (\$/Barrel)

s	26.07	IMPORT PRICE
T ₁	1.52	
T ₂	1.49	
T ₃	2.07	
	5.08	ECONOMIC PREMIUM
T ₄	0.00	

T_s	0.00	0.00 SECURITY PREMIUM
T	5.08	TOTAL PREMIUM
P	31.14	DOMESTIC PRICE
q:d	14.90	DEMAND
q:s	10.77	SUPPLY
q	4.13	IMPORTS

Optimum	Economic Tariff	5.08
	Security Tariff	0.00
	Combined Tariff	5.08
Base	Economic Premium	7.12
	Security Premium	0.00
	Combined Premium	7.12
Cost of Free Market Policy		6.65
	(\$million/day)	

It is clear that the simultaneity and complementarity between the economic and security components of the premium imply a significant optimal tariff even if security problems are eliminated.

Risk Analysis Estimation

These few sensitivity tests illustrate the principal responses of the optimal tariff calculation to changes in the input assumptions. The high and low oil price cases, or the secure world oil market scenario, produce changes in the estimate of the optimal tariff. However, the optimal tariff still continues to be a large fraction of the price of oil and large relative to any tariff that might be considered politically acceptable. Unfortunately, the few sensitivity tests do not exhaust the major uncertainties that could affect the size of the optimal tariff. Higher or lower assumptions about inflation could have a significant impact on both the quantity of oil imported and the estimate of the optimal tariff. Similarly, changes in elasticity estimates, alternative views about the probability of interruptions, or uncertainties in any of the other parameters could alter the optimal import tariff estimate.

It is not possible to examine all potential combinations of the long list of important input parameters. The number of scenarios would quickly exhaust our capacity to absorb the data. As an alternative, therefore, a "risk analysis" of the optimal tariff estimate captures a range of possible tariff policies that should be considered given our uncertainty in the input parameters.

Under risk analysis, the analyst specifies the uncertainties in terms of probabilities for different values of the input parameters. For instance, the most likely estimate of the aggregate demand elasticity is

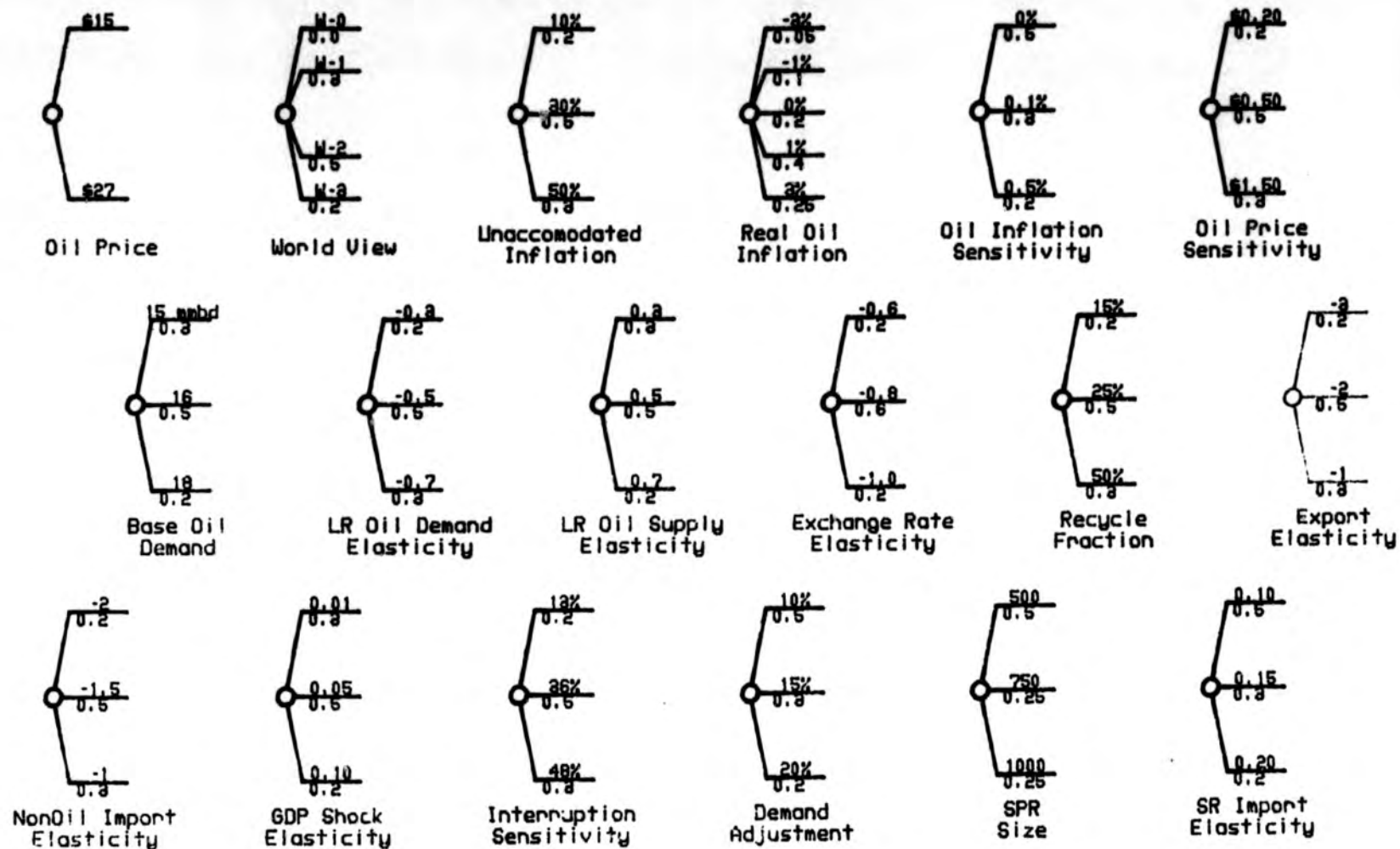
0.5. This demand elasticity reflects the estimates from a variety of studies, some of which produce higher values and some of which produce lower values. For purposes of the sensitivity analysis, it is easy to argue that there is a significant chance that the elasticity could be as high as 0.7 or low as 0.3. A wider range is possible but the principal range of uncertainty should be captured by these values. The probability that the elasticity will be as high as .7 or as low as .3 is not as great as the probability that the most likely case is correct. Using our judgment, we assign probabilities of 30% to the elasticity of 0.7, 50% to the elasticity of 0.5 and 20% to the elasticity of 0.3.

A similar probabilistic analysis across the range of possible values for the other key inputs establishes a probability distribution for all of the uncertain parameters. An event tree summarizes these probability judgments as shown in figure A.1. This event tree assigns one node to each uncertainty and the branches describe the possible alternative values for the respective input parameters. The probability represent the judgments on the uncertainty that should be applied to the sensitivity analysis.

Given the event tree, it is a straightforward matter to apply the optimal tariff model to calculate the probability distribution of the tariff components and the cost of a free market policy. This simulation also provides the probability distribution for the optimal tariff. Application of the event tree to the optimal tariff model produces the probability distributions shown in figures A.2 through A.4. Each probability distrib-

FIGURE A.1

Oil Premium Inputs are Uncertain

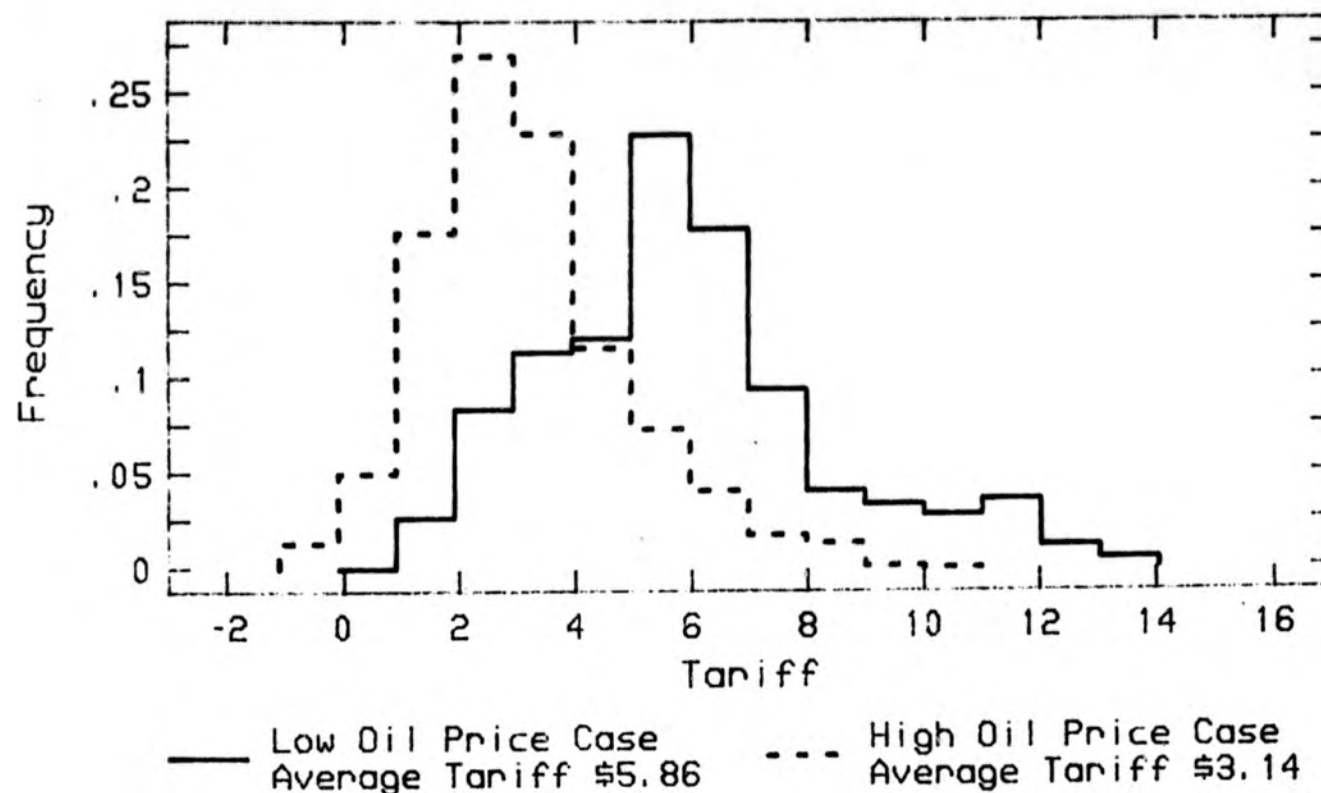


Prices in 1985 dollars per barrel.

FIGURE A.2

Lower Oil Prices Produce a Higher Economic Tariff

ECONOMIC TARIFF

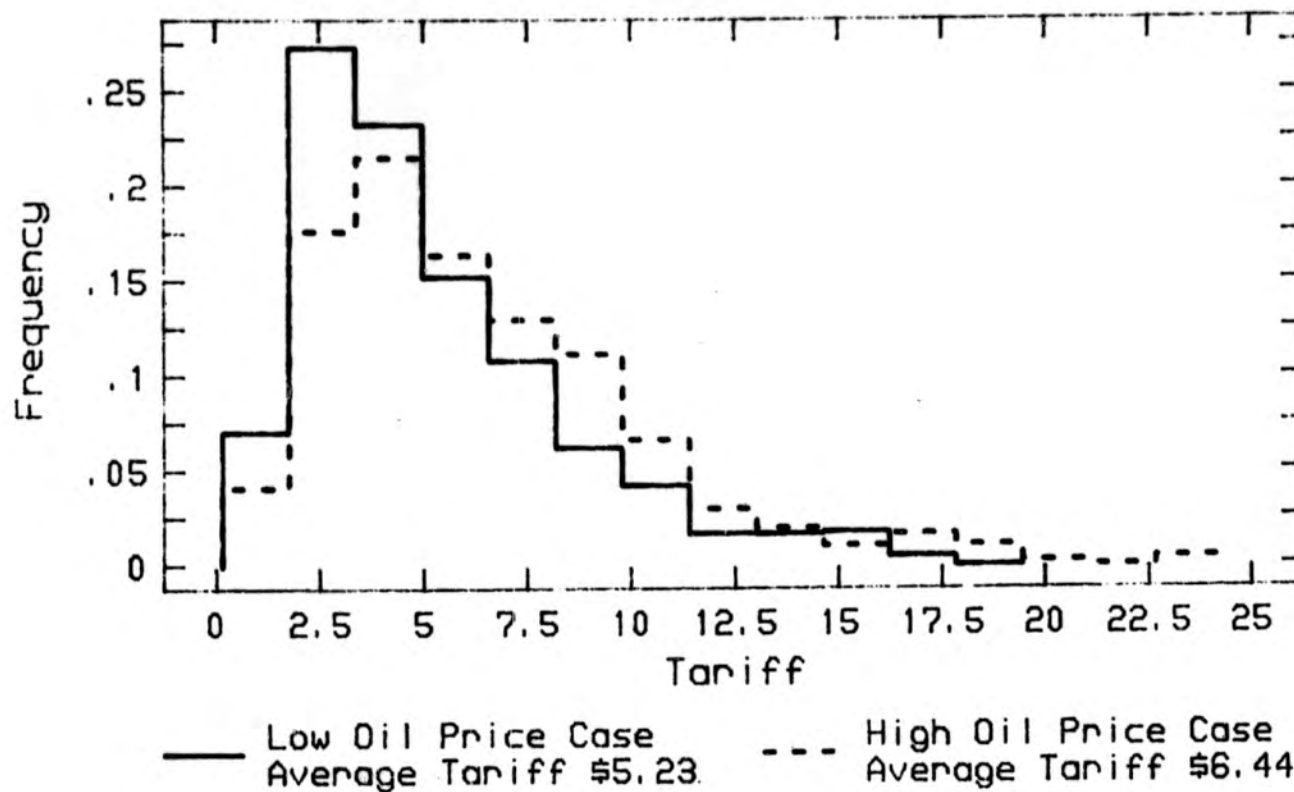


Prices in 1985 dollars per bannel.

FIGURE A.3

Lower Oil Prices Produce a Lower Security Tariff

SECURITY TARIFF

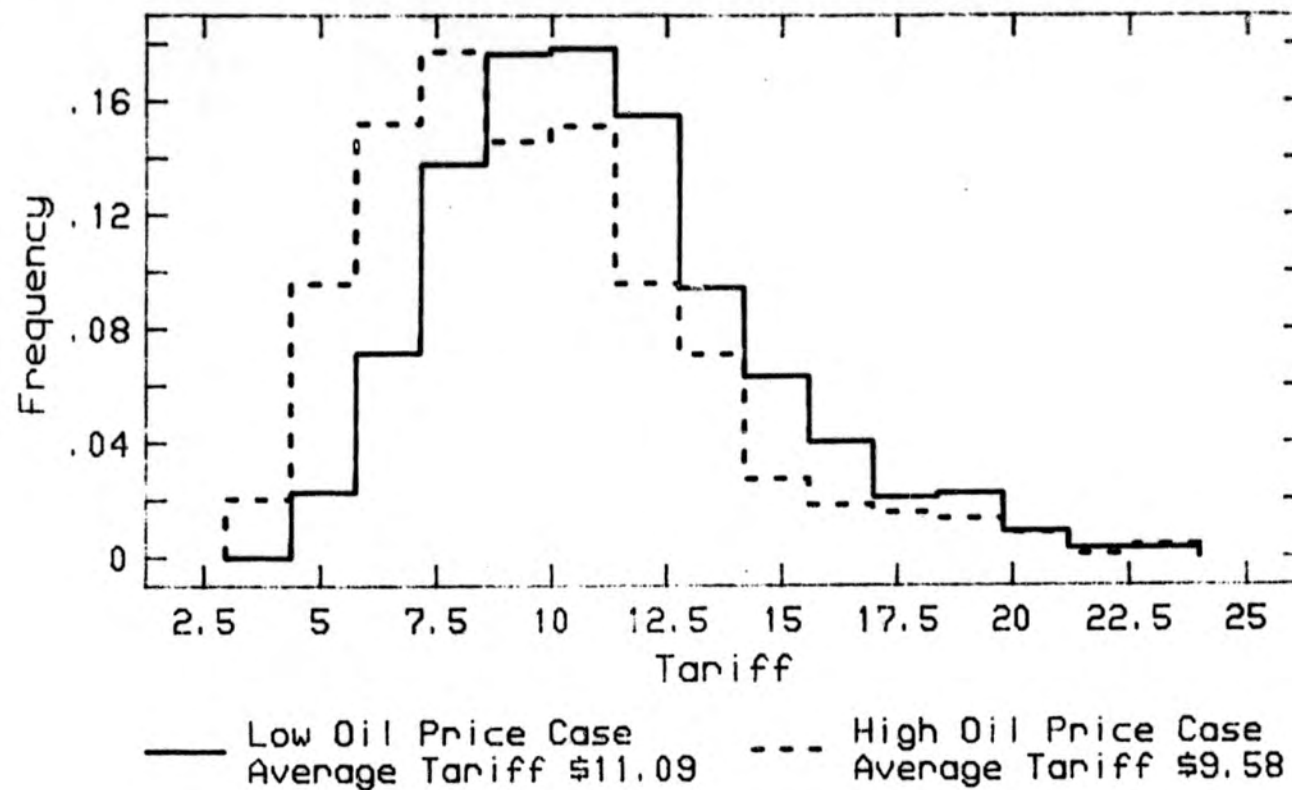


Prices in 1985 dollars per barrel.

FIGURE A.4

After Netting Out Compensating Effects Oil Prices Have Little Impact on the Optimal Tariff

COMBINED TARIFF



Prices in 1985 dollars per bannel.

ution summarizes the range of uncertainty in the optimal tariff estimates policy and the costs of a free market policy.

Focusing on the key sensitivity test between low and high oil prices, the probability distributions include:

**Optimal Tariff and Cost Probability Distributions
(\$/Barrel)**

High Price Case (\$27)

	<u>Lower 25%</u>	<u>Median</u>	<u>Upper 25%</u>	<u>Expected Value</u>
Economic Tariff	1.95	2.85	3.90	3.14
Security Tariff	3.63	5.64	8.52	6.44
Total Optimal Tariff	7.00	8.96	11.26	9.58
Cost of Free Market Policy (\$million/day)	12.71	22.58	36.11	29.03

Low Price Case (\$15)

	<u>Lower 25%</u>	<u>Median</u>	<u>Upper 25%</u>	<u>Expected Value</u>
Economic Tariff	4.03	5.68	6.87	5.86
Security Tariff	2.80	4.20	6.65	5.23
Total Optimal Tariff	8.71	10.81	11.89	11.09
Cost of Free Market Policy (\$million/day)	32.10	49.03	76.51	61.48

SUMMARY

The optimal import tariff balances all the costs and benefits of oil imports. Although any operational estimate of the tariff will depend upon an array of assumptions and judgments, it is possible to make these

judgments and organize them in an internally consistent set of calculations. These estimates quantify the several possible sources of market failure which prevent private actors from recognizing the true costs of the marginal barrel of oil imports. The resulting tariff estimates are sensitive to the assessment of market conditions, but this sensitivity appears to be much less than commonly believed. There is a significant amount of interaction among the tariff components. A change in assumption which reduces one element tends to produce a compensating increase in others, and the whole is less sensitive than the parts.

This complementarity and the numerical results provide a guide for action. The size of the tariff is large. Our preferred set of assumptions sets the optimal tariff about \$10 and \$11 per barrel. Under the High Price case, there is a 75% chance that the optimal tariff is at least \$7 per barrel. And under the Low Price case, this estimate to an optimal tariff of at least \$8.70 per barrel. When compared with the usual political discussions, where the most adventuresome conversation involves tariffs that are half this range, the direction of policy is clear: higher tariffs can be justified. Based on the estimates of market failure, a figure in the range of \$7 per barrel and \$9 per barrel is as low as can be supported by the analysis and the judgments on the range of uncertainty in the parameters.

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