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The current version of cargo preference legislation would require 9.5% of imported oil to be carried in U.S.-flag ships. Witnesses before the House Committee on Merchant Marine and Fisheries presented estimates of the difference in costs between carrying imported oil on U.S. ships protected by cargo-preference legislation and the cost of carrying oil on foreign-flag ships. Findings/Conclusions: Estimates of the transportation cost differential ranged from 1.2 cents per gallon to 2.8 cents per gallon. The Maritime Administration estimate was 1.6 cents per gallon. The differences in estimates were due primarily to disagreement over the capital cost differential between building ships in the United States and obtaining them in world markets. Estimates of costs to consumers for all imported oil ranged from 0.1 cents per gallon to 1.0 cents per gallon. Because of the wide dispersion in estimates, GAO made its own estimates using a simple average of operating cost differentials which is about one-fourth of the total differential. A range for capital cost differentials, the major source of variation, was estimated on the basis of different assumptions about world tanker prices. No firm conclusion was reached on possible costs of retaliation by other countries, since it could take forms other than adding to price. A reasonable range of cost estimates would be from about 0.15 cents to 0.23 cents per gallon of imported oil. (HTW)

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REPORT OF THE COMPTROLLER GENERAL OF THE UNITED STATES

Costs Of Cargo Preference

GAO has assessed the estimates of the costs of cargo preference legislation that were submitted to the House Committee on Merchant Marine and Fisheries. GAO's own estimates of these costs are presented.

PAD-77-82

SEPTEMBER 9, 1977

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-95832

The Honorable John M. Murphy
Chairman, Committee on Merchant
Marine and Fisheries
House of Representatives

Dear Mr. Chairman:

Pursuant to your request of March 4, 1977, we have prepared an independent assessment of the cost estimates presented to your office in connection with H.R. 1037, a cargo preference bill. On July 29, 1977, we sent you a letter which presented our basic findings and our own cost estimates. Our final report presents these same cost estimates and a more detailed review of the methodology used by our staff and by the witnesses who presented estimates to your office.

Because of time constraints, we have not asked for comments on this report by any of those whose estimates we reviewed.

As agreed with your office, this report is being released immediately.

Sincerely yours,

Comptroller General
of the United States

D I G E S T

GAO has assessed the estimates of the costs of cargo preference legislation that were submitted to the House Committee on Merchant Marine and Fisheries. Because these estimates varied widely, GAO made its own estimates.

The current version of the legislation would require 9.5 percent of imported oil to be carried in U.S.-flag ships. In this report, most figures in the text apply to 9.5 percent cargo preference. A preliminary report (PAD-77-74, July 29, 1977) stated figures for both 9.5 percent and the 30 percent cargo preference that had been proposed in an earlier version of the legislation. The two reports are consistent, but the reader should be aware of that difference.

HIGHLIGHTS OF THE WITNESSES' TESTIMONY

All of the witnesses presented estimates of the transportation cost differential, which is the difference between the cost of carrying imported oil on U.S. ships protected by cargo-preference legislation and the cost of carrying oil on foreign-flag ships. GAO put these estimates on a common footing by expressing them in a common unit of measurement--cents per gallon of oil in 1977 prices. This translation required removal of the various inflation factors that some witnesses had used in their estimates and the deflation of vessel values that had been stated in dollars of different years. GAO also presents the cost figures in dollars per year.

The estimates of the transportation cost differential for oil carried in cargo-preference ships range from 1.2 cents per gallon (Marine Engineers' Beneficial Association) to 2.8 cents per gallon (Federation of American Controlled Shipping)--a high-to-low

range of more than 2:1. The Maritime Administration estimate given in testimony, adjusted for comparability, is 1.6 cents per gallon. The differences in these estimates are due primarily to disagreement over the capital cost differential--the cost of building new ships in the United States and obtaining ships (new and existing) in world markets.

The disagreement among witnesses was, however, far greater than this. Costs to consumers would eventually be reflected in the price of oil, which is affected by oil transport costs and other factors. When the cost estimates were expressed in cents per gallon of all imported oil, they range from 0.1 cents per gallon (Marine Engineers' Beneficial Association) to 1.0 cents per gallon (American Petroleum Institute)--a high-to-low range of 10:1. (These figures reflect adjustments by GAO to 1977 prices.)

The increased dispersion in these estimates is the result of the witnesses' varying analyses at this point:

--The witnesses who presented the highest figures assert that the transport price would increase by considerably more than transport cost. That is, because of cargo preference, U.S. ships would be much in demand and, it is assumed, they could receive returns far in excess of normal profit levels.

--These witnesses also assert that there would be costs due to retaliation by foreigners whose economic interests are harmed by the legislation. These witnesses expect the retaliation to result in substantially higher prices of foreign-flag petroleum carriage.

GAO ESTIMATES

Because of the wide dispersion in the witnesses' estimates, GAO estimated the cost of cargo perference. The method of analysis is summarized below.

Operating cost differential

Because there was substantial agreement among the witnesses on operating cost differentials, GAO used a simple average of these estimates. The operating cost differential is roughly one-fourth of the total differential, the capital cost differential accounting for the balance.

Capital cost differential

This was the major source of variation in the estimates of the cost differential. It is understandable that the estimates should vary, because it is difficult to predict capital costs due to the present tanker glut and the uncertain prospects of recovery by any given date. GAO therefore estimated a range for the capital cost differentials, on the basis of different assumptions about world tanker prices and, thus, foreign-flag capital cost. GAO believes that it has improved upon the techniques of capital cost estimation provided by the witnesses.

Market effects

GAO assumed that regulation of some form would prevent excess profits on cargo preference shipping. (H.R. 1037 would give the Secretary of Commerce authority to waive the requirement of shipment on U.S.-flag tankers if the rates are not "fair and reasonable.") GAO believes that regulatory efforts to reduce excess profits will encounter substantial difficulties. GAO assumed, however, a 10-percent markup on U.S.-flag transport costs as virtually unavoidable.

Retaliation

GAO reached no firm conclusion on the possible costs of retaliation by other countries. Although retaliation might occur, it could take different forms other than adding to the price of oil. GAO therefore did not include such a cost in its estimates of the cost of cargo preference to oil consumers.

Based upon these and other assumptions, GAO concluded that a reasonable range of cost estimates would be from about 0.15 cents to 0.23 cents per gallon of imported oil.

To estimate annual costs, it is necessary to estimate how much oil will be imported in 1985. Eight million barrels per day was a figure used in some of the testimony, and this figure is probably on the low side. A recent GAO report entitled "An Evaluation of the National Energy Plan" (EMD-77-48, July 25, 1977) concludes that, even with the National Energy Plan, imports of 10.3 million barrels a day in 1988 is a more plausible estimate. If the level of imports is higher, more oil would have to be carried in cargo-preference vessels, and the total costs would be higher.

For imports of 8 million barrels per day, each 1-cent increase in price per gallon means $1.23 billion annually. Therefore, GAO's midrange estimate of 0.2 cents per gallon translates into about $240 million annually. For imports of 10.3 million barrels per day, GAO's midrange cost figure would be about $300 million annually.

Besides these additional transport fees, the American consumer probably faces an increase in the price of domestically produced oil, as the price of this oil adjusts to the change in the world market price. A full adjustment of domestic prices would cost consumers an additional $310 million, in our midrange estimate, if U.S. oil production reaches 10.5 million barrels per day as estimated for the National Energy Plan by the GAO report referred to earlier. Some of this increase could be suppressed by price control, at least in the shortrun, or recovered by wellhead taxes.

Because of time constraints, we did not obtain comments on this report from any of those whose estimates we reviewed.

Contents

ABBREVIATIONS

AMA	American Maritime Association
API	American Petroleum Institute
CDS	construction differential subsidy
DWT	dead weight tons
FACS	Federation of American-Controlled Shipping
MarAd	U.S. Maritime Administration
MEBA	Marine Engineers Beneficial Association
MDWT	thousand dead weight tons
MMB/D	million barrels a day
SCA	Shipbuilders Council on America
ULCC	ultra large crude carriers
VLCC	very large crude carriers

CHAPTER 1

INTRODUCTION

Legislation which would reserve a portion of U.S. petroleum imports for carriage by tankships under U.S. registry (cargo preference or cargo reservation) has been reported out of the House Committee on Merchant Marine and Fisheries as H.R. 1037. Witnesses that have testified before the Committee on H.R. 1037 agreed that U.S. shipping has substantially higher operating and capital costs than its foreign competitors.

Proponents of cargo preference do not dispute this. Their contention is that (1) the extra cost of cargo preference to the consumer is small and (2) the national security, environmental, employment, and distressed industry benefits of fostering the U.S. tanker industry by Government intervention are worth the extra cost. Opponents of the legislation dispute these two points.

SCOPE OF REVIEW

The Chairman of the House Committee on Merchant Marine and Fisheries requested us to make an independent assessment of the cost estimate of cargo preference to the consumer which was presented in testimony to the Committee during May-August 1977. Our assessment is based partly on data (1) provided by the witnesses and (2) from other sources. Also provided are our estimates of the cost of cargo preferences to the consumer.

This report does not address the potential national security or environmental impacts of the legislation. Thus, no recommendation is made as to ultimate cost effectiveness of the proposed legislation.

According to the original version of H.R. 1037, the level of cargo preference was to reach 30 percent in 1980. Virtually all of the testimony received during hearings and in statements prepared for the record consequently referred to cargo preference at the 30-percent level. Subsequently an amendment was adopted that changed the maximum percentage of cargo preference from 30 percent to 9.5 percent.

In chapter 2 the testimony on the cost of cargo preference at both the 9.5 and 30 percent levels is analyzed. In chapter 3 our estimates of the cost of cargo preference are presented for both the 9.5-percent and the 30-percent levels.

Chapter 4 addresses some of the other economic effects of cargo preference.

The witnesses who testified concerning the cost of cargo preference and whose estimates are analyzed in this report are the following:

--American Maritime Association (AMA).

--American Petroleum Institute (API).

--Federation of American-Controlled Shipping (FACS).

--Marine Engineers Beneficial Association (MEBA).

--Mobil Oil Corporation.

--Shipbuilders Council on America (SCA).

--U.S. Maritime Administration (MarAd).

This report was requested and prepared within a short period of time. Thus, it does not include comments from MarAd or from the other witnesses.

CHAPTER 2

THE COST AND PRICE OF OCEAN CARRIAGE OF PETROLEUM IMPORTS

There is substantial agreement on the size of the operating cost differential between U.S.- and foreign-flag tankers, when these are considered for each vessel size. 1/ There are, however, substantial differences in capital cost estimates even when individual vessel sizes are taken into account. These differences in capital cost estimates result in estimates of the cost of cargo preference that also differ widely. At the 30-percent level of cargo preference, which most of the testimony was directed to, the estimates of the import price differential in 1985 differ by $3.1 and $4.6 billion at oil import levels of 8 and 12 million barrels per day, respectively. (These figures are presented in constant 1977 dollars.)

At the 9.5-percent level of cargo preference specified in the amended version of H.R. 1037, the difference between the low- and high-cost estimates is $1.1 and $1.7 billion at the two import levels. Given differences of this magnitude, we constructed a set of our estimates of the costs of cargo preference. These will be presented in chapter 3.

COMPARABILITY OF ESTIMATES

The original cost estimates are not comparable with each other, since transport costs, or its operating and capital cost components, are often expressed in monetary values for different base years. We have adjusted the estimates and expressed them in 1977 dollars to make the cost estimates

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1/ It wasn't quite unanimous, however. One argument presented at the Hearings before the Subcommittee on Merchant Marine during the 93d Congress on H.R. 8193 by Stanley Ruttenberg did suggest that American-flag cargo preference tanker rates would be below foreign-flag tanker rates existing prior to cargo preference, because the regulations accompanying cargo preference would force the large petroleum companies to disclose what they charge for ocean petroleum carriage. Furthermore, a test of "fair and reasonable," if applied to the shipping charges would, according to his argument, result in a reduction of the charges, however, this argument is not considered germane to the subject of this report, since both disclosure of oil company shipping charges and the imposition of price controls to force these charges to conform more closely to costs could be done without reference to cargo preference. Cargo preference, for its part, could also be carried out without price controls.

comparable. We have also recalculated all of the original estimates that assume a cargo preference rate of 30 percent and converted them to a 9.5-percent rate of cargo preference. In each case, the methodology of the witness was followed. (See table 1.)

Different assumptions have been made by the various witnesses as to the years in which new purchases are to be valued. This is particularly important in the case of newly purchased VLCCs, which in all analyses are assumed to carry the bulk of preference oil. In this case, new ship purchases have been valued in the dollars of a wide disparity of base years (see table 1, column 3). Of the six witnesses covered in table 2 only two (Mobil and MEBA) value 1985 capital costs in the same year's dollars as operating costs. Two others use book values for new VLCCs (API and FACS), but because different amounts of ship construction are projected by the two witnesses to take place in the various years before 1985, even these values are not completely comparable. For AMA, 1985 operating costs are expressed in 1985 dollars and the 1985 capital costs of new VLCCs are expressed in 1978 dollars. For MarAd, however, 1985 operating costs are expressed in 1976 dollars and 1985 capital costs of new VLCCs are expressed in 1981 dollars. (VLCCs are expected by MarAd and all other witnesses to carry the vast bulk of preference oil in 1985.) 1/

The use of different base years for capital costs impedes comparability. Since subsequent analysis will show that capital cost is the crucial element in determining the cost of cargo preference, we have therefore chosen to deflate all capital costs consistently so that, to the extent possible, they are all expressed in the same 1977 dollars as operating costs. This procedure results in the adjusted estimates of table 1, column 5.

It should be noted that, after adjustment to produce consistent capital valuation, the estimates of transport cost for the 30-percent and the 9.5-percent preference levels are the same. Thus, the adjusted estimates of table 1, column 5 are valid, given the witnesses methodology and the adjustment technique, for all levels of cargo preference. This occurs because the only factor that caused a difference in the original estimates for the different preference levels was the inconsistent valuation of ships purchased in different years.

1/MEBA does not independently determine a vessel mix. For its calculations of transport cost, it uses 100 percent 90 MDWT vessels, but elsewhere in its statement, it regards a mix of vessel sizes as likely.

TABLE 1

Transport Cost Differentials: Estimates Given in Original Testimony and Estimates Adjusted for Comparability

Witness	(1) Noncomparable 1985 transport cost differential estimates given in or derived directly from testimony (cents per gallon) (note a)	(2) Dollars in which 1985 operating costs expressed	(3) Dollars in which new very large crude carriers (VLCC) capital costs expressed (note b)	(4) 1985 transport cost differential estimates deflated to common 1977 dollars for comparability: Simple deflation of column 1 by inflation rate assumed by witness	(5) 1985 transport cost differential estimates deflated to common 1977 dollars for comparability: Complete deflation of all costs including capital costs
	(1977 dollars; cents per gallon)			(1977 dollars; cents per gallon)	
FACS	4.1	1985	c/1978, 1980, and 1985	2.4	2.8
API	3.5	1985	c/1978, 1980, and 1985	2.2	2.5
Mobil	2.7 (1981) (note d)	1981	e/1981	2.0	2.0
AMA	2.0	1985	f/1978	1.1	1.6
MarAd II (note g)	1.0 (note h)	1976	i/1981	1.1	j,k/1.6
MarAd I (note g)	1.6	1976	h/1981	1.7	j/1.3
MEBA	1.2	1/1977	m/N/A	1.2	1.2

a/As described in column 3 or in footnotes, certain witnesses' have presented capital costs in dollars of various years. Where this is true, the witnesses' estimates of transport cost would be different at 9.5-percent cargo preference than at 30 percent. We have redone the witnesses' estimates that would be different for 9.5-percent cargo preference, using their methodology. The resulting estimates are: FACS, 3.6 cents; API, 2.8 cents; and MarAd 1, 1.4 cents. Mobil and AMA are unchanged. MarAd II and MEBA were estimated for 9.5 percent originally.

b/Treatment of the capital costs of existing VLCC's and other size vessels is given in separate footnotes for each witness.

c/All new vessels are valued at cost in 1978, 1980, 1985. Existing vessels are valued at book value. An exception in the API analysis: existing foreign VLCC's in 1978 and 1980 are valued at market values.

d/The number originally presented in Mobil's statement, $1.50 per barrel (= $1.54 per barrel in subsequent backup communication to us = 3.6 cents per gallon) was derived using an inappropriate annual average laydown figure for a 275,000 dead weight tons (DWT) VLCC on all routes of 1.914 million tons per year. This is the figure Mobil believes to be appropriate for the Persian Gulf-U.S. route. Mr. L. H. Atherton of Mobil, in a communication to us, suggested a more reasonable average laydown figure of about 2.5 million tons per year, similar to the 2.8 figure that results from distributing a 8.6 million barrels a day (MMB/D) imports over 154.4, 275,000 DWT VLCC's. Using the corrected laydown figure (2.8) results in a 1981 transport cost of 2.7 cents per gallon and presumably would result in a revision of testimony.

e/Fleet specified to consist only of VLCC's, all of which are valued at 1981 prices.

f/U.S.-flag fleet is assumed to consist of new vessels priced at 1978 cost. The foreign-flag fleet is estimated as "average cost of existing modern fleet."

g/MarAd's analysis of the cost of 30-percent cargo preference was provided by the Assistant Administrator for Policy and Administration in April 1977 and was based on cost information incorporated in "required freight rates" that had been calculated in January 1977 or before. The analysis on which MarAd's testimony in August 1977 on cost of 9.5-percent cargo preference was based, was provided to us by the Merchant Marine Subcommittee. It used the same "required freight rate" schedule as the earlier analysis. The dollars of the second analysis as well as those of the first have, therefore, been identified as 1976 dollars. We have labeled the earlier analysis "MarAd I" and the later analysis "MarAd II." It might be noted that all the documents referred to were undated and on paper without MarAd letterhead.

h/This is the original MarAd II figure given in testimony and incorporates two assumptions not present in MarAd I: (1) A deduction from total import cost of "construction differential subsidy (CDS) payback" of $61 million on the assumption that the rates for U.S.-flag ships that have received CDS will be lower by the amount of their CDS subsidy allocated over the vessel's lives, (2) Costly "extraordinary safety equipment called for in S.568" will be required for new U.S.-flag VLCCs," but will not be required for foreign-flag vessels and other U.S.-flag vessels. MarAd II's second assumption could address the issue of "what is the cost of requiring some U.S.-flag ships but not foreign-flag ships to have extraordinary safety equipment," but this issue is conceptually separable from cargo preference.

i/All vessels except new VLCC's valued at 1976 book value. VLCC's existing before December 31, 1977, are valued at the cost of the SS Brooklyn. Those on order but not delivered by that date, as well as those not ordered by that date, are valued at 1981 delivery-date prices.

j/For MarAd's estimates, only the 75-200 thousand dead weight tons (MDWT) and the 200 + MDWT tonnage classes were deflated because of a lack of information about the size composition of the smaller vessel class. In any case, the 0-75 MDWT class is projected to carry only a small percentage of the tonnage of petroleum. The VLCC deflation, since this category is preponderant, is described in detail: (1) the MarAd 100+ MDWT class uses for "existing" vessels cost figures for a single 225 MDWT tanker that was purchased for $60 million and delivered in 1974, (2) the 100+ MDWT class of "planned" vessels uses a capital cost of $119.6 million for 1981 delivery, (3) for this adjustment, we have inflated the "existing" class and deflated the "planned" class to $87.9 million 1977 dollars, the latter being the figure from which the $119.6 million figure was obtained by inflation at 8 percent per annum in the first place.

k/To achieve comparability with MarAd I and the other testimony, the MarAd II figure has been adjusted in the following additional ways: (1) the deduction for "CDS payback" of $64 million at 8 million barrels per day has been reversed, resulting in a total cost of cargo preference (in 1976 dollars) of $175 million rather than $110 million, the figure given in testimony, and (2) "required freight rates" that incorporate "extraordinary safety equipment called for in S.568" for new U.S.-flag VLCC's but not for foreign-flag VLCC's were not used. Instead, the rates from the same table that did not incorporate this equipment and that were used in MarAd I were used instead. MarAd II's use of required freight rates is considered to address a separate issue, which might be phrased as "the cost of requiring some U.S.-flag ships but not foreign-flag ships to [illegible] safer equipment."

l/Operating cost estimates are stated to be in 1977 dollars; capital values also appear to be in 1977 dollars, although only the phrase "newly built" is used.

m/Since only 90 MDWT ships are used in the cost estimate, the column heading is not applicable. The 90 MDWT ships appear to be in 1977 dollars (see footnote l).

COST AND PRICE DIFFERENTIAL CONCEPTS AND THE IMPORTANCE OF MARKET FACTORS

The focus of the remainder of this chapter will be on the testimony received on three cost or price differentials due to cargo preference:

1. The additional cost of carrying oil on American-flag rather than foreign-flag tankers ("the transport cost differential per gallon of preference oil.")

2. The additional price charged by American-flag tankers over that charged by foreign-flag tankers ("the transport price differential per gallon of preference oil.")

3. The additional price of imported oil due to the shipment of a fraction of imports on American-flag tankers at a given level of cargo preference ("the import price differential per gallon of imported oil.")

Chapter 4 below discusses another type of cost.

1. The additional price of oil consumed in the United States ("the consumption price differential" or the "cost of cargo preference to the consumer.")

Since market factors are involved in each of these concepts, no simple change of base can translate the transport cost differential into an estimate of the cost to the consumer. Except under specific circumstances, costs do not completely determine prices, the latter being determined by the interplay of the forces of supply and demand in markets. Important market factors that will be evaluated in the course of this chapter and the next are (1) the depression of foreign tnaker rates below cost, (2) the possible excess profits of U.S.-flag operators that could result from various regulatory scenarios, (3) a possible change in foreign-flag rates due to retaliation or emulation, and (4) the reaction of the price of domestically produced oil to a change in the price of imported oil.

ESTIMATES OF COST AND PRICE DIFFERENTIALS

Tables 2 and 3 present the adjusted cost and price estimates given by witnesses at the hearings or in backup documents. All estimates have been adjusted to achieve comparability. The estimates of the 1985 transport cost differential varied widely, with the highest (2.8 cents per gallon)

being more than double the lowest (1.2 cents per gallon). For 9.5 percent cargo preference, this range translates into a $190 million range in estimated annual costs for imports of 8 million barrels of oil per day, and a $280 million range if imports are 12 million barrels of oil per day.

The divergence between the estimates of the various witnesses as to the transport price differential is even wider than the divergence between their estimates of the transport cost differential (see table 2, column 2). Of the six witnesses, three, API, FACS, and MEBA, attempted to account for market factors. The others ignored them and equated transport cost and transport price differentials. After the incorporation of market factors, the range of transport price differential estimates widens with the highest, 5.2 cents per gallon of preference oil, being more than five times the lowest, 1.0 cents per gallon. In total 1977 dollar value, if the rate of cargo preference is 9.5 percent and imports are at the rate of 8 million barrels per day, the difference in the 1985 transport bill estimates is on the order of $490 million. If imports are at the rate of 12 million barrels per day, the difference in the estimates is on the order of $730 million.

TABLE 2

Summary of Testimony on Transport Cost and Price Differentials Caused by Cargo Preference in 1985, Adjusted for Comparability (note a)

Witness	Transport cost differential (note b)	Transport price differential (note c)
	(1977 dollars; cents per gallon)	
FACS	2.8	5.2
API	2.5	4.7
Mobil (note d)	2.0	2.0
AMA	1.6	1.6
MarAd II	1.6	1.6
MarAd I	1.3	1.3
MEBA	1.2	1.0

a/Estimates presented in this table are adjusted estimates. Original testimony presented 1985 estimates in the values of various base years. For comparability, the original estimates (presented in table 1, column 1) were adjusted so that the values are expressed in the dollars of a common base year (1977), according to the preferred deflation technique described in the text in which all costs are expressed in 1977 dollars. The transport cost differential estimates in column 1 are taken from table 1, column 5.

b/Basic transport cost differential, including, in the case of the API and FACS analyses, estimated cost increments ("inflexibility premium") due to scheduling and other inefficiencies expected by these analyses to result from the implementation of cargo preference. The transport cost differential estimates in this column are taken from table 1, column 5).

c/Includes market factors, where these are considered by the analyses, in the market for U.S.-flag tanker services.

d/The estimates of Mobil are formally for 1981 but, given the methodology, it is unlikely that they would differ materially for 1985 once inflation is taken into account.

Source: Unadjusted basic data taken from testimony before the Subcommittee on Merchant Marine, U.S. House of Representatives, 1977 (exception noted in footnote on p. 4 .)

TABLE 3

Summary of Testimony on the Import Price Differential at Cargo-Preference Rates of 9.5 and 30 Percent

Witness	(1) 9.5 percent cargo preference (note a): Allocated transport price differential (note b)	(2) 9.5 percent cargo preference (note a): Import price differential (note c)	(3) 30 percent cargo preference: Allocated transport price differential (note b)	(4) 30 percent cargo preference: Import price differential (note c)
	(1977 dollars; cents per gallon)			
FACS	.99	.94	1.6	2.4
API	.45	1.00	1.4	2.9
Mobil	.19	.19	d/.60	d/.60
AMA	.15	.15	.48	.48
MarAd II	.15	.15	N/A	N/A
MarAd I	.12	.12	.39	.39
MEBA	.10	.10	N/A	N/A

a/Except for MarAd II and MEBA, all other analyses were for 30-percent cargo preference. The original unadjusted testimony on transport cost in a number of the analyses did depend on the level of cargo preference because lower book-valued ships make up a larger proportion of the U.S. Fleet at 9.5 percent than at 30 percent (see table 1, note a). However, when capital is consistently valued in 1977 dollars, the resulting adjusted estimates of transport cost and transport price are scalable. This is not true for the import price differential, however, for those analyses (FACS and API) that see a change in foreign-flag prices. Here we have the import price differential for 9.5-percent cargo preference using the witnesses' methodology.

b/Columns 1 and 3 are obtained by multiplying the numbers from table 2, column 2 by 9.5 and 30 percent respectively.

c/Where columns 2 and 4 differ from columns 1 and 3, they incorporate the impact of pricing reactions of foreign-flag operators that certain witnesses assert will be caused by cargo preference.

d/Mobil's original testimony referred to a cargo preference rate of 15 percent, but backup papers provided to us give the following equivalence, "15% Cargo Preference Proforma Basis = Approximately 30% Ton Mile Basis," which is the approach of all other witnesses.

TABLE 4

Summary of Testimony on Operating and Capital Components of the Transport Cost Differential, Adjusted for Comparability (note a)

Cost category	Tonnage class (thousand dead-weight tons (DWT))	FACS	API	Mobil	AMA	MarAd I	MarAd II	MEBA
		(1977 dollars per DWT per annum)						
Operating	0-75	$ 38.87	$ 48.95	$ N/A	$28.26	$26.61	$26.61	$ N/A
	75-200	19.08	20.06	N/A	11.57	18.10	18.10	10.51
	200+	7.55	8.16	8.10	6.39	7.43	7.43	N/A
	Weighted average b/	12.38	12.60	8.10	10.05	9.36	12.59	10.51
Capital	0-75	67.43	62.35	N/A	37.27	c/16.99	c/16.99	N/A
	75-200	60.18	46.23	N/A	30.48	22.90	22.90	9.33
	200+	34.44	30.49	55.41	25.93	22.81	22.81	N/A
	Weighted average b/	42.48	35.37	55.41	28.29	22.55	22.11	9.33
Total	0-75	106.30	111.30	N/A	65.53	43.60	43.60	N/A
	75-200	79.26	66.29	N/A	42.05	41.00	41.00	19.84
	200+	41.99	38.65	63.51	32.32	30.24	30.24	N/A
	Weighted average b/	54.86	47.97	63.51	38.34	31.91	34.70	19.84

a/See footnote a, table 2.

b/Weighted average costs are calculated using the vessel mix of each witness (see table 5).

c/MarAd's capital cost estimate for small tankers (0-75 MDWT) has not been deflated because of incomplete information about the size composition of the category. However, since the proportion of imports carried on the small tankers is small, nondeflation makes little difference.

Some witnesses indicated that the transport price charged by foreign-flag tankers would change in response to a U.S. imposition of cargo preference. Their analyses took into account the effect of retaliatory and emulative behavior of foreign-flag tanker fleets servicing the U.S. market. As an example of such behavior, oil-exporting countries could match U.S. cargo preference by imposing their own unilateral cargo preference arrangements specifying that a certain percentage of their exports to the United States be carried on tankers of their own national registry. Such emulative behavior might extend to price as well, with the exporting country fleets charging rates equal to U.S. rates. For 9.5-percent cargo preference, the increased rates of foreign-flag tankers, when included in the import price differential, further widens the spread between the highest estimate (e.g., 1.0 cent per gallon of total imports, and the lowest 0.10 cent per gallon of total imports. The highest estimate is now ten times the lowest. The figures for each witness and the corresponding figures for 30-percent cargo preference are given in table 3. In total 1977 dollar value, with imports at the rate of 8 million barrels per day and cargo preference at 9.5 percent, the difference in the estimates of increased import cost is about $1.1 billion; at the import rate of 12 million barrels per day, the difference in the estimates of increased import cost is $1.7 billion.

TRANSPORT COST DIFFERENTIAL

The reasons for the divergence in the various witnesses' estimates of the transport cost differential become apparent when their estimates are disaggregated by cost component and by ship size (see table 4). 1/

The operating cost differential (mainly wages) is important, relative to the capital cost differential, only for the smallest tonnage category of the projected fleets. For the larger ship sizes, the capital cost differential becomes dominant. All parties agree that the small-tonnage segment of the fleet will be quantitatively unimportant in moving oil imports into this country in 1985, and that the primary source of crude oil imports will be the Persian Gulf and West Africa. 2/

1/In all analyses, the witnesses assumed that the fleet mixes for the foreign flagships and U.S. flagships would be the same.

2/The prospects of the new Mexican find in the Yucatan are, unfortunately, unevaluated in all analyses.

For transport from these distant sources, only the larger tankers (very large crude carriers of 200 to 300 thousand deadweight tons and ultra large carriers above 300 thousand deadweight tons (ULCC)) are economic. Therefore, the vessel mixes projected in all analyses 1/ (table 5) are preponderantly weighted toward VLCCs, and the average transport cost is primarily a reflection of the VLCC transport-cost profile.

Just how dominant the capital-cost differential is in the transport cost differential can be calculated from the data in table 4. This calculation shows that the average capital-cost differential as a percentage of the average total transport-cost differential ranges from 64 percent to 87 percent for the different analyses (not including MEBA's 2/).

Besides being the dominant element in the cost differential, capital cost is also the major source of disagreement in the estimates. The range of the capital-cost differential estimates, which are averages over the projected fleet in each case, is from $9.33 per DWT of fleet capacity to $55.41 per ton (table 4).

Since the witnesses basically agree on the fleet mix that will carry petroleum imports in 1985, as is shown by the similarity of the fleet mixes used (table 5) 3/, estimated capital cost differentials of the magnitude indicated arise primarily from two sources: (1) different valuation of U.S.-flag and foreign-flag vessels, especially VLCCs, and (2) different

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1/Except for MEBA, which for an unexplained reason uses only 90 MDWT in its comparative cost analysis. Elsewhere in its statement uses a vessel mix of 21 percent (30 MDWT), 52 percent (90 MWDT) and 27 percent (225 MDWT). These percentages refer to numbers of ships. When converted to percentages of tonnage in each tonnage class, the percentages are: 5.5 percent (30 MDWT), 41.4 percent (90 MDWT), and 53.3 percent (225 MDWT).

2/Except again for MEBA, which derives its low capital cost differential using questionable methodology. This involves using the period of amortization for tax purposes as a measure of the economic life of the vessel. In the case of U.S.-flag vessels it uses a period of 20 years. In the case of foreign-flag vessels, the period used is 7 years. This results in a higher capital consumption for foreign-flag vessels than for U.S.-flag ones.

3/See footnote 1 above.

TABLE 5

Vessel Mix, Import Level, Average Vessel Size, Average Number of Voyages, and Average Laydown Assumptions of Witnesses

Vessel mix	FACS	API	Mobil	AMA	MarAd I	MarAd II	MEBA	SCA
Tonnage class (MDWT)	(Percent of tonnage in each tonnage class)							
0-75	8.0	4.5	-	10.9	4.6	12.5	-	3.9
75-200	21.0	21.9	-	24.7	9.8	25.9	100.0	a/9.3
200+	71.0	73.6	100.0	64.4	85.6	61.6	-	b/86.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Ocean-borne import level scenario								
(MMB/D) (note c)	11.0	9.7	8.6	9.5	d/7.55	d/7.53	8.0	10.0
Average vessel size								
(MDWT) (note e)	143	139	275	140	170	113	90	194
Average no. of voyages per annum	6.7	7.4	10.3	8.1	8.9	8.0	5.5	7.0
Average laydown per annum (note f)								
(MT)	958	1,029	2,833	1,134	1,513	904	492	1,358

a/See footnote f.

b/We have included SCA's 188 MWDT vessel category, an unusual ship size in our 200+ MDWT category as well as its 265 MDWT and 390 MDWT vessel categories. Actually, none of the other witnesses except SCA specify vessel sizes between 120 MDWT and 200 MDWT. Since SCA is not included in table 4, we have avoided altering our vessel size categories just to accomodate SCA's 188,000 tonner, which in any case, would seem to fit naturally in the topmost vessel category.

c/Million barrels per day.

d/7.55 and 7.53 MMB/D scenarios. MarAd used a 8 MMB/D total imports figure which included .45 and .47 MMB/D, respectively, overland from Canada for the two analyses.

e/Thousand deadweight tons.

f/Average amount of petroleum delivered in a year, long tons per annum.

translations of these valuations into annual capital cost. Tables 6 and 7 give data on the VLCC valuations by the different witnesses and on the annual capital cost factors they use, respectively.

Some of the wide disparities in the valuation of VLCCs, particularly foreign ones, which are shown in table 6, arise from divergent price data. For example, MarAd expects new VLCCs constructed in U.S. shipyards (1981 delivery) to cost $119.6 million in 1981 dollars, while Mobil expects them to cost $139 million. Most of the disagreement, however, comes from the use of an inappropriate methodology in valuing capital.

In the economic theory of capital valuation, the value of an asset is the present expected value of its future earning stream (including its ultimate return as scrap), discounted at the opportunity cost of capital available to the firm. Economic depreciation in a given year is the difference between the expected present value at the beginning and at the end of the year. Annual capital cost is the sum of depreciation and the return that would have been earned at the opportunity rate if an alternative investment at that rate had been undertaken.

The analyses presented at the Subcommittee hearings were not always based on this definition. Many witnesses presented capital cost estimates based on accounting book value, that is, on the purchase price of vessels expressed in dollars of the year in which the purchase took place. This practice is inconsistent with an economic analysis of capital cost for two main reasons: first, the book value does not reflect the decrease in the value of money due to inflation. Thus, when book value is used to calculate capital cost, virtually identical vessels purchased a few years apart in an era of rapid inflation will have substantially differing capital costs in any given year, independent of physical depreciation.

Second, the use of book value to calculate capital cost has the defect that changed future earnings patterns of vessels are not taken into account, except by accident. If a vessel remains with the owner who purchased it new, the book value will have a relation to the economic expectations at the time of purchase, however long ago that may have been, since an economic decision was then made as to its profitability. If a drastically changed charter market occurs, however, book value and economic expectations can be substantially unequal in a relatively short time, even if an adjustment for inflation has been made.

TABLE 6

Valuation of VLCCs in 1985 by the Various Witnesses, Deflated to 1977 Dollars for Comparability

	U.S.-flag VLCCs	Foreign-flag VLCCs	Differential
	(1977 dollars per DWT)		
FACS	$502	$116	$386
API	480	189	291
Mobil (note a)	386	122	264
AMA	463	111	352
MarAd	391	185	206
MEBA (note b)	N/A	N/A	N/A
SCA (note c)	470	235	235

a/Mobil's analysis is for 1981.

b/MEBA's did not use VLCCs in its cost analysis.

c/SCA's analysis is for 1983.

TABLE 7

Annual Capital Cost Factors Used by Witnesses for VLCCs (note a)

	Year	U.S.-flagship	Foreign flagship
FACS	1985	.10	.12
API	1985	.12	.14
Mobil	1981	.18	.11
AMA	1985	.08	.11
MarAd	1985	.11	.11
MEBA (note b)	1977	.09	.17
SCA	1983	.10	.10
Average		.11	.12

a/Calculated by dividing the annual capital cost estimate for VLCCs by the VLCC's average valuation for the indicated year.

b/For 90 MDWT vessels; MEBA did not use VLCCs in its cost analysis.

The relation of book value to current asset value can be even more widely divergent. If the vessel has changed hands during, for example, a tanker glut or during a tanker boom such, as existed after the 1967 Middle East War, the purchase price of a used tanker, which is set up as the book value, will relate to the economic expectations at the time of the sale but, may be unrelated to the conditions that existed when it was constructed. Thus, the combined book value of a number of vessels, which have been purchased both new and used, even if an inflation correction has been made, is likely to be an unmanageable aggregation of obsolete economic estimation.

In chapter 3, high and low estimates of capital cost will be presented that conform to the economic theory of capital valuation. Alternative estimates are required, since substantial uncertainties exist as to the economic values of foreign-flag vessels in 1985, dependent as they are on expected tanker profits in the world market from 1985 on. The future of tanker profits, in turn, for owners operating in the unprotected world market, is decidedly uncertain. It depends on demand factors, such as world economic growth, the implementation of conservation measures, and the relative prices of oil and other energy sources and on supply factors, such as the rates of scrappage and new construction and the ability of the Suez Canal to take large tankers on backhaul. Each of these factors has a large degree of uncertainty attached to it. Consequently, it is highly uncertain when the world tanker market will recover from the depressed prices of the present tanker glut to prices closer to longrun equilibrium.

It might also be noted that when most commentators refer to the "recovery" of the world tanker market, they mean the situation where the demand for tanker tonnage has increased to the point where it equals the supply of it, the point where all laid-up tonnage is back in service. A fuller definition of recovery would be where demand equals supply at tanker rates equal to longrun average cost plus normal profits. Recovery, according to this fuller definition, need not take place until sometime after recovery is announced in the shipping press.

Two alternative futures are projected as the basis for estimates of foreign-flag tanker values, one in which tanker resale prices continue at their currently depressed levels and another in which they recover to the point where they differ from construction cost only because of physical depreciation.

Once the values of U.S.- and foreign-flag vessels were determined, the witnesses faced the problem of determining the annual capital cost of using these vessels. The general technique used by all witnesses 1/ was to use an annual capital recovery factor, which incorporates the witnesses' assumptions about the cost of investment capital, the length of life of the vessel, and the value of any special financing or tax provisions. The latter include the Merchant Marine Act Title XI Loan Guarantee Program, the Capital Construction Fund provision, 2/ and the investment tax credit. The capital recovery factors used by the various witnesses are presented in table 7.

These annual capital recovery factors vary considerably and, when used by the witnesses to compute annual capital costs, in some cases account for more of the difference in capital cost estimates than do the difference in vessel valuation. For instance, although AMA asserts that the value of U.S.-flag VLCCs is $352 per deadweight ton greater than that of foreign-flag ones, compared to Mobil's estimate of $264 per deadweight ton, a comparison of their annual capital cost differentials goes the other way. In this latter comparison, AMA's annual capital cost differential ($25.93, table 4) is less than Mobil's ($55.41) and considerably so. The apparent inconsistency is resolved by noting that Mobil used a capital recovery factor of .18 for U.S.-flag vessels, whereas AMA used .08.

Capital recovery factors are a convenient way of determining an annual capital-cost estimate that is constant for every year. It would be somewhat coincidental if the estimate of economic depreciation that is implied in the method is realistic. According to the economic definition of depreciation (the change in the present expected value of the stream of future earnings), this can vary from year to year, depending on the vintage of the vessel and the market conditions in which it operates. The use of capital recovery factors to produce constant capital cost, by contrast, results in an implied estimate of annual depreciation (capital cost less

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1/Except MEBA's estimate of foreign-flag capital cost.

2/Capital Construction Fund: Ship-owners under construction differential subsidy agreements are, or in some instances, required to make deposits in a CCF sufficient to purchase a similar vessel at the end of the vessel's economic life. Earnings deposited in a CCF are tax deferred while in the CCF. Funds withdrawn from CCF's, except for the purchase of a new vessel in U.S. shipyards, are taxed upon withdrawal.

the return on invested capital) that starts low, just as in a house mortgage, and increases exponentially until the final year of the assumed economic life. This may be a rather good approximation of the time path of depreciation in the early years in stable market conditions, but it is surely a poor approximation in the later years of a vessel's life.

Nevertheless, the analytical convenience of having an estimate of capital cost that is constant from year to year is so great that we will accept the depreciation time-path it implies as a useful approximation.

TRANSPORT PRICE DIFFERENTIAL: MARKET CONDITIONS IN THE U.S.- AND FOREIGN-FLAG TANKER MARKETS

The analysis of the transport price differential, the difference in the rates charged for oil transport by U.S.- and foreign-flag tankers, is generally inadequate or inappropriate in the analyses presented in testimony. Three of the witnesses approach the issue, but they did not adequately analyze the market factors and the regulatory issues involved. The other three witnesses simply equate transport price with transport cost. The transport price differential estimates of the witnesses are presented in table 2, column 2.

Full costs may not, in fact, determine prices, depending on market conditions. Prospective market conditions in both the world market and the prospective U.S.-flag preference market suggest the probability of prices diverging substantially from full costs. Current conditions in the market for foreign-flag tanker services show a severe excess supply of tanker capacity even at charter prices that cover only variable costs. As a consequence, a vast amount of new tanker tonnage is idle for lack of business. Sixty-nine tankers above 100,000 DWT, averaging 213,000 DWT each, which had been delivered new between 1972 and 1976, a total tonnage of 15 million DWT, were laid up as of January 1977. An equal tonnage of somewhat older or smaller tankers was also laid up, to add to the serious situation of the world tanker glut. Such depressed conditions are likely to persist far into the future.

Market conditions in the prospective U.S.-flag preference market are also liable to cause price to diverge from costs but in the opposite direction. H.R. 1037 specifies that after October 1, 1982, 9.5 percent of U.S.-petroleum imports shall be carried in U.S.-flag ships "to the extent that such vessels are available at fair and reasonable rates." Since,

at present, only about 2 percent of U.S.-petroleum imports are carried in U.S.-flag tankers, at the 30-percent level of cargo preference there would clearly have been a situation of severe excess demand for U.S.-flag tonnage during the lengthy period before the vessels necessary to relieve the excess demand would have been ordered and built in U.S. shipyards.

At the 9.5-percent level of cargo preference, the situation is less clear. There will be demands for U.S. flagships in other preference trades--the coastal and other traditional Jones Act trades, the Alaska trade, the Strategic Petroleum Reserve trade and the Virgin Islands trade. Not including any demands from the possible Virgin Islands preference trade, MarAd estimates that U.S. tonnage available for the cargo preference trade will grow from about 1 million DWT in 1977 to about 5 million in 1981, and remain there until 1985. MarAd also estimates that, at 9.5-percent cargo preference, the tonnage requirements will be the following at various import levels:

6 MMB/D	2.6 million DWT
8 MMB/D	4.4 million DWT
10 MMB/D	6.2 million DWT

During the transition period from 1978 to 1982, lesser tonnage requirements will prevail under the different import-level scenarios.

It is apparent that MarAd expects an excess demand in 1985 at 10 million barrels per day and an excess supply at 8 million barrels per day in the absence of new construction. Over the 1978 to 1985 period, MarAd expects a situation of excess demand to persist until 1985, at an import level of 10 million barrels per day. (At higher import levels, presumably, MarAd would expect an intensified situation of excess demand.) At an import level of 8 million barrels per day, however, MarAd expects a situation of excess demands for existing U.S.-flag tonnage and for ships now under construction to persist only until 1980.

We did not attempt to evaluate the adequacy of these forecasts; however, we do note that the supply and demand of tanker tonnage is forecast without any explicit tanker-rate and regulatory assumptions. MarAd's forecasts do indicate a situation of excess demand in the U.S.-flag tanker market in the absence of new construction until 1980 under all scenarios and a continuation of that excess demand to at least 1985 if imports are at the rate of 10 million barrels per day or more.

Under such a situation of excess demand, and in the absence of regulatory action, the shortrun equilibrium transport price at which supply and demand will be equal could be very high due to both inelastic supply and inelastic demand for tanker services. In chart 1, which is an expositional diagram for the shortrun U.S.-flag tanker market, price P_4 illustrates this outcome. Lower prices, however, can be obtained by regulatory action of the Secretary of Commerce, who is empowered by H.R. 1037 to grant waivers of cargo preference if charter rates for U.S.-flag vessels are not "fair and reasonable."

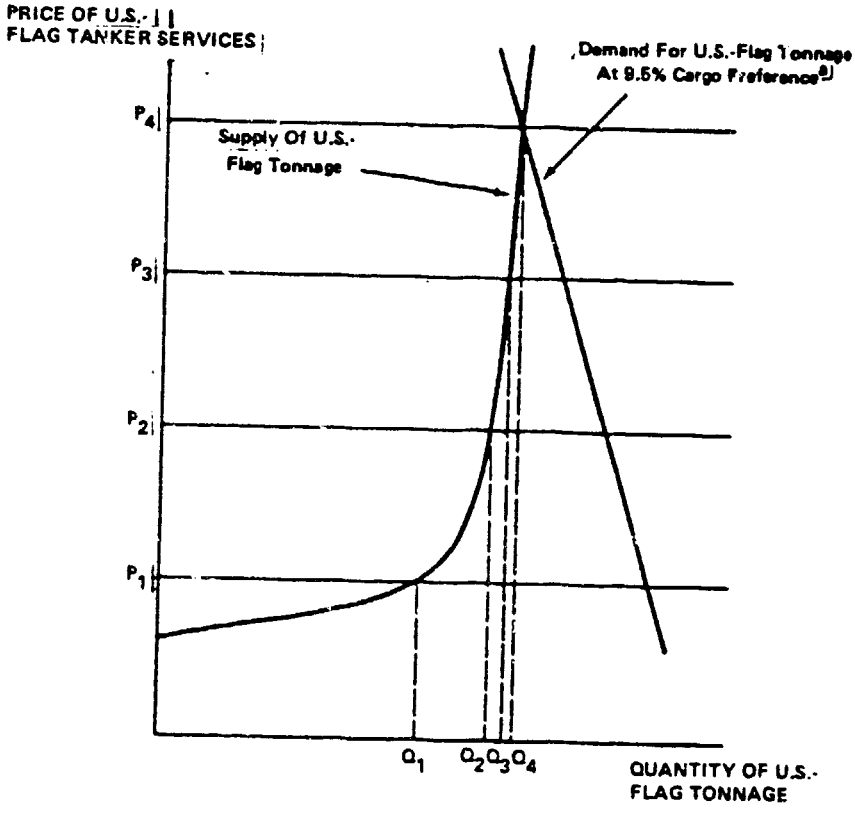
One regulatory possibility is that waivers will be issued if charters are offered above some waiver rate, such as P_1, P_2, and P_3. One point to note is that, even if the waiver rate is raised a substantial amount (e.g., from P_2 to P_3 in chart 1), only a negligible amount of extra cargo preference tanker capacity may be called forth (Q_3 versus Q_2).

Whether or not excess profits will be earned in the situation of excess demand in the U.S.-flag tanker market depends on the waiver policy pursued by the Secretary of Commerce. Since no specification of waiver policy is made in H.R. 1037, the various witnesses were free, explicitly or implicitly, to assume any waiver policy they liked. API and FACS assumed that the transport price would rise to 50 percent above nonfuel cost, their so-called "captive market premium." The other witnesses assumed that transport price would equal transport cost, implicitly or explicitly assuming a perfect waiver policy.

Surely a waiver policy would be designed to keep excess profits well below a 50-percent margin on costs. On the other hand, the regulatory problem will be one of great complexity. Should waiver prices be set for each ship and route or only for each route? The transport cost calculations of the witnesses assume that appropriately sized vessels will be used on the various routes. If waiver prices are set for each ship on each route, what would prevent inappropriately sized, and thus inefficient, vessels from being used on, say, the Persian Gulf route? This would result in higher transport prices (and costs). If the waiver prices are set for each route, however, would they be set low enough on the longhaul route from the Persian Gulf to keep efficient VLCCs down to charter rates equal to cost plus normal profit? If so, they would price much of the U.S.-flag fleet out of these trades. Our guess is that a compromise will be made, in any route-by-route waiver policy that will result in some excess profits to U.S.-flag tanker owners. We believe that it would be

CHART 1

EXPOSITIOAL DIAGRAM OF THE SHORTRUN U.S.-FLAG TANKER MARKET



[a] The slope in the demand curve represents the decline in petroleum consumption due to higher transport price. Alternatives to ocean transport of petroleum, which would also result in a slope, probably will have a negligible effect.

extremely difficult to pursue a regulatory policy to keep excess profits below a 10-percent markup on cost plus normal profit.

If higher levels of cargo preference should be enacted in the future and if they are accompanied by a substantial requirement for new tonnage, a new regulatory problem arises: This is, what should the waiver price be to induce tanker owners to invest in enough tonnage to meet the cargo preference percentage mandated? Since there are many uncertainties involved in tanker operation, the waiver price may have to be set so as to include some excess current profits in order to induce tanker owners to invest.

Tanker owners are likely to be uncertain about a number of key factors that will affect tanker profitability. The first area of uncertainty that is likely to affect tanker investment is uncertainty about the demand for U.S.-flag tankers. Under percentage cargo preference, U.S.-flag tanker demand will, of course, depend on the level of imports. Uncertainty as to energy policy and the rate of economic growth and, therefore, the import level may leave owners uncertain about whether there will be a situation of excess demand or excess supply in the U.S.-tanker market.

A second area of uncertainty that tanker investors confront is with respect to the characteristics and constancy of regulatory policy. For instance, if 10 years from now, a regulation were issued that foreign-flag tankers could easily be re-flagged under U.S. registration, U.S.-flag tankers just put into service could be rendered unprofitable. Uncertainty also affects investor appraisal of a number of other crucial regulatory decisions in this much regulated industry.

A third area of uncertainty for tanker investors concerns the profitability of given vessel sizes. There is a question about whether sufficient deepwater ports will be available to service the VLCC and ULCC tankers that are the most appropriately sized vessels to carry crude oil from the Persian Gulf. Changes in deepwater-port or lightering policy, for environmental or other reasons, could leave investors with vessels of unprofitable sizes. The same would be true if the import mix should shift substantially from the Persian Gulf to Mexico, since medium-size tankers would then be more in demand.

In summary, any number of factors could, if they occurred, create a situation of excess supply in the cargo preference segment of the market or in some vessel-size submarket. Fear about these factors may inhibit tanker investment in U.S.-flag vessels unless there are high enough short term profits to compensate.

IMPORT PRICE DIFFERENTIAL

Knowing the transport price differential tells us only how much more one would have to pay to ship on a U.S.-flag tanker than on a foreign-flag one. In order to calculate the import price differential, the fact that under H.R. 1037, 90.5 percent of imported oil will probably be carried in less costly foreign tankers must also be taken into account. If the imposition of cargo preference did not result in any changes in the rates for foreign-flag oil transport, we could calculate the import price differential by allocating the transport price differential over the total volume of imports. This is how column 1 in table 3 is calculated. All of the witnesses in favor of H.R. 1037 have implicitly or explicitly taken this position. Witnesses opposed to the legislation, however, have directed attention to another set of potentially important market factors that could raise the foreign-flag transport price if the U.S. imposes cargo preference.

These factors represent the reaction of two sets of foreign governments: first, the governments of countries with large nationally controlled tanker fleets, such as Norway and the United Kingdom and, secondly, governments of the oil-producing countries. Oil-producing countries and countries with large tanker fleets might retaliate against what they perceive to be economic loss caused by the cargo preference legislation.

We have not analyzed the likelihood of retaliation and therefore take no position on what its cost might be. It is doubtful that any firm evidence could be presented, one way or the other. In addition, if some kind of retaliation did occur, it would not necessarily affect the price of imported oil. Therefore, we have not added an estimate of retaliation costs to the cost of cargo preference.

With the exception of MarAd in one of its studies, all witnesses presented analyses to answer the following question, which we agree is the relevant one: What is the cost of cargo preference as a maritime support program? The first analysis of MarAd (referred to as MarAd I in this report), which was used as a basis for the discussion of cargo preference in the executive branch, also addressed this question. In its second analysis (referred to as MarAd II in this report), however, MarAd implicitly posed a different question, which might be phrased as: What is the cost of cargo preference minus the recoverable part of past maritime support programs? If this is to be estimated, the recoverable amounts of the construction differential subsidy would have to be subtracted from

the import price differential. This is what was done in MarAd II. MarAd subtracted "CDS Payback Allowances" of $64 and $71 million from the MarAd II estimates of the import price differential of $175 and $245 million, respectively, at import levels of 8 and 10 million barrels per day. For the purpose of maintaining comparability with the estimates of the other witnesses, with ours, and even with those of MarAd I, we added back the CDS Payback Allowance to obtain the adjusted MarAd II estimates presented in this report. (See table 1, footnote k, for a description of the adjustments.)

CHAPTER 3

OUR ESTIMATE OF THE IMPORT PRICE DIFFERENTIAL

In the previous chapter, the major differences in estimates of the transport price differential due to cargo preference were discussed. The witnesses' estimates of capital cost differed substantially, even after all costs had been expressed in 1977 dollars. The capital cost appear to explain a large portion of the differences of costs of cargo preference. This chapter presents our estimates, which we believe improve upon those of the witnesses.

OPERATING COST DIFFERENTIAL

In estimating the operating cost differential, we have made use of the estimates presented by the witnesses. First of all, the operating cost diferential is a minor fraction of the total transport cost differential for all analyses but MEBA's. Second, there is relatively little disagreement among the witnesses as to what the operating cost differential is. Thus, we regard a simple average of the testimony as an adequate estimate of the operating cost differential and have used it as such. 1/

CAPITAL COST CONCEPT

According to the theory of capital valuation presented in chapter 2, "economic" depreciation (to distinguish it from accounting depreciation concepts that are used for financial reporting) is the difference between the present expected value at the beginning and end of the year in question. Annual capital cost is the sum of economic depreciation

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1/The danger of using simple averages of operating cost estimates produced by different witnesses using different assumptions has been pointed out in an undated MarAd memo provided to the Merchant Marine Subcommittee commenting on our preliminary estimates reported in a letter report to Chairman Murphy dated July 29, 1977. We take no exception to the general caution but would note that the averaging of estimates produced by different assumptions has the advantage of reducing the effect of the eccentric assumptions of the individual analyses. In the present case of operating costs per deadweight ton, any one of the witnesses' estimates could be used without affecting the GAO low and high transport cost estimates by more than 7 or 4 precent respectively.

and the expected return that could have been earned in the alternative investment under consideration. For purposes of this analysis, the alternative investment is any investment that would be undertaken at the going cost of investment capital for investments of similar risk.

This definition of capital cost, the opportunity capital cost, is the appropriate concept for allocating society's resources to alternative uses. It attempts to measure the value of the capital resources used in implementing cargo preference that could have been used elsewhere. Conventional accounting measures, like book value, measure economic trade-off only when they approximate market value.

The use of the opportunity capital-cost concept necessarily requires knowledge of the future earnings prospects of foreign-flag and U.S.-flag tankers. If this information were available, the present expected value of a tanker in each year would be determined. The annual change in this valuation could then be calculated, leading to a determination of annual depreciation. The opportunity cost of capital would then be the sum of the cost of investment capital in the general economy for investments of equal risk, plus this earnings-based estimate of depreciation.

If markets work freely, estimation of future earnings is the basis of the caluculations of tanker value on the part of both buyers and sellers. Thus, market values in both the new and used tanker markets are estimates of the present expected value of future tanker earnings prospects by those who are closest to the technical and economic conditions of the industry. For instance, the depressed used tanker prices of 1977 are the best available indicators of depressed earnings prospects of tankers over their future lifetime.

To determine foreign-flag capital cost as of 1977, the prices at which tanker tonnage changed hands in the world tanker market would permit a single estimate, since these prices incorporate the forecasts of tanker earnings by persons close to the economic and technical conditions of the tanker industry. Tanker earnings prospects after 1985, and hence tanker prices in 1985, are highly uncertain, however. As we discussed in chapter 2, there are substantial uncertainties on both the demand and supply sides of the market for tanker services. A number of forecasters have tentatively projected an end to tanker lay-ups in the early to late 1980's, given certain assumptions, but none of the available forecasts have attempted to predict when tanker prices

would return to normal levels. 1/ Because of this uncertainty, two world tanker market scenarios have been chosen to produce high and low estimates of tanker prices in 1985. The low estimate constitutes a projection of current glut condition prices to 1985 (in 1977 dollars). The high estimate constitutes a projection of market recovery to the point where earnings prospects justify the purchase of new tankers for the world tanker trade at prices that reflect the full construction costs in foreign shipyards.

For the determination of the capital cost of U.S.-flag tankers, we consider it unlikely that conditions of glut will occur in the protected U.S. cargo preference market before 1985. A more likely prospect is conditions of shortage but, as described in chapter 2, it is assumed that regulatory policy designed to keep U.S.-flag tanker rates "fair and reasonable," will eliminate this possibility. Thus, projected construction cost for U.S. tankers is considered to be an adequate estimate of U.S.-flag tanker value in 1985.

TANKER PRICE ESTIMATES

To summarize the discussion of the preceding section, three price projections for 1985 (expressed in 1977 dollars) are needed as the basis of our estimates of the capital cost differential:

(1) The glut price of tankers on the world market.

(2) The price of new tankers in foreign shipyards (estimated to cover full costs).

(3) The price of new tankers in U.S. shipyards (also estimated to cover full costs).

The first and third of these will be discussed first, followed by the second.

The glut price in 1985 (in 1977 dollars) can be estimated by the average price of tanker tonnage sold to the world market in each tonnage class since the beginning of 1975 when the tanker glut became fully established. Since no reliable trend can be ascertained in the data since that date, the simple average is

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1/E. g., Drewry (Shipping Consultants), Inc., 1976; and Organization for Economic Cooperation and Development, 1975.

used rather than the most recent data. (See chart 2 for a presentation of data on sales of VLCCs, the most important segment of the market for present purposes). The average price for relatively new tonnage, calculated by using the average weights of the witnesses, 1/ is $100 per DWT. The data for the individual tonnage categories appear in table 8.

The full-cost price of new U.S. tankers in 1985 is estimated from MarAd-provided data and from data in its annual reports on recently constructed vessels that have received the construction differential subsidy. This data, when converted to 1977 dollars, can be used to directly estimate the cost in 1985 (expressed in 1977 dollars). The weighted average estimate per DWT calculated in this way is $470 per DWT, using the average weights of the witnesses. 2/ (See table 8 for data on individual tonnage categories.)

The full-cost price of ships built in foreign shipyards is derived from the price of ships built in U.S. shipyards by using the subsidy rates established by MarAd. According to its 1976 annual report, the typical subsidy rates for tankers delivered in 1976, 1977, and 1978 is about 40 percent. This represents MarAd's determination of the relative prices charged for equivalent tankships in foreign yards and is, therefore, the subsidy necessary to induce the purchaser to buy in the United States.

Given the three vessel valuations discussed, the next step is to convert them into annual capital cost estimates. Based on a decision to determine a constant annual capital cost, we need to make assumptions on the average economic life of tankers and an assumption on the cost of capital in 1985 so that the capital recovery factor can be determined. Capital recovery factors, depending on different assumptions about economic life and cost of capital, are given in table 9. As shown in table 6, the various witnesses made assumptions that result in a diversity of capital recovery factors. None of the assumptions made by them is easily defensible over the others, since they incorporate estimates about technical progress and capital market events that are uncertain in most cases. As can be seen in table 9, the capital-recovery factor is not highly sensitive to small changes in either the

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1/See footnote 1 on p. 12.

2/See footnote 1 on p. 12.

economic life or cost of capital assumptions. Neither is the capital-cost differential if the same capital-recovery factor is used for both U.S.- and foreign-built ships.

Table 8

Resale Prices for Tankers in the World Market and Foreign and U.S. Tanker Construction Costs, in 1977 Dollars

Tonnage category	(1) Average world market resale prices for tankers up to 5 years old, 1975-77	(2) Average U.S. tanker construction costs (note a)	(3) Average foreign tanker construction costs (note b)
(thousand DWT)	--------(1977 dollars per DWT) (note c))-----		
0-75	$309	$697	$418
75-200	108	477	286
200 +	85	429	257
Weighted average (note d)	100	450	270

a/Estimates constructed by us from MarAd data. MarAd include an allowance for engineering and legal fees and for interest during vessel construction.

b/Foreign construction cost is estimated on the basis of MarAd construction differential subsidy rates of approximately 40 percent in effect in 1975 and 1976. The higher rates of 1977 were not used, due to the presence by that year of an undetermined amount of underpricing in foreign shipyards.

c/1977 dollar prices obtained by using an annual 7-percent inflation assumption.

d/Tonnage-category weights are the average weights assumed by the witnesses. (See table 4.) Also see note (a), table 10.

Source: Drewry Ltd., Shipping Statistics and Economics, Shipping World and Shipbuilders and MarAd.

The capital cost differential is sensitive, however, to the use of different capital recovery factors for U.S.- and foreign-built ships. Although an argument can be made for different cost of capital assumptions in the two cases, based on the existence of different capital market situations, it is not clear that such differences which exist at present will persist into the future. A conservative assumption in this case is that the cost of capital will be roughly the same for foreign- and U.S.-built vessels, as the operation of the international economy works to equalize rates of return in different countries. As to economic life, there seems to be no reason to expect that physical depreciation or technical obsolescence will affect foreign-built vessels any differently then their U.S.-built counterparts. We have also, therefore, used the conservative assumption that the two vessel classes have roughly the same economic life. In combination, the same assumptions on cost of capital and economic life, of course, result in the use of the same capital recovery factor for U.S.-built and foreign-built vessels. The question then becomes, what should be the common cost of capital and economic life assumptions? For lack of any prefered alternative, we have accepted the assumptions of MarAd of a 25-year vessel life and a 10-percent pretax return.

TRANSPORT COST, TRANSPORT PRICE, AND IMPORT PRICE ESTIMATES

We now use the vessel prices presented and discussed in the previous section to calculate high and low estimates of 1985 transport cost. The low estimate, based on the differential between U.S.- and foreign-shipyard construction cost is 1.4 cents per gallon of preference oil. The high estimate, based on the differential of U.S.- construction cost of tanker tonnage over the world market price for used tanker tonnage, is 2 cents per gallon of preference oil. Both figures are for 1985 and are in 1977 dollars. The calculation of these figures is given in table 10.

The transport price estimate differs from the transport cost estimate by the inclusion of an estimate of the effect of market factors in the cargo preference market. In chapter 2 we gave our judgment that, given the difficulties of regulatory policy, it would be optimistic to expect U.S.-flag tanker rates to rise no more than 10 percent above cost. Using this 10-percent markup as a measure of excess profit in situations of excess demand for U.S.-tanker tonnage, we estimate the transport price differential as 1.8 cents per gallon of preference oil (low estimate) and 2.3 cents per gallon (high estimate). (Calculation in table 10.)

Table 9

Capital Recovery Factors Resulting From Various Assumptions About Cost of Capital and Economic Life (note a)

Cost of capital	Economic life 15 yrs.	20 yrs.	25 yrs.	30 yrs.
(percent)				
8.0	.1169	.1019	.0937	.0889
9.0	.1241	.1096	.1019	.0974
9.5	.1278	.1135	.1060	.1017
10.0	.1315	.1175	.1102	.1061
10.5	.1353	.1215	.1145	.1106
11.0	.1391	.1256	.1188	.1151

a/Calculated using the following formual, where r = cost of capital and t = economic life:

$$CRF = \frac{r}{r - \frac{1}{(1 + r)t}}$$

Source: David Thorndike (ed.), The Thorndike Enclyclopedia of Banking and Financial Tables, Boston Warren, Gorham and Lamount, 1973. Table b, p. 6-2.

Finally, we calculate estimates of the import price differential. For reasons that we discussed in chapter 2, we do not expect any change in the transport price of oil in foreign-flag tankers due to the imposition of cargo preference. Consequently, the import price differential can be calculated by simply allocating the transport price differential over the total of oil imports, both preference and non-preference. At the two levels of cargo preference we have analyzed, our import price differential estimate per gallon of oil imports is the following:

	Low estimate	High estimate
	(cents)	
9.5 pecent-cargo preference	.15	.23
30 percent-cargo preference	.48	.72

(Calculation in table 10.)

When we apply these cents-per-gallon estimates to various import levels, we get different total dollar estimates. For instance, at 9.5-percent cargo preference and an import level of 8 million barrels per day, our estimates are $190 million (low estimate) to $280 million (high estimate), with $240 million being at the midpoint of the range. With the range depending on the state of the world tanker market, this last estimate assumes that the market is partially, but not completely, recovered. At an import level of 10.3 million barrels per day (our estimate of 1985 imports), our estimates range from 240 million to 360 million, with 300 being the midpoint estimate. These estimates and also estimates for cargo preference at the 30-percent level, are given in table 11.

THE COST OF POSSIBLE RETALIATION

No provision was made in the estimates of the import price differential for an increase in the transport price of foreign-flag tanker services, not because we believe that retaliation by the petroleum and maritime nations would not occur, but simply because we believe that any retaliation is unlikely to affect the import price of oil itself. As was discussed in chapter 2, estimates of retaliation costs cannot be made with any precision.

Table 10

Calculation of our Estimate of Transport Cost, Transport Price and Import Price Differentials

	Low estimate	High estimate
1. Operating cost differential (per DWT/ year) (note a)	$10.48	$10.48
2. Capital cost differential (per DWT/ year) (note b)	18.73	38.57
3. Total transport cost differential (per DWT/year)	29.21	49.05
4. Average number of voyages per year (note c)	8.07	8.07
5. Transport cost differential (per unit of petroleum transported)		
$ per long ton (note d)	$3.62	$6.08
$ per barrel (note e)	$ .50	$ .84
	(cents)	
cent per gallon (note f)	1.2	2.0
6. 10 percent U.S.-flag transport cost (note g) (cent per gallon)	0.4	0.4
7. Transport price differential (note h) (cent per gallon)	1.6	2.4
8. Import price differential at 30-percent cargo preference (note i) (cent per gallon)	.48	.72
9. Import price differential at 9.5-percent cargo preference (note j) (cent per gallon)	.15	.23

a/Derived from tables 4 and 5, average of figures for the various analyses, except MEBA and MarAd II. These are not included since their fleet mixes, which determined their estimates of both the weighted average operating cost and the average number of voyages, were problematic: (1) MEBA's 100 percent reliance on 90 MDWT vessels is not realistic. (2) For MarAd, MarAd I was used rather than MarAd II, since MarAd II assumed (as did MarAd I) that the fleet mix for U.S. flagships would be the same as for foreign flagships. In the case of MarAd II, but not MarAd I, this assumption resulted in a distorted mix for foreign flagships, which would, of course, carry 90.5 percent of imports. The U.S. flag mix is constrained (at 9.5 percent cargo preference) by the fleet in existence, to be sure. The foreign-flag fleet, however, is not so constrained, and would be likely to use VLCCs wherever they are economic.

b/See text.

c/See footnote a.

d/Transport cost differential divided by average number of voyages: line 3 divided by line 4.

e/Using one long ton = 7.2 barrels.

f/At 42 gallons/barrel.

g/The percent applies to the U.S.-flag cost figure including voyage costs rather than to the cost differential. We estimated U.S.-flag cost to be $96.61 per deadweight ton per annum.

h/Total of (5) and (6).

i/30 percent of (7).

j/9.5 percent of (7).

Table 11

Our Estimates of Import Price Differential at Two Import Levels and Two Cargo Preferences Levels, 1985 (note a)

	(1) Low estimate	(2) High estimate (note b)	(3) Midrange estimate (note c)
	(millions of 1977 dollars)		
9.5 percent cargo preference:			
8 MMB/D	$190	$ 280	$ 240
10.3 MMB/D	240	360	300
12 MMB/D	280	420	370
30 percent cargo preference:			
8 MMB/D	590	880	740
10.3 MMB/D	760	1,100	930
12 MMB/D	880	1,300	1,100

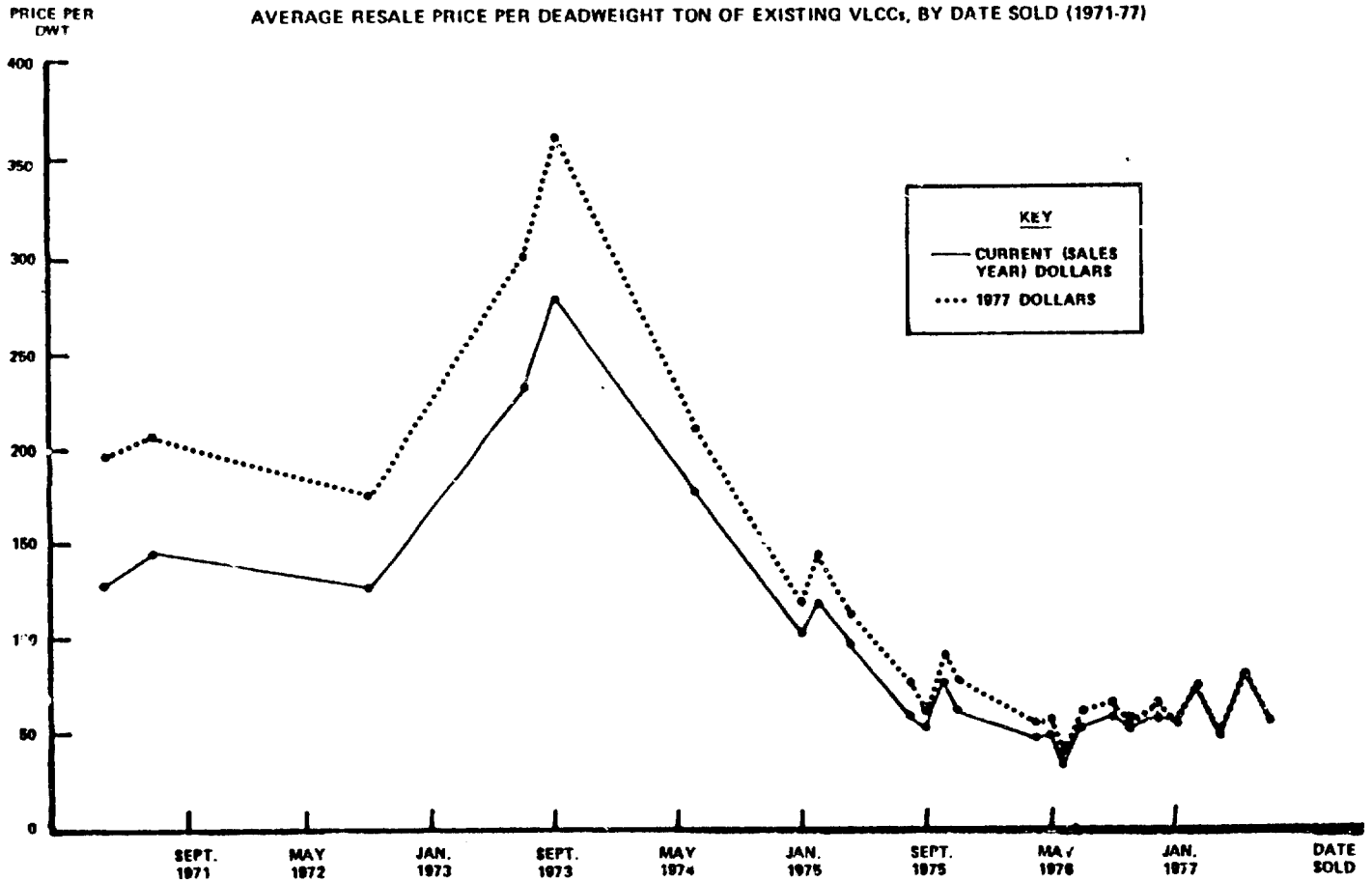
a/Derived from table 10.

b/High and low estimates are ends of a range that depends on the state of the world tanker market in 1985. See text for explanation.

c/Average of columns (1) and (2) rounded to 2 digits.

CHART 2

AVERAGE RESALE PRICE PER DEADWEIGHT TON OF EXISTING VLCCs, BY DATE SOLD (1971-77)



SOURCES OF BASIC DATA: DREWRY LTD., *SHIPPING STATISTICS AND ECONOMICS*, 1971-77 ISSUES AND *SHIPPING WORLD AND SHIPBUILDER*, 1977 ISSUES, FOR CURRENT-DOLLAR SALES DATA. 1977 DOLLAR PRICES OBTAINED BY USING AN ANNUAL 7 PERCENT INFLATION ASSUMPTION.

CHAPTER 4

OTHER ECONOMIC EFFECTS OF CARGO PREFERENCE

The increase in the consumption price of petroleum is the major cost of cargo preference. There are, however, other effects that are not negligible, although difficult to measure. These effects include effects on:

--The price of domestic tanker services, including those in the Alaska trade.

--The price of alternative energy sources.

--Employment.

--Inflation.

--The balance of payments.

--The price of oil produced domestically.

Some estimates of these effects were given by the witnesses, but they were presented mainly in general terms. We make no attempt to quantify these effects, except the last since either data are not available or an analysis beyond the scope of our present report would be required.

IMPACT ON THE PRICE OF DOMESTIC TANKER SERVICES

If the transport price of U.S.-flag tankers serving the international trades is above transport cost by more than that of U.S.-flag tankers serving the domestic (coastal, Alaska, Puerto Rico, etc.) trades, this price effect is likely to be at least partially transmitted to the domestic transport price. If the excess of the transport price above transport cost should be of the magnitude asserted by FACS and API (50 percent of nonvoyage cost) rather than of the magnitude assumed for our estimate (10 percent of transport cost), this impact might be quite large. For instance, FACS, the only witness to make a quantitative estimate, estimated total increase in domestic tanker prices of $1.6 billion (1977 dollars) per year in 1985.

Quantitative estimation of the price impact on the domestic tanker trades is difficult. However, given our assumptions on regulatory policy under the "fair and reasonable" waiver authority of the Secretary of Commerce, this effect is unlikely to be very large.

IMPACT ON THE PRICE OF ALTERNATIVE ENERGY SOURCES

Insofar as other energy sources are competitive with petroleum, an increase in the price of petroleum will produce some increase in their price. For instance, natural gas is competitive in a range of industrial uses with fuel oil. A large number of electric utility boilers are also usable for either oil or coal, either immediately or after conversion. It would, however, require knowledge of the appropriate demand and supply elasticities to make numerical estimates of the impact of an increase in the price of petroleum on the price of coal and natural gas. No estimates will be made in this report of these additional costs to the consumer.

IMPACT ON EMPLOYMENT

Employment is a third area of economic impact. There would be an increase in employment of American seagoing workers and in the employment in U.S. shipyards. Estimates by a number of the witnesses on the direct employment effects are given in table 12. They vary by the level of cargo preference assumed, with roughly 30,000 jobs (seagoing and shipyard) estimated for 30 percent cargo preference and 2,500 jobs (all seagoing) for the 9.5 percent cargo preference.

The direct employment effects are probably exceeded by the indirect effects, however. (Some of the indirect employment effect estimates, given by the witnesses, also appear in table 12.) There are two prominent indirect disemployment effects: (1) the international trade effect and (2) the macroeconomic effect.

The international trade effect tends to offset the direct effect of creating maritime jobs. It would come about over a period of adjustment in the following way: the decrease in the purchase of foreign-flag shipping services would cause the exchange rate of the dollar to rise, since the demand for foreign exchange to pay for the shipping services would decline. The increase in the dollar rate, in turn, would decrease the competitive advantage of U.S. exports and of domestic goods competing against imported substitutes. Those industries under most competitive pressure from foreign goods in either U.S. or foreign markets would lose sales and suffer a decline in employment. The number of jobs lost depends on how labor intensive these industries are. The first approximation, lacking a detailed analysis, is that the indirect international trade disemployment effect would approximately offset the positive maritime

TABLE 12

Witnesses' Estimates of the Impact of Cargo Preference Legislation on Employment Levels

IMPACT ON EMPLOYMENT

	Increase	Reduction
FACS	a/35,322	-
API	-	b/284,000
Mobil	No estimate	No estimate
AMA	No estimate	No estimate
MarAd	c/2,500 to 3,600	-
SCA	d/120,000	-
Transportation Institute	e/539,000	-
Labor Management Committee	f/106,000 to 248,000	-
MEBA	g/39,400	-

a/However, FACS estimated that each job would cost $2.2 million (at 30-percent cargo preference).

b/Based on 30-percent level.

c/Based on a 9.5-percent level of cargo preference, with import levels of 8 and 10 MMB/D, respectively.

d/Includes a "multiplier effect" of 90,000 new jobs and is estimated at the 30-percent level.

e/Estimated at the 30-percent level as follows: 134,000 construction jobs, 400,000 allied industry jobs, and 5,000 shipboard jobs (statement of March 1, 1977). A separate figure of 230,000 jobs was given in direct testimony on the same date.

f/Increase in jobs estimated as follows (at the 30-percent level):

104,000 to 243,000--production and support
2,000 to 5,000--seagoing
106,000 to 248,000--total increase

g/Includes 4,400 seagoing jobs, at the 9.5-percent level.

employment effect. Since the maritime industry is heavily capital intensive, the net effect would probably be disemployment.

The second indirect employment effect, the macroeconomic effect, is negative. Purchasing power, which previously was spent on a range of goods and services, would under cargo preference be spent on the transport-cost differential. Thus, the gross national product and the employment engaged in the production of these other goods and services would both decline. If we purchase goods and services, in this case oil transport services, from costly producers, we have less to spend on the other goods and services.

Considering the direct employment increase in the maritime industries and the indirect employment effects together, our judgment is that cargo preference will cause a net loss of employment. Of course, macroeconomic stimulation of the appropriate magnitude, could attempt to reverse the net disemployment effect, depending on the state of economy at the time, but with possible inflationary effects.

IMPACT ON INFLATION

Cargo preference legislation would tend to increase the general price level. The increased price of petroleum--our estimate, 0.19 cents per gallon at 9.5 percent cargo preference--would add a small amount to the general price level as it works its way through the economy.

IMPACT ON THE BALANCE OF PAYMENTS

There will be an immediate balance of payments increase due to cargo preference, because the United States would be purchasing less from foreigners. Under the present international monetary system of floating exchange rates, the balance of payments effect has two characteristics. First, it is temporary, as a surplus or deficit in the balance of payments is translated into a change in the exchange rate, rather than into a long-lasting change in the level of international reserves. Secondly, the economic or political advantages of a foreign exchange surplus over a deficit have significantly declined, if not disappeared. Thus, the favorable temporary balance of payments effect of cargo preference should not be considered to be an advantage of any great significance.

EFFECTS ON THE PRICE OF OIL PRODUCED DOMESTICALLY

The direct cost of cargo preference is the higher cost of transporting oil to this country. Whatever the magnitude of this cost, it represents a real loss of resources. It is an amount which could have been spent on other goods and services. Under cargo preference this amount would be spent upon higher cost transportation.

When the price of imported oil increases, the price of domestically produced oil will have a tendency to increase by a similar amount. Such an increase would represent a cost to consumers, but at the same time it would increase the incomes of oil producers. As such, it is a transfer of money from one group to another, rather than a direct resource cost.

There are various possibilities of how the potential transfers of income might be dealt with:

1. The price of domestic oil could be allowed to rise in response to the increase in imported oil prices, in which case the transfer would be from oil consumers to producers.

2. There could be price controls on domestically produced oil to prevent a price increase. In this case, there would be no transfer of income. Such control may be difficult to achieve in practice, and it may not correspond with the Nation's energy policy.

3. There could be a wellhead tax on oil. In this case the income would be transferred from oil consumers to the Treasury. This might also be viewed as a transfer of income from oil consumers as a group to taxpayers as a group.

How large would the cost to consumers be in cases (1) and (3)? This depends upon the quantity of domestically produced oil. If the quantity of domestically produced oil is equal to the quantity of imported oil, and the increase in the price of domestic oil matches the price increase due to cargo preference, then the cost to consumers would be about the same as the direct costs of cargo preference.

Our report entitled "An Evaluation of the National Energy Plan," (EMD-77-48, July 25, 1977) estimated that under the 1985 plan the following would occur:

Production	10.5 MMB/D
Imports	10.3 MMB/D
Consumption	20.8 MMB/D

We now consider the three cases in more detail.

HIGHER PRICE OF DOMESTIC OIL

In the first case, the price of domestically produced oil would have a tendency to rise to the price level of imported oil. As a first approximation, this is simply the import price differential times the entire U.S. consumption. Without price controls, since domestic crude is substitutable for imported crude, domestic producers will be able to sell their crude at the import price. An increase in the import price will, therefore, cause an equal increase in the price of domestically produced crude. This essential conclusion was largely missed by all witnesses whose testimony is analyzed in this report.

PRICE CONTROLS ON THE DOMESTIC PETROLEUM PRICE

The second case, that of price controls, is more complex. If price controls on domestically produced oil are perfect, and if the controlled price never responds to changes in the import price, then it follows that a increase in the import price will not cause an increase in the price of domestically produced crude oil. One deviation from perfect price control that has been applied in the oil market is to distinguish certain classes of domestic crude for differential price control treatment. For instance, oil from older oil wells may be dubbed "old oil" and its price controlled. Other classes of oil, "new oil," may, however, be free to respond to the force of the international market. In such a situation, there will be a partial response in the shortrun, to a change in the import price.

A further complication in the case of price controls is how the controlled prices are set. If the differential between the controlled domestic price and the import price is a basis for revising the controlled price, then over a period of time, the price of domestic oil would at least partially respond to increases the import price. This response could vary from nothing to a higher price of domestic oil that is the same as the higher price of imported oil, depending on the characteristics of the control system and its behavior

over time. If there was a control system at the time of the imposition of cargo preference but one that was subsequently eliminated, then the price increase on domestic oil, held back for a time by a control system, would take place.

Although the present system of price controls on the sale of domestic crude oil, together with the entitlements system designed to equalize prices for refiners who use differing proportions for domestic and imported crude, is due to expire, a more likely replacement than simple decontrol is probably something like President Carter's energy proposals that allow for a price ceiling that, depending on the Organization of Petroleum Exporting Countries' actions, could be either above or below the import price. If the ceiling is above the import price, the administration's proposed system would have the domestic crude oil price respond to a change in the landed import price of petroleum. If the ceiling is below the import price, the domestic price will not be free to respond to an increase in the landed import price except through induced changes in the ceiling price.

Because of the complexity of the price-control case, no precise estimate is possible of the cost of cargo preference to consumers under the case of price control. It can be asserted, however, that price controls could suppress part of the distributional component of the cost, at least in the shortrun. Insofar as the controlled price responds to the import price, however, the change in the import price would be transmitted to the domestic price even though the controlled domestic price moves no closer to the import price. In this case, the transfer from consumers to domestic oil producers would not take place. Thus, the cost to the consumer would only be the direct cost described in the previous section on the free market case.

WELLHEAD TAXES

The third regulatory case is that in which wellhead taxes are imposed on oil at the wellhead. Wellhead taxes can be imposed in the context of a free market in domestically produced oil or of a price control system. The aim of wellhead taxes is to recover some or all of the excess profits earned by the holders of existing oil wells when the price of oil exceeds the cost of developing and operating the wells plus normal profits. The increase in domestic producer profits can be recaptured, at least partially, by the Government in the form of a wellhead tax.

The wellhead tax may differ for different classes of oil. For example President Carter's National Energy Plan proposal has three classes of oil--"old oil," "new oil," and "new new oil." The two lower classes will have wellhead equalization taxes, designed to bring them into price parity with new new oil which, as was described above, may or may not be allowed to rise to the import price. In the case of wellhead taxes, some or all of the price increase in domestically produced oil is recaptured in Government revenues. If a tax on oil should increase by exactly the amount of any increase in the landed price of petroleum due to cargo preference, (a "perfect" wellhead tax) then extra cost of cargo preference to the consumer would be offset by an equal increase in Treasury revenues. All or part of this could be rebated to consumers. If the rebates were in proportion to purchases, the net effect would differ from the perfect price control case only in that the levels of consumption, production, and imports would be the same as the free-market case.

In summary, it is not certain how much of the transfer from consumers to producers of domestic crude oil can be suppressed by a possible price control system or recovered by wellhead taxes. If the full impact is passed on to consumers, however, the total increase in the consumers' oil bill from this transfer would be approximately $310 million (1977 dollars), using the GAO estimate of domestic production under the National Energy Plan of 10.5 million barrels per day previously cited and our mid-range import price differential of 0.19 cents per gallon. The transfer from consumers to domestic crude oil producers is in addition to the higher amount paid for imported oil that results from cargo preference. It does not, however, constitute a resource cost to society, as does the higher import bill.

APPENDIX I

U.S. House of Representatives
Committee on
Merchant Marine and Fisheries
Room 1334, Longworth House Office Building
Washington, D.C. 20515

March 4, 1977

The Honorable Elmer B. Staats
Comptroller General
General Accounting Office
441 G Street, Northwest
Washington, D. C. 20548

Dear Mr. Staats:

The Merchant Marine Subcommittee is currently considering H.R.1037, a Cargo Preference Bill, which would require that twenty to thirty percent of U.S. oil imports be carried on U.S.-flag ships.

One of the most complex and controversial issues which will be addressed at these hearings is the potential of increased cost to consumers which might result from the bill's passage.

Several witnesses either have or will present economic analyses on this point. Since the cost estimates will undoubtedly vary significantly, it would be extremely helpful to the Committee to have a secondary analysis of this information. My request then is to have the General Accounting Office staff monitor our hearings and then do an anaylsis of the economic information that is presented there. Len Sutter, Counsel to the Committee, may be reached at 225-6786 if you have further questions about this.

Sincerely,

John M. Murphy

John M. Murphy
Chairman

JMM:jsb

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