

MERGERS IN THE U.S. PETROLEUM INDUSTRY
1971-1984:
AN UPDATED COMPARATIVE ANALYSIS

by

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May 1989

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This report has been prepared by staff members of the Bureau of Economics of the Federal Trade Commission. It has not been

ACKNOWLEDGMENTS

The authors would like to thank John Peterman, John Weyant, and John Woodbury for their useful comments. The Bureau of Economics Statistical Assistants staff, led by Susan Painter, spent many long hours helping to compile the data. Elizabeth Zichterman provided word processing for innumerable drafts. Data from Fortune are used with the publisher's permission. By convention, responsibility for any errors remains with the

authors.

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SECTION 1:

Introduction and Executive Summary

In September 1982, the FTC published a report on merger activity in the United States petroleum industry. That report was written at the request of several Congressional committees that were concerned with the nature and extent of acquisitions by the leading petroleum companies.¹ The 1982 Report dealt with a number of issues involving mergers and acquisitions in the petroleum industry, including competitive effects, possible efficiencies, and the financial costs of these transactions. The 1982 Report presented data for 1971-1981 on merger activity and on concentration in the petroleum industry.

The purpose of the present study is to add three more years of data, for 1982-1984, to the historical series on merger activity and concentration in the 1982 Report. The present study is divided into three principal sections: (1) an analysis

of acquisition activity by leading petroleum firms, (2) a

¹ Federal Trade Commission, "Mergers in the Petroleum Industry: Report of the Federal Trade Commission," Washington, D.C., September 1982. [Cited hereinafter as 1982 Report.]

discussion of concentration in crude oil reserves and produc-

tion, and (3) a review of 4876200000

refining.

The 1982-1984 period recorded several large transactions

involving

tions were newsworthy because of their large size, they do not necessarily represent increases in the relative size of the leading petroleum companies. In some cases, the leading

acquirers' market value. In comparison, 16 Fortune 100 firms with limited petroleum interests made 103 acquisitions, which each year averaged 6.69 percent of the acquirers' market value, and a sample of 18 other Fortune 100 firms with no petroleum interests made 59 acquisitions, which each year averaged 3.53 percent of the acquirers' market value. Recently, from 1982-1984, the leading petroleum companies made \$2.5 billion in net divestitures of non-energy related assets; this develop-

diminished.

1973, movements in the world price level of crude oil have primarily governed the basic price paid by domestic consumers. This should continue so long as the United States does not directly limit the import of foreign oil products, such as happened when the pre-1973 oil import quotas were in effect. The level of world prices is primarily determined by the production decisions of the large state-owned oil companies of foreign governments that control production within their own national borders. Changes in ownership among U.S.-based oil companies will have relatively little effect on world concentration, because these firms own or directly control only a small fraction of the world production and reserves.³

Concentration of world crude oil reserves lies in the lower

end of the "moderately concentrated" range and remains

World crude oil production is unconcentrated. Moreover, concentration fell from 1981 to 1984; the HHI for world crude oil production for 1981 was 816 and for 1984 652. Similarly,

the four-firm concentration ratio fell over the same period from 57.3 to 52.6 percent.

Concentration of domestic oil reserves and production could be of antitrust concern if imports into the U.S. were limited for

a prolonged period either by international developments or by U.S. government-imposed restrictions on oil imports. Here, the concerns are limited however because ownership of domestic

crude oil production and reserves is unconcentrated.⁴ In crude oil, concentration is affected by success in exploration and development independently of acquisitions. Correspondingly,

26.1 percent in 1984 and the HHI increased from 251 to 282 over the same period. Based on US reserves, four firm concentration

tion fell slightly from 30.5 percent at year-end 1981 to 29.2 percent in 1984, and the HHI remained virtually unchanged at 322 in 1981 and 333 in 1984.

The markets for refined petroleum products may be more regional in nature, as discussed in Section 3.2. For a variety of economic and technological reasons, international and inter-regional trade occurs more in crude oil than in refined products. Thus, while the base price may be determined by the world market price of crude oil, the refining margins and the corresponding prices of refined products to end users could differ among regions. Concentration (and acquisition activity) of domestic oil companies is consequently of greater

concern in crude oil refining and is more appropriately considered on a regional basis.

In domestic refining, concentration remained relatively

V)⁵, the four-firm concentration ratio for 1981 was 55.9 percent

and for 1984 58.0

(figures) In the Inner Midwest (east of D.A.P. III)

percent (instead of 54.2) and in the East 37.5 percent (instead of 33.0).

These results, and many others, are reviewed in more detail in the sections that follow.

SECTION 2:

Merger Activity by the Leading Petroleum Companies, 1971-1984

1. Introduction

A principal section of the 1982 Report developed and analyzed data on merger activity by the leading petroleum companies from 1971-1981. The purpose of the present study is to add three more years of data, for 1982-1984, to the historical series on merger activity in the 1982 Report. This update also provides an opportunity to correct certain errors in the data reported in the 1982 Report. Data sources and methodology used for this update are, with indicated excep-

The 1982 Report observed that apparently heightened acquisition activity by the largest petroleum companies ("LPC's") could be attributed to these firms' absolute large size

and apart from two exceptional years, there are no discernible trends in acquisitions relative to the LPC's size. Secondly, the 1982 Report noted that LPC's were concentrating their ac-

tions on energy-related assets. This trend extended in 1982-1984, with the LPC's making substantial net divestitures of non-energy-related assets; the conglomeration movement among petroleum companies, prominent in the early- to mid-1970's, has not continued in the 1980's.

The present study, as was the original study, is organized around two sets of data. The first reports the merger and

calendar 1970 as reported in the 1971 Fortune 100.⁷ The 1982 Report sought to identify and quantify all mergers acquir-

the entire period covered by both studies. The second set of data compares the

largest petroleum companies (as of 1978) with that of (1) a group of 16 petroleum-related firms (those with some but proportionately smaller oil interests than the 18 largest) and (2) a random sample of 18 large non-petroleum companies. The 1982 Report presented figures for each of these groups over the period 1979-1981. The present Report extends this comparison through 1984.⁸ Again, most of the tables present figures for the entire period covered by both studies.

A large variety of measures can be used to describe merger activity, and our choices are governed largely by those measures employed in the 1982 Report. In both the description of mergers by LPC's over time and the comparison of petroleum

sample.⁹ We then proceed to look at the acquisitions classified in several ways. Data tables are presented for each of these classifications.

The primary taxonomic split is between acquisitions that involve entire companies, "whole company acquisitions" and

those that involve some of a firm's assets as well as whole

these two primary classifications, acquisition activity can be measured by simple counts of transactions, by the amount of the sales price, by the book value of the assets acquired, and by dollar sales of the acquired firm (in the case of whole company acquisitions).

The basic data are then adjusted to correct for the effects of

underreporting of smaller acquisitions in the pre-1978 period, when there were no official reporting requirements. The third group of adjustments expresses measures of merger activity relative to several measures of the acquiring firm's financial size; these adjustments allow for the effect of the increase in measures of the absolute size of petroleum firms following the post-1973 oil price increases.

We believe that by reviewing a multiplicity of measures, which allow for potential sources of bias in the data, we have strengthened our basic conclusions: (1) that there has been no trend, apart from two very active years (1979 and 1984), in LPC acquisitions relative to the size of the firms.

the acquisition activities of the larger petroleum companies are not proportionately greater than those of other large companies.

In the present Report, the discussion concentrates on developments in the 1982-1984 period. When appropriate, the reader is referred to the 1980 Report for a

discussion of earlier developments.

2. Acquisition Activity of LPC's, 1971-1984.

a. Background Information on LPC's

Table 1 (parts A and B) lists the 16 corporations identified in the 1982 Report as LPC's based on their sales and assets in 1970

and 1971. 10 A Y B C

of the Fortune 500 D

and devoted a substantial proportion of its activity to domestic crude oil production and refining. The preparers of the 1982 Report determined the domestic crude oil and natural gas liquids production for 1970 and the domestic petroleum refin-

TABLE 1A
16 Large Petroleum Companies, 1970:
1970 and 1983 Comparative Assets,
Sales, and Fortune Rankings
(values in current dollars)

Company	Rank	1970		Rank	1983	
		Assets	Sales		Assets	Sales
Ashland Oil	79	1000	1407	45	4108	7852
Atlantic Richfield	30	4392	2738	12	23282	25147
Cities Service	62	2193	1714	N.A.	N.A.	N.A.
Continental Oil	31	3023	2712	N.A.	N.A.	N.A.
Getty Oil	95	1946	1221	24	10385	11600
Gulf Oil	11	8672	5396	11	20964	26581
Mobil Oil	6	7921	7261	3	35072	54607
Phillips Petroleum	39	3057	2273	16	13094	15249
Shell Oil (US)	19	4610	3590	13	22169	19678
Standard Oil of CA	14	6594	4188	9	24010	27342
Standard Oil of IN	16	5397	3733	8	25805	27635
Standard Oil of NJ	2	19242	16554	1	62963	88561
Standard Oil of OH	83	1747	1374	25	16362	11599
Sun Oil	48	2767	1942	17	12466	14730
Texaco	9	9924	6350	6	27199	40068
Union Oil of CA	57	2515	1811	31	9228	10066

Sources: Fortune 500 Directory, 1971 and 1984. Sales are for years shown. Assets are end-of-year values. Company names are those used in 1970.

Note: N.A., Company merged, and separate data are no longer available.

TABLE 1B

16 Large Petroleum Companies, 1970:
 1970 and 1983 Comparative Assets,
 Sales and Fortune Rankings
 (values in constant dollars: 1970=100)

Company	Rank	1970		Rank	1983	
		Assets (\$ million)	Sales		Assets (\$ million)	Sales
Ashland Oil	79	1000	1407	45	1662	3177
Atlantic Richfield	30	4392	2738	12	9420	10175
Cities Service	62	2193	1714	N.A.	N.A.	N.A.
Continental Oil	31	3023	2712	N.A.	N.A.	N.A.

measure of relative petroleum activity on at least one of the indices and most ranked high on both. For 1970, the LPC's

a per-firm average of 394.4 thousand barrels per day of domestic crude oil and natural gas liquids production, and as of January 1, 1971, they had a per-firm average of 636.5 thousand barrels per day of domestic refining capacity.¹¹

As of 1983-1984, the LPC's were still substantial enterprises that as a group had increased in size in real terms since 1970, although not necessarily by acquisition of other firms. Two of

and separate data are no longer available for them.¹² The 14

¹¹ For a more complete discussion of the definition and selection of the LPC's

firms that remain as identifiable entities had combined assets

of \$307.1 billion as of January 1, 1984 and 1983 sales of \$380.7 billion measured in current dollars; in constant (or deflated) 1970 dollars their beginning 1984 assets were \$124.3 billion and their sales for 1983 were \$154.0 billion. They accounted for 34 percent of the assets and 33 percent of the sales of the 1984 Fortune 100. In 1971 they accounted for 29 percent of the assets and 21 percent of the sales of the 1971 Fortune 100.¹³

¹²(...continued)

and policies of the surviving, non-LPC buyer might have been significantly different than those of the acquired LPC so that the comparability of the data on the acquisition behavior of a specific group of LPC's defined at a particular point in time would be limited.

To account for a possible downward bias in the data caused by the exclusion of the post-acquisition activity of the LPC's purchasers, certain of the tables present alternative estimates (based on a simple proportional extrapolation) of

b. Basic Acquisition Data

Tables 2 and 3 provide summary information regarding the number and size of acquisitions by LPC's in each year from 1971 through 1984.¹⁴ The data in Table 2 refer to "whole company acquisitions," which the 1982 Report defines as the acquisition of essentially an entire firm as opposed to just some of its assets.¹⁵ Column 1 of Table 2 lists by year the number of whole company acquisitions that were each valued at \$10 million or more in current dollars. Column 2 provides by year the total value of these acquisitions measured by the amount

¹⁴ A variety of sources were consulted to construct the series on acquisitions including FTC records of premerger notification filings under the Hart-Scott-Rodino Act

TABLE 2

Whole-Company Acquisitions by
16 Large Petroleum Companies: 1971-1984
(values in current dollars)

Year	Number of Acquisitions (1)	Value of Acquisitions (\$million) (2)	Number of Acquisitions ² (3)	Assets of Acquired Companies (\$million) (4)	Sales of Acquired Companies (\$million) (5)
1971	1	26	1	22	1
1972	1	1,164	1	2,301	2,630
1973	7	1,351	7	2,035	1,485
1974	3	48	2	42	85
1975	9	5,989	10	2,025	1,828
1976	12	1,451	12	2,303	2,889
1977	8	3,145	8	5,195	5,490
1978	2	106	2	318	980
1979	3	1,253	3	687	417
1980	6	2,112	6	3,112	2,112
1981	1	1,164	1	2,301	2,630
1982	7	1,351	7	2,035	1,485
1983	3	48	2	42	85
1984	9	5,989	10	2,025	1,828

TABLE 3

Total Acquisitions and Divestitures by
 16 Large Petroleum Companies¹: 1971-1984
 (values in current dollars)

Year	Number of Acquisitions	Value of Acquisitions (\$million)	Number of Divestitures	Value of Acquisitions Net of Divestitures (\$million) ²
1971	2	113	0	113
1972	4	132	6	-289
1973	3	55	5	-184
1974	13	1,358	1	1,333
1975	7	678	0	678
1976	7	1,256	5	859
1977	13	1,598	2	1,542

paid for them by

TABLE 3

shows the number of whole company acquisitions each with a book asset value of \$10 million or more. Columns 4 and 5 present the book assets and sales, respectively, of the acquired companies for the transactions tallied in column 3.

Table 3 presents figures on "total acquisitions," which the 1982 Report defines as both (1) full

and (2) partial acquisitions involving only some of the assets of

independent entity post-transaction,¹⁷ Column 1 lists the number of total acquisitions each having a transaction value of \$10 million or more.

value of these acquisitions.¹⁸

Columns 3 and 4 reflect the fact that many of the LPC's both sold and purchased assets during the period studied. Thus, column 3 of Table 3 gives the number of divestitures by these companies which were valued at \$10 million or more, while column 4 gives the total market value of acquisitions net of

The data presented in Tables 2 and 3 indicate that LPC acquisition activity, measured in current dollars, has increased since 1971, particularly during 1979-1984, when compared with

measured by the value of whole company acquisitions, total acquisitions or total acquisitions net of divestitures

example, total acquisitions net of divestitures averaged \$1.594

¹⁹(...continued)

In the case of the sale of a LPC to a firm...

billion per year over the period 1979-1984 compared with an average of \$542 million per year over the period 1971-1978. Comparable averages for the value of whole company acquisitions are \$6.898 billion (1979-1984) and \$455 million (1971-

Similarly, the average transaction size increased in the 1979-1984 period when compared with earlier years. The average whole company acquisition in 1971-1978 was \$158 million and

in 1979-1984, \$1.035 billion. The average total acquisition was \$100 million from 1971-1978 and \$560 million from 1979-1984.

The 1982 Report noted that net acquisitions of energy-

acquisitions for the years 1971-1978 to 63.1 percent for 1979-1981.²⁰ This apparent move toward greater specialization continued in the 1982-1984 period. Net acquisitions of

energy-related assets totaled \$6.334 billion, or 164.3 percent of

1984 period, total net acquisitions of the 16 LPC's were \$17.15

billion of which \$15.122 billion or 88.1 percent were of energy-related properties.

The data for 1984 and the magnitude of all acquisitions for

c. Adjustments for Inflation

The data presented in Tables 2 and 3 are to some extent biased toward finding an increase in acquisitions. The most

important source of bias is the general inflation between 1971 and 1984, which affects both the total number of transactions exceeding a particular threshold and the total value of such transactions. To correct for this, the figures in Tables 2 and 3

have been adjusted by a two-step procedure based on the GNP deflator.²²

Inflation influences the number of acquisitions reported by

current dollars reporting threshold may be partly addressed by using the GNP deflator to adjust the threshold from year to year. Thus, a time series of the number of transactions adjusted by the GNP deflator counts the number of transactions of \$10 million or more in 1971, of \$10.4 million or more in 1972, of \$11 million or more in 1973, and so on up to acquisitions of \$24.7 million or more in 1984. The adjusted results for the number of whole company acquisitions, total acquisitions, and divestitures are presented in Tables 4 and 5.²³

The adjustment of the reporting threshold to \$10 million in constant (or inflation adjusted) dollars

number of transactions only for the later years of the study period. From 1979-1984 there were 30 whole company acquisitions each with a transaction price of \$10 million or more measured in constant dollars (see Table 4).

TABLE 4

Deflated¹ Whole-Company Acquisitions by
16 Large Petroleum Companies: 1971-1984

Number	Value	Number	Assets	Sales
--------	-------	--------	--------	-------

TABLE 5

Deflated¹ Total Acquisitions and Divestitures
by 16 Large Petroleum Companies: 1971-1984

Year	Number of Acquisitions ² (1)	Value of Acquisitions (\$million) (2)	Number of Divesti- tures ³ (3)	Value of Acquisi- tions Net of Divesti- tures ⁴ (\$million) (4)
1971	2	113	0	113
1972	4	125	6	276
1977	9	1,033	2	995
1978	4	224	3	162
1979	13	4,145	11	2,847
1980	16	2,904	3	2,655
1981	17	2,217	9	-2,066
1982	5	406 (433) ⁵	11	-1,704 (-1,818) ⁵
1983	5	669 (765) ⁵	10	342 (391) ⁵
1984	22	13,065 (14,931) ⁵	10	2,788 (3,186) ⁵

¹ Deflated by GNP deflator (1970 = 100).

constant dollars (Table 5, column 3) compared with 61 in current dollars (Table 3, column 3).

second adjustment must be applied to the measures of the value of transactions, sales, and assets. These figures must be

dividing them by an appropriate deflator. The results of these deflation steps are also presented in Tables 4 and 5.

Several features of the inflation-adjusted results deserve comment. The deflated data obviously show a much less

and total acquisitions net of divestitures averaged \$414.8 million per year from 1979-1983.²⁴

The number of LPC's fell, as noted earlier, from 16 to 14 through the acquisition of two LPC's by non-LPC's--Conoco by Dupont in 1981 and Cities Service by Occidental Petroleum in 1982.²⁵ There are several possible ways of modifying the

analysis to handle this change. One is to include subsequent acquisitions by the acquiring firm, treating it as the successor

much different in both past and future acquisition activity than the acquired firm. Under these circumstances, a retro-active adjustment in the data to substitute the acquiring firm's past acquisitions for the acquired firm's is required to gauge trends in acquisitions. Rather than attempting such a retro-spective adjustment to the data, which would have greatly

²⁴ The average transaction size also increased. From 1979 to 1984, the average whole company acquisition, in deflated dollars, was \$3.04 billion (\$262 million for 1979-83), while from 1971 to 1978 the average whole company acquisition was \$132.4 million.

reduced the comparability of the present data with that in the 1982 Report, we exclude subsequent acquisitions by DuPont and Occidental from the LPC sample. Acquisitions by Cities Service and Conoco up to the time of the purchase of each of these companies continue to be included in the data reported. Unlike the effect of inflation, removing subsequent acqui-

tions may have biased the data downward. To examine the possible effect of this change, we estimated, based on a proportional increase, the amount of merger activity that might have occurred if the number of firms in the sample had remained constant.²⁶ These estimates are presented (in parentheses) in Tables 4 and 5. The estimates suggest that the LPC's acquisition activity may have been 14 percent higher in 1983 and 1984 had Conoco and Cities Service remained independent and behaved in a similar manner.

d. Large Transactions

The 1982 Report presented separate data on acquisitions exceeding \$100 million. The purpose was to address a problem that could have arisen from possibly overlooking some smaller transactions that exceeded the \$10 million threshold chosen for the 1982 Report but that were not widely (or even publicly) reported. If this underreporting became

on the \$10 million threshold would be biased toward showing too small an increase in acquisitions activity. By considering a \$100 million (in constant dollars) threshold as a check, the preparers of the 1982 Report sought to identify acquisitions

Table 6 presents the number of whole company acquisitions, total acquisitions, and divestitures that exceeded \$100 million (in constant dollars) for the years 1971-1984. Examine Table 6.

6 suggests that transactions of this magnitude were relatively infrequent in the 1971 to 1978 period and became more frequent in the late 1970's and early 1980's. In 1982 and 1983, the number of large transactions dropped to a much lower level only to rise in 1984. Comparing Table 6 with the corresponding counts of transactions in Tables 4 and 5 shows the same general pattern of acquisition activity.

²⁷(...continued)
the context of financial reporting standards or newsworthy in the perspective of the business press. The Journal of Applied Corporate Finance, Vol. 1, 1989.

TABLE 6

Number of Deflated¹ Large Acquisitions and
 Divestitures by 16 Large Petroleum Companies: 1971-1984
 (based on deflated transaction price of \$100 million or more)

	Deflated Number of Acquisitions	Deflated Number of Divestitures	Deflated Number of Transactions
1971	0	0	0
1972	0	0	2
1973	0	0	0
1974	1	1	0
1975	0	2	0
1976	2	2	0
1977	3	4	0
1978	0	1	0
1979	4	6	4
1980	2	6	0

With respect to bias caused by possibly more underreporting in the later years, the data do show a somewhat greater proportion of large acquisitions in the later years, which if statistically significant, would be consistent with the hypothesis of bias. The large transactions represent 30 percent of the whole company acquisitions for 1971-1978

for 1979-1984; large transactions represent 21.7 percent of total acquisitions for 1971-1978 and 32.1 percent for 1979-1984; and large transactions represent 16.7 percent of divestitures for 1971-1978 and 24.1 percent for 1979-1984. While these figures suggest that the proportion of large transactions may have increased in the later period, the differences are not large enough to be statistically significant,²⁸ and hence we cannot conclude that the difference was caused by reporting bias or any other systematic effect.

The tabulations of acquisition activity reported above in Tables 4 and 5 have been repeated for those transactions

exceeding \$100 million in constant dollars. The results for whole company acquisitions are shown in Table 7 and for total acquisitions in Table 8. While the number of such large transactions increased somewhat in the 1979-1984 period, the size of the individual transactions has increased markedly in this period, whatever measure of size is used. Total acquisitions averaged \$380 million per year (in constant dollars) from 1971-1978 and \$3.59 billion per year from 1979-1984.

1979-1984, \$862.6 million; and for 1979-1983, \$449.0 million.

c. Adjustments for Firm Size

Correcting the thresholds used in generating the acquisition

TABLE 7

Deflated¹ Large Whole-Company Acquisitions
 by 16 Large Petroleum Companies: 1971-1984
 (based on a deflated transaction price of
 \$100 million or more)

Year	Deflated Market Value of Acquired Companies (in millions)	Deflated Total Assets of Acquired Companies (in millions)	Deflated Sales of Acquired Companies (in millions)
1971	0	0	0
1972	0	0	0
1973	0	0	0
1974	705	1,443	1,931
1975	0	0	0
1976	779	1,613	1,801
1977	804	1,252	819
1978	0	0	0
1979	0	0	0

TABLE 8

Deflated¹ Large Total Acquisitions

by 16 Large Petroleum Companies: 1971-1984

(based on transactions with a deflated price of \$100 million or more)

Year	Deflated Market Value of Total Acquisitions (\$million)	Deflated Market Value of Total Acquisitions Net of Divestitures (\$million)
1971	0	0
1972	0	-247
1973	0	0
1974	705	705
1975	448	448
1976	799	635
1977	904	904
1978	183	183
1979	3,901	2,812
1980	2,601	2,440
1981	1,775	-2,269
1982	223	-1,714
	(238) ²	(-1,828) ²
1983	479	479
	(547) ²	(547) ²
1984	12,585	2,636
	(14,383) ²	(3,013) ²

¹ Deflated by GNP deflator, 1970 = 100.² Represents adjustments for changes in group size

the effect on the acquisition data of general changes in energy prices and in the prices of energy-related assets as reflected in certain LPC financial indices. In Table 9, the market value, assets, and sales of whole company acquisitions (from Table 2) are expressed as percentages of the LPC's market value, assets, and sales respectively. Table 9 also reports the market value of

whole company acquisitions expressed as a percentage of total flow of funds of the LPC's. Table 10 reports total acquisitions, and total acquisitions net of divestitures (from Table 3), expressed as percentages of the market value and of total funds from operations of the LPC's.

Viewed over the entire 14 year period, Tables 9 and 10 indicate little discernable pattern in acquisition activity. In Table 9, columns (1) and (2), two sharp peaks in acquisition activity (in 1979 and 1984) can be seen in the ratios based on the market values of whole company acquisitions. However, except for a single peak in 1984 that is five to six times greater than any of the previous observations, the measures of whole company acquisitions in columns (3) and (4) that are based on

TABLE 9

Whole Company Acquisitions

Market Value of Acquired	Market Value of Acquired	Assets of Acquired	Sales of Acquired
--------------------------	--------------------------	--------------------	-------------------

TABLE 10

Total Acquisitions: Percentage of Large Petroleum
Company Financial Indicators

Year	Market Value of Acquisitions as Percentage of Market Value of LPCs	Value of Acquisitions as Percentage Funds from Operations of LPCs	Value of Acquisitions Net of Divestitures as Percentage of Market Value of LPCs	Value of Acquisitions Net of Divestitures as Percentage of Funds from Operations of LPCs
	(1)	(2)	(3)	(4)
1971	0.18	0.18	--	--
1972	0.20	1.20	-0.45	-2.63
1973	0.07	0.47	-0.24	-1.57
1974	1.67	8.80	1.64	8.64
1975	1.14	3.26	1.13	3.26
1976	1.77	7.72	1.23	5.28
1977	1.71	8.05	1.60	7.76
1978	0.46	1.83	0.30	1.32
1979	7.81	27.79	5.36	19.10
1980	4.24	14.54	3.80	13.29
1981	2.20	9.19	1.70	7.16
1982	0.64	1.96	-2.61	-7.98
1983	1.37	3.68	6.66	1.77
1984	22.27	71.37	4.72	15.14

indication of trends in acquisition activity in the data on total

acquisitions and the acquisitions net of divestitures reported in
Table 10.

3. Comparison of Merger Activity Between Large Petroleum

activity of large petroleum companies

Fortune 100 that had some but relatively limited interests in the domestic oil industry compared with the petroleum companies.³⁰ The selection of the petroleum and petroleum-related companies followed the same general protocol used to select the original 16 LPC's. For all Fortune 100 firms with available information, the firms' domestic 1978 crude oil production and January 1, 1979 refinery capacity were

ranked as highly as the original 16 LPC's were added to the petroleum group, and the remainder with lesser petroleum interests were classified as pet-

Rodino Act. The members of the three groups of firms are identified, and comparative 1979 and 1984 Fortune 500 data for them are listed in Table 11 (parts A to F). Summary statistics for the three groups are given in Table 12.

b. Acquisitions by the Three Groups

acquisitions, the number of total acquisitions, and the number of divestitures for each group of companies. Based on counts of transactions, it does not appear that there have been consistently larger numbers of acquisitions by the petroleum companies than by the comparison groups during the study

TABLE 11A

1978 and 1983 Comparative Assets,
Sales and Fortune Rankings
(values in current dollars)

Company	1978			1983		
	Rank	Assets (\$ million)	Sales	Rank	Assets (\$ million)	Sales
Amarada Hess	49	3435	4701	39	6217	8369
Ashland Oil	44	2886	5167	45	4108	7852
Atlantic Richfield	13	12060	12298	12	23282	25147
Cities Service	51	4005	4661	N.A.	N.A.	N.A.
Continental Oil	18	7445	9455	N.A.	N.A.	N.A.
Getty Oil	79	4718	3515	24	10385	11600
Gulf Oil	9	15036	18069	11	20964	26581
Marathon Oil	52	3758	4509	N.A.	N.A.	N.A.

TABLE IIB

18 Leading Petroleum Companies, 1978:

1978 and 1983 Comparative Data

(values in constant dollars: 1978=100)

Company	Rank	1978		Rank	1983	
		Assets (\$ million)	Sales		Assets (\$ million)	Sales
Amarada Hess	49	3435	4701	39	4324	5821
Ashland Oil	44	2886	5167	45	2857	5462
Atlantic Richfield	13	12060	12298	12	16194	17491
Cities Service	51	4005	4661	N.A.	N.A.	N.A.

TABLE IIC

16 Leading Petroleum-Related Companies, 1978:
 1978 and 1983 Comparative Assets,
 Sales and Fortune Rankings
 (values in current dollars)

		(\$ million)			(\$ million)	
Allied Chemical	84	3228	3268	29	7647	10351
Armco	54	3096	4357	87	3609	4165
Borden	68	2166	2902	85	2720	2265

TABLE IID

16 Leading Petroleum-Related Companies, 1978:
 1978 and 1983 Comparative Assets,
 Sales, and Fortune Rankings
 (values in constant dollars: 1978=100)

Company	Rank	1978		Rank	1983	
		Assets (\$ million)	Sales		Assets (\$ million)	Sales
Allied Chemical	84	3228	3268	29	5319	7200
Armco	54	3096	4357	87	2510	2897
Borden	68	2166	3803	85	1892	2967
Continental Group	67	2997	3944	68	2541	3437
Dow Chemical	27	8789	6888	28	8334	7617
E.I. Dupont	16	8070	10584	7	16994	24608
Esmark	38	2116	5827	88	2547	2808
General Electric	8	15037	19654	10	16198	18639
Georgia Pacific	53	3344	4403	51	3463	4600

TABLE 11E

18 Non-Petroleum Companies, 1978:
 1978 and 1983 Comparative Assets,
 Sales and Fortune Rankings
 (values in current dollars)

Company	Rank	1978		Rank	1983	
		Assets (\$ million)	Sales		Assets (\$ million)	Sales
Aluminum Co of America	65	4167	4052	65	6267	5263
American Can	66	2478	3981	117	2831	3346
American Home Products	94	1862	3063	73	3086	4857
Bethlehem Steel	34	4933	6185	69	4457	4898
Boeing	40	3573	5463	27	7471	11129
Coca Cola	56	2583	4338	48	5228	6991
Dresser Industries	95	2355	3054	112	3245	3473
Goodyear Tire & Rubber	22	5231	7489	32	5986	9736
LTV	42	3720	5261	78	4406	4578
McDonnell Douglas	63	3098	4130	42	4792	8111
Procter & Gamble	20	4984	8100	22	8135	12452
Ralston Purina	64	1898	4058	71	2101	4872
Raytheon	88	2061	3239	59	3729	5937
Republic Steel	82	2585	3479	145	2867	2701
Rockwell International	37	3535	5833	43	5231	8098

TABLE 11F

18 Non-Petroleum Companies, 1978:
1978 and 1983 Comparative Assets,
Sales and Fortune Rankings
(values in constant dollars: 1978=100)

Company	Rank	1978		1983	
		Assets (\$ million)	Sales	Assets (\$ million)	Sales

TABLE 12

Comparative Size Data for
Petroleum, Petroleum-Related, and

a. Average Assets and Sales
(values in millions of current dollars)

Group	Number of Firms	1/1/79 Assets	1978 Sales	1/1/84 Assets	1983 Sales
Petroleum	18	11408	14494	20888	25939
Petroleum- related	16	5915	6965	11488	9791
Non-petro- leum	18	3414	4882	4957	6868

b. Percentage of Fortune 100 Assets and Sales
Held by Each Group, 1978 and 1983

Group	Number of Firms	1/1/79 Assets	1978 Sales	1/1/84 Assets	1983 Sales
Petroleum	18	35.0	32.5	34.3	33.5
Petroleum- related	16	16.1	13.9	20.1	13.5
Non-petro- leum	18	10.5	11.0	9.8	10.6

Source: Calculated from Tables 11A to 11E

TABLE 13

Number of Acquisitions by Petroleum,
Petroleum-Related and Non-Petroleum Companies,
1979-1984
(acquisitions greater than \$15 million
in current dollars)

Acquisition Type/Year	Petroleum Companies	Petroleum- Related Companies	Non-Petroleum Companies
Whole Company Acquisitions			
1979	8	15	6
1980	10	10	5
1981	8	12	2
1982	2	9	5
1983	3	7	8
1984	6	2	6
Total Acquisitions			
1979	13	18	7
1980	19	18	7
1981	16	27	7
1982	6	12	13
<hr/>			
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1979	9	10	3
1980	2	11	4
1981	9	19	6
1982	12	19	11
1983	14	19	2
1984	12	22	13

companies.

Examining total acquisitions in Table 13, the petroleum companies made 48 total acquisitions in the 1979-1981 period, compared with 63 for the petroleum-related companies and only 21 for the non-petroleum companies. From 1982-1984, the petroleum companies made 37 total acquisitions, compared with 38 by the non-petroleum group and 40 by the petroleum-related group. Over the entire period, the petroleum companies made 85 total acquisitions, whereas the petroleum-related companies made 103, and the non-petroleum companies, 59. Thus, the petroleum companies made fewer total acquisitions than the petroleum-related firms and more than the

acquisitions during 1982-1984, whereas the non-petroleum firms increased theirs.³¹

Acquisition activity based on the

transaction size for the period 1979-1984 are presented for the three groups of firms in Tables 14 and 15. As discussed in the Appendix, these data have been adjusted to reflect differences in the numbers of firms in each group. As in the case of the number of acquisitions, the data on the value of acquisitions also present a mixed picture. Table 14 presents the data for whole company acquisitions. Table 15 presents the data for total acquisitions and total acquisitions net of divestitures.

Examination of Table 14 suggests that the value of whole company acquisitions by the petroleum and the petroleum-

TABLE 14

**Whole-Company Acquisitions by
Petroleum, Petroleum-Related, and
Non-Petroleum Companies,
1979-1984¹**
(values in millions of current dollars)

Market Value

1979	5,978		
1980	1,469	3,189	1,548
1981	3,145	1,481	937
1982	112	12,167	751
1983	1,504	8,171	1,685
1984	35,330	2,448	1,019
		101	1,561

Assets

1979	2,013		
1980	2,290	2,998	1,673
1981	5,195	3,185	427
1982		15,368	624
1983	337	10,864	

1979-1984¹
(values in millions of current dollars)

Measure of Acquisition Activity/Year	Petroleum Companies	Petroleum-Related Companies	Non-Petroleum Companies
--------------------------------------	---------------------	-----------------------------	-------------------------

Market Value of Total Acquisitions:

1979 7 129 3 665 1 610

acquisitions averaged \$7.92 billion per year for the petroleum companies, \$4.59 billion for the petroleum-related companies, and \$1.25 billion for the non-petroleum companies. Excluding 1984 (so to eliminate the possibly distorting effect of three large mergers in 1984), whole company acquisitions over the period 1979-1983 by large petroleum companies averaged \$2.44

related and non-petroleum companies

and \$1.19 billion per year, respectively.

The data on total acquisitions presented in Table 15 again suggest that the petroleum and petroleum-related group made somewhat larger acquisitions than non-petroleum companies.

in 1984, total acquisitions annually averaged \$3.95 billion for petroleum companies, \$6.11 billion for petroleum-related companies, and \$1.62 billion for non-petroleum companies.

The average transaction size also reflects the tendency of the petroleum and petroleum-related firms to engage in large acquisitions. For 1982-1984, the average transaction for total acquisitions is \$1.13 billion for petroleum companies, \$352.4 million for petroleum-related companies, and \$180.6 million for non-petroleum firms. Over 1979-1984, acquisitions for petroleum firms average \$688.2 million per transaction, for petroleum-related firms \$352.4 million per transaction, and for non-petroleum firms \$176.2 million per transaction. For 1979-

non-petroleum firms \$176.2 million per transaction. For 1979-

1983, which included the \$6.11 billion for petroleum-related

While the petroleum and petroleum-related groups were making substantial acquisitions, Table 15 shows that they also were making substantial divestitures.

In this most recent period, total acquisitions less divestitures by the petroleum companies averaged \$373.7 million per year of net divestitures, and petroleum-related companies disposed of \$1.30 billion per year in net divestitures.³³ In contrast, the non-petroleum companies averaged \$1.28 billion per year of net acquisitions. Total acquisitions net of divestitures for the full 1979-1984 period annually averaged: \$903.7 million for the

³²(...continued)

total acquisitions as whole company acquisitions, petroleum-related companies 82.7 percent, and non-petroleum companies 69.8 percent. To the extent that whole company acquisitions receive greater public attention, the proportionally greater whole company acquisition activity by petroleum and petroleum-related firms could contribute to a perception of greater acquisitiveness.

³³ If Beatrice Foods' acquisition of all of Esmark, Inc. had not been treated in Table 15 as a divestiture by Esmark, the 1984 value for acquisitions net of divestitures of petroleum-

c. Adjustments for Firm Size

Interpreting these data is necessarily difficult because of the short period covered and the diversity of the firms included in the analysis. As the data on acquisitions net of divestitures and, to a lesser extent, the data on average acquisitions per year, apart from 1984, suggest, petroleum firms do not always engage in more acquisition activity than the other two groups. However, there is one difference among the three groups that is

TABLE 16

Market Value, Assets and Sales of
 Whole-Company Acquisitions as a Percentage
 of Market Value, Assets and Sales of
 Petroleum, Petroleum-Related and
 Non-Petroleum Company Groups,
 1979-1984

Measure of Acquisition	Petroleum	Petroleum-Related	Non-Petroleum
------------------------	-----------	-------------------	---------------

Market Value
 of Acquisitions
 as a % of Group
 Market Value

1979	6.36	6.76	4.36
1980	1.09	2.70	2.62
1981	1.47	18.24	1.63
1982	0.07	12.78	4.12
1983	1.03	3.23	1.90
1984	19.98	0.10	2.40

Assets of Acquisitions
 as a % of Group Assets

1979	0.98	2.82	2.72
1980	0.93	2.60	0.61
1981	1.79	11.42	0.81
1982	0.10	6.63	2.61
1983	0.22	2.63	1.21
1984	11.75	0.58	

Sales of Acquisitions
 as a % of Group Sales

1979	0.51	2.67	2.38
1980	0.28		

total acquisitions and total acquisitions net of divestitures in Table 17.

Tables 16 and 17 reveal a generally mixed pattern. Except for the effect of the three very large mergers of 1984, acquisitions by the petroleum companies relative to the overall size of these companies declined over the 1970-1980 period.

acquisition activity of the petroleum-related firms peaked in 1981 and 1982. There is no apparent pattern for the non-

TABLE 17

Total Acquisitions and Total
Acquisitions Net of Divestitures as a
Percentage of Market Value of Petroleum,
Petroleum-Related and Non-Petroleum-Related Assets

Measure of
Acquisition

Petroleum-

TABLE 18

Transaction Values as Percentage of Acquiring
Firms' Market Value, Geometric Means for
Groups of Years, 1979-1984

a. Whole Company Acquisitions
as a Percentage of Firms' Market Value

Firm type	Petroleum	Petroleum- Related	Non- Petroleum
Years:			
1979-1981	2.17	6.93	2.65
1982-1984	1.13	1.60	2.66
1979-1984	1.56	3.33	2.65

b. Total Acquisitions
as a Percentage of Firms' Market Value

Firm type	Petroleum	Related	Non-Petroleum
Years:			
1979-1981	3.93	8.47	2.94
1982-1984	2.62	5.28	4.25
1979-1984	3.21	6.69	3.53

and petroleum-related companies relative to the size of these firms generally declined in 1982-1984 compared with 1979-1981, notwithstanding the very large acquisitions by the petroleum group in 1984. Overall, acquisitions by the petroleum companies were less important, relative to the size of those firms, than were the relative size of acquisitions of the petroleum-related companies. Petroleum company acquisitions were of roughly comparable relative size as those of non-petroleum companies.

4. Summary

To sum up, the petroleum companies increased their acquisition activity subsequent to 1978 compared with earlier years. An important part of this increase is accounted for by several particularly large acquisitions, especially those occurring in 1984. However, as the figures in the previous section suggest, this increase in acquisition activity appears no greater, proportionally, than increases in such activity elsewhere in the economy. Apart from 1984, acquisitions by the petroleum companies declined relative to the size of these firms when compared with the petroleum-related and non-petroleum

companies. For the 1982-1984 period, the petroleum companies as a group had net divestitures of \$560 million.

The pattern of acquisitions is also of some interest.

Recently the petroleum companies

non-energy assets and concentrating on whole company acquisitions of energy-related assets.

related firms follow a similar, but less pronounced, pattern. The pattern suggests that the conglomeration movement among large petroleum companies may be past, and to the extent that the present acquisitions increase specialization, the possibility

transactions in the last 14 years, their relative position in the economy continues to be influenced by other factors, such as relative energy prices, success in exploration and development of new oil reserves, and their ability to manage the assets they have acquired.

SECTION 3:

Concentration in Crude Oil and Refining

The 1982 Report contained information on concentration at different production levels in the oil industry and how concentration was changed by the recent mergers and acquisitions. To some extent, the 1982 Report examined concentration

(production and reserve ownership), refining, transportation (of crude oil and refined products), and marketing (of refined products at wholesale and retail). In this update, recent information is given on concentration in crude oil reserves and production (world-wide and domestically) and in domestic refining.³⁷

³⁷ We did not update information on pipeline concentration. The Department of Justice recently published a report on this subject, and because of the complex nature of pipeline ownership arrangements...

1. Crude Oil

There are literally thousands of crude oil producers in the U.S. and few possess market shares of as much as five percent of total production. National concentration in the ownership of domestic crude reserves is quite low, and mergers involving even the largest U.S. producers have not reached the thresholds identified in the DOJ Report.

³⁷(...continued)
the 1982 Report, pp. 251-256, data are available only on a state-wide basis but competition is direct.

Most regions of the world are still

A

The U.S. as a whole relies on imported crude to meet refining demand. Imports as a percentage of the oil

a. Concentration in the International Market

Since 1973, changes in the level of world crude oil prices have largely reflected changes in OPEC's policies and in its members' ability to function jointly. The output levels of OPEC members for selected years since 1974 are shown in Table 19. It can be seen that OPEC's share of world crude oil and natural gas liquids production has fallen from nearly 53 percent in 1974 to only slightly over 40 percent in 1983.

reflecting the steady increase in non-OPEC production.

Concentration in crude oil can be measured as the share of

TABLE 19
OPEC Share of World Crude Oil
and NGL Production¹
(thousands bbl/day)

	Year			
Saudi Arabia ²	8610	9835	10248	5000
Iran	6067	3178	1389	2184
Venezuela	3060	2425	2157	1863
Kuwait ²	2596	2595	1185	1224
Nigeria	2255	2302	1433	1419
Iraq	1971	3487	1005	1214
Abu Dhabi ³	1750	1450	1159	778
Libya	1541	2132	1175	1124
Indonesia	1375	1631	1700	1541
Algeria	1059	1293	1018	963
Dubai ³	232	360	358	352
Gabon	202	203	151	152
Ecuador	177	214	211	258
Sharjah ³	50	15	9	120
Ras Al Khaimah ³	0	0	0	6
OPEC	30,945	31,120	23,198	18,198
NON-OPEC	27,787	34,833	36,565	40,131
WORLD	58,732	65,953	59,763	58,329
% OPEC	52.7	47.2	38.8	31.2

¹ Source: Energy Information Administration, International Energy Annual, Tables 8 and 9 except as noted.

² Includes 1/2 of neutral zone production.

³ Sources: Crude and condensate production, The Oil and Gas Journal, Dec. 31, 1984; Dec. 28, 1981, Dec. 31, 1979, Dec. 30, 1974. Natural Gas Liquids Production, The Oil and Gas Journal, July 15, 1985, and July 19, 1982. The International Petroleum Encyclopedia, 1980 and 1975.

future, or to expand output in response to higher prices. While reserves are somewhat more difficult to measure than production, they provide a better long-term indicator of market structure and of the relative ability of producers to expand output. It can be seen in Table 20 that OPEC members accounted for nearly two-thirds of world crude oil reserves.

the end of 1973 and that there has been little change in this figure over the last decade.

Analysis of concentration in the world crude oil reserves

complicated

TABLE 20

OPEC Share of World Crude Oil Reserves¹
(billions of barrels, December 31)

Country	Year			
	1973	1978	1981	1984
Saudi Arabia ²	140.8	168.9	167.9	171.7
Kuwait ²	72.8	69.4	67.7	92.7
Iran	60.0	59.0	57.0	48.5
Iraq	31.5	32.1	29.7	44.5
Libya	25.5	24.3	22.6	21.1
Abu Dhabi	21.5	30.0	30.6	30.5
Nigeria	20.0	18.2	16.5	16.7
Venezuela	14.0	18.0	20.3	25.8
Indonesia	10.6	10.3	0.8	0.7

countries, and most Communist countries, the state oil company
determines prices and output levels, even if the crude is nominally

ally produced by private companies. In these countries, the
relevant actor is the state. In other areas, such as the U.K.

and Norwegian North Sea, a mix of private and public control

economic actors.

Tables 21 and 22 provide estimates of concentration in
world crude oil production (including condensate and natural

TABLE 21

Concentration of World Crude Oil
and NGL Production, 1974-1984¹
(thousands bbl/day)

Producer	Year							
	1974		1979		1981		1984	
	Bbl	share	Bbl	share	Bbl	share	Bbl	share
USSR	9246	15.7	11794	17.9	12265	20.5	12328	21.1
Saudi Arabia ²	8610	14.7	9835	14.9	10248	17.1	5000	8.6
	6267	10.2	7172	10.9	7280	12.3	7184	12.7
Kuwait ²	2596	4.4	2595	3.9	1185	2.0	1224	2.1
Nigeria	2255	3.8	2302	3.5	1433	2.4	1419	2.4
Iraq	1971	3.4	3487	5.3	1005	1.7	1214	2.0
Abu Dhabi ³	1750	3.0	1450	2.2	1159	1.9	778	1.3
Libya	1541	2.6	2132	3.2	1175	2.0	1124	1.9
Indonesia	1375	2.3	1631	2.5	1700	2.8	1541	2.6
China	1315	2.2	2122	3.2	2012	3.4	2269	3.9
Algeria	1059	1.8	1293	2.0	1018	1.7	963	1.7
Mexico	651	1.1	1611	2.4	2554	4.3	3007	5.2
Qatar	523	0.9	518	0.8	429	0.7	422	0.7
Argentina	425	0.7	486	0.7	508	0.9	476	0.8
Romania	310	0.5	266	0.4	255	0.4	252	0.4
Oman	297	0.5	290	0.4	317	0.5	404	0.7
	222	0.4	160	0.2	169	0.3	152	0.3

TABLE 21--Continued

Producer	Year							
	1974		1979		1981		1984	
	Bbl	share	Bbl	share	Bbl	share	Bbl	share
Phillips	256	0.4	263	0.4	266	0.4	316	0.5
Getty	300	0.5	268	0.4	283	0.5	0	0.0
WORLD TOTAL	58732		65953		59763		58329	
Concentration Ratios								
4 Firm	45.9		42.9		45.6		39.4	
8 Firm	60.5		57.2		57.3		52.6	
HHI	678		693		816		653	

Source: Data by country, except as noted. Energy Information

TABLE 22

Concentration of World Crude Oil Reserves¹
(billions of barrels, December 31)

Producer	Year							
	1973		1978		1981		1984	
	Bbls	Share	Bbls	Share	Bbls	Share	Bbls	Share
Saudi Arabia ²	140.8	22.4	168.9	26.3	167.9	25.0	171.7	24.6
USSR	80.0	12.7	71.0	11.1	63.0	9.4	63.0	9.0
Kuwait ²	72.8	11.6	69.4	10.8	67.7	10.1	92.7	13.3
Iran	60.0	9.6	59.0	9.2	57.0	8.5	48.5	6.9
Iraq	31.5	5.0	32.1	5.0	29.7	4.4	44.5	6.4
Libya	25.5	4.1	24.3	3.8	22.6	3.4	21.1	3.0
Abu Dhabi	21.5	3.4	30.0	4.7	30.6	4.6	30.5	4.4
Nigeria	20.0	3.2	18.2	2.8	16.5	2.5	16.7	2.4
China	20.0	3.2	20.0	3.1	19.9	3.0	19.1	2.7
UK	10.0	1.6	16.0	2.5	14.8	2.2	13.6	1.9
Algeria	7.6	1.2	6.3	1.0	8.1	1.2	9.0	1.3
Syria	7.1	1.1	2.1	0.3	1.9	0.3	1.5	0.2

net production in these countries, private company market shares are computed on the basis of their production in the U.S. and Canada.

Table 21 reports the production of all OPEC members and each other actor accounting for 0.5 percent or more of world crude production in any of the years reported. While the HHI calculations are not exact, because the market shares of many small producers are omitted from the calculation, inclusion of these producers would have very little effect on the HHI. It can be seen that while international crude production

relatively unconcentrated throughout the 1970's and 1980's, there was a significant decline in concentration after 1981. It

reserves in any of the years reported. It can be seen that control of world crude reserves is somewhat more concentrated

than crude production, and that the degree of concentration has been relatively stable since year-end 1973. As noted in footnote 1 of Table 22, private oil companies are even less significant in terms of reserve ownership than in terms of production, with no company accounting for 0.5 percent or more of world crude oil reserves in any year.⁴⁵

In interpreting these data, it is useful to keep in mind that

both reserves and production depend on the price level. It was the control of low cost reserves and production that permitted OPEC to raise prices in the 1970's.

b. Concentration in Domestic Crude Oil Markets

Domestic crude oil reserves and production are relatively unconcentrated. It can be seen in Table 23 that the four-firm concentration ratio for production in 1981 was 24.8 percent, the eight-firm ratio was 39.6 percent, and the HHI calculated for firms with more than one percent of the market was 251.25.

TABLE 23

U.S. Crude Oil, Condensate and NGL Production
by Company 1981, 1984¹

Company	Net Production (000 bbls/day)	Market Share (percent)	Net Production (000 bbls/day)	Market Share (percent)
Exxon	752	7.4	778	7.4
Sohio	717	7.0	634	6.0
Arco	540	5.3	655	6.2
Shell	514	5.0	534	5.1
Amoco	437	4.3	409	3.9
Texaco	381	3.7	674	6.4
Gulf	345	3.4	N.A. ³	N.A. ³
Socal	342	3.3	622	5.9
Mobil	316	3.1	366	3.5
Phillips	278	2.7	348	3.3
Getty	268	2.7	N.A. ³	N.A. ³
Sun	217	2.1	194	1.8
Union	168	1.6	169	1.6
Marathon/ US Steel	166	1.6	174	1.7
Cities Service	149	1.5	N.A. ³	N.A. ³

U.S. Total ²	10181	100.0	10509	100.0
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(continued next page)

TABLE 23—Continued

Company	1981		1984	
	Net Production (100 thousand barrels)	Market Share	Net Production	Market Share

Concentration

Top 4	2523	24.8	2741	26.1
Top 8	4028	39.6	4672	44.5
HHI		251		282

1. Crude oil, condensate and natural gas

company mergers and acquisitions in recent years might suggest that these transactions materially altered concentration in U.S. reserves, this clearly has not been the case. Concentration in 1981-1984 has increased only slightly. In 1984, four-firm concentration was 26.1 percent, eight-firm concentration was 44.5 percent, and the HHI was 282.⁴⁶

Table 24 shows U.S. market shares based on reserves, which, as indicated above, are an indicator of future market control.⁴⁷

⁴⁶ These figures are based on the net production of publicly held oil companies.

TABLE 24

United States Crude Oil, Condensate and NGL Reserves

Company	1981		1984	
	Reserves (million barrels)	Market Share (percent)	Reserves (million barrels)	Market Share (percent)
Sohio	3419	9.5	2903	8.0
Exxon	2822	7.8	2715	7.5
Arco	2549	7.1	2746	7.6
Shell	2208	6.1	2321	6.4
Amoco	1674	4.6	1737	4.8
Getty	1322	3.7	N.A. ³	N.A. ³
Socal	1237	3.4	2186	6.1
Texaco	1120	3.1	1887	5.2
Mobil	898	2.5	1041	2.9
Gulf	865	2.4	N.A. ³	N.A. ³
Sun	716	2.0	745	2.1
Marathon	641	1.8	576	1.6
Union	678	1.9	N.A. ³	N.A. ³
Phillips	473	1.3	659	1.8
Conoco/DuPont	387	1.1	N.A. ³	N.A. ³
Cities Service	564	1.6	N.A. ³	N.A. ³
Subtotal	21,573	59.8	19,381	53.7
U.S. Total ²	36,494	100.0	36,089	100.0
<u>Concentration</u>				
Top 4	10,998	30.5	10,500	29.2
Top 8	16,351	45.3	17,401	48.2
HHI		322		333

¹ Sources: 1981, 1984 Annual Reports and 10K's. The data includes proven developed and undeveloped reserves. See footnote 1, Table 23.

² Sources: E.I.A. U.S. Crude Oil, Natural Gas and Natural Gas Liquids Reserves, 1984 Annual Report, Table 1, p. 5.

³ Merged with another firm, and no longer reported.

This table shows slightly greater concentration in reserves than in production, where again concentration in reserves has not increased significantly from 1981-1984. In 1981, four- and eight-firm concentration ratios and HHI were, respectively, 30.5 percent, 45.3 percent, and 322. In 1984, the corresponding figures were 29.2 percent, 48.2 percent, and 333. The leading firm, Sohio, owned less than ten-percent of domestic proven reserves. (Sohio's share is largely attributable to its

Table 25 presents concentration data for the top four and eight reserve owners as of year-end 1978 through year-end 1984.⁴⁸ It is evident from this data that acquisitions of oil reserves by large oil companies have had a negligible effect on

concentration over the years 1979-1984.

⁴⁷(...continued)

unitization agreement, production rates may be controlled by the operator rather than the working interest owner.

⁴⁸ Certain sources report this data as of January 1 of the subsequent year. We have treated this as year-end data for the previous year to be consistent in the time periods of this report.

TABLE 25

**Concentration of U.S. Crude Oil, Condensate and Natural Gas Liquids,
Reserve Ownership: 1978 to 1984
(as of December 31 each year)**

	1978	1979	1980	1981	1984
Total Reserves¹	38,127	36,425	36,533	36,494	36,089
<u>Top Four Firms</u>					
Year-end reserve² ownership in millions bbl	12,275	11,684	11,346	10,998	10,685
Percent of total reserves	32.2	32.1	31.1	30.1	29.6
<u>Top Eight Firms</u>					
Year-end reserve² ownership in millions bbl	18,595	17,407	16,902	16,351	17,495
reserves	48.8	47.8	46.3	44.8	48.5

¹ Sources: API, Market Shares and Individual Company Data for U.S. Energy Markets, various years.

² Source: EIA, U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves, 1985 Annual Report, Table 1.

2. Refining

The markets for refinery products may be, at least in the short run, regional rather than national, a feature which would be of importance in the antitrust analysis of acquisitions involving refineries. Moreover, the matter is complicated by the fact that the geographic scope of the refinery products markets may be product specific. For example, lubricating oil moves in a national market, while asphalt is very localized. Gasoline and residual oil trade in more regional markets, but with distinctly different shipping patterns.

are capable of producing the same slate of products as that

short run do they have equal access to distribution facilities for more specialized products, such as kerosine jet fuel. Consequently antitrust reviews of mergers involving refinery assets

markets within the United States.⁴⁹ While the exact boundaries of these possible markets are difficult to determine, the available data from the Petroleum Administration for Defense Districts (PADDs)⁵⁰ provide a useful starting point. The 1982 Report noted relatively little refined product flowing into or out of PADDs IV and V (excepting Hawaii and Alaska), suggesting that these two may be separate markets. PADD III might also qualify as a separate market.

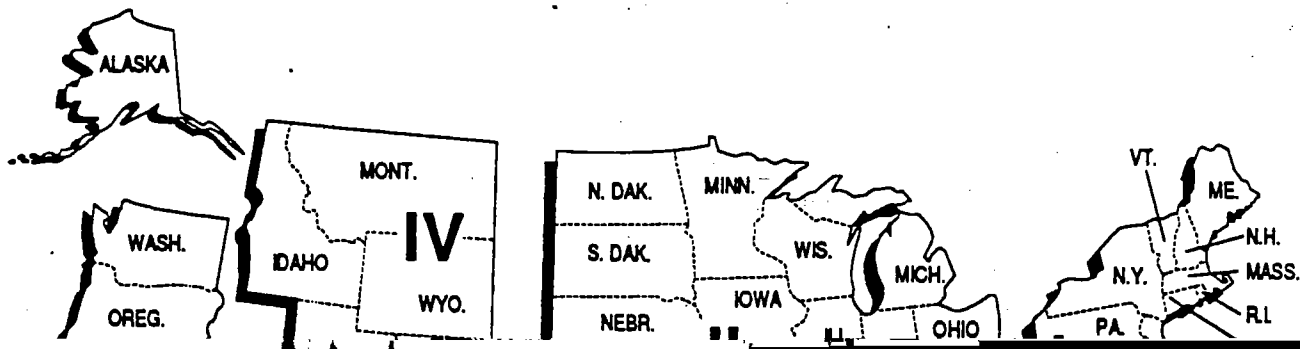
impediments to product flows into the area. However, owing to

the significant inflow of refined products from PADD III, PADD I may not be appropriately treated as a separate market.

but instead should be combined with PADD III. Appropriate treatment of PADD II is more problematic because of complicated shipping patterns: here candidates for relevant

FIGURE 1

Petroleum Administration for Defense Districts (PADDs)



markets are parts of PADD II (the "Upper Midwest"), all of PADD II, and a combination of PADDs I, II, and III.

Refinery capacity concentration ratios for these various regions are provided in Table 26 for the period year-end 1949

1949 and 1979. Two principal exceptions in which there were modest increases in concentration over this period were PADD II and the Upper Midwest region. In PADD IV, four-firm concentration remained virtually unchanged, and eight-firm concentration rose by 1.5 percent.

A comparison of the data for year-end 1981 and 1984 intimate recent increases in concentration in refinery capacity. An increase occurred in all of the specified regions. In PADD V, four-firm concentration increased by 3.9 points between year-end 1981 and year-end 1984 and eight-firm concentration increased by 2.0 points. In PADD IV, four-firm and eight-firm concentration increased by 4.2 and 4.1 points respectively. In PADD III, four-firm and eight-firm concentration increased

Table 26

Regional Refining Concentration Trends, Year-end 1949-1984

Concentration Trends--PADD III¹
(Alabama, Arkansas, Louisiana, Mississippi, New Mexico, Texas)

	1949	1959	1969	1979	1981	1984	1984* ⁵
CR4	49.5	43.7	44.0	36.2	36.8	38.8	42.9
CR8	73.7	65.7	64.8	54.5	55.6	58.1	64.9

Concentration Trends--PADDs I and III²

	1949	1959	1969	1979	1981	1984	1984* ⁵
CR4	46.5	40.9	40.9	35.0	35.1	38.3	44.1
CR8	66.1	59.0	62.3	55.0	54.7	58.4	64.9

Concentration Trends--PADDs I, II, and III³
(Illinois, Indiana, Kentucky, Michigan, Ohio)

	1949	1959	1969	1979	1981	1984	1984* ⁵
CR4	45.3	42.9	47.7	48.7	54.1	58.3	64.2
CR8	70.4	69.0	74.4	75.5	81.4	87.2	93.7

Concentration Trends--PADD II³

	1949	1959	1969	1979	1981	1984	1984* ⁵
CR4	36.7	34.6	38.3	37.4	40.1	42.0	45.9
CR8	55.3	53.5	59.7	60.0	60.8	65.3	69.8

Concentration Trends--PADDs I, II, and III

	1949	1959	1969	1979	1981	1984	1984* ⁵
CR4	36.0	31.4	35.2	30.7	29.5	33.0	37.5
CR8	55.7	49.6	58.0	49.2	47.8	54.9	59.2

Concentration Trends--PADD V⁴
(Arizona, California, Nevada, Oregon, Washington)

	1949	1959	1969	1979	1981	1984	1984* ⁵
CR4	45.3	42.9	47.7	48.7	54.1	58.3	64.2
CR8	70.4	69.0	74.4	75.5	81.4	87.2	93.7

Table 26--Continued

Refining Concentration Trends

Concentration Trends--PADD IV (Colorado, Montana, Idaho, Utah, Wyoming)							
	1949	1959	1969	1979	1981	1984	1984 ^a
CR4	47.9	47.2	53.5	48.0	53.4	57.6	57.6
CR8	73.8	74.2	81.7	75.3	80.4	84.5	84.5

Sources: Department of the Interior, Bureau of Mines, "Petroleum Refineries including Cracking Plants in the U.S." as of January 1, 1950, 1960, 1970; Department of Energy, Form EIA-87, "Petroleum Refineries in the U.S. and U.S. Territories" as of January 1, 1980, 1982; Energy Information Administration, Petroleum Supply Annual, 1984 vol. 1.

Note: Market share is based on operating crude distillation capacity.

1. Gulf is treated as a subsidiary of Socal, except for the Alliance, Louisiana refinery which is assumed to be owned by Sohio. Final approval of the divestiture of the Alliance refinery to Sohio had not been received from the FTC as of December 31, 1984.
2. Getty is treated as a subsidiary of Taseco.

by 2.0 and 2.5 points respectively.⁵¹ In the combined PADD I and PADD III region, four-firm concentration increased by 3.2 points and eight-firm concentration increased by 2.7 points. For

the three regions involving PADD II, four-firm and eight-firm concentration increased respectively by 4.2 and 6.2 points for the Upper Midwest, by 1.9 and 4.5 points for PADD II, and by 3.5 and 7.1 points for PADDs I, II and III combined.⁵²

The data presented in the body of Table 26 are based upon operating crude distillation capacity. From time to time, other

⁵¹ The 1982 Report contained a more detailed examination of capacity for refineries located on the Gulf Coast in

Alabama, Mississippi, Texas and Louisiana (see pp. 186-188). This analysis was done to assess capacity in the Gulf Coast

refinery capacity either in 1984 or 1985.

entire refinery, is temporarily shut down for either economic reasons or longer-term maintenance and may again become available. In most cases, whether this capacity is classified as operating or shut down has little effect on the market share calculations because the capacity involved is small relative to total regional capacity. However, two relatively large refineries were shut down at year-end 1984 but subsequently resumed operations. These were Texaco's Wilmington,

California refinery and

year-end 1981, the apparent increase in concentration for those regions may be an artifact of the capacity classifications used.⁵³

The capacity shares in Table 26 are measured at the end of

the given year, so the data for year-end 1984 reflect the 1984 acquisitions of Getty by Texaco and of Gulf by Soconal.

However, as noted in Table 26, the data have been adjusted to take into account refinery divestitures.

refinery divestitures were made after the end of 1984.

The column at the extreme right of Table 26, labeled 1984*,

shows that, excepting PADDs IV and V, four-firm concentration in refinery capacity would have been about four to six percentage points higher had there been no refinery divestitures in Texaco/Getty and Socal/Gulf and had Mobil

divestitures. These transactions, however, would have had no effect on refinery concentration in PADDs IV and V.⁵⁵

⁵⁴(...continued)

Mobil abandoned its attempt to acquire Marathon after Marathon won a preliminary injunction in its own private

to challenge this merger.

⁵⁵ Since the publication of the 1982 Report the use of the HHI has become much more widespread as an indicator of concentration. For the purpose of comparison with other industries, we present the December 31, 1984 HHI's for refining capacity for the various geographic areas presented in Table 26. They are stated in the following order:

3. Summary

Concentration in crude oil reserves and production, either in

the U.S. or worldwide, is shown in Table 1.

year-end 1984. In domestic crude oil and refining, concentra-
tion increased modestly in some regions. These increases in
concentration came partly through closure of smaller refineries
that benefited from entitlements to low-cost oil during the
period of price controls and partly through horizontal acquisi-

tions among refineries.

Appendix
Data Explanations

A. Methodological Notes

The table content is almost entirely obscured by heavy black redaction bars. Only faint horizontal lines are visible, suggesting a table structure with multiple rows and columns. The redaction covers the vast majority of the page's content area.

group which were used in the denominator of the percentage calculations.

Turning to the cross-section comparison of petroleum, petroleum-related and non-petroleum groups, note that Tables 14 and 15 contain group-size adjusted data throughout. All groups are normalized to 18 firms. Specifically, petroleum-related group activity was multiplied by $9/8$ for each year, adjusting for the fact that this group had 16 firms. Between 1979 and 1981 the petroleum group did have 18 firms, but it

leum group had 17 firms, having lost Conoco in 1981; in 1983 and 1984 the group had 15 firms, having lost Marathon and Cities Service in 1982. As a result, data for the petroleum group in these two tables were multiplied by $18/17$ for 1982 activity and by $18/15$ for 1983 and 1984 activity. No adjustment was necessary for the non-petroleum group since that

errors, due probably to rounding or transcription mistakes, also occurred in data presented for the two other groups.

Finally, yearly group size financial totals (market value, assets, sales, funds from operations) were recalculated for this update, and in some instances were found to vary slightly from the corresponding group size financial totals used in the 1982 study. Consequently, in both the cross-sectional and time-series

analyses, statistic on pre-1982 acquisition activity as a percent of a group financial total will differ slightly from the

corresponding data presented in the 1982 study in some instances.