

ALASKA LEGISLATURE SPECIAL COMMITTEE / SUBJECT FILES 8672
1536 SCOMM 57: SENATE SPECIAL COMMITTEE ON OIL & GAS, 1987-1988, 333

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.

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* CREATED: 02/26/87 TIME: 17:13

* SUBJECT: OIL AND GAS TELECONFERENCE

* PRINT DATE: 02/26/87 TIME: 17:28

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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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* FROM: LTCCFBX
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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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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

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Senator Jack Coghill
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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.

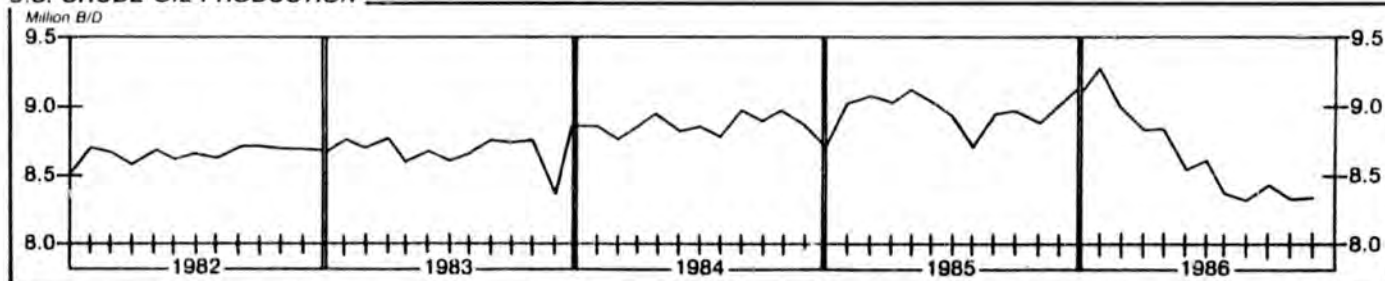
Imports peaked at 8.03 million bbl/day in September, and for three months last year were higher than 7 million bbl/day. In December, however, they fell to 6.2 million bbl/day. Crude oil imports alone averaged 4.48 million bbl/day in 1986; crude prices averaged \$14.79/bbl, compared with \$27.07 in 1985. 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.

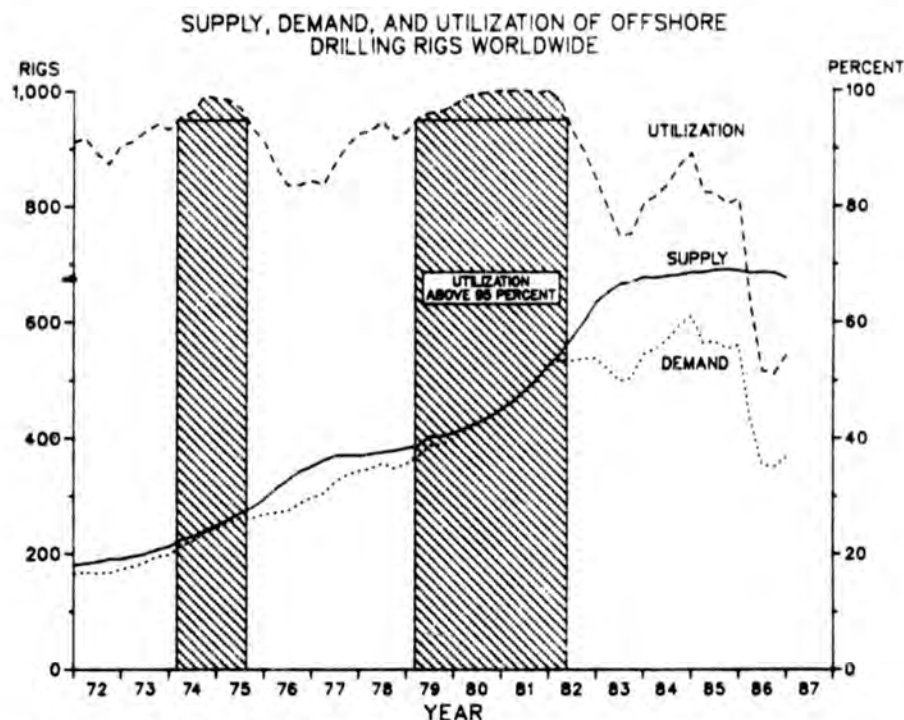
By state, increases were reported for Ohio, Mississippi, Oklahoma, Arkansas, Michigan, New Mexico, Utah, Wyoming, and New York. States reporting declines included Texas, Colorado, Nebraska, Pennsylvania, Alabama, and Florida.

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).

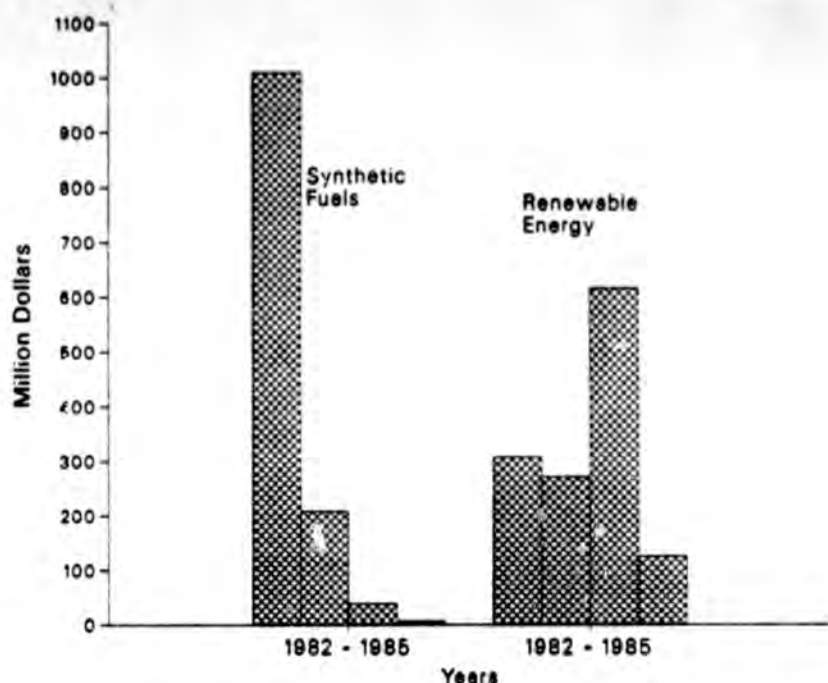
billion, the lowest level since 1978.

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
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3001 "C" St.
Anchorage, AK 99503

Lobo

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Sincerely,

Bettye Fahrenkamp
Chairman

BF:dc

Enclosure

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disk - work.
oilga

Testimony given by:

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Washington, D.C. 20510

2960 3178

34 Tim Dowd, Executive Director
Interstate Oil Compact Committee
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Oklahoma City, OK 93105

2195

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



WHILE IN JUNEAU
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(907) 465-4525

March 4, 1987

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

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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

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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 dark ink, appearing to read "Raymond Plank".

Raymond Plank

RP/ek



Official Business

Alaska State Legislature

Senate

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:

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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."

CORRECTION

**THIS DOCUMENT
HAS BEEN REPHOTOGRAPHED
TO ASSURE LEGIBILITY**

f. SJR 8
Alaska State Legislature

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(add code +
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WHILE IN JUNEAU
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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

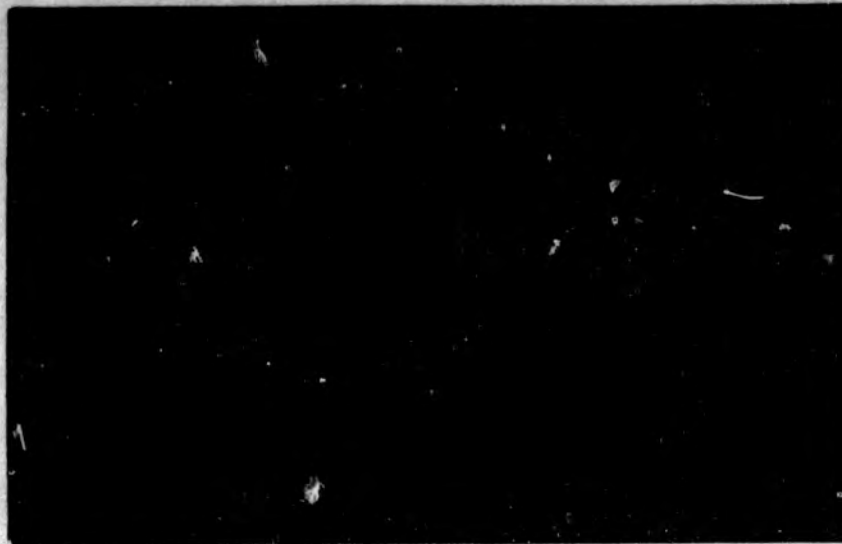
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Joe P. Josephson
State Senator

JPJ:mas

✓-OAG - SJR 3

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OIL TARIFF POLICY
IN AN UNCERTAIN MARKET

HARRY G. BROADMAN
WILLIAM W. HOGAN

NOVEMBER 1986

E-86-11

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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

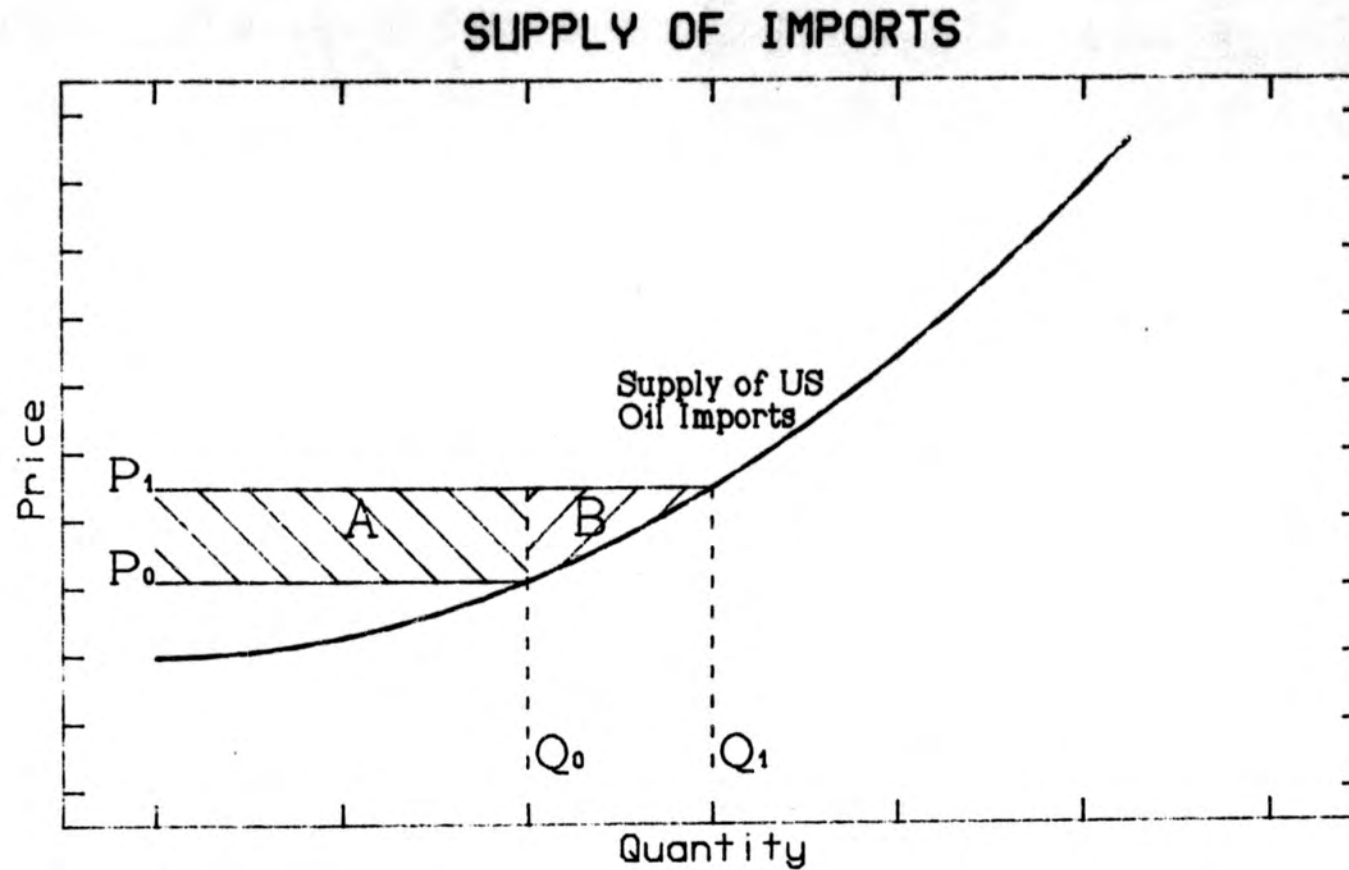
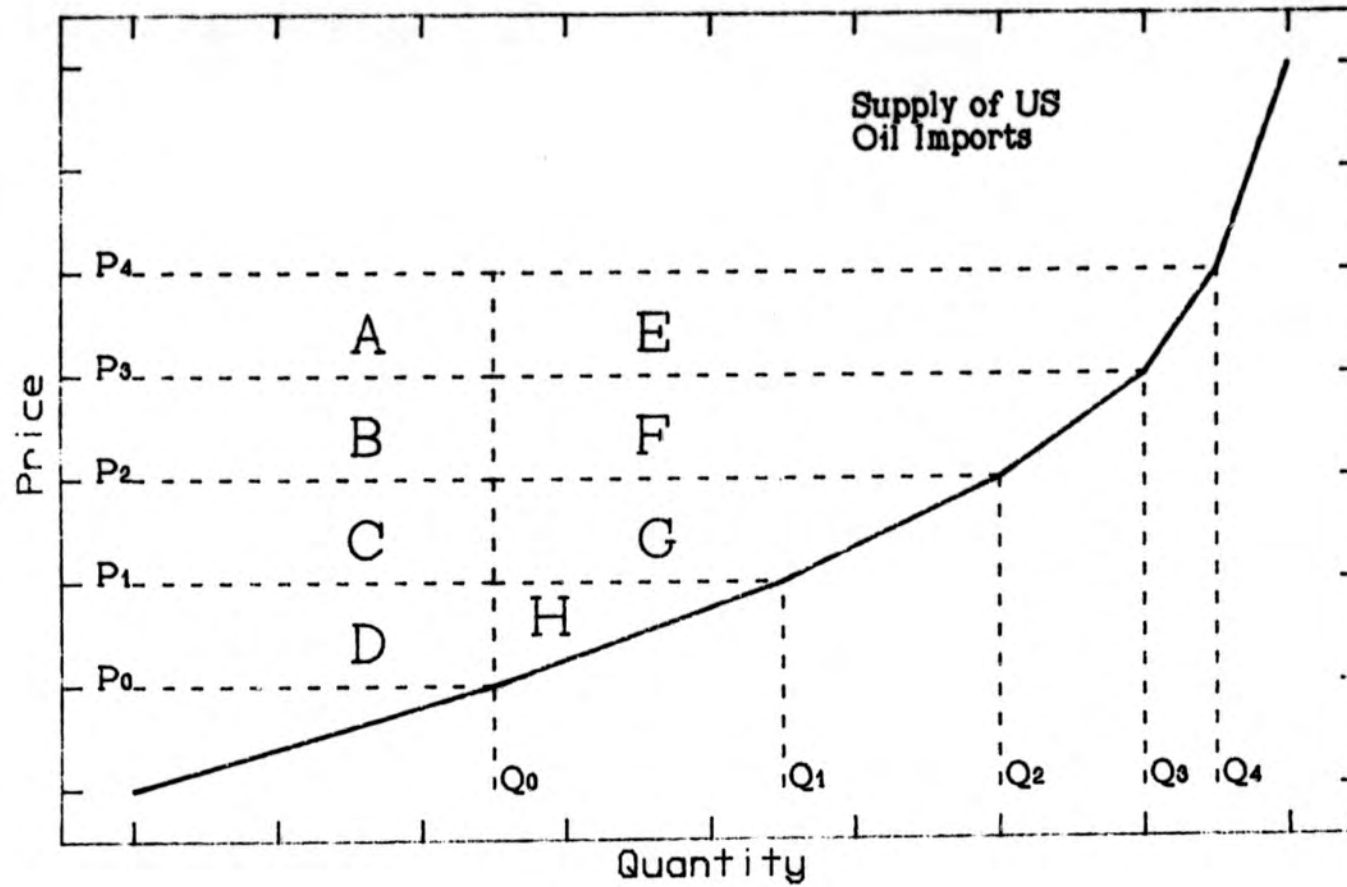


FIGURE 2

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

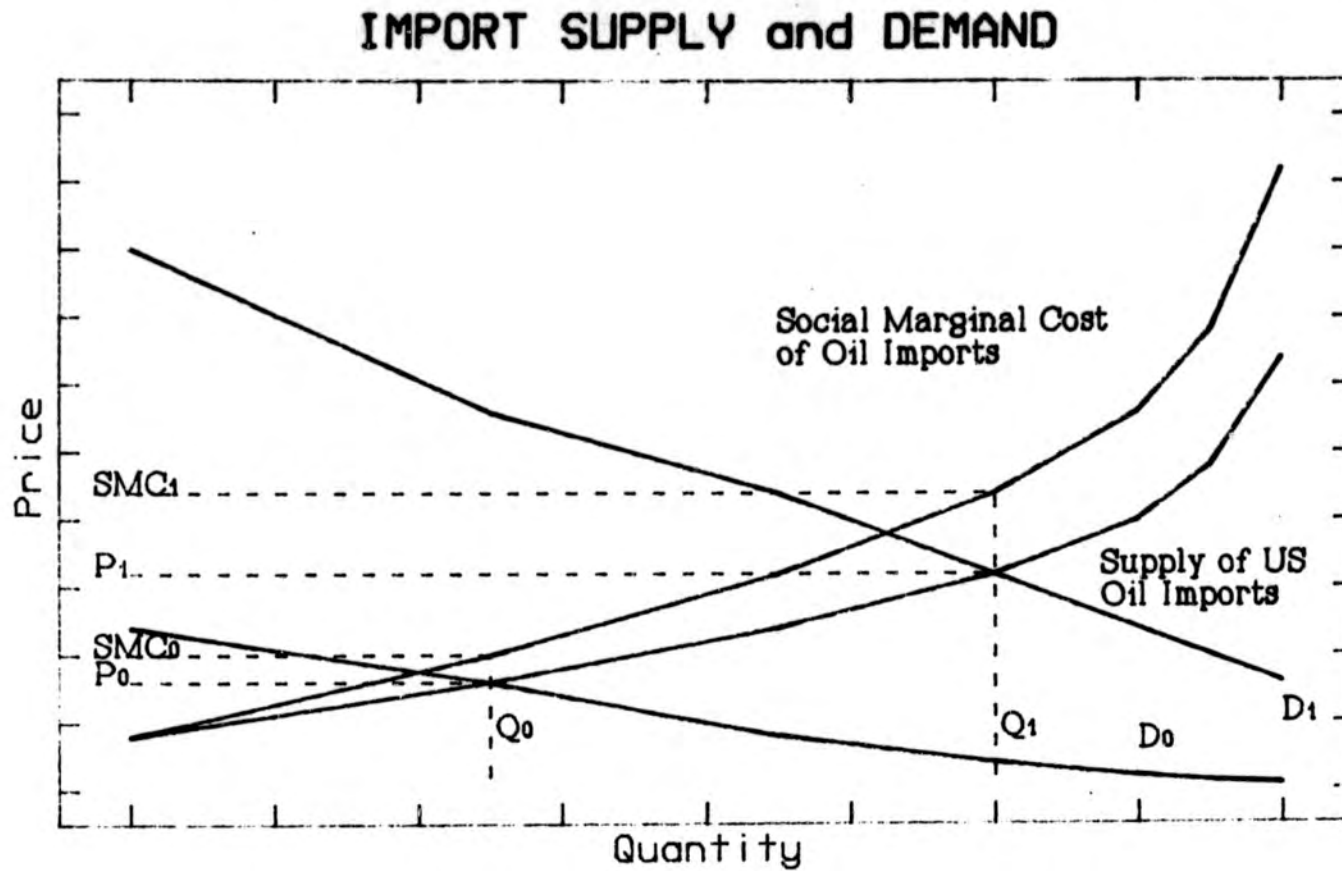
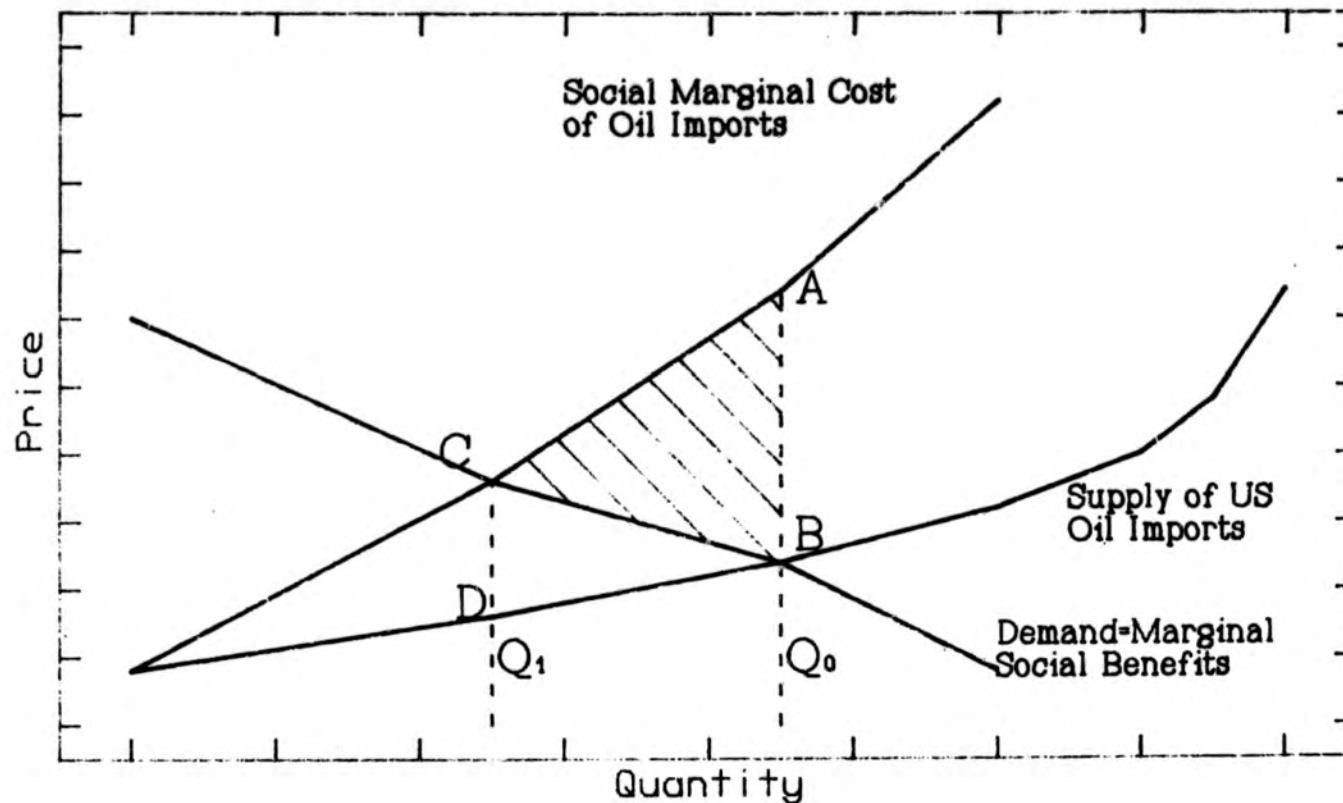


FIGURE 4

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.

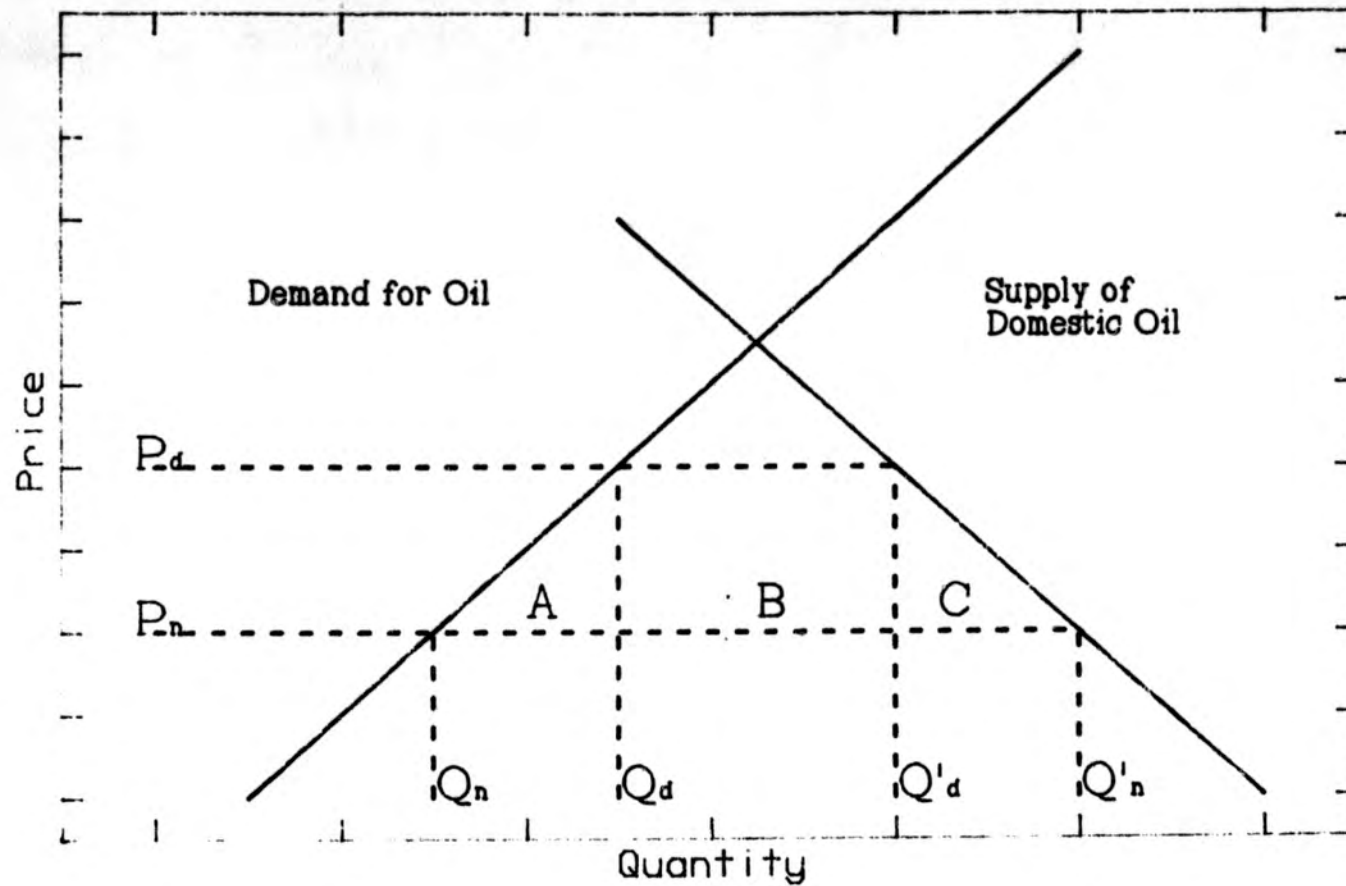
If there is one attribute common to the two elements of the security component, it is that the costs associated with oil supply disruptions arise because of the economy's failure to adjust smoothly to such price shocks. Empirical research on the macroeconomic effects of disruptions generally concludes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

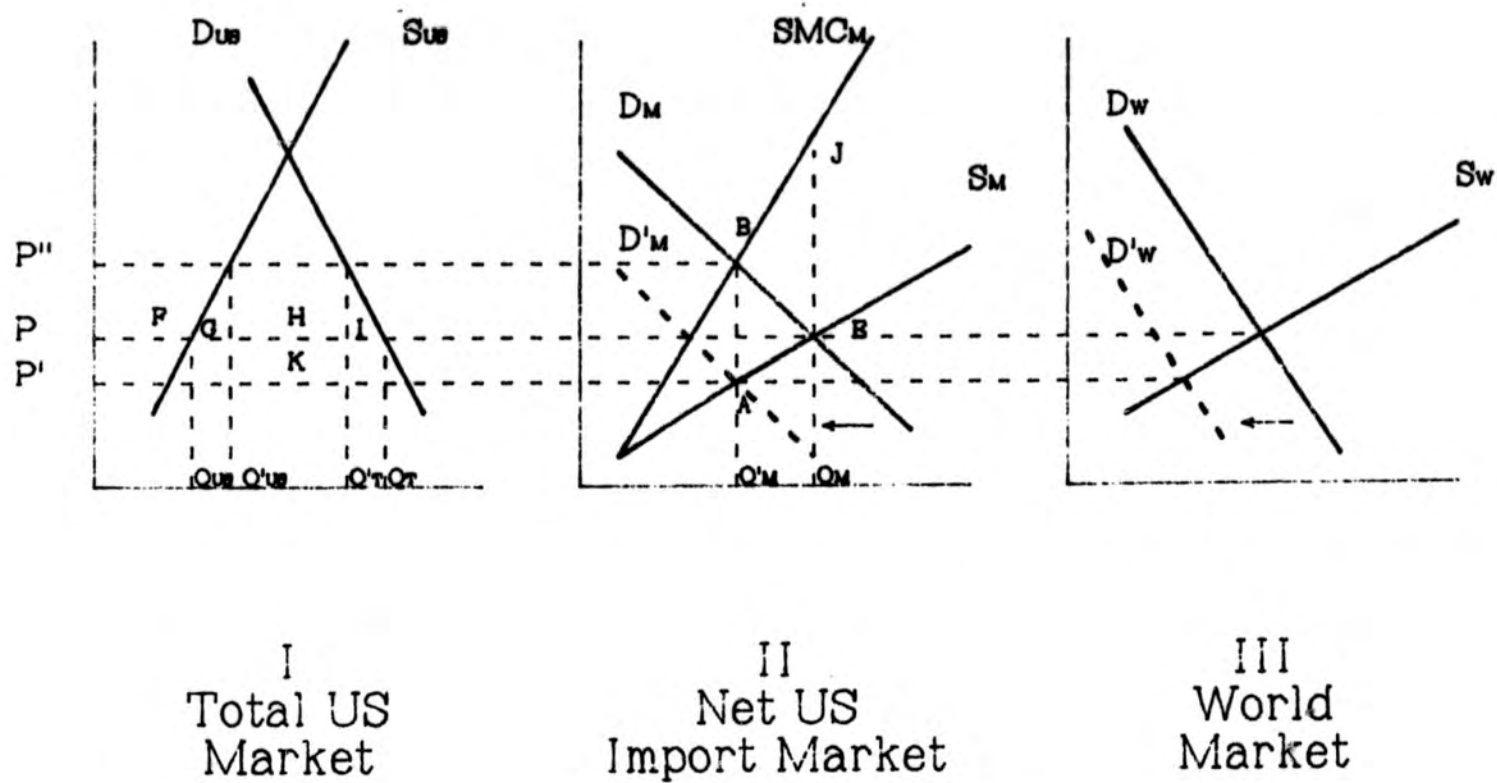
Using a simple comparative static framework, the aggregate implications of using the oil import premium as a guide for policy making are illustrated in Figure 6.

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.

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