The Cartel in Retreat

by

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ABSTRACT

In 1981, the price of oil was $34 in current dollars ($50 at 1992 price levels). The consensus was that it would keep rising toward the cost of synthetic crude oil or some such long-run ceiling. In fact, the cartel had fixed the price far above the point of maximum profit. OPEC members did not lose their power, they regained their wits, and saw their limits.

The drop in consumption in belated response to the two price explosions was borne entirely by OPEC as price guardian. Non-OPEC production rose. OPEC market share fell to less than 30 percent.

OPEC members kept a remarkable cohesion. During 1982-1985 Saudi Arabia absorbed most of the loss, and prices declined moderately. But when Saudi exports went to near-zero, they ceased to be the restrictor of last resort. The price fell below $10, until OPEC could patch up a market sharing deal and bring it back to the neighborhood of $18, where it has remained.

Consumption revived, and OPEC exports have approached but not equaled the old peak. The once-massive excess capacity dwindled, but in theory and in fact this had little effect on the price. Each increase in exports meant a fresh contention over sharing it among members. OPEC meetings and disputes became almost continuous. Each member did its best to push the burden of restriction on to others. This limited OPEC cohesion and power over price.

The oil market became "commoditized," with many re-sellers probing for even a slight gain. Adherence to a fixed price became much more difficult to monitor. Increasing reliance had to be placed on production restraint.

Low prices caused Iraq to be hailed as savior for threatening Kuwait and Abu Dhabi, but this in turn provoked invasion and war. Despite the shutdown of two major producers, then one, prices have not revived.

The cartel mission is to trade off market share against a higher price. But their market share remains too low to bear the losses a higher price would bring. Until it increases, the cartel stays in a trap.

Whether revenues were higher or lower, OPEC members overspent them and ran current-account and budget deficits. They had difficulty raising money for oil capital expenditures, which were only a small fraction of total government expenditures. The Iraqi aggression was an extreme example of this tension, and of the temptation of a rich neighbor.

The world oil industry is an oddity. Socialism is repudiated everywhere, yet most oil is produced by bumbling state companies. The travail in the Former Soviet Union is the extreme example. Taxes on crude oil production in non-OPEC countries is usually regressive and hinders development. But past mistakes are present opportunities, and make likely continued long-time growth of non-OPEC oil, with the OPEC price stuck in the market share trap.

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1981 "Sometime in the future (perhaps as long as two years) a gradual real [price] increase up to the cost of production of synthetic liquid hydrocarbons."
--James E. Akins

1982 "[Oil] supply shortage may hit after 1985 ... anywhere from 9- to 21-million barrel daily.
--International Energy Agency

1983 "American strategists have always found a silver lining in the stable pro-Western Gulf that high oil prices helped create."
--New York Times, March 6

1984 "The world is running out of oil."
--Daniel Yergin

1984 "After the days of luxury, we have become
A lamb in the midst of the jungle.
Like a gang, the wolves of the market
Swarm around us."
--Sheik Manei Saeed Al Otaiba, Oil Minister, Abu Dhabi

1985 "There is no fear in OPEC of a price decline." [Price eventually equates to synthetic hydrocarbons' cost.]
--James E. Akins

1985 "Market realities will again give way to geological realities. ... And that will eventually put the era of surplus behind us."
--Daniel Yergin

1985 "If [the U.S.] Congress does not go for a [gasoline] tax soon, it will have missed its best chance of returning the world to cheap oil, low inflation, low interest rates and rapid growth."
--The Economist (London)

1986 "The protection of American security interests requires action to stabilize the falling price of oil".
--George H. W. Bush

1986 "U.S. officials root for higher oil prices."
--Wall St. Journal, December 19

1987 "Saudi Arabia has contributed billions of dollars...in areas where the executive branch has been unwilling or unable to gain Congressional support. As the payments to the Nicaraguan contras demonstrate..."
--New York Times, June 21

1987 "Better relations with Washington have moderated Iraq's behavior considerably."

--State Department source in Wall St. Journal, March 31

1988 "I just cannot understand how this low price can sustain investments in high-cost oil areas."
--Ali M. Jaidah

1989 "A consistent underestimation of potential supply and a consistent underestimation of the consumers' ability to adjust their demand ... led OPEC (and usually leads every other cartel) to overestimate its strength."
--Sheikh Ali Al Khalifa Al-Sabah,Oil Minister, Kuwait

1990 "Iraq has modified its behavior and policies in large part because of our diplomatic efforts." --U.S. Ambassador Glaspie

1991 "What we had before was a special relationship [with Saudi Arabia]. Now we have a more special relationship."
--Daniel Yergin

THE CARTEL IN RETREAT 1981-1992

INTRODUCTION - OPEC AT THE PEAK

By the middle of 1981, the second price explosion was over. In January, Minister Yamani said that the 1979-80 increase was "another corrective action" like the earlier one, a long-delayed adjustment. [PIW 3-9-81 SS:1-4] In early 1981: "Fear of soft market seems behind latest Mideast price rise" [PIW 1-19-81:1, emphasis added] That is bizarre under competition, but rational conduct under collusion: since you must soon defend the price line, advance it as far as possible. (A last pre-emptive push was to come in October 1981.)

[FIGURE 1: CRUDE OIL PRICES 1973-1992]

Figure 1 shows that in 1979-1981, as in 1974, spot prices fluctuated while the OPEC nations kept excess capacity at bay, and kept raising effective contract prices. But by mid-1981, various crude oil prices which under stable conditions are close to one another, and which had been widely separated after 1978, were now rejoined. One could stop to characterize the new conditions of the 1980s.

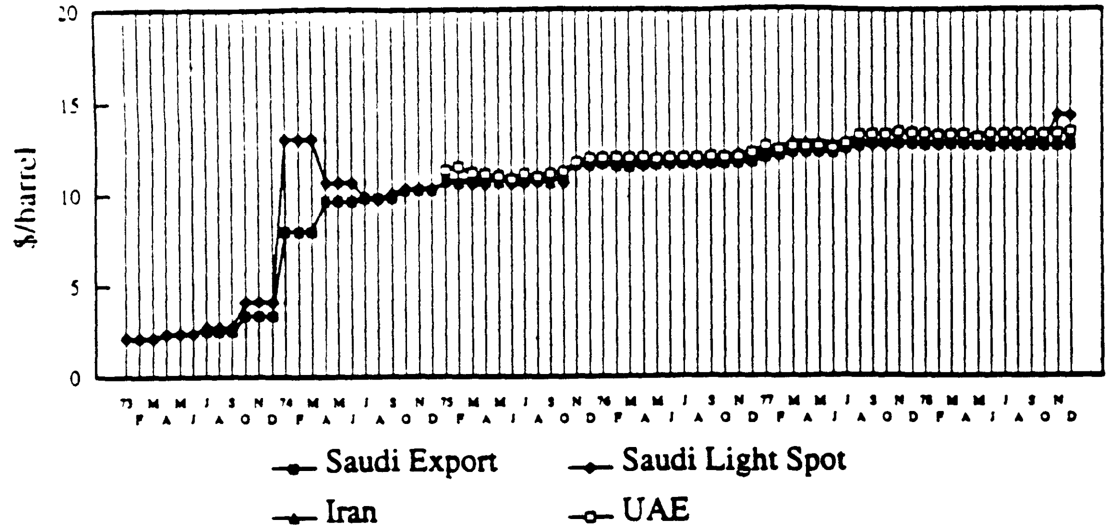
The clear blue sky As perceived in the producing and consuming countries in 1981, all signals were Go, and prices were

[FIGURE 2 & 3: PRICE FORECASTS]

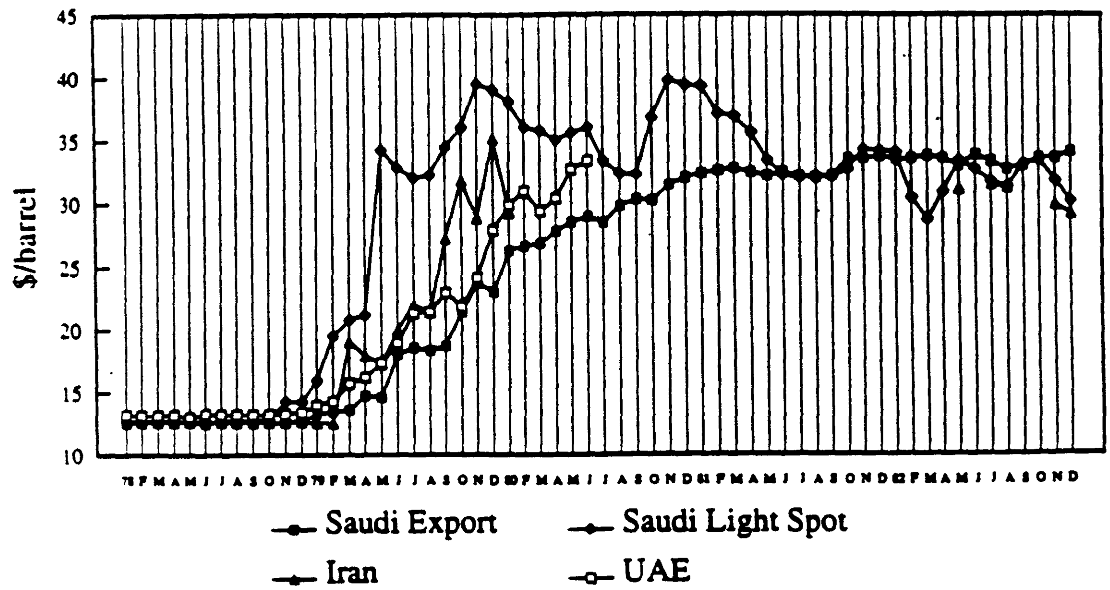
headed up and away. Figure 2 shows the consensus forecasts tabulated by the International Energy Workshop, and Figure 3 those of the Society of Petroleum Evaluation Engineers. Implicit in each forecast are two assumptions: first, the current price is

Figures 1a-1c. Crude Oil Prices, 1973-1992

1973-1978



1978-1982



1982-1992

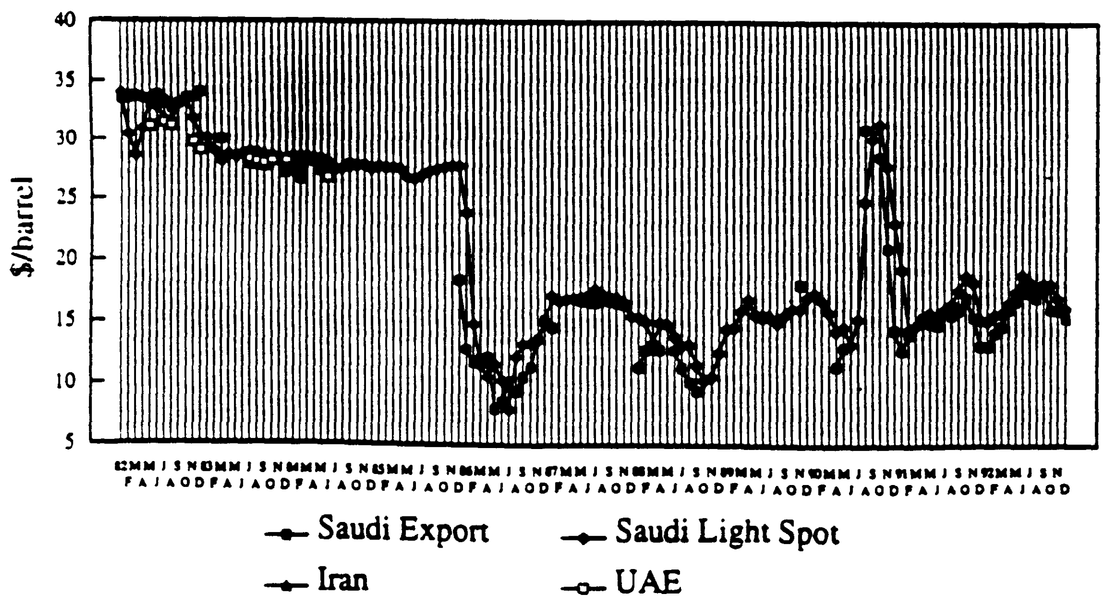


FIGURE 2

Crude Oil Prices (1990 $ / barrel)
Actual and Successive IEW Polls

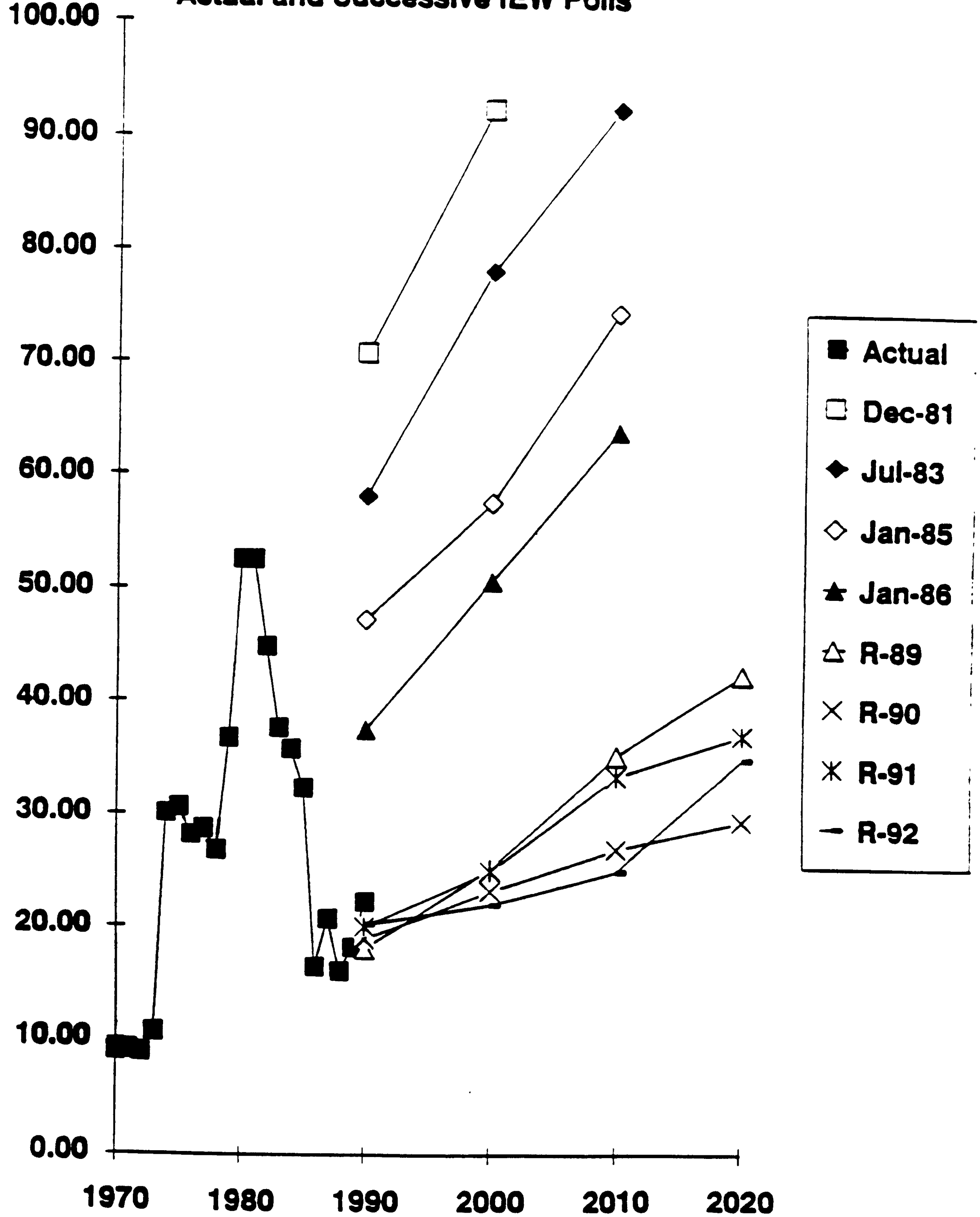
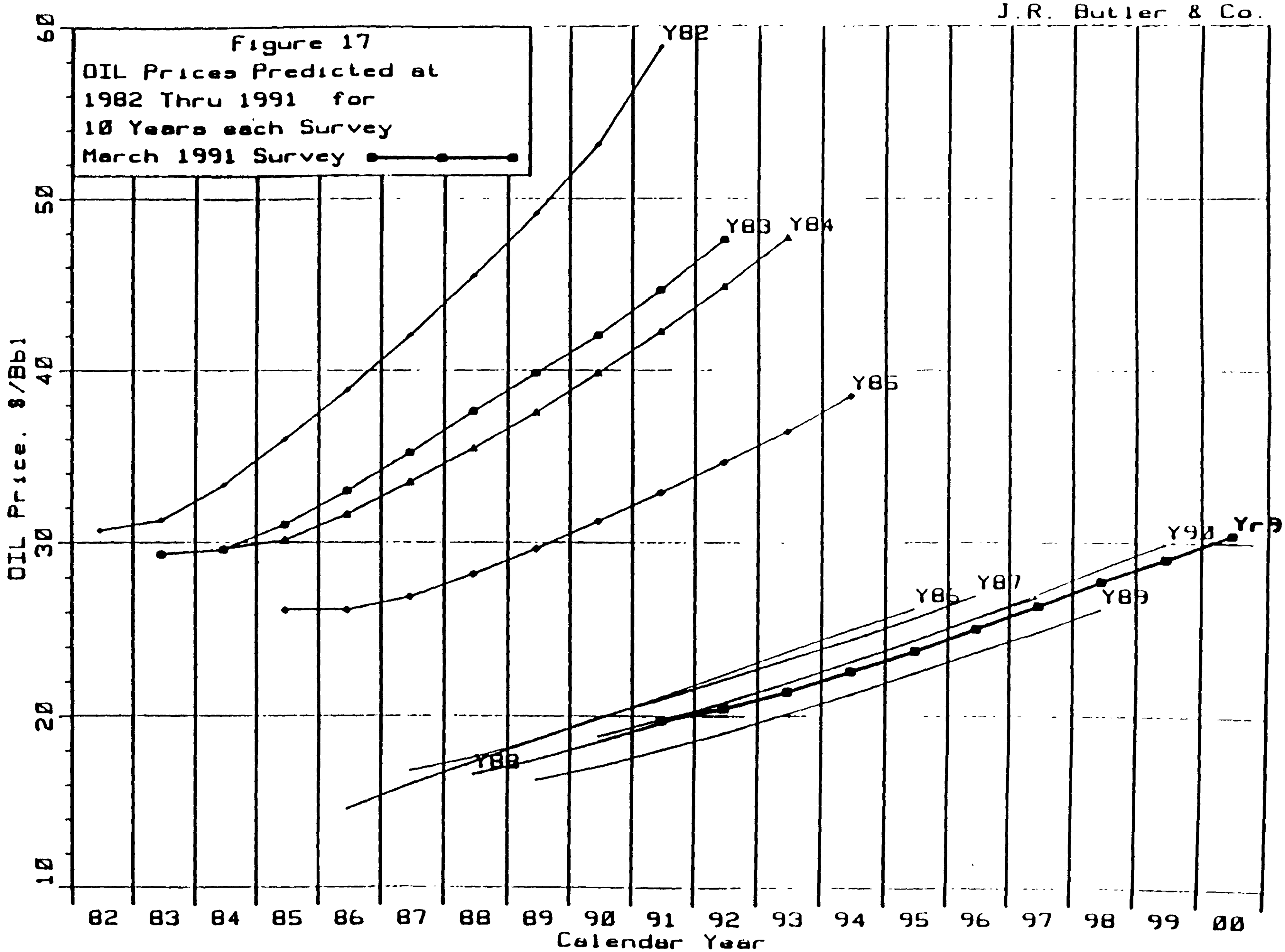


FIGURE 3

SPEE 1991 SURVEY



the long-run competitive price. If the price changes, that changes the data, and enables a better initial estimate. Second, the price must increase from its current level because... how can you doubt it? [Lynch, 1992]

Yet, by 1983, the deflated value of OPEC revenues was actually less than it had been in 1978, before the second price hike. Seldom has a mistake been so quickly punished, and so slowly understood.

THE YEARS 1981-1992: A PREVIEW

From reserve price-raising power to market share-price tradeoff

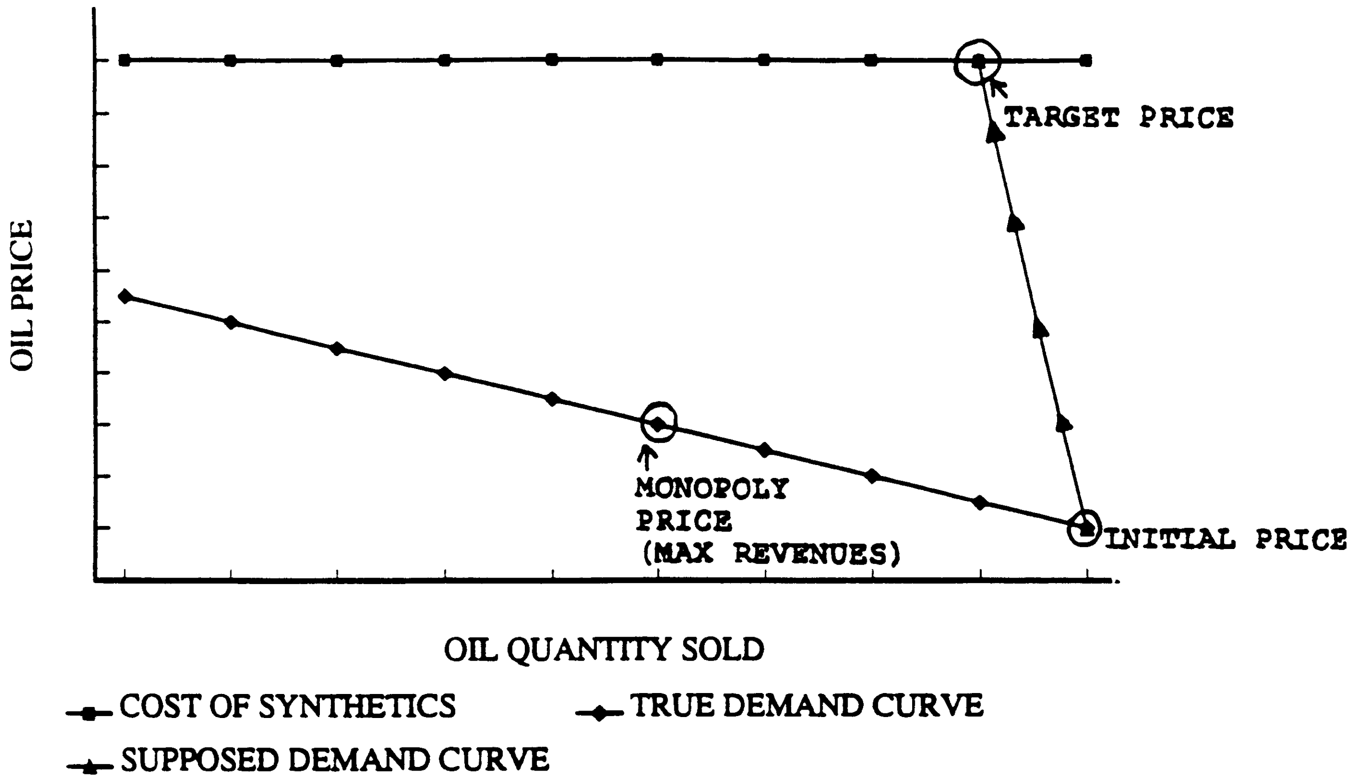
For years, the OPEC members were guided by a vision of the market which is sketched in Figure 4.

[FIGURE 4: OPEC: REAL & SUPPOSED DEMAND CURVES]

(The whole figure shifts slightly to the right in a year of world economic growth, leftward in recession. We ignore these movements to avoid needless cluttering of the diagram.) Demand for oil was viewed as highly price-inelastic. As noted in the previous paper, Minister Yamani in mid-1978 said oil demand price elasticity was zero. Surely he did not mean this literally, only that the price could be profitably raised very high, with very little sales loss.

The target was a price just below the cost of producing synthetic crude oils in large amounts. This is logical for a monopoly. Only when oil-on-oil competition is suppressed can the price be set by the nearest alternative. We showed in earlier

Figure 4. Real & Supposed Oil Demand Curves



papers that the vision in Figure 4 was the explicit guide to the first generally fixed price, on December 31, 1973. The never-modest Shah of Iran called it his "new idea," but the U.S. State Department had already suggested it in 1970, and its author still clung to it at least as late as 1985. (Below, p. 69)

The synthetics' cost was also the goal set in the 1979 report of the Long Term Price Policy Committee, chaired by Minister Yamani. The exact location of the ceiling was now seen as uncertain, but a long way up. In the interim, OPEC would have great unexerted price raising power. In early 1981, OPEC saw itself as still on the upward path, and expected to raise the price again in time. [PIW 3-9-81:SS 1, 4]

One 1980 estimate of the ceiling, by a renowned Oxford economist and previous U.K. Minister of Energy, was $90-$100 ($148 to $164 in 1990 prices). "The restraint by oil exporters is entirely political," in deference to the U.S. [Balogh 1980] Of course this flattering legend of the "special relationship" is still believed. [Fesharaki 1980] expected the price to exceed $80 (in 1980 prices) because OPEC nations would reserve oil for domestic use rather than "deplete their dwindling asset to appease the appetities of industrial nations."

This final paper is concerned with the loss of an illusion, and OPEC's retreat since 1981, from a price above the monopoly optimum. It was gradually realized that demand was really much more elastic than had been supposed. Sales not only ceased to grow but diminished.[1] An unexpected increase in non-OPEC output--which would have come about even without any price increase--made things worse.

[TABLE I: CONSUMPTION & OPEC EXPORTS 1986-1992]

[TABLE II: RESULTS OF AN OPEC PRICE INCREASE]

The market share trap With the benefit of hindsight, i.e. history, we can see that the OPEC mission has become to trade market share for a higher price.

The purpose of Table II is to capture the relation between market share and demand elasticity, [2] both for total OPEC and for Saudi Arabia. Table II is much oversimplified, but the reader can substitute his own assumptions at several places. The column "notation" shows how to set up the table as a Lotus file, and experiment with the parameters.

The demand for crude oil is derived from the demand for oil products, whose long-run price elasticity was estimated by [Griffin 1979] as around unity.[3] The price elasticity of crude oil is equal to the product elasticity, multiplied by the crude/products relation, which in the OECD was only about 11

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[1] I once speculated, on no firmer basis than the average lifetime of taxable business equipment, that the half-life of the consumption response was about nine years, i. e. that 7.7 percent of the response was felt the first year, and thereafter 7.7 percent of what remained. It is hard to measure any such slow-acting process.

[2] If $Q=P^E$, ln Q = E ln P. Differentiating, 1/Q = E/P (dP/dQ)
E = P/Q (dP/dQ), the conventional elasticity definition.

[3] [Kouris 1983] seems to indicate a modal value around 0.85. [Dahl & Steiner 1991] estimate around unity for gasoline, the least elastic of oil products. [CGES 1992] estimates product price elasticity at 0.85.

TABLE I. MARKET ECONOMIES' CONSUMPTION & OPEC EXPORTS, 1967-1992
(IN MILLIONS OF BARRELS DAILY)

	MARKET ECONOMIES' CONSUMPTION TOTAL	ex OPEC	OPEC PRODUCTION	OPEC EXPORTS	OPEC SHARE (PCT)
1967	30.8	30.0	16.9	16.1	53.7
1968	33.5	32.6	18.8	17.9	54.9
1969	36.6	35.6	20.9	19.9	55.9
1970	39.5	38.3	23.5	22.3	57.9
1971	41.6	40.4	25.4	24.2	60.0
1972	44.5	43.2	27.2	25.9	61.7
1973	47.8	46.3	31.0	29.5	61.7
1974	46.3	44.7	30.7	29.1	62.9
1975	45.2	43.5	27.2	25.5	56.5
1976	48.1	46.1	30.7	28.7	59.7
1977	49.4	47.2	31.3	29.1	58.9
1978	50.2	47.8	29.9	27.5	54.7
1979	51.3	48.7	31.0	28.4	55.4
1980	48.6	45.7	27.0	24.1	49.6
1981	46.8	43.8	22.6	19.6	41.8
1982	45.2	42.0	19.3	16.1	35.6
1983	45.0	41.5	17.3	13.8	30.7
1984	45.9	42.0	16.7	12.8	27.9
1985	45.9	42.5	16.1	12.7	27.7
1986	47.2	43.8	18.7	15.3	32.4
1987	48.2	44.5	18.2	14.5	30.1
1988	49.9	46.0	20.4	16.5	33.1
1989	51.0	46.9	22.6	18.5	36.3
1990	52.2	47.8	23.9	19.5	37.4
EIA 90	52.9	48.5	25.1	20.7	39.1
91	54.0	49.6	25.3	20.9	38.7
WRLD'91	66.3	61.9	25.3	20.9	31.5
WRLD'92	67.1	62.5	26.5	21.8	32.5

Source: 1973-1990, BP Annual Statistical Review
OPEC consumption from CIA, 1973-1989; estimated for earlier years.
1990-1992, EIA, International Petroleum
Statistics Report. (Format change after July 1992)
Natural gas liquids included.

TABLE II. RESULT OF AN OPEC PRICE INCREASE

	notation	(50 PERCENT INCREASE) CRUDE OIL ONE YEAR		CRUDE OIL FIVE YEARS		10 PCT TAX ON PRODUCTS (LONG TERM)
AGGREGATE ALL SELLERS						
New price: ratio to old price	P	1.5		1.5		1.10
Price elasticity of demand	E	-0.10		-0.20		-1.00
New sales volume: ratio to old	Q=P^E	0.96		0.92		0.91
New revenues: ratio to old	PQ=P^(E+1)	1.44		1.38		1.00
SUB-GROUP			(Saudi)		(Saudi)	Total
Initial market share	G	0.37	0.12	0.37	0.12	0.34
New sales volume: ratio to old	Q(G) = Q-(1-G)/G	0.89	0.67	0.79	0.36	0.73
New revenues: ratio to old	PQ(G) = P^(E(G)+1)	1.34	1.01	1.18	0.54	- -
Sub-group elasticity of demand	lnPQ(G)/lnP =	-0.28	-0.97	-0.58	-2.51	-3.23

percent in 1970, but 53 percent by 1982. Crude price elasticity, earlier negligible, was now worth estimating.

We take the initial price as unity, and a hypothetical price increase of 50 percent. Following [EMF 1992], we take the price elasticity of crude oil demand[4] at -.1 in one year, -.26 in a decade, and 0.38 to 0.56 after 20 years.[5] The initial OPEC market share is assumed at .34. It was lower in 1982-1987, and is now, because of the integration of Former Soviet Union (FSU) production into the world market. The Saudi market share is assumed at one-third of the OPEC share, which it has been recently.

A 50 percent price hike increases non-OPEC revenues by 50 percent. All the curtailment of output is by OPEC, which gains 34 percent in revenues. If nobody in OPEC cheats, the Saudis too gain 34 percent. If everybody cheats, they gain only 1 percent. What actually happens is somewhere between these two extremes--at first. Over time elasticity rises, the OPEC sales loss grows, and more of it is gradually loaded on to Saudi Arabia. It is an unattractive prospect for them. The incentive is strong for everyone to join in a firm quota agreement, and to keep their word, at first. But it does not last. The table can be used to see the effects of the incessant pull and heave of the OPEC

[4] This may be over-conservative because we set to zero the elasticity of supply in non-OPEC countries. As we will see in a moment, the non-OPEC supply response was swamped by changes in taxation and regulation.

[5] It is safe to assume that elasticity increases at a decreasing rate, e.g., proportional to the logarithm of time. Then E = -.10 + 2.3 ln(t), and at t=5, E = -.21.

members trying each to get just a bit more, and the final impact on Saudi sales.

There is a risk for all OPEC: the demand response may not be as expected. For the Saudis there is the additional risk that other members will cheat. With the possible exception of Kuwait: all OPEC members are weak risk-bearers. [Adelman 1986] They are compelled to bet heavily on every price decision because they have few sources of income except oil. Some of them have spent heavily, of course, to start other industries, but with little result. The purchase of downstream refining - marketing assets has been profitable to Venezuela, and possibly to Kuwait and Saudi Arabia, but the exceptions are simply too small. With everything riding on their oil revenues, they must fear making another big mistake. After 1981, nearly every member was overspending its revenues. The cash squeeze made each one bitterly resist any reduction in volume or in price. Yet both were needed.

Table II is not a model, but it does show that OPEC's first concern is the interplay between what would be good for the group as a whole and what would serve the largest single member. The three problems which OPEC needed constantly to keep solving and re-solving were: price, total output, and output division.
The far right-hand panel of Table II shows the long-run result of a 10 percent sales tax on oil products, assumed to be fully passed on. OPEC loses 27 percent of its sales revenues. Nothing else was to be expected, yet we must note with amazement that

when OPEC nations threatened to retaliate for tax increases with additional price increases, they were taken seriously in the consuming countries.

The awakening The story of the 1980s is OPEC's slow realization that the the real world is in Table II and the lower, not the upper, line of Figure 4. They had to awaken from the comforting dream of unexerted price-raising power, "lots more where that came from", and it was not easy.

But the sharper conflict was within the group. Even in the 1970s, when prices were being raised, market division was always Topic A at OPEC meetings. From the squabbles of 1975-1977 they had progressed to the secret agreement of 1978, the proposed safety net of end-1979, and the gentlemen's agreement of 1980 (aborted by the Iran-Iraq war). Ahead were an endless succession of annual and quarterly and special meetings and agreements. The price decline during 1982-1985 was relatively mild, showing OPEC members' impressive cohesion. But power is not wisdom. They were unable to cooperate to share the burden of lower output, and they let all the pressure flow on to Saudi Arabia. By 1985, total OPEC sales were 29 percent of the Market Economies' consumption, and Saudi Arabia was only 6 percent. Table II shows how elastic their demand had become.

In late 1985 the Saudis refused to keep carrying the rest of the cartel, and the price collapsed. In 1985-86, unlike 1983, it took not two but nearly nine months to patch together an accord at a price whose deflated value was about half where it had been in 1981.

From late 1986 to mid-1990, despite reviving OPEC exports, and disappearing excess capacity, they could not get the price up, and it was always in danger of further decline under the pressure of discounting. Saddam Hussein was the savior in July 1990 and a demon in August. When he failed and was kept out of the world market, the rest of the cartel benefited, but could barely cope with the zero-sum game of market division, and failed to raise the price.

There, at the end of 1992, we must leave it.

STRUCTURAL CHANGES IN THE 1980s

Dis-integration and spot and term prices Outside of Nigeria, Indonesia, and some Persian Gulf remnants, the multinational oil companies had been formally stripped of ownership by the mid-1970s. But they had remained in charge of producing operations, and marketed most or all of the host government's production. They were compensated by a price preference or margin. But this connection was jolted apart by the rapid increase in spot prices beginning in late 1978.

For over two years, as supply fears swelled the demand for hoarding and speculation, and raised spot prices, the producing governments repeatedly raised their official prices in pursuit of spot. They disregarded contracts, openly or by various fictions. Some would add various non-money elements to the price, principally destination restrictions. It was often forbidden to resell to South Africa or Israel, or the United States.

There is no evidence that these restrictions had any effect on the actual pattern of shipments. At most, they allowed the non-restrictors to charge a slightly higher price. But restrictions helped weaken or destroy the force of contracts. Strangely, some commentators saw these restrictions as permanent. They did not explain how a market could remain with permanent excess demand. But by June 1982, the OPEC state oil companies had discarded the restrictions, even Saudi Arabia. [PIW 6-28-82:1] They were costly. [PIW 7-26-82:1]

The multinational companies ceased to sell OPEC crude oil. In a few countries (Abu Dhabi, Nigeria and Indonesia the most important) they lifted oil for their own use. Term contracts shrank greatly in importance, "thanks to quarterly price reviews and phase outs and unilateral mid-quarter price changes." Security of supply was proved non-existent. "Japanese buyers in particular feel hard done by in their past term dealing with OPEC suppliers." [PIW 4-5-82:1]

Customer-supplier relationships continued, to a lesser degree, because they saved transaction costs, of search and negotiation. But prices were not fixed in the term contracts. They were linked to the spot price, which fluctuated over and under term prices, depending on short-run market conditions. (In 1988-1991 inclusive, term prices were perceptibly lower. (Below, p. 181)

In Saudi Arabia, Aramco became Saudi Aramco, and the four companies (Chevron, Exxon, Mobil, Texaco) who had once been its manager-operators became suppliers of special management and engineering skills. The four companies bought at a small fixed differential from a contract price which was close but not identical to the spot price.

"Commoditization" With dis-integration, short-term bargains, and great price volatility, oil markets were rapidly "commoditized." [Verleger 1987] The general and trade press was supplemented by many individual services reporting prices in great local detail, by place and even time of day.

Markets rapidly developed in the forward sale of physical volumes of crude oil, notably Brent in the North Sea and Dubai crude oil at the Persian Gulf. Much more important were the various futures markets. In 1978, futures trading began in middle distillates (heating and Diesel oil). In the early 1980s, markets were set up for futures in other products and in crude oils. By late 1990, there were "about 10 active futures contracts trading worldwide, with combined daily volume equivalent to over 150-million barrels a day, or 130% more than total world demand." [PIW 1990, p. 1]

Refiners and marketers, who depend on relatively thin margins between the purchase price and resale price, can lose all profit and run big losses when even relatively small price changes occur between the time they buy and the time they resell. Companies producing oil are at lesser but considerable risk because of fixed tax payments. All of them urgently need markets where they can hedge against unforeseen fluctuations, and "lock in" the current price. In late 1982, this was still a novelty. [PIW 10-18-82:1, "Refiners locking in future profits through oil futures trading."] It soon became routine.

Buying or selling futures transfers the risk to speculators, who are expected to win some, lose some, but on balance make a profit. It seems to be agreed that these markets have worked well, and provide liquidity and insurance to buyers and sellers. The futures markets now extend to three years from the date of the transaction, though the great bulk of the transactions are for 18 months or less.

Moreover, a set of futures markets provide information to the spot markets. Thus spot quotations have become better market indicators.

There has also been a limited synthetic long-term market through "swaps", a practice borrowed from the currency market. [PIW 1990][Arshi 1992] Here a financial institution or sometimes a large non-financial company provides a fixed price to a buyer or seller, for a period which may be as long as ten years, but rarely exceeds three. The provider tries to make a bargain with a seller to offset every bargain made with a buyer, e. g. promising a refiner a fixed price for his sales and an airline a fixed price for their jet fuel purchase. Thereby the provider avoids much or perhaps all of the risk. This is rarely attained. More commonly, the provider lays off the risk in the futures market.[6]

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[6] Spot prices and futures/forward prices were decried as "speculative", fly-by-night, no solid rock on which to base an industry. This was nothing new. Spot prices were dismissed and belittled in the early 1960s, when they

In contrast to the futures market, where the "open interest" is published, not much is publicly known about the size of the swaps market. In theory, swaps could provide finance for investment in production, especially by governments strapped for cash. A variant of the swap is the simple pre-selling of oil, which in effect is an extension of credit from buyer to seller. This has not amounted to much, partly because the credit standing of most OPEC governments remains poor. But efforts will undoubtedly continue as the OPEC countries try to find capital without capitalists.

The success of forward and futures markets has also highlighted their limitations. Refiners/marketers and others can use these markets to cope with the kind of incessant up-and-down of margins, caused by seasonal changes, inventory overshoot, and changing refining patterns. But they can at best soften the larger fluctuations caused by unforeseeable cartel actions. Forward bargains cannot be struck for more than a few months at most, and the insurance of futures contracts cannot be stretched past 3 years, because there is no assurance against big and ruinous changes.

<u>Illusion: "the market sets the price"</u> The wealth of quotations, and the constant interaction among them, give color to a half-truth: that "the market sets the price." Of course it

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were first regularly reported. Invective shows there is more competition than the name-callers would like.

does; but who controls the market? Under competition, nobody does because nobody controls supply. Since the OPEC nations change supply up or down to set the price, they control the market. The various reporting systems discover the price, but they do not determine it.

Open markets promote competition But the existence of wide liquid markets has made one real difference. It has become easier for a producer to "find a home" for crude oil, or for a buyer to find crude oil. This has made competition more active. It has become harder to maintain an above-competitive price. There are too many parties constantly probing for a slightly better deal. In previous times, when most crude supply went through the multinational companies, there were two great conservative forces: inertia, and respect for each others' turf. There were few challenges to the customary price. After the early 1980s, as many sellers looked constantly for buyers, and many buyers looked for sellers, the challenges were many. More than ever, the price had to be maintained by deliberate changes in supply. Thus the "clumsy cartel" had to intervene often, and made the price more volatile. The transition still had some way to go, and was not complete until the mid-1980s.

NON-OPEC SUPPLY

The increase in non-OPEC production actually exceeded the drop in world oil consumption. This was a surprise. The powerful consensus had been "limited resources." Oil supply was expected to run down everywhere except at the Persian Gulf.

The famous 1977 CIA report on the Soviet Union merely put in writing what was generally believed: it was an old played-out province. Falling output and rising "needs" or "requirements," would make it an importer by 1985. As Yamani summed up: "All the available studies point to the fact that the Soviet Bloc will be definitely importing oil sometime in the eighties...." [PIW 3-9-81:SS2] Instead, exports from the Communist blocs to the market economies, which were 1.8 mbd in 1976 (the base year of the CIA report) rose steadily to 2.9 mbd in 1985. [BP 1985 p. 18] (Some have suggested that the CIA report shocked the Communist high command into taking remedial steps. No support has been shown for this.)

But the non-Soviet non-OPEC countries increased output from 17 million barrels daily in 1973 to 18.7 in 1978, and then to 25.9 mbd in 1985. By that time, it seemed that higher prices had done their work on the demand and the supply side. When prices collapsed in 1986, "symmetry" required a surge in demand and a collapse in supply. But the revival in consumption was well short of "symmetrical." And the drop in non-OPEC production did not happen at all.

It would be tiresome to cite the many bad predictions. But an impressive work with many authors forecast lower non-OPEC production in the 1980s, despite higher prices, because of the powerful resource constraint. [EMF 6, 1982] Instead prices slid, collapsed and only partly recovered; yet non-OPEC output actually rose.

[TABLE III: National Petroleum Council (NPC) Projections]

Table III is based on projections drawn up in mid-1986 by a task force of the National Petroleum Council, which can draw upon an incomparable richness of experience among its constituent oil companies. They assumed alternatively a $12 price increasing at 4 percent annually, and an $18 price rising at 5 percent. We can compute their implicit supply elasticities, which range from a low of 0.11 to a high of 0.47. They obviously regarded the price drop of 1986 as being such a cataclysm or divide that one should not compute smooth functions across it. I would agree. But at either $12 or $18 per barrel, they could see nothing but declining output. For the USA, given a price halfway between $14 and $22, the predicted 7.4 mbd is exactly right. But the other non-OPEC sources all produced substantially more than expected. Obviously there has been some powerful offset to the lower prices. We need to look at the connection among price, cost, and the inducement to invest.

Price, cost, and value A higher price increases the reserves in a project, and the value per barrel. First, the life of the reservoir is extended. If the daily operating cost of running an oil well is $100, and the price is $10, the well must produce at least 10 barrels daily or be shut in. At a price of $20, it can continue until it produces less than five barrels.

Second, the higher price makes it profitable to develop more intensively. This raises the needed investment, but it raises the present value even more. [Adelman 1990] Thus more is produced,

TABLE III. NATIONAL PETROLEUM COUNCIL (NPC) PROJECTIONS
OF NON-CARTEL OUTPUT UNDER LOWER PRICES

YEAR	1985	1990		1991	1995		2000	
	(ACTUAL)	(projected	)	(ACTUAL)	(projected	)		
OIL PRICE	25.67	14.04	21.88	17.09	17.08	27.92	20.78	35.64
			CRUDE OIL PRODUCTION (million barrels daily)					
USA	8.9	7.1	8.0	7.4	5.7	7.0	4.5	6.4
W EUROP	3.8	3.3	3.5	4.2	2.6	3.1	2.0	2.6
OTHER	9.7	6.5	7.6	11.6	6.6	7.9	6.4	7.5
NGL	2.7	2.5	2.6	3.1	2.4	2.6	2.2	2.4
					B. ELASTICITIES			
USA			0.25			0.43		0.62
W EUROPE			0.11			0.37		0.47
OTHER			0.36			0.36		0.29
NGL			0.11			0.18		0.19

SOURCE: Survey conducted by Chevron for National Petroleum Council
Reported in PIW, 10-6-86:3; OGJ 10-13-86:40

DATA: OGJ 3-9-92:25; liquids from EIA, International Petroleum
Statistics Report July 1992, p. 5
Prices are for "total OPEC", published in Monthly Energy Review.
Because the NPC takes "$12 oil" as the basis for increase at 4
percent, we use the price for "total OPEC", which was $12.21 in 1986.
1986 and $17.09 in 1991.
Other" production excludes Communist blocs.

NOTE: Elasticities by formula E=ln(Q1/Q2)/ln(P1/P2) and sooner. Third, projects which were previously uneconomic are now worth undertaking.

But taxation and regulation may turn these rules upside down. We will look at some important examples, then try to draw the general rule.

The United States ex-Alaska [Adelman 1992] The discovery of large oil fields had peaked in 1929, and dwindled thereafter. Yet the amount developed into new oil reserves each year increased for thirty years, then stabilized around 1960. The unit cost per barrel added tended if anything to decrease through 1972. The decrease was mostly a one-time gain, the retreat from "market demand prorationing", a wasteful cartel of the more important producing States. [Adelman 1964] There is a hint worth considering later.

What would have happened absent the first price explosion, we do not know. But the price rise plus oil price controls and pre-existing gas price controls worked a misfortune. Oil wells vary greatly in cost. Even taking only depth as an independent variable, in the USA the most expensive tenth of all wells absorb half the capital expenditures. For deep or exotic oil or gas projects, which hard-working lawyers could somehow winkle into an exempt uncontrolled-price class, profits were huge. Investment in these projects boomed, raising factor prices and imposing bottlenecks everywhere. Unit costs soared. This depressed the development of known fields, which produced the crude oil whose price was under control. It was an attack on the very process which had kept the USA oil-gas industry in being--the continuing expansion of old fields.

Hence as prices rose, the reserves-added in the early 1970s were wretched--the lowest in decades. The decline in production was much slower, of course, from just under 9 million barrels daily in 1973 to just under 7 million by 1980. The decline would have accelerated, had not price controls begun to be limited, then abruptly ended in 1981. Reserves-added and production then increased, despite weakening prices, until the collapse of 1986. Gas prices were not decontrolled but they had been considerably raised in early 1979.

Thus the effect of prices plus controls in the USA before 1980 was the contrary of what would have happened under conditions of competition and stable taxes. Output declined when prices rose, rose when prices fell, declined again when prices fell very sharply. We cannot of course tell what would have happened had the process continued, of diminishing returns versus increasing knowledge. But it could hardly have been so abrupt.

<u>The new areas: Alaska, North Sea, Mexico</u> We showed in a previous paper that all three were profitable and would have been developed at prices existing before the first price explosion. In Mexico, output went from half a million bd in 1972 to over 3 mbd in 1982. The national oil company Petroleos Mexicanos (Pemex) was the gaudy exemplar of investment spending for jobs, contracts, and payoffs. Its burgeoning revenues propped up the existing national economic policy of dirigisme and deficits. It was made

much worse by the confident expectation of revenues forever soaring as prices and outputs rose. With roughly 50 billion barrels in reserves, and current prices exceeding $30 per barrel, the simple "Hotelling Valuation Principle" (value in ground equals net wellhead price) would have yielded a current in-ground value of up to $1500 billion. To borrow only $60 billion abroad was conservative.

The resulting financial crisis starved Pemex and led to massive disinvestment in oil production. Published money figures are indecipherable, but wells drilled in Mexico fell by 76 percent, from 434 in 1980 to 103 in 1987. We cannot tell how many of the wells were uneconomic, drilled to provide jobs and contracts for local caciques. Mexican policy in the financial crisis was as prescribed by the school of Nicholas Kaldor at Cambridge (U.K): more nationalization, more barriers to imports, more subsidies, and more regulation. (For a good brief account, see [NYT 10-24-82:1F])[7]

The policy was slowly reversed after 1982, then more quickly under President Salinas after 1988. But revival and cleaning up the debris of decades of mismanagement is painful and slow.

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[7] Kaldor thought oil prices should be kept high. "The very large expenditures incurred on prospecting and developing new fields since the war would not have been possible if oil had fluctuated in price in the same way as copper or tin. ... Recently there was a threat of a collapse of oil prices due to reduced demand which (in my opinion) was rightly received with a great deal of misgiving, even by the large oil-importing countries: since they realized that in the long run they are likely to fare worse under a regime of fluctuating oil prices than under a regime of stable prices, even though the latter would be a relatively high one in terms of industrial goods." [Kaldor 1983, p. 34]

Output has held steady around 3 million barrels daily. It is both a tribute to many unsung engineers and workers, and an indication of how much fat there was to squeeze out. Thus the higher price levels resulted in less not more Mexican supply in the world market.

In the countries of private enterprise, the booming prices led to drastic tax increase to capture the windfall rents. In Alaska, it is not clear whether they inhibited expansion. Alaska reached 1.2 mbd by 1978, and slowly expanded for the next ten years, reaching just over 2 million in 1988, then declining, at 4 percent per year.

In the North Sea, the largest and earliest discoveries had been off Norway, and as late as 1975 Norwegian output was six times British. But the UK expansion was far more swift, and one reason was a more flexible tax regime, particularly after 1979. British offshore production peaked at 2.6 mbd in 1984-1986, then declined and revived. A comprehensive survey by County Natwest Woodmac expects the UK to regain the peak in 1995 as fields under development come on stream. [OGJ 8-17-92:50]. Norwegian production expanded steadily, and the combined North Sea rose throughout the period. There were strong cost reductions in the North Sea, where the slowdown gave designers the chance to optimize with respect to prices and costs long run, instead of trying to maximize haste--which made for great waste.

Other non-OPEC producers There remained the miscellaneous "all others." Their output rose from 5.4 million barrels daily in

1973 to 10.3 mbd in 1992, an average 3.5 percent per year. Here too, "supply elasticities" were overlaid by more important changes in costs and taxes.

[TABLE IV: Non-OPEC Producers]

Non-OPEC Investment Requirements Table IV shows the investment per daily barrel in the 13 most important non-OPEC producers outside North America, i. e. those which by 1985 were up to 100,000 barrels daily. Their production rose from 3.8 mbd in 1981 to 6.8 mbd in 1990. [8]

The calculations can all be replicated from sources publicly available. Anyone with access to better data can (and I hope will) substitute them for ours at any point. In particular, they may be able to improve on the averages we have been compelled to use.

The start of the estimate is all wells drilled in the country in a given year. This overstates, because some wells, especially dry holes, are not for oil development but for exploration, or for gas production. The next step is to raise drilling costs 20 percent to allow for the non-linearity of the

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[8] A rare bit of published data: Arco in Indonesia expected total Indonesian oil capital expenditures to be around $300 million during 1983. "This will help push production...to about 220,000 barrels a day from 120,000." [NYT 6-8-83:D9] This suggests the capital coefficient was $3,000 per daily barrel, close to the average in neighboring Malaysia. An offshore development well drilled to 3800 feet is said to cost $1261 thousand; the 1990 [API-JAS] gives the class at $1136. "Costs associated with offshore development [in South East Asia] are similar to those in the Gulf of Mexico." J.A. Khin and D. Johnston, "Southeast Asia Drilling on the Rise," [OGJ 9-28-92:66, 70]

TABLE IV. INVESTMENT IN $/IDB, NON-OPEC PRODUCERS 100 TBD OR OVER.

COUNTRY, change '81-'90	1981 OUTPUT tbd	1981 INVESTMENT T$/IDB	1981 RANK	1985 OUTPUT tbd	1985 INVESTMENT T$/IDB	1985 RANK	1990 OUTPUT tbd	1990 INVESTMENT T$/IDB	1990 RANK
ARGENTINA -	497	37.36	12	460	47.68	13	470	33.26	13
BRAZIL -	213	18.33	9	563	8.59	7	653	8.93	7
COLOMBIA -	134	56.07	13	176	22.55	12	439	7.63	6
PERU -	193	36.90	11	189	21.73	11	130	24.26	12
TRINIDAD +	189	18.03	8	185	13.55	9	157	19.42	11
ANGOLA -	130	4.49	4	231	4.61	5	474	5.02	4
*CAMEROON -	86	23.34	10	190	5.18	6	155	10.21	9,10
CONGO -	76	4.00	2	115	11.15	8	170	3.16	3
EGYPT +	627	4.66	5	895	2.69	3	893	6.80	5
SYRIA na	172	NA	NA	176	NA	–	388	6.72	–
OMAN -	328	1.20	1	505	1.38	1	668	2.15	2
YEMEN na	NA	NA	NA	–	–	–	194	0.93	NA**
BRUNEI +	156	6.37	6	160	21.24	10	152	10.13	8
INDIA na	300	15.28	NA**	606	14.05	–	656	NA	--
MALAYSIA -	258	4.27	3	444	1.59	2	621	2.08	1
AUSTRALIA -	394	13.17	7	575	4.47	4	578	10.21	9,10
TOTAL	3753			5470			6798		
NUMBER COMPARABLE		13			13			13	
LOWER QUARTILE		4.49			4.47			5.02	
MEDIAN		13.17			8.59			8.93	
UPPER QUARTILE		23.34			21.24			10.21	
INTERQUARTILE RANGE		18.85			16.77			5.19	
AVERAGE OPEC PRICE ($) (exports to USA)		35.17			25.67			17.09 (1991)	
IRR BEFORE TAX: LOWER Q		1.57			1.13			0.64	
MEDIAN		0.49			0.56			0.33	
UPPER Q		0.25			0.19			0.28	
HIGHEST		0.06			0.05			0.04	

Formula: IRR = p/(1.75K/Q) - a
Explanation in text, Appendix

NOTE: An increasing ratio of investment per IDB to output indicates rising cost, denoted by +. A lower ratio indicates declining cost, denoted by -. The comparison is of 1981 with 1990.

*Offshore only **Not available in a later or earlier year, hence rank eliminated.

IRR BEFORE TAX, ASSUMING TRUE INVESTMENT 1.5 TIMES INDICATED (USER COST ALLOWANCE)

	1981	1985	1990
LOWER Q	1.02	0.73	0.41
MEDIAN Q	0.49	0.35	0.20
UPPER Q	0.25	0.10	0.17
HIGHEST	0.06	0.05	0.00

depth-cost relation, then double to allow for the difference between the USA and the rest of the world. Finally we apply the USA allowance for non-drilling costs: lease equipment, enhanced recovery (gas and water injection, thermal and chemical methods, etc), and overhead.

The investment is divided by the gross capacity increment, estimated as the number of newly drilled oil wells multiplied by the average production of all oil wells. I think newly drilled wells tend to be bigger producers than average old wells. If so, the true increment to capacity is greater than as estimated, and the investment per unit is overstated. Whether and to what extent capacity is really cheaper to install than we have calculated, must be left for later research. There is some confirmation in our calculation of decline rates (below, page 120).

Although one year's results may be temporarily high or low, the rankings stay fairly consistent. The measure is affected by changes in factor prices. The IPAA measure decreased by one fourth between 1981 and 1985, then rose nearly 7 percent to 1990. More important are changed technology and the mix of projects. In a given project, the greater the output, all else being equal, the greater the pressure on the reservoirs. Therefore a decrease in cost might reflect only less intensive development, or the culling of more expensive projects. If cost declines despite higher output, that is a good indication of a rightward shift in the supply curve, which is our concept of declining cost, indicated by a (-) sign. If cost rises despite declining output, that signals a leftward shift (+). If cost and output change in the same direction, the larger change, in output or in cost, decides the sign.

Had the expectation been borne out, of lower output in the 1980s despite higher prices, the signs would have all been (+). Trinidad and Brunei do show increases. Peru, Egypt, and Oman are ambiguous. But most countries decreased. The median investment fell sharply from 1981 to 1985, then held. So did the lower-cost quartile. The more expensive countries improved sharply.
Table IV shows why predictions of declining output in 1981 and later years were and are far-fetched. Returns were very high on new development projects. From Table IV, we have an indication of the rate of return in oil development. The general break-even formula is explained in Appendix A. The bottom panel is a rough allowance for exploration cost/user cost.

During 1981-1990, the price (here measured by the average OPEC price on export sales to the USA) fell by half, but rates of return stayed high. Most interestingly: the return in the lowest cost countries fell from 1981 to 1990, but in the higher-cost countries it actually rose.

If costs and prices determined investment, we might expect with some confidence that output would keep rising for the group as a whole. But costs are less important than taxes.

<u>The taxation of oil production</u> More important than cost changes, perhaps even in the North Sea and certainly outside of

it were changes in tax systems.[9] The ideal system induces the operator to invest for maximum present value before tax, and captures all economic rents, to offer the investor just enough prospective profit to make the investment worth while. The higher the pre-tax rent, the higher the tax. With no rent, no tax. The ideal tax is progressive, not for equity but for efficiency. Suiting a tax system to a mineral industry is particularly difficult because of the difficulty of reckoning cost. In the United States, a rough but effective way to capture rent has been: cash bonus bids. The oil company is invited to estimate how much they expect to earn, over and above cost of exploration, development, and production; and to offer as much of it as they think is needed to get the lease.

Under stable conditions, bonus bidding is a very efficient rent-skimmer on the whole, with large individual gains and losses. Even under unstable conditions, it seems to have worked well. The research of [Mead 1986][Mead and Sorenson 1980] showed that the return on oil leases won by bidding was normal or even subnormal. Other features of the tax system, notably the excises and royalties (a private tax) were shown by [Lohrenz et al 1981] to lessen investment and production, as in theory they should. But a cash bid system only works where the number of bidders is large enough to insure independent i. e. competitive bidding. The

[9] The following account is based on [Bradley 1986] [Eckbo 1987], [Smith 1987], [Bradley and Watkins 1987] [Kemp 1987] and [Kemp and Reading 1992]

industry in the USA was large and long-established and the public was willing to (correctly) assume competition. Elsewhere, with the partial exception of Canada, this was not the case.

The other vehicle for rent absorption, the "resource rent tax" was worked out in concept by [Garnaut and Clunies-Ross 1975]. Its practical difficulties are great. [Bradley 1986] [Bradley and Watkins 1987] But an incomplete study [Eckbo 1987] concluded at least tentatively "that a resource rent tax combined with cash bonus bidding would capture rent in a tax neutral fashion and behave robustly."

No country, however, has devised a tax system to capture rent and be neutral to investment. Even outside the third world, the air is thick with mistrust of private especially foreign companies who had designs on the nation's precious bodily fluids, or crown jewels, or whatever metaphor took the place of thought. Taxes were badly designed or hardly designed at all. Changes were a patchwork; some fields were actually subsidized, while others were overtaxed. The higher prices of the 1970s led to taxes even less tied to rent than previously.

There were also hidden regressive taxes, like requiring crude oil or refined products to be sold at specially low prices; putting customs duties on machinery or materials; favoring or requiring local labor or suppliers; local graft and/or corruption[10]; and so on. The two price explosions led to hasty ad

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[10] An oilman explained: "Graft is when you must pay someone in the Government to do what he should do without payment. Corruption is when you pay him to do what he should not do."

hoc attempts to capture the suddenly increased profits. The net result would as likely as not discourage or preclude more investment.

But when prices stagnated and sagged after 1981, some nations began to learn that the price would not necessarily keep rising. The process is best seen in Canada, whose [National Energy Plan 1980] was practically one long drool over the revenues to be drawn from the constant price rise. Yet as prices fell, the plan was soon scrapped and Canada moved toward freeing up prices not only of oil but natural gas.

Previously Canadian gas exports had only been allowed with a backup of 25 years' supply in the ground. Since investment in a large unproductive inventory was unattractive, gas reserves failed to increase, which of course "proved" how scarce gas was. When border prices were nearly $5 per thousand cubic feet (mcf), the Government of Canada withheld gas from export to the USA. They argued with justice that their gas was no different from exempted gas which the USA was allowing to be sold for nearly $10. They should have recognized that the $10 prices were only the temporary result of price regulation producing excess demand for gas and then channeling it into a few exempt classes. In only a few years the border price was down to a little over $2. Canada had lost about 75 percent of the capital value of the gas it was "reserving."

Taxes still regressive in 1992 It is impossible to summarize the changes that came about after 1981. The oil trade press was full of items about new areas being opened, and of tax reductions. By 1990, PIW said oil companies were "spoiled for choice", with more targets than they could chase. [PIW 7-16-90:1] One survey of 36 large US companies [OGJ 2-24-92:26] showed their oil/gas production capital expenditures outside the U.S.A. going from 40 percent in 1990 to 48 percent in 1992.

But by looking at taxes as they were in the late 1980s and early 1990s, after many improvements, we see from how low a base line the nations started, and how little progress they have made. A comprehensive review concludes that "the great majority of the fiscal schemes do not perform very efficiently as extractors of economic rent." Only Australia had enacted a resource rent tax, but coupled it with a highly regressive conventional royalty/production tax. [Kemp 1987, p. 319-320] A more recent study of offshore exploitation of new fields in ten countries (U.K., Norway, Denmark, Netherlands; Australia, China, Indonesia; Egypt, Nigeria; USA) concludes that the tax systems were highly complex, not well-aimed at economic rents, and regressive. [Kemp Reading & Macdonald 1992, pp. 52-56] A more detailed study of Norway shows that its taxation aborts production which is profitable pre-tax, sometimes to a startling degree. [Lund 1992]

Regressive taxes increase risk and abort discovery [Wood 1990] gives typical capital and operating expenditures, decline rates, and project lives, for three hypothetical fields, of respectively 15, 50, and 350 million barrels. At his assumed price of $18, we calculate that even the smallest highest-cost field would earn nearly 40 percent before taxes, and the larger ones are much more profitable. Wood reduces a large number of known exploitation contracts in many countries to 20 types. The small field provides the threshold 15 percent after tax in only four of the twenty. In only seven of the 20 countries is it worth developing even the intermediate field, which, we calculate, earns 60 percent before tax. The large field is always worth developing.[11]

The result in a typical new country is that none of these fields will ever be found. Regressive taxes raise the risk of oil exploration. Exploratory effort typically finds many more small than large fields. A small field, if taxed only on its net profits, would provide the company with funds, knowledge of local geology, and a stable beachhead for more exploration. But if it is known in advance that anything small is a money-loser, the risk of complete loss is unacceptably high. Large fields are not found because small fields are overtaxed.

Ignorance of low costs and changing taxes frustrated even the well-informed in OPEC.

"I just cannot understand how this low price can sustain investments in high cost oil areas....Somebody somewhere must be losing his shirt." [Ali Jaidah 1988, p. 3]

In summary: lower oil prices did not prevent, and may even

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[11]In a similar study, [OGJ 9-17-90:29], P.J. Hoenmans, of Mobil Oil E & P, took a sample of 25 countries under 1989 published terms. In a hypothetical 50 million barrel (mb) field, government take ranged from 35% to 90%. Only in six countries was profit after tax acceptable. In four countries, even a 200 mb field was unprofitable.

have promoted, non-OPEC expansion in the 1980s, even after the 1986 crash. Costs were and are low even outside OPEC, and tax changes pre-empted price changes. National companies in non-OPEC countries like Mexico were another depressant.

There is a long way to go. Some of it will be travelled in the 1990s. Costs ex-tax are far below the current "low" prices. As understanding improves, tax systems will slowly move toward neutrality, and non-OPEC production will continue upward.

THE PRICE PATH DOWNWARD 1981-1985

Spot and contract prices Figure 1 shows how Saudi Arabia discounted in 1978-1980. Their price is the solid line, f.o.b. on shipments to the USA, and it should be compared with those from other Middle East countries, not with the spot price. Under the conditions of the late 1970s and early 1980s, most oil moved under contract. But the reported contract price was not a meaningless average of old and new contracts. It was essentially a stabilized current price, subject to change at any time.

The spot price was a special corner of the market into which excess demand was channeled. Assume a 1 percent increase in the amount demanded. If spot were (say) 20 percent of the total, a 5 percent increase in spot supplies demanded. If spot became 50 percent of the market, there would be only a 2 percent increase in the demand for spot supplies. If the short term price elasticity was around .1, the spot price would rise by 67 percent in the first case, but only 22 percent in the second.[12]

It is mistaken to regard the spot price as "the market" and calculate the revenues Saudi Arabia could have earned had they sold everything at spot. Had they tried to do so, the spot price would have quickly collapsed.

First, the excess demand would have been spread over a much larger spot market, and the price increase much less. Second, the excess demand would itself have been less. If spot prices kept leading the rise in contract prices, contract buyers were eager to keep buying more, since they expected to resell at higher prices. The temporary speculative demand disappeared once the market was again in balance. By the end of 1980, this was already approaching.

Our standard for comparison, therefore, is not the spot price but the price charged by sellers who felt free to price as they wished. By this standard, Saudi Arabia underpriced substantially through the end of 1980. The discounting was a success, as in 1977, but on a much larger scale. Their share of the rapidly rising OPEC revenues rose from 30 percent in 1978 to 38 percent in 1980 and 45 percent in 1981, and only a minor part of the increase was due to the Iran shrinkage.

[TABLE V: Saudi Exports & Revenues]

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[12] Let Q and P be the respective ratios of quantity and price. A 5 percent decrease in demand meant that effective Q was reduced by that much. Then $.95=p^{-.1}$, $\ln P=.51$, and $P=1.67$. If spot shipments rose to 50 percent of the market, a 1 percent demand increase would be a 2 percent spot demand increase, and if $.98=p^{-.1}$, $\ln P=.20$, and $P=1.22$.

TABLE V. SAUDI OIL EXPORTS & REVENUES, 1970-1992

	EXPORTS		REVENUES	
YEAR	MBD	PCT OPEC	BILS $US	PCT OPEC
1970	3.7	0.166	1.2	0.155
1971	4.7	0.194	2.1	0.175
1972	5.9	0.232	3.1	0.216
1973	7.8	0.261	5.1	0.224
1974	8.5	0.287	22.6	0.250
1975	7.1	0.278	25.7	0.271
1976	8.6	0.299	33.5	0.289
1977	9.0	0.306	38.6	0.312
1978	8.1	0.290	34.6	0.299
1979	9.2	0.319	55.5	0.295
1980	9.6	0.389	106.0	0.366
1981	9.8	0.471	113.2	0.448
1982	6.3	0.367	78.0	0.377
1983	4.5	0.292	46.1	0.287
1984	4.2	0.272	47.0	0.289
1985	2.9	0.210	28.0	0.209
1986	4.7	0.290	20.0	0.267
1987	3.8	0.238	23.0	0.237
1988	4.5	0.254	21.0	0.239
(NEW SOURCE)				
1988	4.3	0.257	19.6	0.231
1989	4.4	0.233	24.1	0.211
1990	5.8	0.290	39.7	0.269
1991	7.3	0.363	43.8	0.333
1992			48.5	0.355

SOURCES:
1970-74, Petroleum Economist vol. 42, March 1975, p. 84
Petroleum Economist vol. 45, July 1978, p. 285
1974-80, Petroleum Economist vol. 48, June 1981, p. 232
1980-88, Petroleum Economist vol. 52, July 1985, p. 236
Petroleum Economist vol. 53, June 1986, p. 211
Petroleum Economist vol. 56, July 1989, p.214
1988-Onwards, no longer reported.
1988-1992, OPEC Statistical Bulletin.
1991-1992 tentative, from PIW 1-11-93:3.

"Haggling" invades the market in 1980-1981 During 1979-1981, as just explained, the Aramco companies bought their oil more cheaply, and rivals complained bitterly about the "Aramco advantage," which promoted their liftings. In late 1980, OPEC demand was sagging and spot prices under pressure. But that was viewed as temporary, and indeed prices rose at year end. In December 1980, Minister Yamani warned of a possible $50 a barrel by the Spring of 1981.

At the end of March 1981, Kuwait demanded that Gulf, Shell, and BP pay a premium on contract sales. The companies refused. [WSJ 4-1-81:2;4-6-81:20] A Kuwait minister complained: "The companies have resorted to haggling." Kuwait cut its output rather than deign to haggle, but nobody stirred. "For the first time in years, OPEC seems genuinely worried that it has pushed oil prices too far too fast...The time may have come to slow down the drive for higher and higher oil prices."[WSJ 4-13-81:21, emphasis added] Slow down the rate of increase, not to stop increasing.

Then Arco notified Nigeria that it was ending two oil supply contracts. "This is the first time in several years that an oil company has willingly relinquished a guaranteed source of oil. [Previously] buyers have swallowed high prices to insure continued access to crude supplies." [WSJ 4-14-81:2] "I think it is the starting point for a trend...I don't know how you could send a stronger signal that prices are too high." [NYT 4-15-81:D3] Before the month was out, Kuwait agreed not to require any premium on contract sales. [WSJ 4-23-81:2; 4-29-81:4]]

Shortly thereafter, Minister Yamani said his country would not raise its prices or cut production. "In the past, Sheik Yamani has made similar...statements, only to end by raising prices." [NYT 4-20-81:D1] Saudi Arabia had the right to be complacent. Their 1981 surplus was expected to be $50 billion, foreign assets were nearly $100 billion, and were expected to reach $145 by years end. [NYT 3-24-81:A12] "To the surpise of some observers," the Saudis kept production 1.5 mbd above "their preferred ceiling," [PE 5-81:186]

"In the unaccustomed role of supplicant, the IMF has had to pay a high price to persuade Saudi Arabia to lend it...around 16 billion dollars....The Saudis did not press for the PLO to be granted observer status at the joint annual meetings of the IMF and the World Bank. But on the financial side the Saudis have demanded and got their pound and a half of flesh....Because the IMF needed its money fast the terms have extracted are anything but concessionary." [Economist 4-4-81:81]

By end-May, "the flood of Saudi oil is taking a stiff toll on the production rates of other countries, who have reduced output to maintain their official prices." [NYT 5-21-81:D1] As OPEC gathered for a meeting, "all other members are pressing them [Saudis] to slash production some two million to three million barrels a day [to]...wipe out the oil glut...[It] would send panicked purchasers into the market and would push prices up again." [WSJ 5-22-81:1] At the meeting, Yamani refused to cut production. [NYT 5-26-81:1] Others did cut, and there was a price freeze, with the usual worry and inaction on differentials. [NYT 5-27-81:1] One view was that "the Saudis are good businessmen", who increased their revenues by selling more at lower prices at their rivals' expense. [NYT 5-27-81:D13]

The failed meeting had almost immediate results. The head of Exxon, who had recently made light of inventories, now said the company needed less oil and would not pay current prices. [WSJ 6-1-81:20] Others made similar remarks, and said the refusals of higher-priced oil mentioned earlier were only the beginning. "Companies discuss the accelerating moves in only the most guarded terms for fear of angering foreign suppliers." [NYT 6-2-81:D1] But the fact that they discussed them at all was a clear break with the past.

By early June 1981 there were numerous press reports of a "buyers' revolt [and] actual bargaining." Again, language mirrors life: "haggling" and "bargaining" were so unusual as to be remarked. Moreover, the "Aramco advantage" was gone. "The have-nots have turned into don't-wants."[PIW 6-8-81:3] For the next three months, spot and contract prices both decreased, and "companies, in a tough mood that hasn't been seen in many years, are demanding that oil prices be shaved further." [WSJ 6-18-81:4] The OPEC Long Term Strategy Committee, dormant for three years, was again convened.[13] [WSJ 6-17-81:4] Expert reports to it recognized the drop in consumption, and recommended a price policy "to keep price rises from forcing further conservation." [WSJ 6-19-81:6] This was the first acknowledgment of price elasticity. The Committee was scheduled to meet again in August

[13] This indicates that the Committee's work was finished in 1978, although its report was not leaked until 1979 and 1980.

1981. Nothing more was heard of it.

The negotiations between companies and governments over third-quarter supply were now very different.

"It is a time of changing relationships....Dozens of oil companies...have suspended or phased out [deliveries].... After years of submission to the price demands of the oil exporters, the willingness of oil companies to force a showdown with at least some producers has come as quite a shock. `I have never seen contracts suspended on this scale,' said the chief negotiator for an international oil company, who, like others, declined to be identified because of the sensitivity of the negotiations. The producing countries have responded to this effrontery with threats of blacklists, diplomatic protests and even economic sanctions against the oil companies' home countries--<u>everything but a significant price cut</u>. ... [Previously] even in times of oversupply, like the present, the companies were willing to pay uneconomic prices just to maintain a long-standing relationship with a producing country. But times have changed ....`We are no longer slaves to our capital investments in these countries'... " [NYT 7-13-81:D1, emphasis added]

The capital investments no longer existed. Through July 1981, the OPEC nations all stood firm on prices, and preferred to let liftings decrease, thereby strengthening the market. And some companies still felt "anxiety to retain friendly relations for the sake of future oil supplies", thereby encouraging OPEC. [WSJ 7-16-81:1] The OPEC nations demanded that Saudi Arabia either raise prices or cut production; either way, they would sell more at existing prices. The Saudis refused, continuing to produce at over 10 mbd. In mid-August an emergency OPEC meeting failed to decide anything.

The spot market practically suspended trading "in the apparent expectation that some [official contract] crude prices would be reduced" [NYT 8-25-81:D1] And on August 26, Nigeria made the first official contract price cut, from $40 to $36.[NYT 8-27-

81:1; WSJ 8-27-81:3] It equated to a Saudi Light price of about $32, the current contract figure. But it was officially only a "discount", i. e. revocable at discretion. During the next week, other OPEC members cut prices also. It was a moment for taking stock. Production was down by a third since 1978. It was about 20 mbd, against 35 mbd capacity. [WSJ 9-11-81:6]

Despite their insistence on lower prices, Saudi Arabia would not cut contract prices to the Aramco companies. Since late 1980, Saudi Arabia had had the best of both worlds: high prices and high output. But Minister Yamani was worried over a price collapse, which he thought was invited by the intransigence of the other nations.The current $32 was the downward limit. [WSJ 9-8-81:3]

In mid-September, informal negotiations again started on a single crude price. [NYT 9-13-81:22] Meanwhile, the trade was again puzzled and apprehensive because it did not know how large inventories really were, nor the rate of downdraw in recent months; hence they did not know how much was being consumed, and how much would soon be demanded for consumption. [NYT 9-15-81:D1]

Long run comfort At the 1981 Oxford meeting, Nordine Ait Laoussine predicted that before the end of the century six OPEC members would have quit production, and the world would be dependent on a few Persian Gulf nations with "small populations and therefore little incentive to produce much oil. Oil executives and the conference generally agreed...Many top business and oil executives said they believe that the glut is a temporary phenomenon that will end when the world recession bottoms out." Robert Mabro said it was wrong to "predict an end to the energy crisis. Forecasts of abundant oil supplies are as wrong as forecasts of the 1960s that saw limitless oil supplies." [WSJ 9-30-81:2]

James Akins, the former Ambassador to Saudi Arabia, predicted that if AWACS aircraft were sold to Saudi Arabia, the kingdom would keep the price at $32. "Then sometime in the future (perhaps as long as two years) a gradual real increase up to the cost of production of synthetic liquid hydrocarbons." [Akins 1981, p. 9] (The aircraft were sold, but in the next month the price was raised.)

While the sales of other OPEC countries fell by about 30 percent in the first eight months of 1981, Saudi liftings were steady. But by September 1981, even Saudi Arabia had a problem. The Aramco partners had built huge inventories, which they now began selling off at discounts of about $1 per barrel. [PIW 9-28-81:3]

By mid-October, contract prices had been reduced in ragged fashion by most OPEC countries, and an agreement was expected whose main feature had been widely discussed: raising the Saudi marker price from $32 to $34, and cutting Saudi production [WSJ 10-15-81:4; NYT 10-16-81:D1] Minister Yamani was prepared to cut Saudi output to 7 mbd to defend the price, but not below. [PIW 11-16-81:1]

"Spot prices [were] rising on hopes for OPEC accord." [PIW

10-19-81:1] They were not disappointed. When Saudi Arabia raised its "marker" price, the whole structure rose. There was even an accord on price differentials for 40 days, until the regular December meeting. [PIW 11-2-81:1]

As usual, the October rise in the free-market spot price was the result of an expected collusive increase in contract prices in December. First came the expectation, then the effect, finally the cause.

Production limited in March 1982 As exports receded, it was realized that the main objective was to hold the price line. In September 1981, Robert Mabro recalled the 1970s:

"OPEC's market power manifested itself as an ability to hold the price line under adverse conditions....The acid test of power is a slack market when strong competitive waves batter the price front." [9-28-81:SS3]

The December 1981 OPEC meeting had as its main business "how to deal with the world oil oversupply. The differentials set in October were temporary and "did not reflect real market conditions", as Yamani said. [NYT 12-9-81:D11] In December, for once, they did agree on differentials, with more decreases than increases. [WSJ 12-11-81:6] But they had to face "an enormous shift...OPEC members are now faced with the possibility that increases in the price...are not in their own long-term interests." This was progress in recognizing facts, but no acknowledgment of any need for price reduction. The report of the Long-term Strategy Committee was put off for another year. [NYT 12-9-81:D1] [WSJ 12-10-81:4]

At least as early as November, non-OPEC producers were taking the lead, cutting price in order to move output, forcing OPEC to cut output to hold the price. [WSJ 11-9-81:2; NYT 11-21-81:33] [PIW 2-15-82:3, 3-1-82:3; NYT 2-9-82:A1;WSJ 2-8-82:2; 3-3-82:1] By February 1982, "price leadership is momentarily in the hands of U.S. and North Sea crude sellers and their solution to a shrinking market is to reduce prices rather than lose volume." [PIW 2-15-82:3; also WSJ 3-2-82:6 (USA), 3-3-82:2(UK)] As we shall see, it says much about the industry mind-set that all attention was directed to the North Sea, none to the USA, which was several times as large.[14]

Iran seems to have been the first open price-cutter in OPEC, judging from occasional reports. (NYT 2-16-82:D12 noted their "second" price cut.) Oil executives thought the Saudis wanted a lower price [WSJ 2-25-82:2] Their opinion is to be respected, but they were probably wrong: Yamani reprimanded Aramco partners for underlifting, without mentioning a price cut. [PIW 3-8-82:1] Kuwaiti oil minister Al Khalifa Al Sabah said the price could be held. [WSJ 3-9-82:3] Nigeria was the most likely to cut prices, and Saudi Arabia and Kuwait threatened sanctions against companies which reduced their liftings there, since this resulted in price cuts. Threats were cheaper than loans to Nigeria, but accomplished nothing. [WSJ 3-26-82:2] [NYT 3-26-82:21] [WSJ 3-30-

[14] In January 1982, Iraq announced it was planning to reach 6 mbd of production (its previous maximum had been only 3.5) with the help of foreign companies. [OGJ 1-4-82:73] That is precisely what they were to say ten years and two wars later. (Below, p.***)

82:5;4-1-82]

The Bank for International Settlements reported that by the third quarter of 1981, oil exporters were again net borrowers, as they had been in 1978. [NYT 2-15-82:D5; WSJ 2-16-82:31] They had reverted to their normal deficit condition.

Production limited in March 1982 An emergency OPEC meeting in March 1982 showed "an unprecedented hostility toward Saudi Arabia" for not cutting output more. [WSJ 3-18-82:3] Had they cut now, they would have been twice blessed, by the Aramco companies and by the other OPEC producers. But profit took them in the other direction.

[TABLE VI: OPEC QUOTAS 1982-1993]

The March meeting was a new departure. OPEC nations now agreed to cut production from 18.2 to 17.5 mbd. It was not clear how they would apportion the cut. [NYT 3-21-82:1] However, the Saudis finally had the commitment from the others to share the reduction. It was viewed as a "new market-sharing approach instead of conventional price adjustment....This is not OPEC's first fling at production planning, however, and previous efforts have been notably unsuccessful." [PIW 3-29-82:1]

But the March 1982 production agreement did succeed for a time. By mid-May, inventories were down, spot price were up, and "the crisis has passed." [NYT 5-17-82:D1] But even in this "triumphant atmosphere," there was disagreement over whether to continue with production controls. [NYT 5-21-82:D1] Iran said it would not abide by any output ceiling and assailed Saudi Arabia

TABLE VI. OPEC QUOTAS 1982-1992
(in thousands barrels daily)

	MARCH 1982	MARCH 1983	OCTOBER 1984	DECEMBER 1986	NOVEMBER 1988	JULY 1990	2d & 3d QUARTER 1991	SEPTEMBER 1991	NOVEMBER 1992E	1st QUARTER 1993
S Arabia*	7650	5000	4353	4348	4524	5750	8034	8600	8030	8395
Iran	1200	2400	2300	2369	2640	3350	3217	3300	3340	3490
Iraq	1200	1200	1200	excl	2640	3350	excl	350	500	500
Kuwait	800	1050	900	996	1037	1600	none	300	1600	1500
Qatar	300	300	280	299	312	396	399	400	360	380
UAE	1000	1100	950	948	988	1590	2320	2300	2160	2260
Tot PG	4500	6050	5630	4612	7617	10286	5936	6650	7960	8130
Algeria	650	725	663	667	695	882	827	780	730	764
Gabon	150	150	137	159	166	212	285	290	280	293
Libya	750	1100	990	996	1037	1320	1425	1500	1350	1408
Nigeria	1300	1300	1300	1301	1355	1720	1840	1840	1780	1857
Ecuador	200	200	183	221	230	273	273	290	290	293
Venezuela	1500	1675	1555	1571	1636	2070	2235	2300	2260	2360
Indonesia	1300	1300	1189	1190	1240	1460	1443	1400	1310	1374
TOT OPEC**	10350	12500	11647	10717	13976	18223	14264	15050	15960	16479

SOURCE: Petroleum Intelligence Weekly, various issues, latest 12-7-92:7
NB *Saudi Arabia was acting as swing supplier in 1982, 1983, and 1984.
Hence the quotas stated here are those assumed at the meetings.
Neutral Zone quota 0.3 mbd equally divided between Kuwait and Saudi Arabia
**Iraq refused any quota in 1986, excluded from quotas, and total OPEC.
***August 1990 quotas identical with July 1990, except for exclusion of Kuwait and Iraq. Hence not separately shown.
****November 1992 quotas are applied to second quarter 1993.
Ecuador, having left OPEC, is included at recent maximum for comparability.

for allegedly discounting, and for supporting Iraq in the war. "When Saddam Hussein falls all of OPEC's problems will be solved. We will then see a much humbler Saudi Arabia." [WSJ 5-24-82:4] The meeting reaffirmed the 17.5 mbd ceiling, but not a permanent control mechanism. [PIW 5-24-82:3] The Saudis wanted to discard it as soon as possible. Yamani said: "Saudi Arabia's policy still precludes production planning." [PIW 5-31-82:3]

The market-watch committee was unable to decide whether or not to change the ceiling, and "how any increase would be allocated among members."[15] But more fundamentally, some wanted to abolish prorationing, others to maintain it at least on a standby basis. [PIW 6-21-82:1] The emerging strategy, as Yamani had put it months ago was to "freeze or at least restrain nominal price and let inflation erode [it] in real terms." [Id, 6] This is the first approach to lowering the price, even temporarily.

<u>Prices, policy and the long term</u> Ministers Yamani and Al Khalifa Al-Sabah were now willing to "concede that OPEC made a serious `mistake' in letting prices rise so rapidly after the Iranian revolution." But they thought lower prices were bad in the long term, for everybody. "A break in the nominal price would only set the stage for another `serious' shortage....[Prices must

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[15] On June 6, 1982, Israel invaded Lebanon. The siege of Beirut aroused much indignation worldwide, including Israel. There was no suggestion of any oil action by Arab or Muslim oil producers. "In fact, there was little popular indignation in any Arab country." [Akins 1991] Instead, Iran and Libya produced above their ceilings. [WSJ 7-1-82:2] And the Saudi ambassador to the US "<u>hinted</u> ...that if the Israelis tried to enter west Beirut the Saudi Government <u>might</u> consider cutting off <u>some</u> oil shipments and transferring its dollar reserves out of American banks." [NYT 7-22-82:A8, emphasis added] The political element in Saudi or other OPEC nation's oil policy was the usual zero.

rise in the long run to avoid a basic resource crunch before the end of the century." [PIW 3-29-82:6] [16]

The International Energy Agency "now warns [oil] supply shortage may hit after 1985", "anywhere from 9- to 21-million b/d." [PIW 10-4-82:3 The IEA chief economist, Herman Franssen, thought OPEC could hold the marker price. In April, and in October, PIW carried a special supplement by Robert Mabro on the role of OPEC.

"The real issue is one of power. OPEC was able to hold its reference price fixed at least in nominal terms in periods of slack demand, when an unchecked market normally would have led to a price collapse. ... Failure to hold is to surrender...the power over price.... OPEC's power...manifested itself as an ability to hold the price line in adverse conditions...The acid test of power is a slack market when strong competitive waves batter the price front." [PIW 4-19-82:SS1,2]

The senior managing director of the Shell group agreed and was more precise on distinguishing monopoly from competition:

"These producers are now selling at less than half of their available capacity rather than reduce their price. This contrasts sharply, of course, with what is happening downstream, where...the same phenomenon (of a substantial surplus in capacity) generates such competition and price pressure that much of the downstream industry is in jeopardy...That is indeed the traditional market at work." [6-14-82:9]

"Divisive" differentials An obvious weak point was in quality/location differentials. They could be used as a subterfuge or cover for deliberate discounting. Perhaps more

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[16] This was of course the consensus. Daniel Yergin and Martin Hillenbrand, Global Insecurity: a Strategy for Energy and Economic Renewal (Boston: Houghton Mifflin, 1982)], have an "optimistic" scenario: a 2 percent annual increase in the real price, from $30 in 1980 to $45 in 2000 AD. The "pessimistic" scenario was one of OPEC reserves not growing, in which case the price would rise at 4.5 percent per year to $75 per barrel. At 1992 price levels, the optimistic oil price would be $74, over three times the 1992 price.

important, at any moment a small competitive advantage for buyers could bring a big diversion of sales. Sellers who unexpectedly lost business had to retaliate and discount, or lose much revenue. By December 1981, "the divisive issue of differentials" was high on the agenda of the month's OPEC meeting [PIW 12-7-81:1]. The next August a new working group was formed to recommend action. [PIW 8-30-82:3] There was quick dissension, starting with disagreement over the spread between Arab Light and Nigerian crudes [PIW 9-13-82:3]. The committee report was stalled [PIW 9-20-82:1], and the matter was referred to the full meeting [PIW 10-18-82:3], where nothing could be done [PIW 12-13-82:1]

It is useless to cite additional reports. The issue has never been resolved, and remains an irritant to this day.

Managing total OPEC output Production control was always the leading topic at OPEC meetings. Reaching agreement was hard, enforcing it was harder. Even good news was partly bad: an increase in the amount demanded could disrupt. A year later, looking back: "The disastrous pattern of Spring 1982 [was that] OPEC nearly succeeded in restoring market prices--only to have its production ceiling crumble the moment buyers showed some interest in increasing purchase volumes." [PIW 4-11-83:1, emphasis added] The problem was well summed up in July 1982:

> "The organization's own hopes are pinned on a gamble to hold firm for a few weeks in expectation that rising demand for OPEC oil by autumn will save the day, firming up prices and enabling discontented members to secure higher production quotas--if the revived Iran-Iraq war doesn't `solve' the oversupply problem in an earlier and brutal fashion." [PIW 7-19-82:1]

In fact, the market division fell apart in July. Spot prices were down. The Saudis kept demanding that African producers raise their prices. Otherwise, they would cut theirs. Both Saudi Arabia and Venezuela threatened to disregard production limits if others did not stop overproducing. But others demanded that the Saudis cut production. Iran would no longer accept its quota, and threatened "force."[17]

Yet the storm blew away, because of reviving demand during the autumn and winter. It had made people think. Minister Al Khalifa Al-Sabah of Kuwait pointed to the effect of OPEC nations' macro-economic management on oil price policy. He echoed Ali Attiga a year earlier. ["How Oil Revenues Can Destroy a Country", PIW 10-19-81:SS] Higher revenues caused "sharp and irreversible spending increases": to civil servants and other interest groups, subsidies for goods and services, and new development projects. The heavy spending inflated prices and imports, and liquidated foreign assets. The national oil company, unless sound and well run, would make "substantial discounts" to sell oil. [PIW 9-18-82:3]

In October 1982, the Gulf Cooperation Council's oil ministers warned that they would not tolerate "`irresponsible...misguided' price cutting." But it was unclear what they could do to stop it, except to punish offenders by making even bigger cuts of their own. This might lead to a chain reaction "of downward spiralling prices all around." [PIW 10-25-

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[17] [Foregoing paragraph based on NYT 7-5-82:31; 7-8-82:D18;7-9-82:D3;7-9-82:35; 7-11-82:3; 7-12-82:D1, D3; WSJ 7-8-82:3; 7-12-82:2; PE 8-82:315]

82:1] It was the classic dilemma. Sources in OPEC and the companies said that retaliatory price cuts were "the only action that would catch the attention of Libya and Iran." [OGJ 10-25-82:91] But they did not dare.

An appraisal of 1982 We have paid much attention to 1982 because it was the first full year after the second price explosion. The decline in output from 31 mbd in 1979 to 19 mbd in 1981 had been cushioned by the 4 mbd fall in Iranian output. Now the Iranians were back, and others had to make room. OPEC confidence in the long-run shortage and rising prices was not shaken. But in the meantime, they had had to live with the same everlasting "temporary" glut. And on the whole, they had done well. They had fixed a production ceiling and maintained it nominally at 17.5 mbd, actually at 19.3, despite bitter disagreements over both the total and its allocation. The 1982 agreement marks a logical progression from the wrangling in 1974-1977, the secret agreement of 1978, the proposed safety net of 1979, and the "gentlemens' agreement" of 1980. [18]

Harbingers: Saudi Arabia now overpricing Previously Saudi Arabia had underpriced and been well rewarded by their revenues rising faster than total OPEC. But in 1982, on exports to the USA, the Saudi price rose by 63 cents, while the non-Saudi price

[18] All of which did not prevent the rhetorical question: "If OPEC is a cartel, where is the production-control mechanism?" Those asking it are like Thomas Mann's hero waking up with a shock, outside the Magic Mountain; he had neglected to read the papers.

fell by $3.05.[19] The Saudis had gone far beyond wiping out the discount. They now overcharged.

In March, Yamani had reprimanded the Aramco partners for underlifting. [PIW 3-8-82:1] While other OPEC members insisted the Saudis must cut production by 2.5 mbd, the Saudis would only permit the Aramco companies to cut by 0.7 mbd, and even so the companies "may yet have to take the oil they didn't take in February." [WSJ 3-1-82:2] The companies feared they would incur large losses on Saudi oil at $34, which was now some $4 to $5 above spot. But they "are even more worried about alienating the Saudis." [WSJ 3-4-82:3]

Some shed their illusions more slowly than others. In December 1980, Mobil announced participation in some Saudi industrial projects. In return, they would have "access" to an additional 1.4 billion barrels over 15 years. The deals were part of "Mobil's continuing efforts to cement its relationships with Saudi Arabia in order to guarantee access to crude oil." [NYT 12-10-80:D20] "Access" was mentioned three times in two paragraphs. At a later Mobil stockholders meeting, president William Tavoulareas defended

"Mobil's currently unprofitable supply agreement with Saudi Arabia...:`A temporary glut should not make us forget that oil is a dwindling resource, and the companies with access to it are the ones that will be able to supply their customers and maintain their earnings growth. ...[Losses were in the hundreds of millions.] But it is a price we must pay for a long-term arrangement with a country which owns a quarter of the free

[19] Since Saudi production was 37 percent of the total, we can set up an equation with one unknown: .37($.63)+.63($x)=-$1.69, where x is the change in non-Saudi OPEC price. It is equal to -$3.05.

world's oil reserves and has proven itself to be a reliable supplier at moderate prices." [NYT 5-7-82:D4]

The Saudis soon cut "ceiling" production, which was now really a floor, from 8.5 mbd to 7.5, which was generally viewed as still too high. [WSJ 3-8-82:3] In May, Aramco partners said they were losing $5 per barrel, Texaco "has continued to make these purchases...upon the expectation of having continued access [sic] in the years ahead to Saudi Arabia's reserves." [PIW 5-3-82:2] But then they must have cut back abruptly, since Texaco's liftings for the whole year 1982 were half of 1981. [PIW 11-2-82:8] In contrast, as late as October 1982, Mobil "has taken pains to lift its full allowable all year, apparently partly to maintain its standing with Riyadh." Mobil suffered a 50 percent drop in corporate profits. [PIW 10-25-82:7]

By the end of 1982, the Aramco companies let it be known that they were "gagging on expensive, money-losing Saudi crude oil..." on which they had lost about $2.5 billion in 1982. "Even formerly highly-prized rights to `incentive' oil gained for participation in Saudi industrial projects have lost their attraction at full official prices." [PIW 12-20-82:1]

By December of 1982, they had finally learned the real value of "access", "special relations", etc. They had cut liftings so far that Saudi output was at only 45 percent of capacity, other OPEC at 60. "Saudis seem ready for a showdown on price cutting." A group of several former high OPEC officials and two others (Robert Mabro, Ian Seymour) warned that Saudi Arabia, although opposed to cutting official prices, might do so "if necessary to defend the market price by putting a halt to discounting." They thought pricing discipline was a "must", and a new production quota system. [PIW 12-13-82:1]

THE SLIDE RESUMES IN 1983

At a crucial meeting in January, the Aramco companies finally screwed their courage to the sticking point. They gave an "earnest warning" to Minister Yamani: they had already cut liftings 50 percent, and would cut further unless the price was lowered. [WSJ 1-4-83:2] [PIW 1-10-83:3] About a week later, there was a special OPEC meeting in Geneva. It took them a week to agree on a trifling output cut, with no agreement on price levels or differentials. [WSJ 1-24-83:3] Minister Yamani walked out of the meeting, calling it "a total failure." [WSJ 1-27-83:1] He sent the parties home with the knowledge that stronger measures were needed, and soon.

Cooperation, dialogue, interdependence The Iran-Iraq war continued, with France buying more Iraqi oil and sending it more weapons. "Their military aid to Iraq is intended to prevent its military collapse and a destabilization of the region." [NYT 1-8-83:4]

Fereidoon Fesharaki urged that the marker price actually be increased to $36, that differentials also be increased, and that production quotas be set with "a firm commitment to protect at all costs any member country that is pressured by the oil companies." [PIW 1-10-83:11] James Akins "derided analysts who predict sharp declines in the oil price. He said Saudi Arabia considers the `correct price' of oil to be more, not less, than the former marker price of $34." [OGJ 4-4-83:NL1]

The OECD chief economist, Sylvia Ostry, thought lower oil prices were harmful. "The ensuing fall in OPEC demand for OECD exports would probably outweigh advantages of cheaper oil that would help further lower inflation rates." [PIW 1-3-83:8] "American strategists have always found a silver lining in the stable pro-Western Gulf that high oil prices helped create." [NYT 3-6-83:E2, emphasis added] That tells us much about American strategists. The World Bank's World Development Report 1983 predicted that by the mid-1990s inflation-adjusted world oil prices would be 20% above the 1981 peaks. In 1992 prices, that would be $62 per barrel. ($34x1.2x1.51=61.6) Daniel Yergin warned that by the late 1980s "the industrial world would once again rely increasingly on...the Middle East. This, in itself, would bring us back to 1973." [NYT OpEd 7-19-83] The EIA 1982 Annual Energy Outlook said Saudi Arabia could meet its "needs" producing 3 mbd.

The Group of 30, "a high-level body of international economic and monetary experts and government officials led by ...the former managing director of the IMF", and including Sheik Yamani and Sheik Al-Sabah of Kuwait warned of the need to face the transition to higher future energy costs. Lower oil prices promoted economic recovery, which would bring "a dramatic increase in the demand for oil by the end of the decade. Another interruption of oil supplies would then produce another oil shock, repeating the cycle of the 1970s." The Group favored "tacit collaboration" between importers and exporter nations.

During the past three years, they had themselves "helped to persuade OPEC to hold its marker price to $34 a barrel..." [NYT "Economic Scene" 3-18-83][OGJ 5-2-83:98] They must really have believed it![20]

In the consuming countries, there was talk of "Western aid to OPEC" to maintain the price.

"The West may see political advantages, too....Stable prices would bolster Saudi Arabia and other... friends of the West in a particularly volatile region. It would also improve North-South relations. In return, the West might get what it has sought in vain up to now--a long term agreement with the major producers for reasonable price increases in return for guaranteed supplies and an end to disruptive `oil shocks'. According to Prof. Peter Odell... the present glut offers `a golden chance to build new political bridges between North and South'." [NYT 1-30-83:E2]

The Brandt Commission on International Development Issues also called for "a dialogue between major oil producing and oil consuming countries to consider arrangements beneficial to all parties, including safeguarding supplies to the poorest countries." [IMF Survey, 2-21-83]

An example of cooperation was Algerian gas. A trans-Mediterranean pipeline to Italy had been built in 1981, but no gas was shipped until the Italians paid a higher price than the one they had agreed on. Finally the Italian Cabinet approved a subsidy, "linked to improved economic relations [and]...a tacit promise ... to buy more Italian goods." [WSJ 2-25-83:31]

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[20] There was one interesting new development. "Ecuador, strapped for cash to pay foreign debt, has stepped up its efforts to lure foreign investment in its petroleum industry....Ecuador, like other members of the Organization of Petroleum Exporting Countries, has been courting oil companies in recent months because of the oil glut." But the best they could offer was "a rate of return higher than the U.S. prime lending rate". [WSJ 4-7-83:33, emphasis added] There has been only modest progress in ten years.

Minister Yamani warned the consuming countries:

> [If prices fell "you would see bankruptcies all over the world and mainly in the USA, ...[and] the banking system come under serious pressure. So there is something to protect, and Saudi Arabia is not alone here." [PIW 1-31-83:SS1]. "[C]ooperation between the producers and consumers ...has become more necessary now than ever before." [PIW 2-14-83:8] [WSJ 2-11-83:2]

Yamani was, as usual, well informed about the United States. Until 1982, "most oil and gas loans were made on the premise that energy prices would continue to rise sharply....The estimates had been for dramatic increases, [e.g.] ...at almost 10 percent a year, to $90 a barrel by 1990." [NYT 2-14-83:D1] But in 1982 there had been an embarrassing bankruptcy because of oil and gas loans, and banks were nervous. (WSJ 7-19-82:17)

Oil companies seemed to fear that if the price were not deliberately cut by $4, it would fall even more of itself. But the more important question was "whether the organization would be able to agree to limit production levels for its 13 members." [NYT 2-2-83:A1] While the OPEC countries were considering the next meeting, they were approaching the non-OPEC producers, notably the UK, Norway, and Mexico. "Nations in and outside of OPEC are joining in unprecedented bid to support oil prices." [WSJ 2-25-83:3] But the meetings never seemed to reach any conclusion.

The sequence was again repeated: non-OPEC price cuts, especially light crude oils from the North Sea, forced down light African crudes, especially Nigerian, which in turn reduced the light-heavy margin, which took sales away from Saudi Arabia and the others. This happened in January-February 1983. Saudi production was down to less than 3.5 mbd in March, which meant exports were below 3 mbd. But in the meantime, non-OPEC price cuts were led by the USA [WSJ 2-1-83:3] By mid-February, the price of British oil "is now equivalent to a $29 price for Saudi Arabia." [NYT 2-19-83:39] Nigeria then "clearly undercut the British" [NYT 2-21-83:D1] It equated to Saudi Light at $27. [NYT 2-21-83:A1] Yamani had threatened to cut from the $34 base, but he and his Persian Gulf allies were now reluctant to do so. [NYT 2-21-83:A1]

There followed a "hectic spate of mini-meetings", too numerous to list. The Soviet Union "called on OPEC members to close ranks to halt plummeting oil prices." [[NYT 2-23-83:D4] What all parties obviously feared was an endless downward spiral.

In the meantime, Robert Mabro said that only coordination between OPEC and non-OPEC countries would work. He suggested, like Fesharaki, support for governments losing sales, ("the special targets of oil companies in campaigns designed to lower oil prices.") [PIW 2-28-83:1] He did not distinguish (a) individual buyers, each acting alone and competitively to exploit cartel weakness, from (b) concerted action, multi-company "campaigns to lower prices", which incidentally would have been against the companies' interests.

<u>The March 1983 production allocation: Saudi Arabia the swing producer</u> The March OPEC meeting lasted nearly two weeks, preceded by three weeks of negotiations. It was "the longest

negotiating effort ever undertaken by the 13 oil exporters." [WSJ 3-15-83:3] Repeatedly stalled, in the end it was a success, and put an end to the "hysterical talk of an oil price crash", as was noted a year later. [PIW 7-9-84:1]

The marker price was reduced from $34 to $29. This reversed the previous strategy of raise higher, the better to defend. But spot prices, and effective government selling prices, were already about $2 lower than $29, and there was widespread disbelief that the line could be held. [NYT 3-15-83:1, D22]

Total OPEC production was set at 17.5 mbd, 1 mbd below current output. [Id] It was a lot of effort for a small but essential result. Explicit quotas were fixed for all but Saudi Arabia. For the first time they accepted the role of "swing" or residual supplier, to make up the difference between 17.5 mbd and the total demanded at the new price. "Prices are floor prices, ...quotas are ceilings..." [PIW 3-21-83:9]

The marker price was above spot prices. "The growing opinion of many buyers that OPEC is the marginal supplier of last resort does not bode well in an environment that places little value on term contract arrangements." [PIW 3-14-83:3] In fact, the distinction between spot and contract was blurred. "Contracts now seldom cover more than one year", renewable "if prices are satisfactory." "Security of supply" had mostly evaporated, including Saudi Arabia. [PIW 3-7-83:1]

The ministers feared the agreement could unravel; its very success was the result of that fear. [WSJ 3-22-83:1] For the first time, there was discussion of how far down oil prices could go in the short run before production began to be shut in. A PIW survey placed it in the neighborhood of $10. [PIW 4-4-83:4] Nearly 95 percent of UK North Sea output would have positive cash flow at a price of $5. [PIW 6-20-83:5]

As the OPEC members placed their chief reliance on production limits, they became aware of the deterioration in output data. The possible error was now as much as 1.8 mbd, or 10 percent of their production.

> "The data gap on oil production figures has mushroomed over the past decade as oil companies lost most of their control over the producing sector to OPEC and national oil companies. It seems hard to believe nowadays that as recently as the early 1970s it was possible to assemble monthly production data (down to the last barrel) for all major oil fields, and often on a company-by-company or crude-by-crude basis. ... Consumer nations should not be too quick to criticize OPEC for its output data shortcomings, since they have largely failed to provide complete current information on oil demand and inventories. The largest single discrepancy is in stocks, where assessments vary by as much as 700-million barrels--equivalent to almost 1.9 million bd over a year." [PIW 5-16-83:1]

(Data bearing on exploration and development costs had already shrunk more drastically than output data, and continued to shrink.)

In the Spring of 1983, as at other times, a fearful season turned into a tranquil one: spot prices actually rose close to official levels, [PIW 5-2-83:1, PIW 7-11-83:1] An OPEC market-monitoring committee expected to raise prices "`in a gradual and orderly fashion' after 1985...in the context of a global agreement with the industrial powers that will assure the world a reliable source of energy at reasonable prices...Buyers must have confidence in us...'" They were counting on a production agreement already reached, they thought, with Britain, Mexico, and Norway. [WSJ 4-13-83:31][WSJ 5-2-83:34]

The US Department of Energy expected a further price decline to about $24 by 1985, but thereafter a rise to about $37 in 1990. [NYT 5-6-83:D14] OPEC appointed a new ministerial committee on long-term strategy, again chaired by Yamani. They would need to recognize "the sensitive relationship between OPEC prices and demand levels for its oil. That was an element totally missing from the previous document." [PIW 7-18-83:5]

Two months later the group were "coming to terms with the hard fact that, with the exception of Mexico, "none of the non-OPEC producers would cooperate in reducing output. "Internal supply and price discipline will require sharp sacrifices for [OPEC] for the next two or three years, but [they] expect the oversupply position to ease later this decade." [PIW 9-19-83:3]

<u>Efforts to expand capacity</u> Non-OPEC governments were said to be now competing with each other for scarce company investment funds. But fear of expropriation prevented any substantial investment. [PIW 6-20-83:9] Despite the war, Iran and Iraq had made great efforts to maintain and even expand oil output. Iran had done better than had been generally expected. [PIW 1-17-83:6] The Iranian oil minister estimated "production costs" as being as low as 5 to 20 cents; this presumably meant only lifting costs. [PIW 10-17-83:9] Iraq had conducted a wildcat drilling program. "Mobil Oil has been providing technical services." [PIW 8-8-83:8]

As we will see later, Iraq had some substantial success. It was evident a year later, when Iraq said it aimed at 7 mbd of exports "by the 1990s", which would have been twice their previous output peak. It would have required pipelines across Jordan and Saudi Arabia; the latter was built later. There was no mention of any resource constraint. [PIW 3-26-84:3][20]

"The increasingly short-term nature of the oil market ...[requires] some non-bureaucratic mechanism that is market responsive, even if only on volume and not price." Any scheme which by-passed the Aramco partners would displease them, "since they absorbed substantial losses at one time for the sake of their valued "special relationship." Accordingly, Saudi Aramco sold through a new oil marketing outlet, Norbec.[PIW 8-15-83:1] One of the Aramco companies said Norbec was "directed against the Aramco companies" [WSJ 8-28-83:15] The Saudis called it only a temporary entity [OGJ 9-5-83:NL1], but it survives today and is very important in short-term transactions. The Saudis' floating storage, which also began at this time, is an important part of

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[20] Despite production down to 1 mbd and exports around 400 tbd, Iraq had been able to persuade "governments including those of the United States, Brazil, Turkey, Thailand, Australia and Japan, to supply credits for food imports, so austerity has not pinched too hard. But the biggest accomplishment was persuading the major foreign contractors for the development program not to pull out, even though the Iraqis said there would be no payments during 1983 .... `We can't pay so you get your governments to provide credits, and we will start paying you back in 1985.'...None of the major contractors left....The companies wanted to keep in Baghdad's favor for the postwar period, and their own governments were willing to back them...." [NYT 11-24-83:D1] Of course they were not repaid in 1985. Thereupon, the ploy was repeated. "When will they ever learn?"

its operations.

The felt need for enforcement OPEC, "deeply troubled by the failure of demand to recover and their inability to trim output far enough, are now giving thought to a series of really tough measures" against quota violators. [PIW 10-31-83:1] "The oil market is losing confidence in the ability of the $29 pricing structure to survive in the coming year unless there is a sustained demand upturn or dramatic new action by OPEC to rein in production....It seems less risky to refrain from buying oil than to gamble on a market recovery." [PIW 11-7-83:1]

The advisory group which had, a year earlier, issued a warning on the need for discipline (above, p. 47 [PIW 12-13-82:1]) now criticized the lack of a mechanism to allocate output, and urged OPEC to make "a show of strength" to make non-OPEC exporters restrain production. In Mabro's words: "They too share the burden of defending oil prices." The panel said that the cheating of several OPEC members was masked by lack of production data. They again urged a return to companies buying under long-term contracts. They repeated the mantra that lower oil prices were bad for consumers as well as producers, but this ritual should not discredit a thoughtful report. [WSJ 9-30-83:35]

A well-reasoned paper by the Iran delegation urged higher prices and lower output. For maximum OPEC revenues, the $34 marker should be restored. Like others, they recognized the backward-bending curve: lower revenues increased the "propensity to export", hence a production surplus, a further weakening of prices, with "a chain reaction ending in a serious market glut." [PIW 11-21-83:5] The Iranian prime minister accused the Arab monarchies of "treason toward Muslims" in overproducing to reduce prices. [WSJ 12-6-83:6][21]

The Mabro proposal In December, Robert Mabro issued his most far-reaching plan for OPEC. Members should "offer their traditional customers long-term contracts at official prices." Additional oil, prorated to members, would be sold at shorter term only through a central sales agency. It would match immediately all non-OPEC offers. There was a threat, veiled about as heavily as Salome:

> "If OPEC, God forbid, were to engage in a price war against non-OPEC producers it could lower the price on incremental supplies without having to lose a penny on base-load sales, which would continue at official prices under long-term contracts. This is a formidable deterrent." [PIW 12-5-83:8]

Mabro was an important spokesman[22], but the proposal had no chance of success. First, the companies could not sign long-term contracts at official prices. They knew that if spot prices exceeded contract, governments would raise contract prices; when spot prices fell, companies would be choked with unwanted oil

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[21] James Akins said the Israeli Defense Minister advocated joint US-Israeli occupation of the oil fields. No proof was offered. [OGJ 12-19-83:59]

[22] Robert Mabro's newly established Oxford Institute of Energy Studies was supported, among others, by OAPEC (not OPEC, since Iran refused support because of his supposed partiality to the Arabs); the European Community, energy research groups in Japan, France and Sweden, the UK Secretary of Energy, the Arab Banking Corporation, and other banks, corporations, consultant firms and research institutes. Thus his proposals for stabilizing prices indicate what these groups were willing to support.

billed at full contract price. Aramco's experience had just shown that.

Second, the threat to retaliate against price cutters was simply provincial. North Sea production plus Soviet exports were in round numbers less than 6 mbd. But production elsewhere in the non-OPEC world was over 17 mbd, of which 10 mbd was in the USA. Producers in the USA were among the first to reduce prices. [OGJ 2-8-82:85; 2-22-82:67; 3-22-82:71]

In ignoring US producers, Mabro ignored competition. When producers are many and independent, they cannot threaten or be threatened. Each one must take the price as an objective fact. OPEC could cut prices enough to put many of them out of business. It could not know in advance how many would be driven out--nor how many would stay out when the price was raised back above the old levels. But to threaten them was to demand that they act in concert, which was exactly what they could not do. Those unfamiliar with the economics of competition are baffled by it because they can only think of a few actors reacting consciously to each other. (There was the same lack of understanding in 1990, blaming Kuwait for weak prices.)

Unlike Mabro, Yamani understood the American scene. He pointed to damage inflicted by low prices on the USA oil industry, and on the banks, who had local and national political influence. If the US government would help by enforcing a price/production policy, that might make a difference; not otherwise.

The new independence of oil refining worked the same way. Slightly lower prices on spot crude oil would become slightly lower prices on refined products, which would divert sales. OPEC producers losing market share would retaliate by discounting, and so on down the price ladder. Integrated private companies preferred high prices to benefit their crude operations, but they could not coordinate. Each company was also a buyer, who looked for a lower price. In seeking his own benefit, as Adam Smith said long ago; he brought about a result "which was no part of his intention."

THUNDER WITHOUT RAIN IN 1984

<u>Prices hold, supply shaky</u> To the surprise of the trade, prices were mostly stable in 1984. The OPEC average declined only 86 cents, the Saudis' export price by 43 cents. As ever, OPEC was still plagued by unsatisfactory production data [OGJ 12-26-83:Editorial][PIW 3-5-84:3] and members were "resentful that last year's [1983] big $5 a barrel cut failed to have the desired effect." [PIW 3-26-84:4] An Iranian military offensive was countered by Iraq, but the low level of production in these countries had long been made up. Nigeria was the weakest link financially, with foreign exchange reserves almost gone. A coup at the start of January raised fears in the trade, but the new junta reaffirmed their ties to OPEC. [NYT 1-5-84:D10] Iraq was being helped by neighbors, and the American policy was now definitely tilting toward it. [WSJ 1-6-84:24] We cannot say how

important this aid was in raising Iraq oil production from 0.9 mbd in 1983 to 2.8 mbd in 1989. Saudi Arabia had borne the brunt of export loss, but its foreign assets were still said to exceed $150 billion. [PIW 4-23-84:4]

> [By mid-1984] "hysterical talk of an oil price crash so prevalent in March 1983 has all but disappeared, even though producer nations are still fragmented, oil is in oversupply, and refining margins are poor...The lessons of 1983 are now clearly perceived: OPEC output restraint, however unevenly applied, has a major strengthening effect on spot prices." [PIW 7-9-84:1]

The horizon still fair Some large oil-company mergers showed it. "Oil industry set for series of takeovers" because the cost of adding a barrel of "oil equivalent" in the ground was said to be in the range of $15-$17. [WSJ 1-10-84:35] Since the barrel had to be held for an average of roughly 7 years before sale, a reasonable discount rate (say 10 percent) meant it had to fetch something well over $30, plus another 50 percent for operating expenses, royalties, and taxes. [cf Adelman 1992] Some may have dreamed of $45, some day. It is not credible that they spent $15 for a barrel in ground.

But repetition made it widely believed that buying a barrel was cheaper than finding/developing it, just as though there were no market to equate the two choices. To do them justice, some analysts and oil companies, including Exxon and Amoco, rebuffed this chatter. But Daniel Yergin explained: "An obvious reason for [mergers] is that the world is running out of oil." [NYT 2-9-84:D1] He said that by the 1990s the current surplus "may well have eroded, putting pressure once again on supplies." [NYT 4-29-84:OpEd] But the International Energy Agency, which a year earlier had projected the 1990 demand for OPEC oil at 30 mbd, now lowered it to 24 mbd. [PIW 7-23-84:3]

Barter deals At an OPEC meeting in early July, Yamani "told reporters the recovery had already started." [WSJ 8-1-84:2] But in the next three weeks, prices fell because Saudi Arabia actually increased output. A Saudi barter deal became known, of 34 million barrels for civilian jet aircraft, the oil reputedly valued at $27.10 instead of the posted $27.92.

Deals of this type were nothing new. In 1981, a Wall Street Journal survey showed how various members of the Saudi royal family had cut themselves in as sales agents for oil sold through the state company Petromin or (later) Norbec, which they resold at a commission.

"One problem facing top Saudi officials is that commission payments--for oil export and for nearly every major development project inside the kingdom--are part of the glue that holds the 4,000 princes of the royal family together. Prominent princes have come to expect a big share of the kingdom's spoils.... What worries Western oilmen is the likelihood...[of] a decline in the relatively orderly marketing operations of the four U.S. companies." [WSJ 5-1-81:1]

Such deals were viewed as discounts [Economist 7-21-84:62]. "The market disruption is wholly unintentional, and does not reflect policy change." [PIW 7-23-84:3, 7-30-84:1, 8-6-84:3] But control of export volumes and prices was "increasingly eroded" by such barter deals. [PIW 2-13-84:1]

"[Yamani] is understood to have resisted the deal as much as he could, but it was concluded above his head at the behest of senior members of the royal family without regard for state oil policy." [to gain a $50 million commission] [Financial Times 8-1-84:10]

In early August 1984, the British government asked oil refiners "not to put pressure on the British National Oil Corporation (BNOC) to cut prices." [NYT 8-6-84:D4] [WSJ 8-9-84:3] The London Financial Times called Britain "Opec's Other Member":

"There is something instinctively suspicious about ministers acting in secret, in collusion with a cartel whose activities have been the source of many of the world's economic problems." [FT 8-13-84][Economist 8-4-84:53]

But the Aramco companies reduced their liftings and did not make them up elsewhere, thus strengthening prices.

"Washington, while not overtly supporting OPEC, is not fighting it either ...Lower prices would cut billions of dollars of windfall profits taxes. Cheaper oil would undercut coal. Development of wood, solar energy and synthetic fuels would suffer, as would programs for conservation and to produce domestic oil using new technology. Lower oil prices would lead to greater long-term dependence on imported oil and thus risk a future price shock. They also fear this would weaken Saudi Arabia, further destabilizing the Middle East." [NYT 8-19-84:E5]

The Economist [8-4-84:13] mentioned "commentators [who] bewail the 'danger' of much lower oil prices." Another key to world public opinion is in a statement by Pope John Paul II criticizing "imperialistic monopoly." Far from calling OPEC an example of monopoly, His Holiness "was unambiguous in supporting the call by third world countries for a redistribution of the world's wealth." [NYT 9-18-84:A9] A few months later, he "spoke sternly to the world's wealthy nations...[and the International Monetary Fund about]...the market for raw materials." [NYT 2-4-85:1]

France helped by renewing an oil supply contract with Iraq "that last year allowed Baghdad to overcome severe financial problems stemming from its war with Iran...The deal was imposed on the state-controlled Elf Aquitaine and Total last year...In addition to the oil contract, France has agreed to refinance Iraqi debts totaling about $1.4 billion since May 1983." [NYT 8-20-84:D6]

The lack of production data (1983 numbers were still not released) became a kind of help. The additional Saudi production may have gone into floating storage not sales, hence exerted no pressure on price. [NYT 8-21-84:D1] This gave more credibility to an earlier report that non-OPEC suppliers seemed almost openly cooperative. [PIW 8-6-84:1] From this time, the distinction between Saudi production and sales became routine.

Light crudes start a decline But in September 1984, even as prices generally rose, Nigeria and Iran began discounting light crudes. [WSJ 9-26-84:42] In October, for the first time since the March 1983 accord, another OPEC light crude producer (Abu Dhabi) warned it would unilaterally cut the price if it could not otherwise sell enough crude because of competition from Saudi floating storage. [WSJ 10-2-84:34] BNOC (British National Oil Company) customers were no longer willing to accept the unchanged prices which they had so recently approved. [WSJ 10-8-84:35]

Norway then reduced prices "in a break with British policy", which had held prices firm. [WSJ 10-16-84:2] So did BNOC. [WSJ 10-18-84:3] Within a day, Nigeria more than matched them, and there was an emergency meeting of OPEC ministers.

"Even if the $29 marker price now seems beyond rescue, a policy of toughing it out and waiting for the market to turn round could still be OPEC's best short term bet. ...The sudden fracturing in the $29 pricing edifice comes after an almost unbelievable series of miscalculations by both OPEC and non-OPEC producers... Individual actions taken by producers...can all be justified when viewed in isolation. But taken together in the context of a weak and volatile spot market, the moves domino [i. e., cumulate] far beyond the intentions of each producer." [PIW 10-22-84:1]

"OPEC output must fall fast and far enough, in combination with rising seasonal demand, for the shaky $29 oil price to be reestablished....The oil marketplace has not only lost confidence in OPEC intentions, but also in the industry's supply/demand appraisals. ...A secret accord between Saudi Arabia and Kuwait is the real underpinning of last week's OPEC agreement...[where] consensus was achieved more quickly than some had anticipated."[PIW 11-5-84:1]

Of course the Saudis and Kuwaitis wanted the accord kept secret, in order not to advertise that the two were bearing the burden of cutting back output. It would be worthwhile if the market might be starved into a price jump. As Yamani said, cutbacks could make spot prices rise "well above" official levels. [NYT 11-15-84:D30] That was their obvious goal. But secrecy did not last out the week, and the known willingness to cut back did the Saudis immediate harm. Their December 1984 output was below 4 mbd.

Another meeting was held in December. Norway had begun openly to base its own price on recent spot prices. [WSJ 12-12-84:4][FT 12-16-84:10] The same fruitless quest for revised differentials was resumed. [NYT 12-19-84:D17] Members first blamed Britain and Norway [WSJ 12-19-84:6], then each other. [WSJ 12-20-84:3] They needed to regain credibility, whose loss had been making prices tumble. To do so, they would retain an outside firm to audit production. [WSJ 12-21-84:2][WSJ 12-28-84:3]

"[J]ust a month ago--following OPEC's quota cuts--most forecasters...were predicting that a yawning supply gap of 1 mbd was opening for November and December, but no such thing has materialized." [PIW 12-3-84:1] [At year's end, the market was] "closer to the brink now than in 1983....OPEC is launching an *in extremis* bid to reestablish its credibility and...role as manager and defender of the world price structure." [PIW 12-24-84:1]

During the December meeting, the UAE Minister Manei Saeed Al Otaiba wrote some mournful verses:

> After the days of luxury, we have become
> A lamb in the midst of the jungle.
> Like a gang, the wolves of the market
> Swarm around us.

Yet the actual prices cited in the desperate-sounding PIW appraisal were in the neighborhood of $27 or a little less. The decrease was only about 10 percent over nearly two years. The trade seemed to overreact, but the potential for a crash was always there.

Throughout the period, one heard facile wisdom that after all, "when the market talks, OPEC must listen." On the contrary, it was clear that changes in spot and futures prices responded to actual and hoped-for OPEC action, or inaction, on output cuts.

THE SAUDIS ARE PUSHED TOO FAR IN 1985

Emergency meeting, data gaps, prices decline and hold In January, spot and futures prices continued to slip. The British national company (BNOC) followed the Norwegian example, abandoned official prices and sold by the current market. "OPEC's ministers repeatedly have threatened that such a cut by Britain would force the cartel into a price war." [WSJ 1-8-85:3] The threat was not taken seriously. Indeed, a spokesman for Britain's Ministry of

Energy said that Britain would not reduce oil production to ease pressure on prices. [WSJ 1-15-85:5] That ended the collaboration which had troubled some in Britain.

In January, there was another emergency meeting.[23] Minister Yamani remarked that the $29 price was "not sacred" [NYT 1-29-85:D10], but it was not changed.

The "decision" was a set of price cuts between 25 cents and $1.16 per barrel, derisively small; and several members refused to agree to anything. [WSJ 1-31-85:3; NYT 1-31-85:A1] But the hope of production cuts caused a sharp jump in futures prices, regaining most of the ground lost since August 1984.

Saudi Arabia had suffered a sharp decrease in non-oil gross domestic product, which was mostly a use of oil revenues,not an independent source of income. "The private sector ... is much smaller than it was even two years ago. Over the past 18 months, some 1,500 companies have either gone out of business or asked for emergency financing." Payments to American companies were much delayed. [NYT 2-18-85:D3]

OPEC retained a Dutch accounting form to audit members' prices and production. In early February, Minister Yamani expected "exact figures on production" by the end of the month, and selling prices for March. The need was obvious: "increasingly

[23] With nothing of substance to report, the veteran Youssef M. Ibrahim, to whose work we and all other observers are greatly indebted, wrote an item on high living at the hotel: late suppers, and "a procession of $200- to $1,000-a night `escorts' making their way to the elevators." [WSJ 1-25-85:1] Only jangled nerves can explain why Mr. Ibrahim was, very briefly, barred from these meetings.

unreliable output statistics and imaginative pricing schemes have plagued the group." [PIW 2-4-85:1] It was a formidable task, and observers recalled that in 1983 the market monitoring committee had hired Arthur D. Little, whose contract was terminated in December 1984. [WSJ 2-26-85:39] But by end-February, prices were excluded from the audit. [PIW 2-25-85:1].

The auditing process took longer than expected [PIW 3-25-85:1], and in April Nigeria, Kuwait, and two others stopped sending production data. [PIW 4-29-85:1] Somehow this was smoothed out. By early June, although members had been disconcerted by the auditors' thoroughness, and by regular followup visits, the Dutch auditors could "provide fully certified statements on all members' production." [PIW 6-3-85:1] This was too hopeful. An oversight ministerial committee, chaired by Yamani, was categorical: "Not one single OPEC country has from the beginning given the auditors sufficient access to date to enable unqualified positive endorsement to any member's complete statistics." [PIW 7-29-85:1] At about that time, OPEC hired a London-based group to track tankers to get reliable export statistics. [PIW 8-12-85:1]

At this point, auditors and trackers disappear from view. A year later, the auditors' contract had lapsed. [PIW 4-14-86:4]

<u>Short run gloom, long run rosy</u> The anxiety of early 1985 was reflected in expert opinion. Cambridge Energy Research Associates and Arthur Andersen polled 125 forecasters. "Nearly all expect oil prices, adjusted for inflation, to continue declining over

the next several years, but to rise again in the 1990s. One dissenter not polled by CERA-Andersen thought the glut had existed for 70 years. "OPEC is on the verge of a dogfight." [NYT 1-30-85:D2] A distinguished expert team called for "a new initiative between oil producers and users." [PIW 4-1-85:5] Britain, however, was still uncooperative. They dissolved the national oil trading concern BNOC. It was generally agreed that this would make it harder to maintain prices. [WSJ 3-14-85:3] In March, Norway was shocked by the loss of a large gas contract of sale to Britain.[24]

> "The [U.K.] government had been under intense pressure to force the corporation to maintain prices....OPEC officials have alternately pleaded with Britain to help prop up prices and threatened to initiate price wars or trade boycotts if it did not. The OPEC ministers have allies in the British Treasury...The opposition Labor Party which created the oil corporation in 1975 condemned the announcement as the `final act of vandalism' against an organization set up to protect the oil industry and the security of supply to the oil industry.'" [NYT 3-14-85:D1]

A group of experts convened by the CIA in April expected some price decline, "before starting to gather strength by the 1990s." [WSJ 4-23-85:1] James Akins said: "There is no fear in OPEC of a price decline." In the long run, the price would rise to the cost of synthetics. [OGJ 4-15-85:32] (He had been the first to suggest the target, in 1970.) Daniel Yergin warned:

> "unless there is a major technological development, at some point the reduction in energy investment will come back to haunt us, and market realities will again give way to geological realities--the concentration of oil reserves in OPEC and in the

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[24] We lack space for the important developments in the natural gas market, which pushed the price down during this time, both in North America and in Europe. See [Adelman & Lynch 1986] See Table VI.

Middle East. And that will eventually put the era of surplus behind us." [NYT OpEd 7-8-85]

[TABLE VII: GAS PRICES]

The Norwegian oil minister, speaking in Kuwait, countered "accusations" by saying Norwegian output would level off at about 700 tbd. [NYT 3-25-85:D5] (In fact,the 1985 average was 815, and it continuesto rise, exceeding 2 mbd in 1992.)

Spot and futures prices increased in March and April. However, trade opinion was still gloomy, expecting some decrease in the near future.

<u>The Saudi dilemma: retaliation invites general collapse</u> By May 1985, "three months of apparent restraint by [OPEC] members ... are giving way to serious breaches." Iran was particularly aggressive in discounting. "About the only thing that is propping oil prices is the Saudi willingness to take deep production cuts, which have pared output to a 17-year low of about 2.8 mbd." [WSJ 5-16-85:5] There was a report that the Aramco companies had requested price cuts, which had been refused, "in the belief that any Saudi price cut would lead to a downward spiral in world oil prices." [<u>Financial Times</u> 5-25-85:2] That was the card which the other members were playing; Saudi output was believed to be only 2.5 mbd, as compared with its quota of 4.3 mbd. [<u>Id</u>]

At the end of May, Yamani called for official price cuts on heavy crude oils, but not light ones, in order to promote the sales of heavy crude (including the marker Arab Light). [WSJ 5-30-85:14] It was the same old intractable issue of price

TABLE VII. NATURAL GAS PRICES: USA, W. EUROPE, JAPAN, 1980-1992
(Source: Cedigaz annual report 1992)
($/mmbtu)

YEAR	USA border	W. Eur border low	high	Japan
1980	4.42	3.00	3.70	5.01
1981	4.84	3.30	4.70	5.83
1982	4.94	4.10	5.20	5.74
1983	4.51	3.50	4.40	5.16
1984	4.08	3.50	4.20	4.90
1985	3.19	3.40	4.40	4.99
1986	2.53	3.20	3.60	3.98
1987	2.17	2.50	2.80	3.29
1988	2.00	1.90	2.50	3.22
1989	2.04	1.70	2.50	3.26
1990	2.03	1.80	2.50	3.60
1991	2.06	2.90	3.20	3.97
Jan 92	n.a.	2.40	2.80	3.60

differentials. Saudi willingness to continue to accommodate others' overproduction "is wearing thin." But Yamani had warned in similar terms in February, and nothing had happened. [PIW 6-3-85:1] The Saudis called an emergency meeting in their summer capital Taif. A senior OPEC official said "It seems quite plausible that the Saudis are ready for a confrontation." [WSJ 6-3-85:3]. They were not; King Fahd sent a warning message, but they only offered arguments which others opposed. [WSJ 6-4-85:2] [NYT 6-10-85:D1] [WSJ 6-10-85:26] Yamani now viewed the price/ production problem as more serious than what had produced the $5 cut in the marker price in early 1983. Production control was necessary but not sufficient; "marketing practices [were] ... undermining the pricing structure..." [PIW 6-10-85:1]

A week later, Yamani again warned that Saudi Arabia could not continue at 2.5 mbd production (and only 1.6 mbd exports), and demanded "at least" its quota of 4.35 mbd. Yet "he will oppose any reduction in the OPEC price level because it would only mean more discounting from a lower base." He also explained how a properly run OPEC would cope with demand fluctuations, by the price-raising ratchet:

> "If you stick with the price...then everybody will be selling a little bit below the quota.... Then prices on the spot market will be going up because supply is less. Then I think we would have to meet, increase the quota, and increase the [price] ceiling."[PIW 6-17-85:1, SS]

The pressure on the Saudis was revealed by some financial data. Playing the swing producer had cost them $2 billion in June alone. In 1983-84 there had been a $22 billion drawdown of foreign assets, which now stood at $90 to $100 billion, of which "$65 billion is reasonably liquid." [PIW 7-8-85:5] Presumably most of the non-liquid $25 to $35 billion was in "loans" to Iraq. We cannot tell how much of it found its way to Saddam Hussein's treasure trove, reckoned in the billions, which enabled him to bear the embargo in 1991-92. [NYT, 7-27-92:A7; 7-31-92:A8]

By the end of June, "a growing number of oil analysts" expected a price as low as $20 by year-end. Traders did not expect the cartel to splinter, despite acrimonious rhetoric, "and they tend increasingly to doubt the threats of Sheik Yamani." [WSJ 6-28-85:1] That was the problem: OPEC members doubted also, or they felt simply unable to act together to accommodate Saudi Arabia to ward off disaster. Along with others, even the Aramco companies "have abandoned their long-term contracts." [WSJ 6-28-85:13]

In mid-July the Saudis were still insisting on some "guaranteed minimum level" of production, said now to be 3.5 mbd, well below their earlier demand for full 4.35 mbd quota. But a special meeting ended in failure. Sheik Otaiba of the UAE guessed that 75 percent of OPEC oil was being discounted. [NYT 7-8-85:1]

> "Saudi Arabia, increasingly desperate...[is] prepared to increase their oil production from the current two million barrels a day to as much as nine million barrels a day by year's end unless other members...agree to renounce all forms of discounting prices and cheating on production quotas. ...[This was] the most blunt of Saudi threats that have been made in recent months. ...Most OPEC members refused to accept production curbs, in part because many of them have come to disregard the Saudi threats as a bluff." [WSJ 7-10-85:2]

We may note in passing the Saudi claim of 9 mbd capacity, which seems not to have been generally accepted.

Spot prices were generally $2 to $4 below official. Japan, Sweden, and the Netherlands, called for a "dialogue" with OPEC; others, including Britain, Norway, and the United States, rejected it. [WSJ 7-10-85:2][NYT 7-10-85:D1][25]

An OPEC consultative committee claimed that their "agreement in principle to end marketing `malpractices' represents a significant advance in OPEC's slow campaign to defend oil prices." [PIW 7-15-85:3] This was a confession of impotence to rein in overproduction.

The official truth about Saudi Arabia had been that the Western-schooled technocrats wanted less production, in order to conserve the resource; only the government's desire to help the USA and the West had prevailed. Reality was now briefly glimpsed.

> "More and more of these educated and increasingly vocal Saudis have come to feel that the country should forget OPEC, cut price and sell more oil....Behind this view...are serious concerns that Saudi Arabia's political and economic weight in the world are being undermined by its decline as an oil exporter. Arab diplomats note in interviews that Saudi Arabia's political clout within the Arab world, which rests solely on its wealth and its generosity in foreign aid, is waning." [WSJ 7-19-85:1]

The search continued for a "magic formula to squeeze quart-size oil supplies into the pint-pot of demand." The Saudis said they had been negotiating with both the old Aramco partners and

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[25] There was a general decline in the readiness of the industrial nations to support commodity prices. Secretary of State Kissinger had called in 1975 for a worldwide system of price support through North-South cooperation. Attitudes had greatly changed. An American official said: "We're fed up with it and now the Soviets are fed up with it." [WSJ 10-2-85:34]

others to move more Saudi oil. But their threats to OPEC continued to be viewed as bluff.[NYT 7-22-85:D2]

"In OPEC there is growing dissatisfaction with its current strategy of defending oil prices through production restraint. As a result, radical and risky changes in policy direction aimed at making the defense of OPEC's market share the number one priority are now being discussed seriously in several quarters....[Some want] head-to-head market confrontation...matching but not undercutting non-OPEC prices. [PIW 7-22-85:1]

Another special meeting in July came to nothing, and six members--Algeria, Ecuador, Iraq, Libya, Nigeria, UAE--were reported not even permitting the auditors to enter. [NYT 7-28-85:D1]

"[A] majority of OPEC delegates [were] convinced that a threat by Saudi Arabia to unilaterally boost production and touch off a price war was only a bluff. By sponsoring [a] proposal to adopt such small price cuts, some delegates said, the Saudis effectively had backed down. [Previous hints were now more bluntly expressed.] Within OPEC, the Saudis increasingly are viewed as the rich landlord in a slum. Resented for their wealth, the Saudis are seen as preying on poor members who can't afford to sacrifice much more of their revenue by cutting prices or trimming production. ...On at least three occasions this year, the Saudis retreated just as their threats were beginning to bite...The upshot is that most OPEC members now believe the Saudis are bluffing."[WSJ 7-26-85:3]

Perhaps because the Saudis' threats of retaliation were not feared, spot prices actually improved, and by end-July were only about $1 below official. One helpful factor was a flareup of the Iran-Iraq war. There were heavy attacks on the Iran export terminal at Kharg island, which "may be Iraq's own way of `making room' for its incremental exports this autumn, without weakening prices." Iraq exports had already increased, trucked out through Turkey and Jordan, and sold at deep discounts. These supply worries seemed to bolster the spot market, which approached $28, close to the marker. [PIW 8-26-85:2] However, Nigeria moved to reduce taxes on equity operations, which amounted to a price cut to those companies. [WSJ 8-26-85:2]

When the Saudis announced that production would at some time double to quota level, 4.3 mbd. [WSJ 8-1-85:4], nobody bothered to comment. Yamani stated in mid-September that this would happen by winter. "The Saudi move, which had been threatened but disbelieved for several months, amounts to the end of an era." [WSJ 9-16-85:1] But some still thought he was only bluffing for an October meeting. [NYT 9-16-85:D1]

Prices in the last quarter rose, propelled by new air attacks by Iraq on Kharg Island, which stopped Iran exports completely. Coincidentally, the Soviet Union "apparently beset by production problems", temporarily stopped exports. And Saudi Arabia said it would accept no new customers for two weeks. An oil trader said: "In my experience, I've never seen a set of circumstances as bullish as this. Just everything is going right if you want to see prices rise." [NYT 9-27-85:D1][WSJ 9-27-85:33]

Everything continued right for several weeks, as fear of supply losses drove up spot and futures prices. At another OPEC meeting in October, Saudi Arabia repeated that it had abandoned its role as swing producer. [WSJ 10-7-85:3] But prices continued to rise.

<u>The Saudis draw back for a jump</u> The Saudis arranged, at first only with the former Aramco partners, for additional output to be priced at the spot product value of the barrel, less

refining and transport cost. This was the f.o.b. "netback value." "Predictably, reports of the Saudi netback sales are already drawing bitter criticism" from Venezuela, Iran, and others. Some term buyers were demanding discounts for "security" of outlet. [PIW 9-16-85:1,2] It had taken them a long time to learn that sellers' access to outlet was more important than buyers' access to supply.

The Saudis tried to minimize market disruption, by distinguishing between incremental sales at netback value "and continuing sales at official prices." This was what Mabro and others had urged in 1983. (Above, p. 58) It did not work. Customers resisted segregation, and Japanese customers were outraged since "the new formula is for Atlantic destinations only." [PIW 9-23-85:1] By mid-October, the Saudis were selling to other than the Aramco partners. They had already built Atlantic-area stockpiles, now to be drawn upon. [PIW 10-18-85:1]

By end-November, all geographical discrimination was on the way out. Saudi Arabia was selling generally at netback, or at spot crude prices, which might exceed netback values. More importantly, they were converting existing officially priced contracts into netback deals, and the Japanese customers expected to be included. [PIW 11-25-85:1]

By now, oil companies had given up "trying to produce an internally consistent supply/demand balance for 1986." More than 1 mbd of supply was "in limbo", i. e. without visible outlet. [PIW 11-25-85:1] Yet all this time, spot prices were increasing, as the result of low inventories.

At end-November, Saudi Arabia and OPEC suspended official prices. The targets of the action were the UK, Norway, <u>and</u> the OPEC majority:

"Other ministers [as well as Yamani] advocate price `shock therapy' sooner rather than later as the only way to halt the erosion of OPEC market power....The idea is for a seasonal production pact with non-members, discreet enough to avoid embarrassing ... Britain and Norway, but concrete enough to persuade OPEC's maverick majority to start producing within their quotas ....Evident failure to phase out `marketing malpractices' as promised at midyear...augur ill for attempts to agree on new pricing norms." [PIW 12-2-85:1]

At the meeting, OPEC was said to be "no longer even pretending to be a cartel.... Instead, it is preparing for a price war against rival producers outside of OPEC." [NYT 12-9-85:1] (Cartels have been know to cut prices to enforce decisions.) The meeting called for "a fair share in the world oil market," whatever that meant. They were frustrated by non-members' lack of restraint. [WSJ 12-9-85:3]

"Differences emerge over the degree of commitment to engage in a bruising battle for market share if non-OPEC exporters are unwilling to limit output. The hardline group, including Saudi Arabia, asserts that the Geneva action is a concrete `first step' and not a bluff. ... Yamani specifically singled out the UK as the `number one target'. ... [A committee would] "examine ways of putting pressure on non-OPEC producers to restrain output, as well as look at alternate pricing formulas." [PIW 12-16-85:1]

December prices were down, not only on spot markets but on export shipments. During 1982-1984, Saudi prices had been within 50 cents of "Arab OPEC" and "total OPEC." Their prices during the first 11 months of 1985 are unknown. But for December they were $5 below "total OPEC." Officials in Britain, Norway, Egypt and Mexico blamed the cartel and disclaimed cooperation. The

London Economist said that "OPEC oil ministers have made it clear that Britain is their main target." Economist 12-14-85:57] For reasons stated earlier (p. 69, 77), this target made no sense. The ball was in another court, where the players were unaware of it.

> "American congressmen are now making their umpteenth attempt to reduce the $200 billion budget deficits... Congress could find salvation in the oil market. ... The taxman could simply stand between the wellhead and the petrol pump, scooping every fall in the price of crude without raising the cost of American motoring....The dismal science rarely gives politicians what they most want, painless solutions to their problems. It is doing so now....If Congress does not go for a petrol tax soon, it will have missed its best chance of returning the world to cheap oil, slow inflation, low interest rates and rapid growth." [Economist 12-14-85:16]

The great missed opportunity is still being missed.

THE RANKS COLLAPSE AND REFORM: 1986-1987

In 1985, the average "total OPEC" export price, less volatile than the spot price, peaked at $26.81 in April. As late as November, even with netback deals sprouting, it was $25.68. The Saudi export price is not available before December 1985, but in that month it was down to $18.48, followed by $12.75 in January, while the "total OPEC" average was still $21.02. The Saudis had stolen a march on all of OPEC. Their May 1986 price was down to the all-time low of $7.91.

The seductive netback as price hedge For buyers, a netback price was more attractive than a fixed spot or contract price of the same amount. Netback was a costless hedge against price changes. In the two months or more between the date of loading and the date of sale of the refined product, if the product price rose the refiner's crude cost also rose. But if, as many expected and all feared, the prices of crude and products declined in the two months' interim, the refiner's crude cost would drop also. The fear of the slim refining margin being turned into a heavy loss was gone. The crude oil seller assumed all the risk.

Netbacks also had another, more subtle, price-lowering effect. Previously, an autonomous drop in the product price level would shut down some high-cost refining. The result would be lower output of refined products. (The stubborn legend is that because variable costs are a relatively low proportion of total costs, refinery output does not respond to higher crude oil costs or lower refined-product prices. But this confuses the single unit with the whole plant and with the whole industry. Oil refining, like oil production and almost all other industries, is an industry of increasing cost because it is an array of plants, from lowest- to highest-cost. And within each plant there is an array of units.)

The lower product price would normally cause some refining throughput cutbacks. The lower volume of refined products slowed or stopped the product price decline. Lower product output in time became less crude purchased, and this depressed the price of crude. Thus the lower product price worked through to the crude level, gradually and not completely. Some of the effect was absorbed by the refiner.

But with a netback deal there was no slowdown of the price decline as it was transmitted through the refining industry. The refiner became indifferent to a lower product price because he knew that it would be immediately offset by a lower crude price. The lower prices were a deliberate tactic "to scare up cooperation" from non-OPEC producers. "Yamani, who previously described the paper and futures markets as `purely psychological', added to the havoc last week by speaking of a `downward price spiral...to less than $15 a barrel." [PIW 1-27-86:1] The result was that physical spot markets nearly dried up "because buyers and sellers are too far apart on prices and terms." [PIW 2-3-86:1]

Pain inflicted Some producers soon cried hold, enough. "Political pressures ... are beginning to mount... But Arab Gulf producers show no willingness to ease pricing tensions by an early accord on lower production ceilings." Iran, Libya, and others called for an emergency OPEC session, but Saudi Arabia and Kuwait refused. "`Let them all stew', says one high Gulf official." [PIW 2-3-86:1] Saudi Arabia and Kuwait were not moved by threats of terrorist violence against them. [WSJ 2-4-86:3] Most OPEC members wanted non-member producers to cut along with them, naming Britain, Norway, the Soviet Union, Egypt, and Oman. [WSJ 2-5-86:3] There are many such reports, yet the largest non-OPEC producer, the USA, is never mentioned. [WSJ 2-5-86:3] A week later the policy, of letting prices go in order to regain market share, was still in place. [PIW 2-10-86:1]

Britain was urged, and even expected by some, to join with OPEC, because its high-cost oil would be shut down. Yet this was obviously wrong. Operating cost in the North Sea was roughly $5. As for the government's reaction, the loss of oil revenues as part of the national income was very much smaller in Britain (or even Norway for that matter) than in the OPEC nations. Many believed (wrongly, as we have seen) that $15 was "below what's required to replace reserves," and that the persistence of such a price "will erode non-OPEC output enough by 1990 to put OPEC back in the driver's seat..." [PIW 3-24-86:1]

In Saudi Arabia, unlike the rest of OPEC, there were immediate large revenue gains, "[W]ithin Saudi Arabia the policy of maximizing production and pumping more money into the economy enjoys great popularity and will be hard to reverse." [WSJ 2-11-86:1] Saudi Arabia was earning more at lower prices.

In early March, the Saudis and Kuwaitis were still standing fast against "a majority of OPEC members ... seeking ways to persuade [them] to call off the fight for market share." [PIW 3-3-86:3] So much for another legend: how Saudi Arabia does not dare resist "pressure" from its partners to pump less.

The Persian Gulf producers said that prices had fallen to "unacceptable levels and only cooperation between all producers inside and outside OPEC" could improve matters. [NYT 3-11-86:D11] But later in March, "even the Saudis [are] becoming concerned about the rapidity and depth of the current price plunge." [PIW 3-17-86:3] Yamani's position was seen as diminished; he was blamed for having previously cut Saudi production to prop up OPEC prices. Discounting by netbacks was said to be a reversal of Yamani. [WSJ 3-14-86:30] But such inside-dope stories about a closed society should be put aside. The Gulf producers were simply distrustful of their colleagues. "The Saudis believe the pain of reduced oil revenue should be extended through the summer to encourage adherence to any future OPEC limits on production." [WSJ 3-18-86:3]

As usual, the long run was rosy. "By 1990, perhaps sooner, the stage will be set for a new run-up in the oil price."[26]

In March 1986, the objective was said to be re-establishment of the $28 marker price. But there was no known plan to accomplish this. [NYT 3-22-86:35] The Iranian Oil Minister blamed the United States for trying to destroy OPEC "`because it is an organization belonging to the third world.'" He proposed cutting output from 17 to 13 mbd. Sheik Otaiba of the UAE said he shared Yamani's view "that some countries had not suffered enough financially to assure strict production discipline." [NYT 3-23-86:9] After sitting for nine days, another meeting quit on March 24, having done nothing. Prices, which had stabilized since the start of the month, fell again. [WSJ 3-25-86:50]

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[26] " ... This run-up might start as early as 1988 as the oil exporters see this excess capacity noticeably shrinking.... The fundamental forces described here--both those of the market and those of geology--make it prudent for us to look across the narrow `valley' of lower-cost oil to the likely high-price `cliffs' on the other side." [Henry M. Rowen, in WSJ OpEd 3-21-86]

Mr. Bush speaks on All Fools' Day The US Government was now heard from. On April 1, Vice President George Bush "said he would tell Saudi Arabia that the protection of American security interests requires action to stabilize the falling price of oil." He would "be selling very hard" on his forthcoming visit. [NYT 4-2-86:1] But of course: "We're not going on a price-setting mission." Hypocrisy so blatant was almost refreshing. It was scorned by editorials in the New York Times (April 2) and Wall Street Journal (April 3), among others. His mission was to persuade the Saudis to "stabilize--or even increase--the price of oil by cutting production." [NYT 4-3-86:A1] [PIW 4-7-86:3] But hypocrisy aside, what did Mr. Bush accomplish?

The Saudis were trying to influence OPEC and non-OPEC producers by inflicting pain. When Mr. Bush said that they were indeed inflicting much pain, this encouraged them to inflict more. Accordingly, their May output was actually higher than March and April. That was clearly the view in OPEC.

> "Many delegates [to an OPEC meeting] saw these observations, later awkwardly retracted by the White House, as a sign that OPEC's drive to win market share by letting oil prices fall is reaching its goal. `It is clear the U.S. advocacy of free market pricing for oil has cracked', said an Arab delegate who asked not to be identified. `We must continue to push the price war further. The pain must go on to get real cooperation from non-OPEC members', he said." [WSJ 4-15-86:3]

Thus if Mr. Bush had any effect, it was the contrary of what he intended. It was much like Undersecretary of State Irwin in Tehran in January 1971, telling the Persian Gulf producers how much harm they could inflict by cutting back output, which of course encouraged them to threaten more and to do more. As Karl Marx might have said, the Irwin visit was tragedy, the Bush visit was farce. Mr. Bush continued the solemn foolery of US-Saudi oil "dialogue," which continued throughout the 1980s, as it had through the 1970s. (Washington Post, 7-21-92:1, citing documents obtained under the Freedom of Information Act.)

In March, OPEC had met with five non-OPEC producers [PIW 3-17-86:3] and asked them to cut back, but it had not settled its own output. [PIW 3-24-86:1] By April they could still say they were hopeful over statements by "high US and Japanese government officials", and by "Norway's willingness to allow production to shut in even temporarily", particularly since there would shortly be a new government there, "a socialist alliance more sympathetic to OPEC." [PIW 4-14-86:5] But in the end there was no cooperation from Norway or Britain, and a disconcerting discovery: that when taxes and royalties were price-dependent, the tax decline helped offset low prices [PIW 3-24-86:1]

Netbacking continues Saudi Arabian revenues were up from late 1985 because of higher sales at lower prices. And "reserve drawdowns, borrowing and budget cuts [don't] seem to be shaking the popular support for the Saudi government's decision to pursue an aggressive oil-production policy despite the fall in oil prices." [27] [WSJ 4-8-86:34] Indeed, some of the royal family were

[27] Foreign "liquid and semiliquid assets" had been estimated at about $110 billion in early 1983, $55 billion by end-1985, and due for another drop of $15 billion by end-1986. [WSJ 4-7-86:3] Another estimate put total assets at about $80 billion, bank deposits plus short-term investments at $50 billion. In addition,

reported as thinking Minister Yamani should have acted sooner to increase production. [NYT 4-13-86:F6][28]

At an April OPEC meeting the majority favored cutting output to 16.7 mbd, but even this was opposed by Libya, Algeria, and Iran; and the meeting did nothing on quotas. [PIW 4-21-86:3] Yamani denied that any output ceiling had been set. Non-OPEC producers had first

> "to trim a million barrels a day... before OPEC tries to cut its own output when it meets...in June. He said low oil prices will eliminate another 1 mbd of high-cost oil. Then OPEC might remove a third mbd or so. That, he said, would take care of an excess 3 mbd.... `But if we don't get anything from non-OPEC, nothing will happen.'" [WSJ 4-23-86:2]

In May, it became clear that other OPEC nations were not only maintaining output, they had actually undercut the Saudi netback prices. In response, Saudi Arabia offered a cash discount on every barrel of oil bought that month in excess of the previous month.

Futures prices had been rising, but now fell again. As the trade saw it, the Saudis would do everything necessary to keep their market share.[WSJ 5-6-86:5] Last summer's output of 2 mbd was intolerable. "The country's prestige evaporated along with

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there were loans impossible to collect quickly (to the IMF or World Bank) or perhaps ever (to Iraq), and equity investments. But much could be done by cutting spending.[WSJ 4-8-86:34]

[28] In April 1986 the USA bombed Tripoli in Libya. The merits of the attack are not our concern. But Italy and West Germany were reluctant to approve it or join in anti-terrorist measures, because "Libya remains their largest supplier of crude oil." [NYT 4-14-86:A6]; Japan, because it is "a major importer of Middle Eastern oil". [NYT 4-29-86:6]

its oil revenues." Yamani said the "eventual" price goal was $28, "but not in a year or two"; the interim goal was about $18. Iran's oil minister "roared: `We will tell them it is a U.S.-Saudi conspiracy against the poor of the world.'" [WSJ 5-13-86:1] Nobody laughed.

By May, with no sign of the Persian Gulf alliance relenting [PIW 5-12-86:1], many were wondering how low the price could go, or was likely to go--two separate questions.[29] The new socialist government of Norway said it would consider limits on oil production, provided OPEC set a total and distributed it among members. [WSJ 5-15-86:7] One development was quite threatening, however: various industrial and less-developed countries were raising taxes on oil products, thereby pre-empting OPEC revenues at the source. If this became more widespread, it would frustrate OPEC hopes for higher demand. [WSJ 5-28-86:39]

In June, an OPEC meeting started with an experts' report recommending more pressure on non-OPEC producers, none of whom appeared to be ready to cut production significantly. Many suggested that higher prices were also the responsibility of "bankers and nations interested in world financial stability" . [WSJ 6-26-86:10] The immediate target was a price between $17 and

[29] "One academic economist calculated the floor would be about $8 a barrel in the short run and $5 over the longer term.... M. A. Adelman of MIT warned...that oil prices could sink to $5 and remain there for the next 10 years--though he assigns that a low probability. Prices are more likely to fluctuate between $5-$25, mainly in the $10-$15 range, he said." [PIW 5-5-86:1]

$20, and ultimately $28, but most of the members continued to resist production cuts--while prices hovered around $13 and some Persian Gulf crudes were below $10. [WSJ 6-27-86:4] By the end of the meeting, the majority were willing to cut production, but Iran, Libya, and Algeria held out. [NYT 6-29-86:6] The meeting could not agree. [NYT 6-30-86:D1]

"A shrinking majority...led by Saudi Arabia" thought it was impossible to parcel out a smaller total, hence impossible to cut total production. Moreover, "Saudi Arabia believes that the price war eventually will eliminate much oil from non-OPEC producers, such as Britain and the U.S., because their oil is too expensive to produce." The exit of this oil would make room for more OPEC production. [WSJ 6-30-86:7] It is hard to believe such a report. But the Saudis raised production to 6 mbd at the beginning of July. [NYT 7-17-86:D16] For once, this was actually above their quota.

<u>The July-August meeting stops the price decline</u> The next meeting was late in July. It was urgent: some spot sales of Saudi Light were rumored to be $6.08, although the reported spot prices was $7.70. Yamani first proposed a production ceiling of 17.6 mbd, about 2 mbd less than current production. But the minority wanted a cut to 14.5 mbd, and much higher prices. [NYT 7-29-86:D1; NYT 7-30-86:D3]

> "Nearly all delegates appeared genuinely panicky over the prospect of OPEC oil prices sinking closer to $6 a barrel. The chief fear among delegates is that with prices so low, industrialized consumer countries...may ... impose taxes and tariffs on oil, effectively holding consumption." [WSJ 7-30-86:3]

This of course was what the Economist had advised in December (above, p. 78). After a week, there seemed to be deadlock. The delegates had apparently learned, however unwillingly: "The total volume of non-OPEC output shut in purely on the basis of production costs is likely to remain surprisingly small [PIW 7-21-86:1; emphasis added] If the reader credits Table IV above, he will understand. Earlier in the year, the predominant industry view was for prices to be at $18 - $20 by year's end, but no longer. There were steep cuts in planned capital expenditures. [NYT 8-4-86:D1].

The split continued between the Gulf producers and the others. It was apparent that there would be no help from non-OPEC governments. OPEC had long ceased to make threatening statements.

"Partly, many experts say, the problem is OPEC's seeming inability to do without instant gratification. ... The ministers are seeking to achieve cuts in their individual crude oil output to dry up a glut of oil on the world market and push prices to a level that would more than compensate for the cuts in volume they would have to accept. But while the ministers agree on the principle, they appear unable to trust the reckoning. `Two barrels is something I hold, it's real,' a source close to delegates said. One barrel for a higher price is a promise. So I hang on to what I have.'" [NYT 8-4-86:D1]

As hard to take was the distrust and suspicion. Delegates interpreted conciliatory proposals as expressions of weakness. A popular explanation was a Saudi-Kuwaiti conspiracy to bankrupt Iran and let Iraq win the war. This is more excusable in Ministers under stress than in Western writers. [Milton Viorst, NYT OpEd 8-5-86]

A new production agreement in August was regarded as "temporary and fragile", and covered only the months of September and October. The new limit was set at 16.8 mbd, compared with a current output of 20.5 mbd. Saudi Arabia and Iran resumed their old quotas, others cut mildly, and Iraq was permitted to produce ad lib--which meant in effect their current output. [WSJ 8-5-86:3] [NYT 8-6-86:D1] [NYT 8-7-86:D3] [PIW 8-11-86:3] Therefore Iran no longer needed to insist that it must receive twice as much as Iraq.

The agreement turned the market around. By end-August, the new OPEC cutbacks were taking hold, and buyers were being turned away. [PIW 9-1-86:1] The Norwegian government said it would reduce exports by 10 percent, to help "`stabilize oil prices at a higher level.'" [WSJ 9-11-86:4] China, the Soviet Union, Mexico, Egypt, Malaysia, Oman, and Angola each made a similar pledge. [NYT 10-3-86:D1]

Yamani announced a six-year (i.e., 1992) goal: 20 million barrels daily of OPEC exports at $20 per barrel. [PIW 9-15-86:1] His forecast of production was right on target, but $20, adjusted for the increase in US GDP-IPD during 1986-1992, would have been $25.30 in 1992. The actual average OPEC "basket" was $18.41 in 1992, and the average on export to the US was $17.87.

But although the August and October meetings were in a good hopeful climate, Saudi Arabia and Kuwait demanded a new set of quotas, which would be tied to a schedule of prices based on a fixed marker around $18. The two demands were inter-related, since raising the price up to the target level would require further output cuts. [WSJ 10-7-86:7] Iran, however, favored the easier course of simply extending the August agreement. Temporizing was natural to them because they could not tell, after another Iraqi raid on Kharg Island export terminal, whether they could export more. [NYT 10-10-86:D1]

Most members wanted to retain current quotas, the line of least resistance, but Kuwait demanded an increase in their quota, which they had cut more than any other member. [WSJ 10-13-86:3] Both they and the Saudis wanted higher quotas, based 50 percent on reserves, 20 percent on producing capacity, and 10 percent on population. [WSJ 10-14-86:2] [NYT 10-14-86:D1] [NYT 10-18-86:35]

The Saudi cabinet had publicly stated they would not accept a renewal, but on October 18 they did, with the target set at $18. [NYT 10-19-86:A1] Kuwait assented for the time being. [WSJ 10-22-86:2] Their minds had been concentrated by sharp declines in futures prices.

Yamani dismissed at end-October For Minister Yamani it was a last hurrah, since he was dismissed at the end of October. The press accounts were vague, and we cannot rely on any. Yamani allegedly "opposed immediate steps to raise oil prices, [arguing] that raising oil prices is incompatible with the quest of many OPEC members, including Saudi Arabia, for larger market shares. The pricing committee will have to reconcile these contradictory objectives." King Fahd called the stated $18 - $20 target only a "first stage" of the advance to higher prices. [WSJ 11-11-86:2] This is supported by another account, which states also that the

King demanded both a higher quota and a higher price. It also mentions Yamani's opposition to barter deals which enriched some princes but endangered prices. The King thought they could be kept secret. [PIW 11-24-86:1]

Yamani was reported "under strict orders from King Fahd to refrain from any comments on the kingdom's oil policy if he wishes to retain his freedom of movement." [WSJ 1-11-87:A2] Later, an editorial in The Economist [6-27-87:13] thought Saudi Arabia was better off exporting more at a lower price. "Sheikh Yamani was sacked because he recognized this." (The editorial, incidentally, is an excellent brief summary of the Saudis' investment-expenditure plight.) Prices wobbled somewhat on Yamani's departure, but revived. Kuwait supported Saudi Arabia in seeking higher prices, but also without suggesting how to cut production. [WSJ 11-12-86:3]

The American Petroleum Institute now suggested that the United States Government establish a base price for oil through an import fee, which would take effect when the price fell below a certain level. This would penalize OPEC for lower prices and reward them for higher prices. There was never an indication that the USA would join in any production-limitation. The Reagan Administration was in a difficult position, particularly since the knowledge of the "recent surreptitious efforts to re-establish ties with Iran" were beginning to become known. [NYT 11-13-86:D1] Moreover, Saudi Arabia had provided cash for the Nicaraguan contras, and the Administration felt indebted.

More production cuts; stable prices in last quarter It was also widely reported that the Saudi endorsement of higher prices was part of a deal with Iran. [WSJ 11-14-86:12] This report conflicts with the fact that the Iraq airforce, rebuilt with Saudi-Kuwaiti money, had done heavy damage to Iran in August-October 1986. But reports of a deal were superfluous. Both parties wanted higher prices. The obstacle was the lack of concerted production control.

All oil analysts agreed that a substantial production cut was needed. [NYT 11-14-86:D17][NYT 11-14-86:D1] True, the OPEC pricing committee thought pricing discipline would of itself increase by $3 the new marker of a "basket" of OPEC crude oils. [NYT 11-15-86:1] [WSJ 11-17-86:2] To nobody's surprise, it did not. And when King Fahd refused to cut production below quota, there was a renewed price decline. [NYT 11-25-86:D1]

Iran's deputy oil minister now reversed course, saying his country was willing to work with other members to cut production to bring the price up to $18. [NYT 11-26-86:D13] The December meeting should have been brief and rewarding. King Fahd, now in accord with Iran, had also conferred with the chiefs of state of Iraq, Libya, and Algeria. [WSJ 12-3-86:2] The arms-for-hostages scandal in the USA, which in effect broke the arms embargo against Iran, was also a help.[30] A senior delegate said: "The

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[30] "U.S. officials root for higher oil prices, despite possible ill effects. They hope the OPEC meeting's outcome will raise prices into the high teens." [WSJ 12-19-86:1]

Iranians will run this meeting without doubt, and everyone will fall into line." The Saudis would make the biggest contribution, by cutting output from the current nearly 6 mbd to 4.3 mbd. [WSJ 12-8-86:3]

But the meeting, which should have needed one or two days, lasted eleven days. Iran, which had been willing in August to disregard Iraq because it was about to "control" Iraq's production by force, now confronted its failure. The delegates could not agree on a scheme of production cuts. [NYT 12-14-86:3] The Iranian oil minister "talked to reporters--like some wistful Rommel recalling Montgomery--about the `wisdom' of Sheik Yamani." [NYT 12-15-86:D12] But oil markets were encouraged, and spot prices rose, on a reported agreement that "quotas and cutbacks remain the only option." [NYT 12-15-86:D1] The next day, they

> "all but reached agreement on measures to boost oil prices by sharing production cuts. Saudi Arabia, with other members' support, urged OPEC to reduce production at a level below actual demand. Thus OPEC hopes to starve oil markets by next March to prepare the ground for yet another price boost." [WSJ 12-16-86:5]

But Iraq would not agree unless their production was equated to Iran. [WSJ 12-17-86:2] Their quota of 1.2 mbd had been set in 1984, when Iran had badly damaged Iraqi export capability. But export capacity had been restored, and was expected to rise to above 2 mbd. Iran proposed Iraq be suspended for its recalcitrance, but this was not taken seriously. [12-18-86:D2] "Saudi Arabia, which supports Iraq's war effort with oil and substantial war loans, has tried to use its leverage to persuade Iraq to join the output accord. It has not succeeded so far."

Saudi "leverage" over Iraq was as potent as USA "leverage" over Saudi Arabia. Yet "for an accord to push prices higher, there must be some assurance that Iraqi output will not surge." [NYT 12-19-86:33] Iran now relented, since "its need for firm and rising oil prices outweighed its desire to force Iraq into the pact." [NYT 12-20-86:35]

The new agreement emerged on December 21. Everyone was to cut back by about 5 percent, and first quarter 1987 output was set at 15.8 mbd. It fixed the prices of 23 crude oils, including the marker (Arab Light) at $17.52 and the surrogate marker (Dubai Fateh) at $17.42. The ambiguity of August remained: Iraq was not limited by quota, but it was assumed they would produce only 1.466 mbd, a cutback from the current 1.6 to 1.7 mbd. Members also agreed "to phase out all oil sales contracts that are based on a free-market pricing of oil." This meant the end of netback pricing.

As PIW said, the production cuts would maintain the price through the winter, the most favorable season; but "buyers are still extremely reluctant to assume all of the commercial risk ... by accepting the new schedule of fixed prices." Both Saudi Arabia and Iran were losers "in their bid to be seen as effective leaders..., both overestimating their ability to influence Iraqi oil policy. ...[This] may be highly damaging in the long run as [Iraq] expands export capacity in 1987-1988." [PIW 12-29-86:1]

King Fahd had retreated from his price demand. Output reduction he now thought was "the only way to absorb the surplus.

... the price must not be less than $18." [NYT 12-27-86:32] As we will shortly see, the next but not final stage was $20.[31] At any rate, the crisis was over. Figure 1 above shows how prices had revived.

An Appraisal of OPEC in Retreat 1981-1986 We have examined these six years in often tedious detail because it was the cartel's greatest test. OPEC awoke from their dream of moving up an inelastic demand curve to the point where the price of oil would profitably be raised to equal the cost of synthetic liquid hydrocarbons. The true limit to price was set by customer substitution. It was not far above, but far below $34.

OPEC was like someone walking out on a reef, heedless of the incoming tide. When the water starts lapping at his ankles, he must now swim back all the way he walked out. Retreat is much harder than advance.

OPEC could not manage an orderly retreat. In 1981, they actually raised the price to $34 to conciliate all the members. They lowered it to $32 in 1983, but were unable even to discuss a lower price. Nor could they agree on the production cuts needed to support any given price. But after the price decline turned

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[31] We note another interpretation: "Sheik Yamani was ... an advocate of overproduction as a means of keeping world prices down; but he was sacrificed, the experts say, when the Saudi Government responded to heavy pressures from other oil producers by cutting production and letting prices rise--an accommodation to the demands of Iran, in particular." Tom Wicker, "The Saudi Link", NYT OpEd 12-21-86. Surely Mr. Wicker did not misquote "the experts": Saudi Arabia overproduced to keep world prices down, not to profit themselves. Other producers forced them, against their will, to join in raising prices. The story is illogical, unsupported, and believed.

into collapse, they did put the cartel back together, and regained about one-third of the price ground lost.

OPEC members were the victims of the consensus view [Figures 2,3], often referred to. Since the price was surely going to rise, one need only hold ranks and tough it out in the meantime. They waited for something to turn up, specifically the demand for OPEC crude oil.

With the companies gone, the OPEC governments had to fix production and set down market shares in black and white. Any change in planned total output unlocked everyone's demands for a larger share of the market, and the whole deal had to be re-made. Market share was always the topic in chief at OPEC meetings in 1975-1977. There was a secret market share agreement in 1978, aborted by the happy accident of the Iranian Revolution. But even while still raising prices, at end-1979 they proposed a "safety net" for members in trouble, and in the summer of 1980, they had to make a "gentleman's agreement" on output, aborted by another happy accident: the Iran-Iraq war. In March 1982 they had made a loose allocation agreement, which was not well observed, then the firm agreement of March 1983, which was not well observed either.

Each cartel member wants to shove the burden of curtailment on to others. Here small is beautiful and weakness is strength.

If a smaller cartel member cheats by producing more and shading the price, the largest producer cannot retaliate. If he does, the whole arrangement crumbles. The Saudis' share of OPEC exports fell from 47 percent in 1981 to 21 percent in 1985. They obviously could not tolerate exports around 1 mbd. The others knew this, but could not achieve an agreement to alleviate the Saudis' plight.

The only Saudi weapon was to cut prices. But after awhile, nobody believed their threats, and by mid-1985, their partners were openly contemptuous. Indeed, even if another member believed the threat, what was he to do? Unless everybody would cooperate, it was not worth anybody's while. I would be glad to step through the door--after you, dear Alphonse.

The Saudis finally put in place a mechanism whereby they matched product prices, less a differential, everywhere. Thereby they matched crude prices everywhere. Their offering prices went automatically as far down as forced to. There was never any Saudi "price war." They would meet any price, not beat it.

August 1985-December 1986 was a repeat of January-March 1983, when a Saudi threat had brought the rest into line and produced an agreement in two months. Less than three years later, it took them 16 months of actual price rivalry and a price collapse, roughly from September 1985 to December 1986, to work out a new market-sharing agreement. Nor have they ever been able (except briefly in wartime) to get much higher.

UNWILLING PRICE STABILITY 1986-1992

A disappointing period Prices were relatively stable in the next six years, 1987-1992. Omitting four months in late 1990, the monthly average Mideast Light f.o.b. spot price (using Dubai Fateh as the continuation of Arab Light) was $15.97 and the standard deviation only $2.05. In real terms, of course, this represented a continuing decline. The complaints of "unstable" prices after 1986 use "unstable" as a code word for "low." In other words, the stability was involuntary. It resulted from OPEC inability to get its members to act together.

These six years were difficult and disappointing. As we just saw, before 1986, OPEC nations lived from month to month and season to season, hoping for an upturn in demand, and instead seeing it fall. But then following 1985, consumption in the world market economies (ex OPEC) increased strongly, from 42.0 mbd to 49.6 mbd in 1991, an all-time record. (Table I) (The new world market increased by a further 600 tbd, or 0.91 percent, to 1992.)

There were also helpful changes in supply. Production declined in the USA. Mexico output was static. It could not shake off the incubus of its national oil monopoly, and only slowly repaired the waste it had committed. The North Sea expanded only slowly. As the Soviet Union shivered apart there was stagnation then decline. Elsewhere the shock of the oil price drop chilled investment. Accordingly, aggregate non-OPEC production barely increased from 1985 to 1992. But its failure to decline was a great disappointment.

Accordingly, OPEC exports increased from 12.7 mbd to 21.8 in 1992, the highest since 1980. Furthermore, excess capacity in OPEC gradually dwindled and disappeared. The apparent precision of the capacity numbers is deceptive; there is more to say on them later. But natural decline, low investment; destruction by war, neglect, undermaintenance, and cannibalizing--all contributed. Excess capacity had nearly vanished by late 1992, but perhaps Shakespeare had it right: "A little more than a little is by much too much."

Stability in 1987 The price held from January through early November. Saudi Arabia, Kuwait, and Iraq, had all notified customers they were back on fixed-price contracts. [WSJ 1-11-87:A2] Moreover, Norway, the Soviet Union, Mexico, and Egypt announced their cooperation. [WSJ 1-14-87:3] One hears of no actual steps taken, except that Moscow announced an export cutback; someone ungraciously commented that they had reduced exports during the year's first quarter in each of the last three years, only to increase them later. [NYT 1-23-87:D2]

Early on, OPEC was considered to have succeeded with "the simple combination of production cuts and fixed price notices." But the differentials problem was still unsolved. It was not mere stubbornness that kept them hacking away at it.

> "Gaining term commitments from major companies to lift a significant proportion of crude needs at fixed prices is seen vital for OPEC success. For the buyer, the biggest stumbling block in the fixed price approach is a built-in lack of market responsiveness, but the special OPEC ministerial differentials committee may help on this score." [PIW 1-5-87:1

There was a catalogue of malpractices "drawn partly from OPEC documents." [PIW 1-19-87:7] But apparently they were playing by the rules in early 1987. The price rise was the result of "an OPEC-wide output cut of 1.5 mbd in the heart of winter."

But this was in itself a test: as prices improved, the temptation to sell a little extra could bring spot crude and product prices down as the increment flowed through the refining system. [PIW 1-26-87:1]

Term contracts, without fixed prices But the attempt to rebuild term contracts did not succeed. A deal with the four Aramco partners sounded like old times: it was "a multiyear agreement...at the official government prices." [WSJ 2-4-87:4] Much grateful surprise was expressed. [NYT 2-4-87:D1] But--there was no penalty for underlifting. [PIW 2-9-87:1]

Months later, "the most fundamental problem is the seeming inability of producers to rebuild stable term supply relationships with primary contract customers." Fixed prices did not mean much with buyers free to change volumes at short notice. Even the Aramco partners and the Japanese were reluctant to commit more than a month at a time. Mobil Oil's former president continued lyrical over "Mobil's key link to the world's largest oil reserves beneath the deserts of Saudi Arabia." [WSJ 1-29-87:A3] But the chairman of Chevron explained the "link": "It is a long-term relationship, but one that returns nothing to our bottom line." [PIW 11-16-87:1]

OPEC producers "could restore value to the old fashioned term contract by keeping production low enough to push spot prices modestly over official levels...." [PIW 5-4-87:3] A month later, fixed-price contracts "for specific time periods are starting to make a comeback", although "arms-length crude sales by OPEC members at official prices still are a relatively small share of their total exports." [PIW 6-15-87:1]

Thus despite higher prices, the first half of 1987 was uneasy. A hopeful note was the promised cooperation of non-OPEC producers. The new Labor government of Norway said it would cut production in support; Japan, Sweden, and the Netherlands were known to share their fear of another price collapse. [WSJ 4-10-87:4]

Early on, the Saudis were again taking the brunt of the cutbacks. [WSJ 2-11-87:3] [PIW 3-16-87:1] In March, they were down to 2.5 mbd, uncomfortably close to the August 1985 trough. [WSJ 3-20-87:14] But then exports revived. Saudi Arabia seemed increasingly committed to a $20 price by year-end, and to 1988 prices up to $22. Other members liked that; Kuwait was opposed. [PIW 4-27-87:3]

<u>Iraq expands; Saudi Arabia again swing producer</u> "The wild card, of course is Iraq, which scorned the December agreement and is running some 430 tbd [or 29 percent] above its deemed allowable." [PIW 5-25-87:1] Their foreign debt was reported at $50 billion, half of it to Arab states. "A grim picture..." [WSJ 2-12-87:29]--but more is known today of the useful ways in which the $50 billion had been spent. [32] By June, Iraq was still

[32] In 1986, "Renewed Relations with Iraq Fall Short of U.S. Expectations," WSJ 3-17-86:24. "'We hope for it. We still hope for it,' says a State Department official." A year later: "Proponents [of a Deputy Secretary of State's] trip [to Bagdhad] say Iraq's support for terrorism is relatively minor, and that <u>better relations with Washington have moderated Iraq's behavior considerably</u>." [WSJ 3-31-87:33; emphasis added.]

exempted from quota limits and planning new pipeline capacity for shipment through Turkey, and also Saudi Arabia. Their year-end export capacity was expected to be 2.6 mbd, not their 1.466 "deemed" quota. Saudi Arabia "appears to be trying to restrict oil exports from Iraq" [NYT 2-8-87:A7] and were in position to do so because of the shipments through their territory to the Red Sea. But they did not dare speak roughly to Iraq, which kept expanding and thumbing its nose.

By mid-May 1987, the mood was upbeat:

"All 13 members of OPEC are impatient to reap the fruits of a year's discipline that successfully reversed the spectacular price collapse of 1986. ...[Aside from Iraq] there appears to be little else to spoil OPEC's largely bright outlook and pride in having calmed world oil markets. ... In April, the Saudi oil minister, Hisham Nazer, successfully extracted a promise from the U.S. to stop its `OPEC bashing', in the words of a senior U.S. administration official, a move that constitutes a major , but quiet reversal in Reagan administration policies.[33] Furthermore, Mr. Nazer...has persuaded major non-OPEC oil exporters...and a large segment of the U.S. and international oil industry to join OPEC's drive for slow, steady price improvement." [WSJ 5-18-87:2]

As usual, nobody stated just what was the "major reversal" of US policy. In the event, non-OPEC producers did nothing, and prices did not rise. Abu Dhabi, like Iraq, was producing over quota, and a "disjointed" differentials structure meant there was

[33] "Saudi Arabia has secretly contributed billions of dollars since the early 1970s to movements and governments in a dozen countries... particularly in areas where the executive branch has been unwilling or unable to gain Congressional support. ... The Saudi ability to finance foreign policy efforts promoted by Washington has declined recently with the slump in oil prices, but as the payment to the Nicaraguan contras demonstrates, Riyadh remains willing to provide cash at key moments." [NYT 6-21-87:1]

constant temptation for many to cheat. Only Saudi Arabia turned away customers. [PIW 6-8-87:3] Indeed, it "is resigned to acting as swing producer this year to support the $18 price, so long as volume cheating stays within narrow bounds."

In the longer run, it was judged that Saudi integration into refining overseas would save them from the fate of being swing producer. [PIW 6-29-87:1] There is force in the argument: downstream integration is permanent built-in netbacking, as their neighbor had shown: "Kuwait continues to sell its full production quota regardless of OPEC's gyrations, disagreements and fights over the official price." [WSJ 6-25-87:1, emphasis added] But partial downstream integration was only a partial solution for Saudi Arabia. The closer they came to producing their quota, the less was left over for others.

The mid-year meeting had to cope with the prospect of "a delicate market balance on the horizon." [PIW 6-29-87:SS1] The new production accord, for an ostensible 16.6 mbd in the second half, "has set the stage for a hike to $20 in 1988--if discipline is preserved." As usual, the object was to starve the market: the ceiling "was deliberately pitched at a level below projected demand" to force up the price. But some in the trade feared just that: "creating upward price pressures that individual members will find difficult to resist, with the end result excess production and lower prices.[34] If so, OPEC had to walk a tight

[34] Kuwait minister Al Khalifa Al-Sabah showed again why he was the most unpopular of ministers. He was asked: "Some members believe this agreement will stabilize the market and make

rope, and with the same safety net: "Saudi willingness to act as swing producer would again become crucial." [PIW 7-6-87:1] It was already crucial; the Saudis continued to refuse customers. [WSJ 7-17-87:5]

Rosy long term The experts were as reassuring as ever on the long term. As WSJ summarized them: non-OPEC output "has finally declined", and would continue to drop as fields dried up. Thus the world "is becoming ever more dependent on OPEC oil", and the "trigger point" for a crisis was when production exceeded 80 percent of capacity, a point "approaching rapidly." Hence there "will be a shift back to the Middle East" which would increasingly affect "the geopolitics of oil." [WSJ 8-2-87:1] "If supply and demand are left to the market, it will take only a decade for the Saudis to become the swing producer, able to control the world price by regulating the flow from their own wells. [The price could approach $200 per barrel.]" [NYT Ed 8-13-87] OPEC could endure their waning influence in the third world, along with socialism, commodity agreements, and the rest of the New International Economic Order. [NYT 8-2-87:E2]

Peter Odell thought supplies were ample. "OPEC is an organization to be protected and cossetted, so in effect, firmly incorporating into the Western system a group of countries which have hitherto enjoyed scant respect." [Odell 1987]

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the world safe for term contracts of longer than three months. Do you agree? A. If spot is above official, no country is going to sell on term contracts. Any country ... is going to increase its spot volume. We know from experience." [PIW 7-6-87:SS1]

Prices held: Saudis repudiate swing role As the summer wore on, Gulf f.o.b. prices were steady around $17-$18. OPEC overproduction "is casting a shadow over the group's hopes of raising official prices later this year." Cooperation between Iran and Saudi Arabia was unaffected by the riot by Iranian pilgrims in Mecca. "OPEC's two largest oil producers still need their rapprochement on production curbs to support the $18 benchmark price." [PIW 8-10-87:1] Saudi Arabia lodged a formal complaint with OPEC's president about substantial overproduction by other OPEC members, which might be interpreted as a warning. [NYT 8-4-87:A1]

Yet prices were firm. "Most companies still seem happy to take more oil than they really need." Partly this was continuing tension in the Gulf because of the Iran-Iraq war, partly that "many companies are still betting that OPEC...[will]...raise official prices in December, and want to build stocks ahead of an increase." [PIW 8-17-87:1]

Since Saudi Arabia's complaint had not worked, they sounded a "warning": letting it be known that they were going slightly over quota. [PIW 8-24-87:1] When the price fell below $17, the Saudi monarchy denounced "criminal gangs" at the Mecca riots at "a bitterly anti-Iranian news conference." [NYT 8-27-87:D1] A very high-ranking Saudi personage said they would "`demolish [Iran] politically and Islamically.' Western diplomats here are now exultant as they busily cable their home offices about the Saudis' `sea change' and `new activism'." [NYT 8-29-87:A1] Some non-diplomats were unimpressed.[35] Iran made no reply, but in early September attacked the Saudis for not doing more to hold down production by Kuwait, the UAE, and Iraq. [NYT 9-11-87:D3]

Minister Nazer ruled out any Saudi swing producer role, and said his country would allow "field supervision of its production, providing that all the exporters agree to an on-site monitoring system." He would not pressure his neighbors directly, not even Iran. [WSJ 9-14-87:5]

The fears of a price crash died away. By September the higher prices gave both confidence and disquiet:

"OPEC's successful defense of its $18 reference price so far this year is giving the group confidence...[and] a consensus is building ...that the price should move to $20 in 1988...

Higher prices... are seen shattering OPEC's hard-won cohesion--which is already being stretched to the limit. While OPEC can probably hang together when there are hopes of volume gains for everyone, pressures on swing producers are likely to become intolerable if they must defend higher prices that continuously erode OPEC's shrinking market share." [PIW 9-7-87:5]

Not only did the higher prices bring problems, attaining them did too:

"OPEC producers and their customers are trying to preserve the term supply relationships they revived earlier this year, despite the price and supply pressures now evident in oil markets....The common denominator for maintaining OPEC discipline

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[35] Karen Elliott House of the Wall Street Journal wrote: "They are busier than ever trying to buy insurance policies from every peddler. ... The Saudis are putting up a brave front, but there's little evidence they've stiffened their spines. ... While talking of standing up to Iran, the Saudis secretly sent the Algerian foreign minister to plead for their safety in Tehran. ... While American newspapers describe Saudi largesse on behalf of William Casey's covert operations in the Middle East, that, too, is only part of a larger Saudi strategy of making payoffs to every piper in the region...There's probably little America can do that would give the Saudis the courage to stand up for their own self-interests." [WSJ 10-8-87]

is still likely adherence to official prices, since it lets market forces determine who gets cut back." [PIW 9-21-87:1, emphasis added]

There was the rub. If each seller held to official prices, output allocation was left to the chances of the market. Random, seasonal, and longer-run changes, made winners and losers. Some losers would not endure it, but would cheat.

Hence a September oil ministers' meeting was gloomy. Iraq still rejected any quota less than Iran's; they must have enjoyed stating their desire for money as sovereign hauteur. And they were working to equal or even exceed 1979 export capacity of 3.3 mbd. But they were at least open about it.

More widespread and frustrating was the lack of accountability. In August, the Saudis had "strongly criticized the effectiveness of OPEC's efforts to track members' output and sales." [PIW 8-10-87:1] Now a special meeting of five ministers refused to single out any given country for blame, "and they admitted they don't really know how much more oil is being produced than called for." [WSJ 9-11-87:2] Moreover:

"Proposals to set up permanent on-site production and export monitoring in all OPEC countries are seen by some ministers and officials as futile ... A previous $3-million exercise by Dutch auditors was thwarted by individual members' lack of cooperation, not by the auditors' lack of oil expertise." [PIW 9-21-87:5]

Saudi Arabia's downstream investment "is increasingly seen as the only way for [it] to jettison its unwelcome role as the world's main swing producer", as Kuwait had already done. [PIW 9-28-87:3]

By late September, production was falling, but not in response to any plan. With over-full inventories and lower demand, the Gulf producers, especially Saudi Arabia, held price and lost market share. [WSJ 9-28-87:4] When Exxon indicated its preference for "flexibly-priced Iraqi crude", Saudi Arabia, "OPEC's ever more reluctant linchpin", might be forced to go 10 percent below its 4.35 mbd quota. [PIW 10-5-87:1] But the Saudis, to underline their refusal to act as swing producer, let it be known that they had been at least discussing more discounts, in return for more volume from the Aramco companies (Exxon, Mobil, Texaco, Chevron). "The mere possibility ...sent shockwaves through OPEC and across the oil markets last week." [PIW 10-12-87:1] The report of an actual deal restoring netbacking [PIW 10-19-87:1] was later denied. [PIW 11-23-87:1]

Then a string of misperceptions: concern about overproduction was "fading fast" and companies were building not depleting stocks. [PIW 10-26-87:1] There was even "a drift in OPEC toward a $1 to $2 increase", since world oil markets had no difficulty in soaking up higher volumes [PIW 11-2-87:1, 2]. "The oil markets are looking healthier." [PMI 11-4-87:1]

Within a few days, spot prices were down sharply, markets were "unraveling", and "the central question is how vigorously Saudi Arabia will defend its 4.35 mbd output quota." [PIW 11-9-87:1] They "continue[d] to renounce the swing producer role." The Gulf producers were all discounting. [PIW 11-16-87:1] Yet Saudi Arabia did try to hang on to official prices, and there were no netback deals. [PIW 11-23-87:1] But the data gap grew worse.

During the third quarter, the official ceiling was 16.6 mbd, the OPEC President estimated 17.8 production, IEA made it a round 19.0, and one consulting firm said 19.2. Atop the usual statisticians' delights of definition and location were various shifts and excuses, each country firmly convinced that it deserved a higher quota. [WSJ 11-24-87:1]

By end-November 1987:

> "Several oilmen who were in senior positions then are becoming increasingly alarmed at the uncanny parallels between events today and those of two years ago. [OPEC production is] far above official quotas...and price discounting has become more widespread. Those were exactly the factors that both markets and OPEC producers resolutely ignored in 1985....Saudi Arabia also knows that its readiness to bear the brunt of OPEC's volume earlier this year is at odds with public renunciation of any swing role." [PIW 11-30-87:3]

As in early 1985, when the Saudis talked tough and acted soft, they got no respect. Doubtless hoping he would be believed this time, Minister Nazer, Yamani's successor, repeated that "we would never be the swing producer, neither now or any other time." [PIW 12-21-87:SS3]

OPEC producer statements were free of panic, but "the previous apparent consensus for a $2 a barrel price hike has evaporated, with only Iran now pushing for a $20 benchmark price." [PIW 12-7-87:1] Iran demanded a $2 increase, and "accused the Arab members of OPEC ... of trying to keep down the price of oil to hurt Iran. ... The Gulf producers had deliberately glutted world oil markets to pressure Iran's economy." [WSJ 12-2-87:2] This was far fetched, for the penalty to the Gulf producers would have been many times the damage to

Iran. They could have achieved the same result, much more cheaply, by stepping up their payments to Iraq.

At the December meeting, Iran threatened to double its production if its demand for a higher price was not met. This threat was so empty, it upset nobody. [NYT 12-10-87:D1] [WSJ 12-10-87:2] More bothersome was the persisting lack of basic information. "National political positions ... fill the vacuum created by the lack of hard data." Inventories were believed higher than a year ago by some, lower by others, unchanged by still others. Moreover, the "amount of oil at sea and where it is headed are issues of increasing interest", but no knowledge. [PIW 12-14-87:1] Minister Al Khalifa Al-Sabah of Kuwait said "the auditors--to put it mildly--got the runaround from various countries." [PIW 12-21-87:SS3]

The ministers "acknowledged that if they could not reach a credible agreement to limit output, world prices would crumble." [NYT 12-10-87:D1] They expected to do it in two days. [WSJ 12-10-87:2] In four days, they had agreed only to rebuff Iran, despised for its hypocrisy in discounting while calling for higher prices. Saudi Arabia again rejected a swing role. [NYT 12-13-87:1] The Iranian minister returned to Tehran rather than accept what was offered. [NYT 12-14-87:D1] The meeting then reached what was called a "flimsy" agreement: keep the nominal $18 basket price and the 16.6 mbd limit--except that there was no limit on Iraq, whose minister "pledged to produce all the oil it can." [WSJ 12-15-87:3] No action was taken on quota monitoring. [NYT 12-15-

87:D1] Prices were expected to drop, and they did, even as "ministers...headed home vowing to cheat no more." [WSJ 12-16-87:16] Arab-Iranian enmity was blamed, but cannot have been important, because Iranian price discounts would have been a minor irritation if the others had not matched them. An output cut would have raised or at least maintained prices. OPEC could not do it. It was significant that the Saudis had to keep repeating "emphatically ...their resolve `never again' to reduce their market share to save oil prices. ... `The ball is everyone's court, not just ours.' " They had stayed inside quota, while Kuwait, the UAE, and Iraq had "exceeded their quotas by absurdly large amounts." [NYT 12-17-87:D1] The Saudis, now as earlier (and later) had to keep repeating their refusal to cut back because the others could suggest nothing else.

Spot and futures prices fell by several dollars, but the gloom continued to be confined to the short term. Lower prices would mean fewer discoveries and more consumption. "Eventually, <u>and certainly by the mid-1990s,</u> OPEC's excess capacity will have drained, oil analysts generally agree. That means that with only slight adjustments in its production levels, <u>OPEC will be able to manipulate world oil markets at will</u>." [WSJ 12-21-87:6, emphasis added]

<u>1988: Prices decline again; supply grows</u> The price dropped in December 1987 and January 1988 to the lowest point since October 1986. There was no panic, and there had been some re-thinking. At end-January, there was said to be "a new OPEC

strategy...a subtle but important shift in favor of volume restraint coupled with a more permissive attitude toward flexible pricing." [PIW 1-25-88:1]

This was not new at all, but the emphasis was important. Perhaps we might paraphrase it: forget the differentials, which cannot be controlled. Obey the volume limitation. Sell no more than your quota, any way you can. That way, prices may fluctuate, but the average market level will not change much.

<u>Supply conditions and capacity expansion</u> There was some acknowledgment of supply conditions. A Mobil executive said companies could live with a $15 price "for years to come." [PIW 2-1-88:5] Shell's worldwide coordinator for exploration-production said "oil companies are accepting that they can't count on higher prices to stimulate the currently low global drilling pace.." [PIW 4-18-88:3]

Two advances in technology were now being widely discussed. One was "3D"--three-dimensional computer models of oil field structures, once limited chiefly to large offshore fields, but now available for even small fields onshore or offshore. The other was horizontal drilling, which was also the perfection of a technique --"deviated drilling"-- first practiced offshore. [Lohrenz 1991] And the International Energy Agency began to change its supply estimates, which "may go a long way toward reducing criticism within the industry that the IEA has been consistently understating the amount of oil actually available, particularly missing large volumes of world supply from non-OPEC sources." [PIW 2-15-88:3]

The big OPEC producers made a real effort, and mostly succeeded, in staying within quota, and were helped by increased demand. The Saudis had made their point: "the unwillingness of any member or group of members to act as a swing supplier is giving rise to a search for alternative mechanisms for correcting sharp price movements." [PIW 3-7-88:3] The price increased from the January 1988 low and held stable through the first half.

There was a new effort to bring in non-OPEC producers, and much publicity surrounding a meeting in May 1988. But it came to nothing. The non-OPEC countries were unfavorably impressed by OPEC's inability to control Iraq. The output reductions they offered, totalling 183 tbd, only one percent of OPEC output, were too small even to acknowledge. The non-OPEC producers felt aggrieved by the ungracious manner in which their proposed contribution was decried." [PIW 5-9-88:3] Months later, the brushoff still rankled.[PIW 10-17-88:2]

Quota impasse, and sagging prices Rising Iraq production was an increasing threat, because of "a spot-linked pricing system that is geared to specific markets and quite flexible." It freed Iraq production from OPEC constraints, and output [is] near physical limits." [PIW 5-30-88:3, 18]

The June 1988 meeting faced the "basic disagreement over a credible and equitable production sharing system [which] is at the heart of the current OPEC impasse." But the immediate question was what to do about production quotas for the second half of 1988. [PIW 6-6-88:1] They could do nothing, and waited for something to turn up. And consumption did turn up. [PIW 6-13-88:1] The June meeting simply extended the quotas. [PIW 6-20-88:1] But prices began to sag, not helped by Abu Dhabi "no longer making any pretense of abiding by its quota", and Kuwait also increasing. [PIW 7-4-88:3] So did Saudi Arabia. [PIW 7-18-88:1]

Iran-Iraq war ends: expansion plans At the end of July 1988, the eight-year Iran-Iraq war finally ended. Prices actually revived on word of peace. [PIW 8-1-88:3] Both countries were expected to try to increase production rapidly. But there was a spreading realization of how badly the Iranian oil production facilities had deteriorated. [PIW 8-8-88:1] Iraq had hired French and Italian firms to develop new fields; they would be paid in oil. Producing capacity was slated to rise to 4.5 mbd "over the next few years." "Sixteen years after oil nationalization, Baghdad is actively seeking participation of US firms in oil exploration and development." They would not offer equity terms. But one way or another they would triple the number of operating rigs, from the current 25-30 to 90 by 1991." [PIW 5-30-88:3, 18] The oil minister who released this news visited the United States shortly thereafter [PIW 6-6-88:1], but without known results. He also indicated that Iraq had 4 mbd producing capacity, but would only have 3.35 export capacity by the end of 1989.

Precise numbers mislead, but Iraq producing capacity was set for a strong increase. In 1980, they had drilled 40 oil wells, and 67 wells of all types. Numbers for the next seven years were suppressed, and probably near zero, but in 1988 they were 88 and 102, and in 1989 137 and 178. Since there were only 378 operating wells at the end of 1988, it is clear that a very large addition to capacity was underway. But Iraq was still in financial straits; this expansion would obviously take more effort. [PIW 8-22-88:7]

Jennings and Ali Jaidah sum up J.S. Jennings of Shell, forecast that demand would grow more slowly than expected, that non-OPEC output would maintain itself, hence the rise in OPEC exports would be modest.

"In such a world, OPEC, in order to defend an $18 price, would have to continue to live with a quota system for much longer than many of its members expected, and, with the passage of time, internal stresses within the organization could well intensify." [PIW 8-29-88:2]

Mr. Jennings accepted the industry assumption and hope: rising demand would lift all the boats, and make unnecessary the constant dangerous exercise of price fixing and production fixing and allocation. But even when the supply of OPEC oil dropped rapidly, they could not evade the need for constant collusion.

An important statement was made shortly thereafter by Ali M. Jaidah, former OPEC secretary-general. (Annual Oxford Energy Seminar, reprinted in [PIW 9-12-88:SS]. He repeated the usual error that "because of the large discrepancy between investment costs and extraction costs in oil upstream and the very long time lags in energy investment, some sort of price regulation is required."[36] "The ever-powerful oil companies" had regulated for a time, but then became "greedy and improvident. They could not resist the temptation to sell oil to newcomers outside the cartel for the sake of the odd buck." Hence OPEC had to replace them as price controller. But OPEC too became "greedy and improvident" in 1979-1980, and insisted on keeping prices at 1981 levels. For the present:

> "We hear senior managers of oil companies haranguing OPEC, preaching to the organization that the state of the oil world, however depressed, will undoubtedly improve in a few years. They seem to say: Please remain strong and confident, we are going through a difficult period just now, but the wheels of fortune are bound to turn in your favor soon. Please hold tight until then and you will be in control once again. ...
>
> I just cannot understand how this low price can sustain investment in high-cost oil areas....Somebody, somewhere, must be losing his shirt.

Price decline at end-1988 At any rate, prices slid from June through September, Saudi Arabia as usual being slow to match price cuts but ready to move in time to defend its market share. "The policy that it won't be swing producer has almost approached religion." [PIW 9-12-88:1] As they had done the previous year, they formally told the OPEC price committee that they were deliberately exceeding their 4.35 mbd quota as a warning to violators. [PIW 9-19-88:1] At this time, BP managing director Robert Horton made a plea for OPEC production discipline and an $18 price. [Id.] Venezuela, long a pillar of OPEC, let it be

[36] Less pardonable (because easily checked) were two false statements: that "Professor Adelman wanted to see ... 10c a barrel of oil", and that a UN report on the price of oil "never saw the light of day because the ever-powerful oil companies succeeded in suppressing it." In fact, it had been published: [UN 1955].

known that they were trying to obtain "special status in the US." [PIW 9-26-88:1] It was not clear what they meant by this, but it was known that within PDVSA some were in favor of having an exit route ready in case OPEC rapidly crashed.

Observers noted a now familiar paradox: the members could not agree to do what was feasible and profitable:

"While OPEC as a group clearly could boost oil prices and increase short-term revenue by cutting output, the current standoff among members is almost a case of who will blink first. ... Ironically, if market anticipation of...a compromise arrests or reverses the price decline over the next few weeks, such a rebound may actually lessen the odds and the urgency of concrete action." [PIW 10-10-88:4]

But the urgency was manifest in a special meeting in late October, which prepared the agenda and probably the tentative agreement for a full meeting for November 21. Iran seemed ready to concede parity to Iraq, since its refusal simply let Iraq produce at will; and Abu Dhabi (UAE) seemed ready to cut back also. [PIW 10-31-88:1] Iran planned to expand capacity to 3.1 mbd in 1989 and to 3.6 in 1993, mainly through the long-delayed gas injection projects. [PIW 11-14-88:1] Iraq aimed to raise export loading capacity to 6 mbd by end-1989; current production capacity was 4 mbd, and they were aiming at 5 to 6 million in the 1990s. [PIW 11-21-88:1]

In the meantime, output surged, with fourth-quarter OPEC output looking to be around 21 mbd, "about 2 mbd more than forecasters were expecting just a couple of months ago." [PIW 11-7-88:1] Much of the increase was from Saudi Arabia, producing 6 mbd, the highest in years, and said to be only 0.5 mbd short of its actual capacity, far down from the 10 mbd of years ago. [PIW 11-14-88:1] Yet prices had revived; inventory changes somehow were not showing.

The November 1988 meeting was difficult. "The big underlying worry...was the threat of soaring production from Iraq by late next year." [PIW 11-28-88:1] Yet the meeting was a success. A new ceiling was set at 18.5 mbd, which with expected leakage would equal 19.0. This was 2.4 mbd over the last program, and allowed everyone to get more than previously. Iran gained more than most, as compensation for giving equality to Iraq, whose new quota of 2.64 mbd was far above their old quota, but hardly more than the 2.60 they actually produced in 1988. [PIW 12-5-88:1] Nothing was said about the price; Saudi Arabia shocked all present by suggesting a $15 floor, but this was quickly withdrawn. The real lesson was that a formal price did not matter all that much. Spot and spot-linked prices (i.e., practically all prices) promptly rose.

EXPANSION BRINGS CONFLICT IN 1989-1990[39]

OPEC output kept increasing, but there was no easing of tension among members over market share. In fact, it led to war in August 1990. Cartels find it hard to cope with change, even favorable change, because division of revenues is a zero sum game. Higher revenues mean a fresh contention over sharing out the gain. The greater the stakes, the greater the zeal to increase one's share.

[TABLE VIII - OPEC CAPACITY 1979-1992]

Capacity expansion and its obstacles The output expansion brought investment to the fore. There had been a great decline in measured OPEC capacity, from 39.2 mbd (crude oil only) in 1979 to about 27.4 at end-1989. [PIW 3-12-90:6] These capacity numbers are very imprecise, but the calculation in Table IX are confined to an orderly period of almost constant growth, 1955-1980.

The decline rate, four Gulf producers A reservoir or set of reservoirs is always subject to two opposing forces: additions through drilling and connecting new oil wells, and enhanced recovery facilities, versus the natural decline for any output rate. The decline rate is a very important variable, difficult to calculate. Table IX approximates it for four large Persian Gulf producers.

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[39] There have been many econometric studies of OPEC behavior. I found most useful [Griffin 1985] and [Dahl and Yucel 1991].

TABLE VIII. OPEC CAPACITY, SELECTED YEARS 1979-1992
(crude oil, millions bd)

COUNTRY	1979	1983	end 1989	end 1990	1990 proj 1992	Actual end 1992 PIW	Actual end 1992 CGES	June 1993	CHANGE 1989-1993 (exIraq)	CGES 1992 proj 1993	PIW 1992 proj mid1993	1990 proj 1995	CHANGE 1989 to 1995 (proj)
S. Arabia	10.84	11.30	7.75	8.50	9.00	8.70	9.00	9.00	1.25	9.3	9.05	10.00	2.25
Iran	6.99	3.00	3.10	3.25	3.50	3.60	3.70	3.90	0.8	4.5	3.75	3.75	0.65
Iraq	4.00	1.50	3.10	0.50	3.50	0.40	--	0.50	--	--	0.4	4.00	0.90
Kuwait	3.34	2.80	2.40	0.10	2.70	1.35	1.50	2.20	-0.2	2	2.25	3.20	0.80
UAE	2.50	2.89	2.20	2.40	2.50	2.40	2.50	2.40	0.2	2.6	2.4	2.70	0.50
Qatar	0.65	0.65	0.40	0.40	0.45	0.60	0.40	0.45	0.05	0.5	0.45	0.55	0.15
Tot Gulf	28.32	22.14	18.95	15.15	21.65	17.05	17.10	18.45	-0.5	18.90	18.30	24.20	5.25
Venezuela	2.40	2.50	2.60	2.50	3.20	2.50	2.50	2.50	-0.1	2.7	2.5	3.50	0.90
Nigeria	2.50	2.40	1.80	1.90	2.20	1.95	2.00	2.00	0.2	2.2	2.1	2.50	0.70
Indonesia	1.80	1.60	1.25	1.50	1.40	1.45	1.50	1.45	0.2	1.4	1.5	1.30	0.05
Libya	2.50	2.00	1.50	1.50	1.50	1.50	1.70	1.50	0	1.9	1.5	1.75	0.25
Algeria	1.23	1.10	0.75	0.80	0.85	0.80	0.80	0.80	0.05	0.8	0.8	0.85	0.10
Ecuador	0.23	0.25	0.31	0.30	0.37	0.33	0.40	--	--	0.4	0.35	0.37	0.06
Gabon	0.25	0.20	0.27	0.30	0.30	0.33	0.30	0.33	0.06	0.3	0.3	0.30	0.03
Tot non-Gulf	10.91	10.05	8.48	8.80	9.82	8.85	9.20	8.58	0.1	9.70	9.05	10.57	2.09
TOT OPEC	39.23	32.19	27.43	23.95	31.47	25.90	26.30	27.03	-0.4	28.60	27.35	34.77	7.34
Pct utilized	79	55	82	98	na	97	97	na	na	na	na	na	na
Natural gas liquids, condensate	na	na		1.98	na	2.16	na	na	na	2.45	na	na	na

* Neutral Zone capacity is equally divided between Saudi & Kuwait
Source: Petroleum Intelligence Weekly, 3-12-90:6,7 ; 1-7-91:7; 11-2-92:9; 2-22-9392:9; 2-22-93:10
Estimates for Iran, Iraq, and Libya in 1995 are mid-points of ranges.
Alternative estimates for 1992, and one estimate for 1993, are from
Centre for Global Energy Studies, Global Oil Report, vol. 3,
no. 5 (Sept-Oct 1992), p. 45. Second estimate for mid-1993 from
PIW 2-1-93:7
* Feb 1993 Ecuador no longer a member of OPEC

[TABLE IX - DECLINE RATES]

Line 1 shows 1955 output. Since there was then no restriction on output, this approximates capacity. Over the next 25 years, to end-1980, we follow the same procedure as in Table IV: credit each newly completed well with the average output per well during the year of its completion, which aggregates to the total gross additions to capacity over 25 years (line 2). With no decline, capacity would have been as shown in line 3. But capacity was estimated by PIW at a lower number (line 4). The loss is shown in line 5. Its percent of the aggregate output is our best estimate of the average decline rate.

In theory, the decline rate approaches the ratio of output to reserves. That is, reserves are defined as cumulative output starting with current output. In infinite time;

$$R = \int_0^T Q\, e^{-at}\, dt = Q/a, \text{ and } a = Q/R.$$

This ratio is shown in line 7, and is consistently lower than the estimated decline rate in line 6. This is evidence that the published reserves of these countries, and indeed of nearly all countries outside North America and the North Sea, include reservoirs or strata which are not actually being depleted. The bottom line indicates the possible overstatement of reserves past the strict standard we use; it ranges from 15 percent to 102 percent.

TABLE IX. ESTIMATED DECLINE RATES FOR PERSIAN GULF PRODUCERS, 1955-1980
(Output and capacity in TBD)

	KUWAIT	SAUDI ARABIA	IRAQ	ABU DHABI (1962-1980)
1 OUTPUT IN 1955	1092	965	675	16
2 CAPACITY ADDITIONS 1956-1980	2525	13379	5064	2474
3 TOTAL END 1980	3617	14344	5739	2490
4 ACTUAL END 1980	2800	11300	4000	2100
5 LOSS 1956-1980	817	3044	1739	390
6 PERCENT OF AGGREGATE OUTPUT LOSS	1.58	2.89	4.41	2.34
7 AVERAGE PRODUCTION/RESERVE %	1.20	1.65	2.18	2.04
8 POSSIBLE RESERVE OVERSTATEMENT	1.31	1.75	2.02	1.15

Method: Line 3 = line 1 + line 2
Line 5 = line 3 - line 4
line 8 = line 6 / line 7

Sources: lines 1, 2, 6, 7, from Adelman & Shahi,
Working Paper MIT-EL 88-008WP (May 1988), Appendix A
Line 4, PIW 2-23-81:9

Moreover, if our earlier suggestion was correct, that newly drilled wells tend to be bigger producers than average old wells, the true decline rate is higher than as estimated in Table IX. For the same reason, capacity is really cheaper to install than we have calculated, e.g., in Table IV. This must be left for later research.

After 1980, output was severely restricted, lessening pressure on the reservoirs. Production per well might be reduced in fact or only in appearance, counting wells shut in all or most of the year. There is no good reason why the average production per newly drill Saudi well fell from 14,000 in 1980-81 to 5800 in 1991.

How much to blame on less productive investment, how much on neglect and undermaintenance will probably never be known; the days of open discussion (operation by multinational oil companies) are long gone. But of course equipment rusts and breaks. Wells need downhole cleaning by acidizing, fracturing, and workovers (partial redrilling). Hence maintenance and workovers are classified as direct operating expenditures not capital expenditures. [API:SOGE: "Notes and Instructions"]. We may understand more as new capacity is put in place in 1993 and later years.

[TABLE X - OPEC OIL WELLS DRILLED]

<u>Collapse and revival of OPEC drilling</u> In Venezuela, drilling had dropped very far by 1976 because of impending

TABLE X OIL WELLS DRILLED BY OPEC MAIN PRODUCERS

	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
VENEZUELA	362	366	246	202	334	598	720	724	814	1074
ALGERIA	55	46	65	112	111	105	81	76	94	70
LIBYA	47	44	33	27	98	134	138	149	119	74
NIGERIA	183	167	57	147	49	33	49	34	144	49
UAE	74	37	31	37	39	24	34	49	75	79
IRAN	51	64	95	98	120	49	NA	NA	NA	NA
IRAQ	24	34	36	37	35	36	46	40	NA	NA
KUWAIT	0	1	0	5	0	0	0	30	3	5
SAUDI ARABIA	177	150	101	79	117	46	55	119	88	70
INDONESIA	355	350	410	360	340	334	276	354	397	361
	1328	1259	1074	1104	1243	1359	1399	1575	1734	1782

	1983	1984	1985	1986	1987	1988	1989	1990	1991
VENEZUELA	796	565	382	184	134	217	238	313	679
ALGERIA	NA	NA	7	14	14	18	16	32	27
LIBYA	NA	NA	18	21	14	NA	NA	NA	59
NIGERIA	70	39	31	34	35	NA	NA	53	107
UAE	91	116	133	93	60	52	52	63	78
IRAN	NA	NA	NA	NA	12	12	12	12	40
IRAQ	NA	NA	NA	NA	NA	88	137	NA	NA
KUWAIT	18	6	10	54	19	13	10	7	20
SAUDI ARABIA	114	62	82	17	9	7	20	71	124
INDONESIA	454	459	413	350	373	305	408	442	512
	1543	1247	1076	767	670	712	893	993	1646

Source: World Oil, "International Outlook" annual issue.
NA" for Iran 1979-1986 and Algeria 1983-1984
means nearly zero, Iraq fell by about half.

nationalization. With no inducement to add to inventory, continuing production drained reserves. Yet the conventional wisdom was that Venezuela was an old played-out province. In the first years after nationalization, PDVSA (Petroleos de Venezuela Societa Anonima) spent heavily and turned the reserve picture completely around. There were few major discoveries until late in the decade, but a great expansion of old fields, just as had happened earlier in the United States.

The unusually high decline rate in Venezuela, about 22 percent per year, of course slowed down the net capacity growth, which was nevertheless substantial. But after 1982, years before the 1986 price crash, there was a drilling collapse for lack of money. Drilling nearly ceased in 1986-1987: for the six years 1985-1990 inclusive, completions were back to abysmal pre-1977 levels. There was much talk of expansion; it was a real achievement for PDVSA even to have maintained capacity. In part, this was PDVSA success in finding new high-quality fields, which were most worth developing, and for which they needed infusions of capital and expertise which they lacked.

In Africa, drilling declined through the 1970s, then severely after 1981. Algeria was particularly hard hit, probably because it had no private oil production, which helped in Libya and more in Nigeria. (Usually the NA entries mean zero or near-zero.)

The Persian Gulf shows the most diversity. In Kuwait, because of small numbers, annual figures do not mean much; the occasional blip indicates completion of wells partially drilled in earlier years. In 1973-1980, there were 4.5 completions per year; in 1981-83, 8.7 per year; in 1984-86, 23.3 per year; in 1987-89, 14 per year. Occupation and war stopped drilling from August 1990 through late 1991, which makes the annual total the more impressive.

Iranian drilling grew swiftly in the mid-1970s, then went to near-zero after the Revolution. Iraq slowly increased to the eve of war with Iran in September 1980. For the next eight years, in both belligerents, there were some years with no data on wells, and probably completions were very few, in some years none.

After the war, it took three years before Iran staged a strong revival in 1991. But Iraq forged ahead swiftly, with 130 oil wells in 1989, and perhaps a million bd capacity added by the eve of the occupation of Kuwait.

Drilling in the UAE[40] climbed impressively as Iran and Iraq dwindled during their war, declined somewhat, then increased again as Iraq and Kuwait were removed. Alone in OPEC, their 1989 production exceeded 1979, and they kept expanding.

Saudi Arabian oil completions fell from 177 in 1973 to 79 in 1976, and stayed very low through 1985, with temporary peaks at three-year intervals. Then came near-collapse: in the four years 1986-1989 there were only 13 oil wells per year, and not until

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[40] The United Arab Emirates is composed of Abu Dhabi (1.1 mbd in 1988), Dubai (0.4), and Sharjah (0.04). References are not always clear, but since Dubai and Sharjah grew only slowly, changes in UAE production and capacity are nearly always due to changes in Abu Dhabi.

1991 did they reach 124.

These are the publicly available data. Their instability gives us a bare hint of what we do not know about under-maintenance, neglect, cannibalizing, and war damage.

Barriers to capacity expansion By 1987, one sees occasional references to restoring OPEC capacity. In 1987, I expressed confidence that OPEC members would always provide an excess. [Adelman 1987] Beginning in 1989, members' announcements of programs become too numerous to mention. But it soon became apparent that the programs were going slowly, or were reduced or postponed, etc.

Insufficient funds? There have been many complaints of insufficient funds. This is odd. The frequently-mentioned $60 billion needed over 5 years to provide an additional 5 mbd, i.e., an OPEC average of $12,000 per daily barrel of new capacity deserves only to be laughed out of court.[41] It is not much below the USA or North Sea requirements. But $12 billion a year was only nine percent of 1992 OPEC revenues. [PIW 1-11-93:3] During 1976-1987, OPEC Middle East-Africa capital spending on oil and gas production was an average 1.7 percent of oil revenues, and in

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[41] One gropes for some way to reconcile this fable to the real world, like using archeology on Homer's Iliad. Was the "average" weighted or unweighted? A net rather a gross capacity increase? The significant thing is that those putting forth the numbers did not think it necessary even to suggest such problems, let alone work them out. The only oilman who publicly endorsed or repeated the fable was Robert Horton, chairman of BP. He was later forced out by the non-executive directors, who felt "that he had lost credibility with analysts and investors." [PIW 6-29-92:7]

only three years did it exceed 2 percent of revenues. Yet production alone makes those revenues possible.

[TABLE XI: OPEC O&NG CAPEX/OIL REVENUES]

In my opinion, the complaint about money is a valuable clue to the real problem: <u>the weakness of state-owned industries.</u> Even after the collapse of Socialism, most of the world's oil continues to be produced by socialized enterprise.

<u>The Flabby National Dinosaurs</u> The state petroleum companies, OPEC and non-OPEC, are of course a varied lot, most but not all sloppy and corrupt. But what they all have in common is a weakness in financing investment. It is hard to find a national company which has not been strapped for investment funds.

Private investment is created and limited by expected profit. If there is money to be made, money will be found, if not by one company then by another., and by one means or another - some form of equity or debt. Expenditures will be limited to those projects which earn an acceptable rate, since there is an opportunity cost--what the funds would earn elsewhere. If an activity loses money, its life expectancy is poor.

But a national company does not have its own assets subject to its own control. It cannot draw up a rational investment plan to maximize asset value. Development funds go to create jobs, contracts, and payoffs, not for maximum return. But there is an even closer constraint. In a government, one must build a

TABLE XI OPEC OIL PRODUCTION AND CAPITAL EXPENDITURES
MIDDLE EAST AND AFRICA, 1976-1987

YEAR	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	TOTALS
MIDDLE EAST													
TOTAL RIGS	190	192	189	143	175	170	200	206	197	201	178	139	2180
OPEC RIGS	125	132	131	89	102	91	114	112	98	94	70	51	1209
PERCENT	66	69	69	62	58	54	57	54	50	47	39	37	55
AFRICA													
TOTAL RIGS	138	173	175	200	219	212	209	150	105	118	97	90	1886
OPEC RIGS	122	153	149	166	180	160	151	102	70	82	74	66	1475
PERCENT	88	88	85	83	82	75	72	68	67	69	76	73	78
ME+AFR CAPEX ($M)	2375	2290	2250	3120	4100	4820	6730	5970	4530	4010	3160	2770	46125
OPEC RIG PERCENT	75	78	77	74	72	66	65	60	56	55	52	51	65
OPEC ME+AFR CAPEX ($M)	1788	1788	1731	2320	2935	3167	4361	3589	2520	2212	1655	1415	29480
OPEC ME+AFR REVENUES	118565	129627	123916	187193	254952	234952	182784	140668	129189	117019	74882	92138	1787514
CAPEX/REVS PCT	1.51	1.38	1.40	1.24	1.15	1.34	2.39	2.55	1.95	1.89	2.21	1.54	1.65

SOURCES: Rigs operating, International Petroleum Encyclpedia (original source, Baker Hughes Corp.). Revenues, from OPEC Annual Statistical Bulletin. Capital Expenditures, from Chase Manhattan Bank, Capital Expenditures of the World Petroleum Industry (no finer breakdown available, publication ceases after 1987) political coalition to get a share of expenditures. In an OPEC country, oil revenues are a cash stream, into which all groups try to dip. Oil investment must get in line along with all other claimants. Each claimant tries to be a free rider, getting the benefit of oil investment while others cut back their demands. Oil earnings are needed for consumption, subsidies and armaments, which tend to expand without limit.

Between 1974 and 1982 Arab oil producers spent 35 percent of their oil revenues on their militaries, many times what they invested in oil production. During the next eight years the proportion increased. [Sadowski 1992, p. 8] (See also the comprehensive study of Saudi Arabia by [Askari 1990].) Much OPEC history is summed up:

> "Algeria's revenue was used to keep the new privileged class comfortable. Investments in schools, housing, medical care, agriculture, and even the vital oil industry have stopped." [Yussuf Ibrahim, in NYT 1-19-92:E3]

Some kinds of over-investment cannot be blamed on nationalization. Fixing domestic product prices artificially low stimulates demand and "requires" refining-marketing investment. Petrochemical investment feeds the national ego and drains the economy. This leaves even less money for production.

Finally, the lack of engineering/management expertise aggravates the lack of money. True, during the international companies' tenure, host-country nationals had for years filled the lower ranks, and also had many higher-ranking jobs. But working teams, and what the military calls doctrine, were harder to create. Much of the basic thinking in exploration, development, and reservoir management had been done, and the data stored, in far-away central corporate offices. Replacing them was bound to be slow.

The nationalizing governments would not or could not take the time. Foreign individuals and corporations were expelled from Iran and Iraq, and native-born technicians might fare worse. In Kuwait, advanced know-how seemed superfluous, with vast low-cost oil fields in steady operation. Saudi Arabia was unique in keeping Aramco as a hired management team, and only slowly easing out the expatriates. Its good sense has paid off. In Venezuela, there was constant tension between the PDVSA management, respected for its competence and honesty, and government plans and expenditures.

Bring the foreigners back? The problems of both money and expertise could be solved by bringing in foreign companies. In addition to the old multinational majors, there are many newcomers. Entry into world oil has become far easier because markets are much wider and non-integrated. Any group capable of exploration-development would do. They would no longer worry about "finding a home for the oil."

In 1986, Algeria was first in OPEC to change its legal code to permit foreign participation, and it later improved the law. But as the drilling record makes clear, little was accomplished. In late 1989, Algeria reported that it could raise crude oil capacity, but had no money. Since the limited re-opening in 1986, it had signed five contracts, but the results were not given.

[PIW 10-23-89:7] There are more recent reports of discoveries, but not development. Through 1992, neither drilling nor output increased.

By 1989, most OPEC countries were openly trying to get foreign oil companies back, particularly to renew and expand old oil fields. "Stretch" was the great achievement of American oilmen after 1930 [Adelman et al 1983, chs. 4, 6, 7], and in a larger area it promised even more. But the effort was grudging when it needed to be strenuous.

By the end of 1992, new foreign investment in the OPEC countries was small to negligible. We will look at the indicators below, as part of the narrative, since capacity expansion became a high card in the struggle over production quotas.

The OPEC governments could not bring themselves to call back the foreigner on terms he would accept. Companies wanted to invest for the chance of an adequate return. They did not need to own the reserves. In fact, they had not really owned them even before 1970. But letting them back to invest to produce oil, giving them title to the oil even at the wellhead, was too repugnant.

Ingenious wording will in time get around the taboo on foreign ownership. The lawyer in Mozart's Figaro assures us that with a synonym here and an equivocation there, "qualque garbuglio si trovera", some suitable mess of words can be concocted. But even when no equity participation was needed, Kuwait, one of the least inhibited, has moved on feet of lead.[42] And even when OPEC members rise above principle, they must agree on terms.

There cannot be much investment in the OPEC countries without a high rate of return after tax, because risk is great. Companies were once expropriated, with derisory compensation. Much of the population is ferociously hostile. OPEC quotas will limit output and make it fluctuate. By late 1992, in fact, Venezuela, Iran, Iraq, and Abu Dhabi were offering to exempt some foreign-owned operations from quota. [PIW 9-21-92:3] Particularly in Venezuela, but also in Indonesia, some officials said "OPEC membership is actually a liability, particularly since the potential for quota obligations can scare away upstream investors." [PIW 10-26-92:1]

Nevertheless, the OPEC governments made substantial investment and progress on their own, as is shown by the growth of capacity after 1985. As we will shortly see, expansion was a weapon in the endless struggle over larger production shares.

<u>Non-OPEC Countries</u> Of course, non-OPEC countries are similar. "The oil is ours", a precious thing-in-itself, not a vulgar asset to be sold off for maximum wealth, but a family jewel or heirloom. Fetishism was strengthened by local interests

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[42] "Because Kuwait oil wells flowed prolifically with little mechanical prompting before the damage by the Iraqis, the oil men there say they haven't the sophistication needed to do the best job of reconfiguring the fields. Negotiations have been dragging on for almost six months, with the oil company asking unusually high fees for its services, the Kuwaitis say. BP was very active there before the nationalization of the oil industry, and it has retained much of the geological data." [WSJ 2-24-92:B3C] The difficulties were soon composed. [PIW 3-23-92:7]

with political clout trying to pre-empt the good prospects, or get their rake-off.

STABILITY IN 1989

Non-OPEC producers In January, they "vow to help lift petroleum prices, but don't say how." [WSJ 1-27-89:C12] A month later, a meeting resolved to cut production, an action which "puts them firmly in the camp of OPEC". [WSJ 2-22-89:A3] But the skeptics advised: "Don't blink or you'll miss the non-OPEC cutbacks." [PIW 2-27-89:1] They were proved right. (For some far-fetched optimism see PIW 3-27-89:SS].)

Pricing formulas became more precise and permitted some geographical discrimination, but the differentials over and above transport cost were small and transitory; prices were highly correlated among regions. [PIW 2-6-89:1] A special PIW survey found that both buyers and sellers preferred stability, but:

> "buyers are no longer willing to give up the benefits of spot purchases. Hence ... term contracts... mimicking the flexibility of spot markets...now account for over half of world crude oil trade ..." [PIW 2-13-89:1
>
> [Price competition was vigorous by means of] "the formula mechanisms used in term contract crude oil sales. The trends are just harder to identify....In some cases, Mideast exporters, using completely different formulas, delicately set prices to undercut competitors by as little as 5c-10c a barrel." [PIW 7-24-89:1]

By late 1989, exporters were reverting to simpler schemes, and mechanisms based only on spot crude indicators, a PIW survey indicated. [PIW 10-16-89:1] Venezuela long tried to avoid the spot market, but was turning to it by late 1989, "thwarted by its cumbersome official posted price system." [PIW 9-11-89:1]

Rebuilding capacity for higher quotas Iran aimed at 4 million bd in 1989. [PIW 2-20-89:3] To have achieved even 3 mbd in 1989 was impressive. Their "highly visible ... ambitious reconstruction drive may be a first step by Tehran to seek a higher oil production quota later this spring." [PIW 3-6-89:1] In early 1990, Iran expected to be at 4 mbd capacity within a year "via foreign contracts." [PIW 3-26-90:1] They did not obtain the foreign-firm contracts, and to reach 4 mbd took them not one but three years. (See below, page 145.) It is a measure of their loss in not bringing in foreign firms. Later the Oil Minister of Iran thought term contract deals with large up-front payments would provide both markets and money. [PIW 4-10-89:5] That would have financed expansion at high cost, which may be the reason it was abandoned.

Beyond the horizon As usual, the future looked rosy. "For the long run, there is scarcely any way for prices to go but up....In a few years, we should see a break-out of oil prices...."American imports should reach nine million barrels a day by 1991", and 12-13 mbd by the middle 1990s. [James R. Schlesinger, NYT 1-4-89 OpEd] Thus he predicted an increase of 2.6 mbd; the actual increase was 0.2 mbd, to 7.6. The consensus view was: "Global oil production capacity has been shrinking steadily, and oil demand is now rising faster than expected--[indicating]...a much tighter international oil balance in the 1990s." [PIW 4-10-89:4] They did not consider that OPEC nations had to build excess capacity in order to maintain bargaining power against each other.

PE [9-89:270] called a report by Michael Lynch [Lynch 1989] "somewhat heretical." The report was unusual in three other respects. (1) It was based on cost data; and it recognizes reserves as inventories, and the OPEC nations as revenue maximizers. (2) It forecast declining prices. (3) It has been well borne out.

In April 1989, Kuwait and Iraq both demanded higher quotas, and backed up their words with deeds. Iraq restored the war damaged Fao terminal, Kuwait produced 1.8 mbd, over its quota. The GCC (Gulf Cooperation Council, of Kuwait, Saudi Arabia, the UAE, and Qatar) would meet in May 1989 to discuss quotas. [PIW 4-24-89:1] The Saudis had given up some quota in November 1988 to get Iran and Iraq to sign on to the new agreement, but both of them would be asking for more by November 1989. Would the Saudis retreat again, was the question. [PIW 4-24-89:5]

Early in May 1989, King Fahd predicted the price would reach $26 before the end of the year. He did not want the price to be "forcibly raised to $26 by reducing production", explained Minister Nazer, but adherence to production quotas "will allow the natural balance of supply and demand to work" to raise prices. [NYT 5-4-89:**D1**] That is a distinction without a difference. Saudi Arabia was openly exceeding its quota, but the excess output was being stored, not sold. [WSJ 5-5-89:A2] That might be called a second-phase warning. With output increasing because of growing demand, "countries such as Kuwait, Iran and Abu Dhabi are clearly staking their claims for higher quotas by turning up the taps now." Iraq, surprised and discomfited by Iran's success in reaching 3 mbd, was also trying to raise its own capacity. [PIW 5-8-89:1]

At the end of May 1989, Saudi Arabia proposed that quotas be increased, but that actual production should be decreased, with the real cutbacks structured to favor the higher-capacity producers in the Gulf [WSJ 5-30-89:A6] It repudiated the $18 or any other target price, at least for the moment, and this came as a shocking reversal. "If OPEC does not give the price signal, who will?" said one industry analyst. [NYT 5-31-89:D1]

Kuwait's policy reversal (expansion cost) But Kuwait had made a historic reversal of policy:

> Kuwait's willingness to use its production capacity to press for its long-term goals could be a thorn in OPEC's side for the years to come... It will rebuild its potential to 3.5 mbd over the next five years, with a $1 billion investment program. This reverses its early 1970s decision to reduce capacity in order to conserve reserves. [PIW 5-22-89:1]

Kuwait's recent capacity had been reckoned by the CIA at 2.2 mbd. Spending $1 billion to raise capacity by 1.3 mbd meant $769 per additional daily barrel of net capacity. The expenditure per barrel of gross capacity added was less, since some of the new capacity would be used up over the five years. But we would need a forecast of two more variables - output and the natural decline rate - to reckon the difference. In 1990, a project to increase output at Minagish and Umm Gudair required $300 million for an increase of 400 tbd, or $750 per bd. [PIW 4-23-90:1] This agrees closely with the estimate of a year earlier. Fifteen months later, a consultant estimated that the intervening war's destruction had quadrupled cost. He estimated the new investment needed to attain 2 mbd from ground zero: drilling 500 new wells, each to produce 4 tbd, for $1.25 billion, hence $625 per daily barrel. [PIW 7-15-91:7] If his estimates are correct, the cost had been only $156 per bd before the war. But perhaps he omits non-drilling expenditures.

Thus despite rising sales, the discord over market share claims shows why it was expected that the June 1989 meeting would find "a wide divergence of views on optimal price levels, how far to lift the group's output ceiling, and quota distribution." Kuwait and the UAE "seem determined to overproduce if they are unsatisfied with new allocations." Saudi Arabia "is adamant that it will not give up its share of OPEC output." Their November sacrifice of 1.7 percent share was not to be repeated. "The current rift between Saudi Arabia and Kuwait over price and market share goals seems to be fostering closer ties between Riyadh and Iraq." [PIW 5-29-89:1] This would be recalled a year later.

<u>The long June 1989 meeting: rising demand sharpens struggle over market share</u> The discord at the June 1989 meeting was even worse than expected. No matter how approached, "the problem is how to distribute any [production] increase among OPEC nations." Some countries insisted that any increase be prorated. Kuwait

insisted on a larger share. [WSJ 6-2-89:B2] But this seemed in conflict with Saudi insistence or keeping their near-25 percent of OPEC production. [NYT 6-5-89:D2] To this end, the Saudis insisted on prorating the increase among all members. "In a show of brinkmanship, ... the Kuwaiti oil minister has demanded that the quotas ... for Kuwait and the UAE be increased by some 30%." [WSJ 6-5-89:A3]

Iran supported Saudi Arabia against Kuwait. [WSJ 6-6-89:A2] The meeting ended in disarray after six days, after approving a production increase which Kuwait and the UAE refused to accept. Although both signed, the UAE minister laughed and said "I always sign." [NYT 6-8-89:D1] Prices, which had risen since January, now turned down. But Kuwait Minister Ali al-Khalifa Al-Sabah called it "a gentleman's agreement" whereby his country would reduce output somewhat, though not as much as the written agreement required. [WSJ 6-9-89:A2] He and Minister Nazer made a brave show of harmony, but Al-Sabah was considered the winner. But the problem was permanent.

> "OPEC has thought of overhauling its quotas for years. [But] oil is money--the stuff that pays the bills and buys the food. ... And inherent in the very idea of an OPEC ceiling is that for one share to grow, another must shrink. Otherwise, everyone would produce at will and drive prices down for all of OPEC. ... Kuwait seems to be usurping Saudi Arabia's role as the advocate of moderation. ... Indeed Saudi Arabia now wants higher prices. ... Some ministers say, if OPEC members would just wait maybe five years, many would see their excess supply soaked up naturally. ... But Kuwait can't wait."

They feared higher exports from Iraq and Iran, while Saudi Arabia drifted, beset by financial troubles. [WSJ 6-12-89:A1]

Moreover, Minister Al Khalifa Al-Sabah was more cautious about the rosy long term future. He summed up the state of long term forecasting: "a consistent underestimation of potential supply and a consistent underestimation of the consumers' ability to adjust their demand." The underestimation of price elasticity or confusion over long and short term "led OPEC (and usually leads every other cartel) to overestimate its strength." [OPEC Bulletin, vol. XX, no. 1, 1-89:5] Kuwait was aggrieved because Saudi Arabia had signed a non-aggression pact with Iraq, without consulting any other GCC members. Iraq refused to sign a similar agreement with Kuwait.

From the June to the September meeting The accord was seen as fragile. OPEC set the ceiling at 19.5 mbd, "below perceived demand to leave room for expected quota violations". Kuwait only signed on when promised a review of quotas and ceilings in three months. (They did precisely the same thing in February 1993. [NYT 2-17-93:D1]) Rising demand and hoped-for decline in non-OPEC output actually built tension over market share. The paradox was now familiar:

> "It is precisely the lure of rising oil demand that has opened the Pandora's box of market share for Mideast producers." [PIW 6-12-89:1]
>
> [I]n September, Iraq's rising export capacity ... will create new pressure on quotas. [Indeed, that was one reason for scheduling a meeting early, in September.] No point waiting until December, when Iraq would have staked out its position with overproduction. ... Market share remains the [Saudi] top OPEC priority ... [but] is no longer content with attaining only $18." [PIW 6-19-89:5]

But output did seem to decline [WSJ 6-27-89:A4], and Iraq was increasing export capacity more slowly than expected. [PIW 7-3-89:1] So was Iran: "they are behind, but not irretrievably."

Iraq could comfort itself with a goal of "6 mbd by the late 1990s". [PIW 7-10-89:3]

Early in 1990, Oil Minister Al Chalabi of Iraq claimed 4.5 mbd capacity, which was not believed. He said the country had the potential for 6 to 8 mbd, but no plans to install it. Despite "financial constraints", Iraq was "spending $2 billion a year on the industry".[43] The old state producing company INOC had been dissolved and replaced by several regional companies. (This parallels similar moves in Venezuela.) Proved reserve estimates were said to be based on 10 to 12 percent recovery of oil in place, hence too conservative. [WSJ 1-8-90:A1]

In mid-1989, OPEC capacity was expected to grow by 3.3 mbd by mid-1990, much more than the increase in consumption. This signaled greater excess capacity, and more rivalry in getting larger quotas. Some, however, projected deficient supply and higher prices. [Hogan 1989] They disregarded the need of OPEC producers to build and maintain excess capacity as a bargaining tool.

> "Individual country capacity is becoming increasingly important as OPEC members jockey for higher quotas and look for objective standards [i.e. reserves or capacity] for determining them. ... Iraq, and to a lesser extent, Kuwait and Iran will have the potential to become swing producers over the next year." [PIW 7-31-89:1]

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[43] Let us assume it was all on the producing industry: Iraq completed 137 oil wells in 1989. Average production for the year was 2.75 mbd through 378 wells, for 7,275 bd per well. [WO-IO] Total new capacity added was then 997 tbd. If the $2 billion were all spent for production, the maximum investment per daily barrel was $2007. Of course, the true number was a fraction of this amount.

Saudi Arabia was in financial straits, borrowing for the first time in 30 years. "Reducing government spending has been ruled out, lest serious social and political tensions emerge." Foreign financial assets were down from $140 billion in 1982 to about $40 billion, most of it not "readily available," and might be under $30b by end-1989. In fact, it was probably smaller.[44] The stringency, it was said, might explain the shift toward a higher-price policy. [PIW 8-7-89:1] The 1978 ten-year pledge of $500 million annual subsidy to Syria had just expired, and its renewal was in doubt. [WSJ 8-21-89:A6] In contrast, Kuwait continued to run current surpluses and add to foreign assets, expected to exceed $85 billion. [PIW 8-21-89:5]

Saudi Arabia preferred to hold its quota but not exceed it, and "lose ground to other OPEC members rather than stake a claim now for its traditional share of OPEC output, mainly because it fears undermining prices." [PIW 8-14-89:1] Theirs was the leader's curse again: they dared not overprice, as smaller rivals did. One plausible reason was that price had not strengthened but weakened since the June 1989 meeting. [WSJ 8-17-89:A2]

Iraq now aimed at either a higher quota, or else higher output if others did not observe quotas. Higher export capacity

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[44] [Askari 1991a, pp. 37-39], estimates end-1981 holdings at about $160, and end-1985 holdings at $50, excluding so-called "loans," chiefly to Iraq. See also [Askari 1991b] During 1986-1989 inclusive, the cumulative Saudi Arabian current-account deficit was $38.1 billion. [IMF-IFS, September 1991, p. 517] Thus Saudi Arabian holdings were around $12 billion at end-1989. In 1990, there was an additional $4.1 billion deficit. More recent figures were not released in 1992.

expected over the next twelvemonth emboldened them. [PIW 8-21-89:1] And by late August, OPEC production was up but worldwide consumption even more, strengthening prices. "Those who track OPEC production say there are buyers for the oil and that very little of it seems to be going into producer-owned storage." [WSJ 8-30-89:A2] In early September the Saudis were marketing more aggressively, and producing 0.2 mbd above their 4.8 mbd quota. [PIW 9-4-89:1]

Venezuela announced it was aiming at 3 mbd capacity "in short term". [PIW 9-11-89:8] But worries were more immediate. "If the September meeting goes badly, Iraq may be tempted to use its rising capacity to stake out market share." [PMI 9-1-89:1] Kuwait, Libya, and Venezuela had some excess capacity "but difficulties in marketing their crude". This would seem to indicate overpricing, a barrier which could be quickly overcome. But for the moment, Iraq and Saudi Arabia, both with excess capacity, seemed not about to raise difficult disruptive questions. [PIW 9-18-89:3]

As the September 1989 meeting approached, the proponents of a higher ceiling felt undercut because the $18 target had not been approached. "Cheating has become so widespread that it has pushed OPEC's output to the highest level this year--22 mbd." [WSJ 9-12-89:A2] The OPEC secretariat prepared studies showing the effects of several objectives on "scientific" methods of quota setting. If based on capacity, it would benefit chiefly the Mideast producers. Members were already starting to lay the groundwork for claims of rising capacity to get larger quotas. However: "Verification [of capacity] would be an even thornier problem than it is in monitoring output levels." [PIW 9-18-89:3]

But the atmosphere was good. "The usual squabbling over cheating on production quotas was high on the agenda. ... But it is a measure of OPEC's new equanimity that few industry experts think the squabbling will escalate to a danger point, at least not through the end of the year." As usual, their time horizon was very short. But rising demand was said to have eased the tension over quotas, though not removed the disagreement. And there was the comforting delusion that "these new oil-producing areas already have begun to decline." [NYT 9-24-89:3-1] [45]

The September meeting But the squabbling did commence immediately, and it was clear that nobody's position had changed. [WSJ 9-25-89:A2] Kuwait would yield none of its claim for the additional output. Others opposed any increase in the ceiling as long as the OPEC basket stayed below $18. Three days of talks brought no agreement.

"Saudi Arabia has adamantly defended its 25 percent share of any ceiling the organization chooses to fix. Iraq wants a larger percentage than its 14.7 percent, and Kuwait and the Emirates want more than their present level of about 5 percent." [But all were daunted by] the difficult and complicated issue of reassigning new production levels to its members, ... an exercise

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[45] Before and after the meeting, Iraq waged a war of nerves by adding customers and contracts, but "there is little evidence that points to a quick surge in production." [PIW 9-25-89:3 The obvious implication would be that it was not expanding as rapidly as planned. The next week there came some talk of rising export capacity, "but there is skepticism with OPEC." The consensus was that capacity was little if at all above 3.2 mbd. [PIW 10-2-89:1]

... that the group had not been able to address with any success for the last four years." [NYT 9-25-89:D2]

A compromise of sorts fell apart at the last minute. [WSJ 9-26-89:A2] After "five days of sometimes acrimonious talk", they raised the production ceiling, thereby reducing the amount of cheating. The nations producing at capacity wanted an effective limit on output, which would raise prices; Kuwait and the UAE wanted more output for themselves. The effect would be to keep prices stable.

The meeting had been expected to begin work on a permanent allocation system, but "well before it began the ministers were backing off from that task because of its complexities." Iran offered a new scheme of division: they, Iraq, and Saudi Arabia would maintain current shares, while Kuwait, the UAE and two others would receive larger shares, and five others would received smaller shares. "The hope was that the new system would help restore OPEC's credibility...and thus firm up prices." The proposal was deferred. [WSJ 9-28-89:A2] Nevertheless, prices kept rising because the trade perceived "that demand for oil worldwide is increasing swiftly enough, and that OPEC's differences are not significant." [NYT 9-28-89:D1]

Minister Al Khalifa Al Sabah of Kuwait made the classic statement of what had been happening that year: "Everybody who could [overproduce], did; everyone who couldn't complained about it." [PIW 10-2-89:SS]

From September to November As always, the farther-off future was bright. Robert Mabro calculated that unless there was a large enough expansion at the Gulf, oil would be in short supply by 1992. [PIW 10-23-89:5] Non-OPEC production was declining, demand was growing, and could only be satisfied by higher OPEC production. "There is no other way", said an American manager.

But for the here-and-now, the next two quarters, it was more difficult than usual to reduce output to meet seasonally lower demand. "It's unlikely any member will want to reduce output during the struggle for market share." [WSJ 10-4-89:A14]

By late October, output had risen to nearly 23 mbd, some 3.5 mbd above the ceiling. Most members were running flat out, but a few had excess capacity totalling from 3 mbd to 7mbd. It was "enough ... to glut the market and cause an oil price collapse a few months from now if OPEC doesn't soon adopt a new quota system." The wide margin for error, between 3 mbd and 7 mbd, shows how very loose the numbers are. Somebody had to cut. But the Saudis insisted on 24.5 percent, refusing to cut even one half of one percent point. The Iranian proposal mentioned above was still being studied.[WSJ 10-23-89:A2]

"Saudi Arabia remains adamant that its quota share cannot be reduced, even symbolically." Some delegates believed that higher oil prices were weakening OPEC resolution. "If the oil market is sagging and looks likely to weaken early next year as demand slows seasonally, OPEC could find the political will to forge a compromise that has eluded it this autumn." [PIW 10-30-89:1]

Kuwait and Abu Dhabi were the principal gainers by rising demand. [11-13-89:1] Obviously prices would have risen if they had not expanded output, <u>or</u> if others had been willing to curtail.

> "The basic problem is finding a way to cut the current 23 mbd production level. But unless there's a solution to the quota claims of Kuwait and other countries, there is unlikely to be a viable agreement on total OPEC output for next year. And without that agreement, most ministers fear, prices could drop sharply."

Iran proposed raising the Kuwait and UAE quotas, but Saudi Arabia refused to accept any curtailment, and remained "adamant that it will not waver from its claim to 24.5% of OPEC's total physical output ... The UAE remains the single biggest obstacle to a workable quota distribution." A general division persisted: those without excess capacity wanted higher prices. Those with it wanted more volume. "The Gulf countries are unwilling to sacrifice output to provide higher prices for those members that now have little scope to raise production." [PIW 11-20-88:1] [NYT 11-21-89:D5]

Rising OPEC capacity began to be more generally noticed. At least 9 of the 13 could expand. "One force driving OPEC nations to increase oil-production capacity undoubtedly is the notion that any rejiggering of quotas several years hence is apt to be based on production abilities." [WSJ 11-22-89:A1] In fact, the "rejiggering" had been a hotly contested issue for the past three years, at least.

Early in October, the Iraqi Oil Minister Al Chalabi revealed that Iraq had no foreign companies producing oil, only some "engineering, design, and construction projects." [PIW 10-2-89:3]

A spokesman boasted that Iraq could export more than four million barrels daily (as against a 2.92 mbd quota), which "will help to make people think twice before violating the agreement." [NYT 10-10-89:D5] This was not generally believed. "There are signs that Iraq's production capacity may be closer to its current 3 mbd output than the 4.5 million that it now claims." Five fields currently under development could add from 550 to 650 tbd in 1991.) [PIW 11-6-89:1]

"Breakthrough" at the November 1989 meeting The year-end meeting, brought forward to late November, was still without any common ground, despite private meetings since September among Saudi Arabia, Kuwait, Iran, and Iraq. They could always rationalize failure by saying it did not matter. In a sense this was true: output was well in excess of quota, yet prices held. [WSJ 11-22-89:A5] But they feared slack demand in 1990. [WSJ 11-24-89:A2] Saudi Arabia would not retreat from 24.46 percent; Kuwait and the UAE wanted higher quotas to validate their higher production. [NYT 11-25-89:32] But the world oil trade was calm, except for worries over the lower spring demand. Again the meeting stretched out for a week. [NYT 11-27-89:D1][WSJ 11-27-89:A3]

The result was hailed as a breakthrough: "it bases production quotas on the ability of members to produce rather than on longstanding fixed percentages." Iran expressed satisfaction. [WSJ 11-28-89:A2] Of course it looked curious to cut overproduction by raising quotas. But it would work if the over-quota production was cut back. Kuwait received 6.8 instead of the previous 5.6 percent, Saudi Arabia accepted a cut from 24.46 percent to 23.90 percent. They expressed support for the $18 basket price. But Abu Dhabi still refused its 1.1 mbd quota, and their expected overproduction was "factored into the new ceiling calculations." [WSJ 11-29-89:A3]

But there seemed like a truce among the "Gulf countries, whose battles for market share and lack of unity have impeded any effective agreement for two years or longer." However, it pointed to weaker prices in the first quarter of 1990. The Iranian Minister thought that quotas would be abandoned by 1991, because most members would be at full capacity then. More to the point, he claimed that Iran could produce about 3.65 mbd, but would get to 4 mbd within two years, and then to 4.3. [PIW 12-4-89:1,4] This proved premature, but by only 18 months. "News of the agreement was interpreted on Wall Street as a sign that the price of oil would rise, increasing the value of the inventories of major oil companies." And Minister Al Khalifa Al Sabah, "echoing a widespread judgment by a number of oil analysts ... said ... `the quota issue will lose its relevance in the 90s'". [NYT 11-29-89:D1]

But irrepressible Abu Dhabi soon announced that they wanted to go from current capacity of 1.6 mbd to 2.1 or 2.2 in the next few years. They had a non-secret weapon: foreign companies with equity production. Possibly they might need to offer the equity producers more than the current $1/barrel margin. [PIW 12-18-

89:5] But this was obviously a small discount.

THE FIRST HALF OF 1990

<u>Capacity expansion in first half 1990</u> American contractors were said to have found a way to work in Iran, which now hoped to reach 4.5 mbd within two years. [PIW 1-1-90:1] Later, plans to raise capacity to 3.57 mbd by March 1991 were said to be included in the fiscal 1990-1991 budget. [PIW 3-5-90:9] But capacity went barely above 3 mbd that year.

Saudi Arabia announced a capacity expansion "to over 10 mbd," but did not say when, nor whether it was surge or sustainable. Nor did it state current capacity, which the CIA reckoned at 7 mbd. (The Japanese Institute of Energy Economics made it 6.5 mbd.) One company estimated expenditures for expansion at $6 billion. "Potential contractors totally dismiss estimates by some Saudi sources that the expansion could cost up to $30 billion." [PIW 1-29-90:1] One cannot tell how much of the $6 billion would go, as in the past, to the natural gas network or other non-production purposes. What it shows is the wild exaggeration of "some Saudi sources."

Abu Dhabi increased its planned expansion. "Projects already on the drawing board should nudge short-term peak capacity to well over 3 mbd by 1994" [PIW 2-5-90:1], as compared with about 1.3 mbd at the time.

There was great frustration in Iraq.

"Following a year of unsuccessful informal approaches to several majors, oil minister Al-Chalabi says that he is seeking non-production sharing deals with foreign partners. ... However, as one oil [company] executive put it, "We are not in the business of renting people for the cost of money. ... We are looking for a much higher rate of return than a service fee can provide."

Iraq offered the development of the Majnoon field, at the southeast border with Iran. It was said to hold 6 - 8 billion barrels, and could produce 1 mbd. Petrobras had discovered the field under a risk sharing contract in the 1970s, but it was taken away from them in the late 1970s. For years, lack of funds had been hampering plans to push Iraq producing capacity to 5.5 - 6 mbd. This year only $3.2 billion were allocated to "oil, education, and health", and oil's share was uncertain. [PIW 2-12-90:3] Of course, only a fraction of the oil investment could go into production. Capacity was officially rated at 4.5 mbd, but outside sources stated it at 3.5 mbd.

Other producers were also trying to attract foreign investment. Venezuela had a "goal of keeping pace with output growth by major Mideast producers." [PIW 2-19-90:4] It failed. The North African states were also trying. The Algerian oil minister said capacity could be increased "quickly from current levels of about 700 tbd to 850 tbd." [PIW 2-26-90:4]

Some OPEC nations were doing better at expansion than others, and there was "a split in the group between the `haves' and `have-nots'." [PIW 3-12-90:3] In March, Saudi Aramco announced it would raise capacity by about 2.5 mbd, at a cost of about $6 billion. [PIW 3-19-90:1] This would imply $2400 per daily barrel, which seems high, but as usual cannot be checked, either as to expenditures nor for the gas network, nor other extraneous projects.

By March, prospects for a rapid jump in OPEC capacity were fading. In fact, up to half of the 6 mbd new capacity expected by the mid-1990s seemed in question. Budget constraints were blamed, as well as "the snail's pace at which oil companies and some producing-country governments are inching toward consensus on the kind of terms need for the companies to help finance capacity development." [PIW 3-26-90:1]

In March-April 1990, Iraq sent teams to various countries to persuade investors to finance the development of some existing fields. It was inherently a low-risk operation. But "an Iraqi quest for upstream investment funds got a chilly response during oil minister Al-Chalabi's 4-day visit to Tokyo last week, ... designed in part to hear proposals from potential investors." Ties were strained by some $10 billion in unpaid debts to Japanese companies, on which Iraq had suspended interest payment in 1986. [PIW 4-9-90:7]

At this time, the Iranian oil minister said he was "near agreement with companies ... to develop established fields, with payment in crude. ... The decision to seek foreign help in developing onshore oil fields is a clear policy reversal. ... As recently as October [1989], Minister Aghazadeh said, `Iran does not need foreign investment in oil.' ... His aim is to raise capacity from 3.3 mbd to 4 million next year," i. e. 1991. The aim is "to convince OPEC colleagues that Iran ... can turn up the taps unless it gets the price and quota that it desires." [PIW 4-

16-90:3] Iran intended to spend $5 in hard currency on "its oil industry", though that included not only oil production but natural gas. [NYT 5-28-90:29] In the event, this increase took about two and one half years not one, because it was apparently done without agreements with foreign firms, though discussions continue. [WSJ 10-19-92:A2] [PIW 10-19-92:1]]

In May 1990, Libya expressed confidence it could raise capacity to 2.5 mbd "by the end of the year". Nine agreements with foreign companies were said to be already signed or about to be signed. Industry observers thought it would take at least a year or two longer. PIW 5-14-90:3] Even these skeptics were too hopeful. More than two years later, the goal had shrunk to 2 mbd, and not until 1994. [PE 9-92:40] Saudi Arabia now "aimed at increasing sustainable capacity from about 7 million bd to 10 mbd "in the late 1990s at a cost of some $16 billion." [PIW 5-14-90:8] This was half of the earlier $30 billion. It would imply $5,333/bd, which is far higher than any of the Persian Gulf projects reported in enough detail to permit a calculation of the investment coefficient. Such talk simply destroys credibility.

Abu Dhabi expected to be just under 2.5 mbd by mid-decade. [PIW 5-21-90:3] At this point we may reprint what is effectively an industry consensus in early 1990, along with estimates for October 1992. Apparently Iran and Qatar have done as well as predicted, but all others have fallen short.

[TABLE XII: OPEC CAPACITY: ACTUAL & PROJECTED]

From March 1990 to December 1995 is 5.75 years, to October

TABLE XII OPEC PRICE CHANGE & CAPACITY USED, SELECTED YEARS.
(CORRECTIONS TO FIGURE 5)

	1973	1974	1978	1979	1980	1H 1989	1H 1990	1H 1992	1992
OPEC PRICE, $/brl, ANN AVG	5.43	11.33	13.31	19.88	32.21	16.7	16.33	16.34	
INCREASE, GNP-IPD		0.087		0.086	0.095		0.040	0.036	
PERCENT REAL PRICE INCREASE		91.9		37.5	48.0		-5.9	-3.5	
OPEC PRODUCTION, TBD		30616		30802	26804		23468	23900	26627
OPEC CAPACITY, TBD		38135		35235	34435			25550	
PERCENT USED		80.3		87.4	77.8			93.5	
CIA "SUSTAINABLE" CAPACITY, TBD				34430	34680		27440		
PERCENT OF "SUSTAINABLE"				89.5	77.3		85.5		

NB The CIA also uses a higher estimate, "installed" capacity,
which I do not understand. In addition, they estimate:
"Available capacity reflects production ceilings applied by"
several large producers. This is not capacity at all, but
deliberate restriction.

SOURCES: Prices, from Monthly Energy Review, "total OPEC"
GNP-IPD, from Economic Report of the President
Production and capacity, from PIW, 4-21-75:11, 2-4-80:9, 2-23-80:9, 0:9, 2-1-93:7
7-6-92:7. Capacity as indicated from CIA, International
Energy Statistical Review, various issues

1992 is 2.58 years, or 45 percent. The percent accomplished varied widely. Iran, Algeria, Gabon, and Indonesia were ahead of the track. Saudi Arabia and the UAE were almost on it, the rest trailed, while Libya had accomplished nothing and Venezuela actually diminished. Kuwait capacity in mid-1993 already surpassed its first-half 1990 production, and there is no telling the date of Iraq re-entry.

Outside OPEC, the longer-run outlook was for supply growth:

"PIW's first worldwide survey of exploration hot spots shows that oil companies find themselves in an unexpected yet happy position: they are spoiled for choice [for the first time in almost 20 years]...Newly discovered, high-potential regions are competing for attention with large, established producing countries that are reopening to outside explorers after decades of dominance by national oil companies.... Even the Middle East ... is making tentative gestures toward Western companies ... Cash-strapped ... Iran and Iraq have publicly joined the competition [but] only as service contractors for known but undeveloped oil fields. [PIW 7-16-90:1,SS]

Iraq reported a deal with a consortium led by Occidental

to develop Rumaila North (discovered before 1960 by IPC), to be paid for through a long-term crude oil supply agreement, as Iran was doing. Other international oil companies had been issued invitations in January 1990. But there was little progress. "Most oil companies maintained they were not interested in service-type contracts, while the government was unwilling to offer exploration or concession arrangements." [PIW 9-10-90:7] By the time the Occidental deal (if there was one) leaked out, Iraq had of course occupied Kuwait.

Expectations in the first quarter of 1990 The trade seemed untroubled by any price weakness. According to confidential internal projections surveyed by PIW, steady demand growth would support oil markets in the second half of the year. There was "a solid consensus ... on this basic outlook. Market power is seen swinging back to Mideast OPEC producers, with increases in world demand falling squarely on their shoulders." [PIW 2-19-90:5] The Prime Minister of Japan scheduled a ten-day Middle East tour, "aimed at strengthening Japan's relations with [Saudi Arabia] in view of the tightening of oil supply anticipated by the mid-1990s." It was scheduled to begin August 16. [Japan Petroleum & Energy Trends, vol. 25, Nos 11/12, 1-15-90:18]

Expert opinion: prices to rise, OPEC expansion in doubt At the start of 1990, two dozen oil experts expected prices to rise by 50 percent by the start of 1995; the consensus price forecast was $30 in 1995. Supply could not expand enough to match demand, and "the question about OPEC is ... whether it can expand its ability to pump oil enough to match rising demand, experts say." The chairman of BP predicted oil supply shortages in the early 1990s "because of OPEC's inability to expand production", which could cost $50 billion to $60 billion, "an amount they cannot afford." [NYT 1-26-90:D6]

OPEC might be unable to expand enough "without some combination of loans, investments and technical help" from consuming nations. [NYT 2-24-90:1]

Why could not OPEC afford to invest more than between 1.2 to 2.6 percent of their revenues (Table XI)? A question not to be asked.

The growing plight of the Soviet oil industry also made the trade more hopeful, although the production decline had not been fully reflected in Soviet exports. [WSJ 2-26-90:A2]

Another roundup of experts in early March said that there was now "a widespread consensus among petroleum experts that unless investments on the order of $60 billion are made during the next five years to increase production capacity in key petroleum producing countries, oil prices will surge..." [NYT 3-6-90:D2]

"Widespread consensus" was made by repetition. The $60 billion was gospel, above any profane demand for evidence. And no sooner was the figure set than it could be raised. "Iran alone is reckoned to need some $50 billion to restore its oil industry to where it stood ... in 1980." [Id.] More soberly, Minister Nazer of Saudi Arabia expected that "the market will slowly but steadily turn into a sellers' market." [NYT 3-10-90:37]

Prices in the first quarter 1990 In early January 1990, OPEC members began decreasing output. [WSJ 1-19-90:A2] But by the end of the month, firm prices persuaded them to stop reductions. [WSJ 1-29-90:C15] Prices then fell in February and March.

In early March, there was some fear of a growing supply overhang, because futures prices had shifted into "contango"--i. e., prompt supply was priced less than farther-off. [PMI 3-8-90:1] Contango is an inducement to accumulate inventories. The need for this inducement signals a perceived current surplus, and the greater the degree of contango the greater the perceived surplus.[46]

A brief friendly meeting But the leading OPEC countries were not alarmed. Saudi Arabia "appeared to be siding with Iraq against Kuwait in seeking higher prices". [NYT 3-5-90:D8] At the March OPEC meeting there was a general satisfaction, tempered by concern over quota violations, especially by Kuwait, which "with scant support, is advocating a rise in the production ceiling to stop prices from mounting above the $18 a barrel reference." [PIW 3-12-90:3]

Prices had been heading down since December-January, but the talk was all of whether or not to raise them. [NYT 3-16-90:D4] The meeting took only a weekend, and "was most notable for its friendly and gentle tone." A shortage crisis was coming, though it was not imminent. [NYT 3-19-90:D1] There was a slight undercurrent of unease. The price had been sliding. But if all countries respected their quotas, "we will have a stabilized

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[46] With statistics on inventories as bad as ever or worse, contango or its contrary, backwardation, served as a proxy, superior to the original. It expressed the view of buyers and sellers over the adequacy of inventories relative to expected demand in the near future. Philip K. Verleger Jr. was the first to perceive the importance of this inventory surrogate.

market", said Minister Aghazadeh of Iran. [WSJ 3-19-90:A2] The price monitoring committee meeting was concerned with "a shift away from the problems of the 1980s--how to curtail production equitably and keep prices from collapsing -- to a wholly new forward-looking agenda premised on tighter production capacity." [PIW 3-26-90:3]

Markets awaken in April But a week later, rising production "seems to reflect a priority on securing markets and satisfying clients in disregard of production quotas and the slide in crude prices. ... Both [Iran and Iraq] have had trouble selling crude and are offering some steep discounts." [PIW 4-2-90:1] The monthly IEA report suggested an inventory buildup, confirming the switch into contango a month earlier. [WSJ 4-4-90:A2] As competition intensified, there was some switching from term to spot contracts, particularly by Iraq and Kuwait. [PIW 4-9-90:1] A week later:

> "Markets wake up knee-deep in oil, and prices tumble. ...The basic problem is high OPEC production, which reflects efforts by several Mideast producers to stake out larger market shares. ... This has led to intensifying price competition and points to market weakness through the spring." [PIW 4-16-90:1]

OPEC members were now reported "increasingly nervous", and an editorial in a Saudi newspaper was interpreted by some as an official threat of "another pricing war unless quota cheaters curb their output. ... Kuwait is the chief target of the finger pointing in OPEC." [WSJ 4-11-90:C12] Minister Nazer called on members to adhere to quotas, and the ministers were "stepping up their contacts with each other. [WSJ 4-17-90:3]

Saudi Arabia, Kuwait, and the UAE who had "all...been accused of contributing to the oil glut by producing more than their OPEC quotas", now issued a joint statement which affirmed their support for quotas and expressed grave concern over prices. [WSJ 4-18-90:C14]

Price fell by as much as 70 cents the next day. [WSJ 4-19-90:C14] Kuwait and Abu Dhabi were not expected to blunt their demands for larger quotas. "Iraq, Iran, and Saudi Arabia have previously used similar tactics of raising production to secure or preserve their large share of OPEC's production." [NYT 4-19-90:D1]

<u>The emergency meeting</u> But Saudi Arabia, Kuwait, and the UAE now demanded an emergency meeting.

> "They want an agreement about quotas for the second half of 1990 now ... rather than late May. ... They tell PIW that a reallocation of quotas to more accurately reflect production capabilities is necessary for a workable agreement. ... The $6 plunge in oil prices since January is putting untenable financial pressure on [other members]. Their only way out seems to be accommodating the main quota offenders." [PIW 4-23-90:1]

Iran and Iraq, producing at capacity, could not retaliate with increased production. [PIW 4-23-90:1] The hope was of a brief meeting, two days at most, which could give a firm assurance of output reductions. [WSJ 4-27-90:A2] It was held in Geneva rather than Vienna. An Austrian official had criticized Saddam Hussein for his threat to "burn half of Israel". The change was to rebuke Austria and show solidarity with Iraq. [NYT 4-28-90:OpEd]

The emergency meeting decided on a three-month cut to 22.1

mbd, the November 1989 ceiling. But Minister Otaiba of the UAE revealed, after the agreement was struck, that they had been producing not 1.9 mbd as generally supposed but 2.1 mbd. "In just one sentence, Otaiba torpedoed the whole meeting." [WSJ 5-4-90:C14] This is hard to credit, but it suggests the hair-trigger sensitivity of the oil market. Prices certainly did fall on the day of the meeting. It was not made clear how much each member was allowed. It was in effect a gentlemens' agreement.

Still good times ahead But they could see only blue skies farther ahead. [NYT 5-6-90:F15] "Some oil ministers said it was only a matter of time before national production quotas--necessary in recent years of excess capacity--disappear just because most members will be physically unable to pump more oil." None dissented. [WSJ 5-8-90:A2]

A curious note: "The Gulf Arabs maintain that sooner or later, all members will have to recognize that an end to the 8-year-old quota system is inevitable. They see the system as unmanageable with most countries at their production limits." [PIW 5-7-90:1]

This is puzzling. Excess capacity concentrated into fewer hands seems to make output restriction easier. The few can restrict and simply disregard the others. Why even bother to hold an emergency meeting? The only explanation is that they wanted to force the members with little or no excess to accept some - to cut back. Saudi Arabia had made good its claim to a market share, by continuing to produce, and forcing others to cut back to make room. Kuwait and Abu Dhabi were imitating the Saudis to force others to share the burden of maintaining excess capacity.

Pledged reductions not fulfilled in May-June OPEC members did cut rapidly, but not to the full extent promised. The largest drop was in Saudi Arabia, but they were not returning to the role of swing producer. "The Saudi move is contingent on output discipline from others members and will be reassessed in June." Iran and Iraq did have some excess capacity, as proved by their "continuing marketing problems" [PIW 5-14-90:1], a euphemism for overpricing. Dubai Fateh, which (following PIW and PE) we use as the marker crude since 1986, fell to an 18-month low.

On June 5, Saudi Arabia issued a statement in Riyadh and Washington. It reaffirmed its commitment to the May 2 agreement to abide by its quota. The statement was evoked by a sharp price drop following the confirmation of newly-discounted pricing formulas, ranging from 25 to 70 cents per barrel. [WSJ 6-6-90:C6] Only a small fraction of the losses were regained the next day. "Saudis are known to be impatient with Kuwait and the UAE, chronic overproducers." [WSJ 6-7-90:C14]

By early June, the actual May production cuts were seen as only a fraction of pledged reductions, Saudi Arabia alone honoring its agreement to cut 430 tbd. "Both Iran and Iraq...pumped at maximum ..."[PIW 6-4-90:1] In fact, "the main reason that OPEC's May cutbacks have been much smaller than expected is that Iran and Iraq pushed their production a combined 350 tbd higher last month." [PMI 6-7-90:1] Iraq's overproduction was soon conveniently forgotten.

Formula prices were revised to new lows "and it may soon force OPEC members to consider whether they are ready to relive the price wars of 1986 and 1988. ... OPEC production remain[s] stubbornly high, particularly with flows rebounding from Iran and Iraq. ...this is leaving Mideast producers such as Saudi Arabia with the unhappy choice of serving as a de facto swing producer or cutting prices to keep oil flowing." Both Kuwait and Saudi Arabia "are now under pressure to reduce prices." [PIW 6-11-90:1] There now occurred an event of no importance, except to show disrespect for OPEC output controls: Norway announced that it might rescind its rule to produce at only 95 percent capacity. The Oil Minister also forecast peak Norwegian production of 2 mbd after five years. [WSJ 6-18-90:A2] (It was actually reached in one year.)

Late in June, the Kuwait oil minister, Sheikh Ali al Khalifa al Sabah, resigned to become Finance Minister. This did not mean any policy change. But the historian loses an acute and well-spoken observer. At this time, the "early promise of June OPEC cuts is evaporating." [PIW 6-25-90:1] Crude oil inventories touched their highest level in eight years, and despite the hope of relief from Iraqi threats and a Norwegian strike, "the hard fact [is] that there is a huge surplus of crude in the market, experts say. ... OPEC strategists have wondered whether they are about to see a rerun of the 1986 price collapse." [WSJ 6-29-90:A3] June spot prices were at the lowest since September 1988.

(Saudi June export prices were somewhat higher than in May, but that may be a contract phenomenon, reflecting retroactive changes.)

Heads of state take over in July Iraq warned Kuwait and the UAE to curb their overproduction. The Deputy Prime Minister, delivered the message in person and stated publicly "that oil prices, which currently averaged about $14 a barrel, should rise to $25 a barrel. Saudi Arabia is no longer opposing a growing Iraqi role in the Gulf region's oil policies. ... Last year, in a move that infuriated Kuwait, Saudi Arabia signed a non-aggression treaty with Iraq, leaving its Kuwaiti allies in the Gulf Cooperation Council to fend for themselves in their border dispute with Iraq." [NYT 6-28-90:D1]

One wonders: did the Saudis discuss this action with the USA, pursuant to the supposed "special relationship?" Kuwait had asked Iraq for a similar pact, which was brusquely refused. Possibly the Kuwaiti overproduction was based on fear of Iraqi aggression, and the desire to get all they could before the deluge; we cannot tell.

As they prepared for the July 25 meeting, Kuwait and Abu Dhabi said "they deserve higher quotas in light of their output capacity [and] the sacrifices they made for OPEC earlier in the decade." [PIW 7-2-90:1] But in early July, Kuwait announced it was cutting oil output "and could be flexible on its demands for a bigger quota." (NYT 7-6-90:D11). Early in the year, Iraq had gained sales from Kuwait by price cuts. Now both were changing their method of quotation to grant the buyer a 70 cent allowance. [PIW 7-9-90:6] Obviously if both did so, neither was better off. Eight confidential company surveys showed oil markets threatening "to collapse from the sheer weight of excess oil supplies." [PIW 7-16-90:5]

By the second week in July, heads of state were taking over from their oil ministers to try to stop the price decline. Saddam Hussein of Iraq, and the presidents of Venezuela and Indonesia, were "among those taking a harder line toward the quota cheaters... But the King of Saudi Arabia ...seems to be emerging in the leading role." [WSJ 7-10-90:A3]

All five Arab Gulf producers met in Jiddah, Saudi Arabia, to agree that all would adhere to the November 1989 accord "until prices rise to an acceptable level". But they said nothing specific about Kuwait and the UAE. [WSJ 7-12-90:A4] Then prices "exploded" on a Saudi announcement that it would temporarily cut back its 24.46 percent share of OPEC output to 22 percent. Kuwait pledged to stay on quota, which one Saudi source said, "took care of 50% of the problem. The other 50% was the UAE", which also agreed to adhere to their quota. The crude oil futures contract for August delivery went from $16 to $18.50 in a day. [WSJ 7-13-90:A3] It held its gains over the next few days.

But disagreement was only deferred. Kuwait and Abu Dhabi wanted a 1 mbd quota increase in the fall, to let them use "the bulk of their spare production capacity." Iran and Iraq wanted stronger prices sooner. Saudi Arabia repeated that their yielding of market share was temporary.[PIW 7-16-90:1]

A week later, prospects looked good for "a short and sweet OPEC ministerial meeting" to ratify the Jiddah plan. But a stable fourth quarter

> "depends on the willingness of Kuwait, the UAE and Saudi Arabia to forego the hope of quota increases in the fourth quarter, which seems to have been a key factor motivating the original Jiddah compromise. ... The escalation last week of Iraq's verbal assault on its Gulf Arab neighbors may be a symptom that the proposal is not as solid as it seems. ... Iraq's threat...was all the more striking in that it followed market indications that the UAE, Kuwait, and Saudi Arabia were already making [production] cuts. ... `We all want prices back at $18 and are willing to take the necessary steps', observes one OPEC delegate, `but this spirit of cooperation could vanish if arm-twisting is used in an effort to achieve more ambitious goals.'" [PIW 7-23-90:1]

By this time, Iraq had become the chief player in the game. It is time to look at the background.

IRAQ: FROM SAVIOR TO PIRATE[47]

After the 1972 expulsion of Iraq Petroleum Co. (IPC), Iraq profited, first by ignoring the 1973 production cuts ("embargo"), then discounting prices. While Middle East output was flat, Iraq reached a 3.5 mbd record in 1979. These number speak well for their marketing and production. But it was a mistake to let teams of French, Brazilians, and Russians discover oil, then push them out without development rights. It felt good to make suckers of East and West, but it eventually reduced their access to capital and management, when they needed it most. The North

[47] The following is drawn from [FTC 1952]; the respective issues of [AAPG-B]; [Adelman 1972], ch. 7; Petroleum Press Service (now Petroleum Economist), various issues in 1972.

Rumaila field, discovered in 1958, is not developed.

The attack on Iran 1980-1988 In 1980, with production and its revenues at the peak, the Baath regime reached for a much bigger gain. The revolution in Iran, and the weakening of its armed forces, brought a great opportunity. Nearly all Iranian production was within 200 miles of the border. The expected quick victory would have delivered it cheaply to Iraq.

We need not speculate about the "real motives" of Saddam Hussein, then or later. He made great play in 1980 of the Battle of Qadisiya in 630 A.D., where the Arabs had beaten "those insolent Persians." His uncle and political mentor had written that God had made three mistakes: creating flies, Persians, and Jews. These 1300-year-old hatreds may be good for another 1300 years.

But it is wrong to compare "economic motives" with "non-economic", because there is no trade-off or sacrifice of one for another. The more wealth, the better to serve other ends. In 1980 and 1990 the wealth of the victim was a necessary sufficient condition for the attack.

The 1980 venture failed, with a million dead, many more wounded, refugees, etc. Both countries lost oil revenue, directly and by postponed development. But loans from neighbors, Western suppliers, and the Soviet Union more than covered the costs to Iraq. They left enough to develop weapons that have impressed the world, and enought cash to withstand three years of embargo.

In 1990, the seizure of Kuwait offered a producing capacity and cash flow equal to Iraq, and capable of great expansion. Even if Kuwait's foreign assets were out of reach, the horizon could practically explode.[48]

From Enforcer to Hijacker in 1990 At first, Saddam Hussein was the OPEC enforcer, like the late Jimmy Hoffa keeping the truckers in line. The June average OPEC "basket", whose target was $18, was down to $14.10. Dubai Fateh, which we have used as the surrogate for Arab Light since 1985, was $13.25. Saudi Arabia indicated its support of higher prices. [NYT 6-28-90:D1] As late as July 11, the spot price was still under $13. [WSJ 7-12-90:C12] Inventory buildup had ruined the prospect for the normal autumn demand pickup. "OPEC excesses pre-empt autumn stock build." [PIW:PMI 7-5-90:1] Exporters were "playing games" to hide discounts. [PIW 7-9-90:6] As late as July 16, after the accord of the five Gulf nations, markets were "teetering on edge of disaster again." [PIW 7-16-90:5]

Then Iraq began threatening Kuwait and Abu Dhabi, accusing them of the ultimate crime - being under American influence. "`Cutting necks is better than cutting means of living.' Saudi Arabia, Iran and Iraq have joined hands to bring about a greater sense of discipline to OPEC." The Saudi government warned that its "protection would not be extended to Kuwait in the face of

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[48] Cf. Patrick Clawson, of the Foreign Policy Research Institute, in the Brookings Review, Spring 1991, page 3: "The invasion of Kuwait was motivated not by dire need, but by greed on a gargantuan scale."

Iraqi anger." [NYT 7-18-90:D1]

Oil experts called the cooperation of Saudi Arabia and Iran with Iraq the most important event since 1979. One "coined the phrase `Saddam factor' to explain the new realities in OPEC." [WSJ 7-24-90:A3] "The general accord of these three ... has set the stage for a credible policy by OPEC to push oil prices upward in the 1990s, experts say." [NYT 7-25-90:A8] Another expert called this "a historic turning point"; another called Iraq "now the OPEC policeman"; another called it "a landmark in the history of OPEC" [NYT 7-26-90:A1], or "a whole new ballgame," for which he thanked Saudi Arabia and Iraq. [WSJ 7-27-90:A2] This is overblown, as usual, but it would have been very important. See Table I above, substituting 0.67 ("Persian Gulf") for 0.33 ("Saudi Arabia").

The July OPEC meeting was short and decisive in limiting production and raising the target price of the "basket" from $18 to $21. Past efforts had failed, but this one was different: "Discipline is guaranteed by a principal player which carries a loaded gun." [NYT 7-28-90:A1] Bloated inventories and stagnant consumption were overborne because "Iraq as the enforcer has become the key." [WSJ 7-30-90:A4] "The Saudis purred. They pretended not to see the gun Iraq was pointing at Kuwait's head." [Economist 8-4-90]

Yet the markets were skeptical. The Oil & Gas Journal said that there was a need for output reduction in addition to the Kuwait and UAE cuts. "Saudi Arabia, with token help from others, will trim output....This is no small gesture. As they demonstrated in 1985-86, the Saudis take market share seriously. They'll want the ground they have yielded back when market conditions" permit, but this did not look likely. [OGJ 7-23-90:13, editorial] Others agreed: "OPEC, facing bloated inventories, faces long wait for higher prices." Excess supply was expected to reassert itself and bring prices down again. [WSJ 7-30-90:A6]

Up to this point, the "crisis" was on track. The challenge of oversupply and weak prices had brought the response of forceful action and rising prices. But at this point, the story changed.

The policy of the USA We have mentioned that in 1986 the then Vice-President Bush urged the Saudis to cut back output to support prices. In 1990 his Administration wanted "a rapprochement" with Persian Gulf countries, especially Saudi Arabia and Iraq, who "will be crucial to the USA's economic viability in the 1990s." Why we needed a rapprochement or anything else "to ensure that the oil will continue to flow" [PE 2-90:60] passes all understanding. But it was believed on high, and there were consequences.

During the Spring of 1990, despite mounting threats, and revelations about Iraq weapons programs, the United States could see, hear, and speak no evil. Stroking a tiger would turn him into a tabby cat.

On July 25, a week before the invasion, the American

Ambassador told Saddam Hussein that the United States sympathized with his "need" for more money, never mind for what; that some in the United States wanted an even higher oil price than the $25 Iraq demanded; and the US had no opinion on Iraq's border demands on Kuwait.[49] The Ambassador was only shocked when Iraq occupied all of Kuwait. [NYT 9-19-90:A29] [50]

The message to Saddam Hussein parallels a message sent on the eve of World War II.

> "[President Roosevelt's April 1939] message left Hitler with a feeling of oneupmanship over a man he should have regarded as potentially his most dangerous enemy. It does not bode well for the peace of the world when the President of the United States allows himself to be maneuvered into appearing as an inept and ignorant fool." [Watt 1989, p. 264]

United States help for Iraq--of money, intelligence, and

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[49] The Ambassador later said this report, published in the press (e.g. NYT 9-23-90:19], was "fabrication.... disinformation". [NYT 3-21-91:A1, A15] Nobody believes this. "An unidentified senior State Department official was quoted in the New York Times as having said it [the news report] was `essentially correct'". ([NYT 3-22-91:A1]) See also Elaine Sciolino, The Outlaw State: Saddam Hussein's Quest for Power and the Gulf Crisis (New York: John Wiley & Sons, 1991), pp. 179, 271. Senators who finally secured access to the original documents were indignant over the Ambassador's evasive and inaccurate version of them. [NYT 7-13-91:A1]

[50] Even after the attack, Professor Brzezinski thought Iraq had "financial and territorial claims (not all of which were unfounded)." [NYT 10-7-90 OpEd] The president of the Council on Foreign Relations (Undersecretary of State in the Clinton Administration) urged Kuwaiti "concessions to Iraq regarding oil pricing and production, territory and debt." [NYT 11-30-90 OpEd] This is amusing to anyone who follows the oil market. Since the end of 1989, Kuwait had reduced output by 200 tbd, while Iraq had increased by 400 tbd. Plainly Iraq was the bigger price cutter.

strategic and other products--was propelled by the self-flattering myth, that the U. S. Government would influence Saddam Hussein, and change his behavior. The same U.S. Ambassador to Iraq, in April 1990: "Iraq has modified its behavior and policies in large part because of our diplomatic efforts." [q. Boston Globe, 6-15-92:1,10]

Seen from the oil market, this fat-witted self-conceit is deja vu. The U.S. Government has for decades thought it was influencing Saudi Arabia and other producers.[51] It still believes it has a "partnership" with a "top ally". The leading advisor on Middle East affairs on the National Security Council staff thinks there is "a bilateral relationship" with Saudi Arabia, thanks to which we get "cheap and plentiful oil". [WSJ 10-26-92:A1] As General Sherman said, people believe a delusin harder than they do a fact.

Invasion, blockade, and dilatory OPEC On August 2, Iraq seized Kuwait. The Oil & Gas Journal explained it:

"An OPEC accord that effectively lifts the group's second half quota by 400 tbd with demand soft and the world awash in oil stocks seemed more likely to collapse rather than support a $3 hike in the marker ... [Saddam Hussein] recognized that members could be tantalized or cowed into agreeing to an absurd quota increase. He must also have recognized that it wouldn't work. So he invaded Kuwait." [OGJ 8-6-90:NL1; Editorial, p. 19]

The Saudis' hired gun was now pointed at them. On August 5

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[51] Cf the previous papers in this series. State Department documents obtained under the Freedom of Information Act and published in the [Washington Post, 7-21-92:1] tell of frequent communication during the Reagan-Bush Administration, who apparently followed their predecessors' rule: since we said it, somebody must have done something to comply.

came the UN blockade of Iraq and Kuwait. In January-February, military action drove Iraqi forces from Kuwait, and forced it to agree to destruction of chemical, biological, and nuclear weapons. The United States acted without of any treaty or understanding or "bilateral relationship" with Kuwait, because its interests required it to do so. The Saudis had always known that the USA would support them no matter what they did about prices.

Following the August 5 blockade, the price rose faster than in previous crises, to a monthly high of $31.55 in October. Part of the increase was due to the deliberate inaction of the other OPEC producers.

During the first half of 1990, Iraq and Kuwait had produced 5.0 mbd, consumed 0.425 mbd, and exported 4.575 mbd.[52] The loss of their output almost precisely offset OPEC excess capacity, excluding Kuwait and Iraq, as calculated by PIW [PIW 3-12-90:6]

But true excess capacity was probably larger than estimated by about 1.5 mbd. PIW had reckoned excess capacity for the Gulf big five at 3.45 mbd. But just before the invasion, Sadad al-Husseini, an Aramco senior exploration-production vice president had said the five had "more than 6 mbd" excess, and increasing. [OGJ 7-23-90:NL3] Less than 1 mbd of that 6 mbd excess can be ascribed to Kuwait and Iraq. Kuwait was credited with 2.4 mbd capacity, and produced 1.7 in July. Iraq's capacity was reckoned

[52]Production is from PE, which includes condensate and natural gas liquids. Consumption is from the CIA, inventories from DOE : IPSR.

at 3.1 mbd in February, but it produced 3.4 mbd in July. Mr. al-Husseini implied that excluding Kuwait and Iraq there was more than 5 mbd of excess capacity at the Gulf. Thus the excess capacity exceeded the shortfall, by about 1.5 mbd.

Of course the additional capacity could not simply be switched on overnight. But inventories were excessive, to let the market take the interim strain. On April 1, stocks were 100 days of forward consumption, as compared with 92 days on January 1. [OGJ 7-30-90:72] The large accumulation during the first quarter was contra-seasonal. At the end of June, stocks had grown to 102 days. During the July-September quarter, stocks actually increased again, to 105 days' consumption, and were 103 at years-end. [DOE-IPSR]

The inventory buildup shows that production exceeded consumption. The 1990 oil crisis was like the others. The threat of shortage generated <u>precautionary</u> demand for more inventories, which raised prices, which brought additional <u>speculative</u> demand. Expectation of a higher price is a self-fulfilling prophecy.

OPEC excess capacity was considered "ample to replace loss <u>if producers move.</u>" [PIW 8-13-90:1, emphasis added] They could easily have prevented the jump in precautionary demand, by immediately stating in public that they would take immediate action to produce to the limit as soon as possible. They did not do so. Saudi Arabia and Venezuela carefully dithered, seeking OPEC unanimity which they did not need. By August 14, neither had even stated an intent to increase production. [WSJ 8-15-

90:A3] Venezuela made "contradictory start-and-stop announcements on providing extra oil..."[PIW 8-20-90:4] OPEC nations were "uncomfortable with the high levels of commercial stockpiles around the world." [NYT 8-16-90:A1]

Oil prices were helped up by "a Saudi request for an emergency OPEC meeting, without a date or time being established, and the report of lower Saudi production next month." [NYT 8-17-90:D1, emphasis added] But Saudi Arabia (and Venezuela) said they would increase output "to replace much of the 4 mbd lost ...[which] would slow the recent runup ...The Saudis also rescinded indicated supply cuts for next month." [WSJ 8-17-90:A3, emphasis added] The next day, a Saudi official who insisted on anonymity said the country "could increase its production by two mbd `by tomorrow morning', and could add an additional 0.5 mbd quickly thereafter." Venezuela promised a decision soon. [NYT 8-18-90:33] The next day, the Saudis said that they would increase by 2 mbd, but not how soon or how long. [NYT 8-19-90:1] A few days later, this became "as much as 2 mbd". [WSJ 8-23-90:A3] Or it was "nearly" 7.4 mbd from 5.4 mbd. [NYT 8-23-90:A14] It still was not clear a week later. [OGJ 9-3-90:31]

"Oil markets [had] remained jittery because neither the Saudis nor the Venezuelans had publicly declared their plans." Minister Nazer urged other OPEC countries to produce more. [WSJ 8-20-90:A3] President Perez "strongly suggested that Venezuela and other OPEC countries will soon increase production", but not past quotas. [WSJ 8-20-90:A4] On August 23, Venezuela "appear[ed] to end three weeks of indecision" by announcing that September production would be up 325 tbd, and December by 500 tbd. [NYT 8-24-90:D4]

A week after the invasion, the International Energy Agency estimated the September shortfall at 0.6 to 2.5 mbd. But on August 20, they raised their estimated gap to 1.4 to 3.2 mbd. The reason: "little evidence that any additional oil has actually been pumped to replace the lost output of Iraq and Kuwait." [NYT 8-21-90:D1] There were varying reports on how much OPEC would produce above quota: perhaps 3 mbd [WSJ 8-28-90:A3] or 3.6 mbd. [NYT 8-28-90:D6]

The UAE, "one of the most frequent quota breakers in the past, called on all OPEC states to strictly adhere to [i.e, stay within] quotas." The president of Iran said higher output would be treachery, etc, etc--but he had raised output immediately, reaching the limit in August. [OGJ 8-20-90:24] So did others while arguing it was not their mission to save the West from an economic crisis. Consumers were better served by greed than by high principle and "special relationships".

Prices kept rising, doubtless because of fear of war, but the head of the well known consultancy of Purvin & Gertz thought the market was reacting to delays by Saudi Arabia and Venezuela. "The market thinks the additional production just isn't coming on on schedule, and the clock keeps ticking away." [NYT 8-23-90:A1]

Some "senior OPEC ministers" had an interesting explanation for keeping capacity unused. "The only thing keeping a lid on prices is the promise that OPEC can produce more when it becomes necessary. Once that capacity is spent, any added shortfall will create chaos..." [PIW 8-27-90:9] Thus producing less would lower prices. The message was that they would produced less.

On August 29, OPEC finally met and lifted all restrictions. [WSJ 8-30-90:A3] But this did not guarantee capacity output. Spot prices fell, then jumped again. At the end of the month, the IEA predicted a substantial oil shortage for later in the year. [NYT 8-31-90:D1] Such a perception probably underlay the resumed price increase. [WSJ 8-31-90:A3]

By early September, it was known that Saudi production for that month would be up by over 2 mbd, with smaller increases in Abu Dhabi and Venezuela. But "the Saudis offer no indication of likely production levels for the fourth quarter". [OGJ 9-10-90:24] Supplies were ample, but the mere prospect of fourth-quarter shortages raised them. [WSJ 9-6-90:A3] There were reports of hoarding by distributors and retail consumers. [NYT 9-6-90:D4] Private economists were more pessimistic: "usable commercial crude oil stocks will be depleted by the end of October." [NYT 9-6-90:D1] In hindsight, of course, they were wildly wrong. But Saddam Hussein was still in Kuwait. When he issued new threats, there was a strong interaction of precautionary and speculative demand, and a new price peak at end-September. [53]

[53] Former Minister Yamani said on October 8 "that the price of crude oil should drop to $15 to $18 ... once the Persian Gulf crisis was defused." [NYT 10-9-90:D25] He was right on target, one of the most successful forecasts ever recorded.

<u>"Ridiculous surplus"</u> In the first half of October, there were predictions of oil prices reaching $45 before winter ended; if war came, Herman Franssen predicted $60. [WSJ 10-19-90:A2] The Venezuelan oil minister was much more astute: he wanted an agreement by "some of the world's biggest oil consuming and producing countries" to fix the price somewhere between $25 and $30. [WSJ 10-19-90:B9] (There was a meeting in Geneva a month later, with 18 countries represented, to report to the UN Secretary General. [NYT 11-7-90:D8]) James R. Schlesinger thought "a simple war," with no damage to Saudi fields, could send the price to $60. [WSJ 10-22-90:B3A]

But prices dropped on October 19, and then it was all downhill. Late October heard the familiar refrain. Iran "softens price terms in an effort to increase flagging Western sales. [PIW 10-29-90:1 That week, Saudi production surpassed 8.2 mbd, and it was estimated that the lost output had been made up. [NYT 11-4-90:1] A week later, OPEC production exceeded the pre-invasion ceiling, demand was "sluggish" and an oil expert said "OPEC could end up in the ridiculous situation of a production surplus even without Iraq and Kuwait." [WSJ 11-12-90:A3] In fact, the surplus was already there. "Excess capacity is back. In November, for the first time since Iraq's invasion of Kuwait, OPEC members produced less than they could have, and sold even less than they produced." [PIW 12-3-90:1] IEA noted the same phenomenon. [WSJ 12-5-90:A6]

At this point, all that kept the price up was the uncertainty surrounding any expected war. Even so, the December spot price was at about the August level, while contract prices, influenced also by declining futures prices, were between June and July levels. The December OPEC meeting was openly worried about price collapse, even down to the range of $10. [NYT 12-11-90:D1] [WSJ 12-12-90:A2] Both Iraq and Kuwait attended as usual. It was agreed without dissent that quotas would be restored once the crisis was over. [WSJ 12-13-90:A2] By early January, "oil glut seems likely as demand slows, even if there is a short-lived war." [WSJ 1-8-91:A5]

There is no evidence that <u>consumption</u> had slowed, except as caused by recession; but there was an end to precautionary and speculative demand. The IEA had projected a fourth-quarter stock drawdown of 500 tbd; it now estimated there had actually been a 200 tbd buildup. In addition, Saudi Arabia, Iran, and Venezuela had built up their land or tanker storage by about 100 mb, of which 50 mb was above normal. [WSJ 1-10-91:A16] No one should reproach IEA; its basic data were too delayed and fragmentary.

The actual war in January-February ended the uncertainty. The spot price had declined to $27.40 by January 16, the first day of the bombing of Iraq. Two days later, it was down to $16.40, and stayed in the $16-$19 range. Essentially prices were back to where they had been in early 1990, before the trade had been scared by excess inventories. The speed of reversal was unprecedented.

<u>Appraisal of the 1990 crisis</u> This price upheaval started

like the other two. The challenge was excess supply and weak prices; the response was drastic action to restrict supply. Iraq began as cartel enforcer, then became a pirate. Overnight, two major suppliers vanished. The upward price spiral was quicker than in 1973 and 1979. Of course the loss was soon made up, but so it had been in 1979.

But something was new. The price dropped back to earlier levels so quickly that the OPEC nations had not even the chance to discuss how they would peg it at a higher level. Several factors explain this.

First, the Saudis acted differently. After a month's profitable silence, letting the price rise, they increased output and let it be known they would keep it high. Within a month, prices had peaked. That was a far cry from 1979-1980, when their prolonged refusal to assure more supply kept driving up the price for over a year.

Second, there were no price controls in consuming countries. There was no incentive to hoard: to buy crude oil or products at low controlled prices to hold for inevitable and guaranteed higher prices. Hence there was no additional kick to speculative demand.

Third, the use of futures markets also helped. Buyers bought futures contracts instead of bidding for physical barrels. Of course this raised futures prices, and made it profitable to buy now for sale later; but the effect was damped by postponement and hedging, and stopped altogether as soon as the news ceased to be threatening. This appraisal is supported by the work of [Weiner 1992].

Strategic petroleum reserves in the USA, Japan, and Germany, were used too little and far too late. They were saved for a "real physical shortage." This was nonsense. Shortage can happen to an individual, and fear of shortage drives him to panic bidding, which raises the price. But for the whole market a shortage is impossible. Price rises to equate the amount offered with the amount demanded. The price rise does the economic damage. If the SPR had offered large or unlimited amounts for sale (or options for future sale), it would have been prevention not cure.[58]

But use of the SPR to prevent a price rise was considered as interfering with free markets. If so, a central bank should be prohibited from changing the money supply, since that affects the interest rate directly and all other prices indirectly. Any economic policy change affects supply or demand, hence prices. Perhaps the US, German, and Japanese governments had some deeper reason they could not reveal, and had to offer these jewels of economic illiteracy.

In my opinion, the SPRs must have had some effect, like a wartime fleet over the horizon. The knowledge, that the reserve was there and could be used, moderated though it could not prevent a suddenly swollen precautionary/speculative demand.

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[58] This had been explained in my presidential address to the IAEE, published in The Energy Journal, 1984.

Perhaps more important, the knowledge quelled the panic in governments. There was no feeling of a gun pointed at the decision-maker's head. Hence the reserves bought time to take diplomatic and military action.

When the war began and prices collapsed, the IEA recommended, and DOE announced, token sales from the strategic reserves--just when they were no longer needed. Samuel Johnson defines a Patron as "one who looks with unconcern at a man struggling in the water, who when he reaches ground, encumbers him with help." IEA-DOE were patrons of security.

When the fighting had just ended, General Schwarzkopf was asked whether Iraq could rise again to threaten the Gulf. He replied in effect: No, unless "someone chooses to rearm them". But many will choose to sell when Iraq--or Iran--has enough oil money to buy. "Mideast nations are eager to purchase some of the powerful high-tech gadgetry that won the Persian Gulf war. ... American defense contractors are salivating over the prospect of big Mideast sales." [WSJ 3-4-91:A1]

Official Washington believed, as Daniel Yergin wrote: "What we had before was a special relationship [with Saudi Arabia]. Now we have a more special relationship." [NYT 6-19-91:D1] They expected the USA would have "more influence in OPEC than any industrial nation has ever exercised. ... They are now just beginning to discuss how they might use their new franchise. ... If crude oil price plunged ... Washington might lean on a reluctant Saudi Arabia to cut production and push prices back up to a range of $18 to $22." [NYT 3-5-91:D1] Others believed that the failure to raise prices was the result of US influence. [Hogan 1992]

In fact, shortly after the bombing of Iraq began, Saudi Arabia cut output by 15 percent. When prices recovered it suddenly rescinded "most" of the cuts. [WSJ 1-22-91:A2] OPEC output for January was substantially down, for lack of demand. At end-February:

"Opinions differ even in the kingdom on how much the Saudis should reduce output on OPEC's return to quotas. But there are signals from the kingdom's oil-policy makers that they will be willing to cut output as much as necessary to support a $20 or $21 price <u>so long as others in OPEC cooperate</u>. ... `We hope that we get more commitments from the others--and a better understanding of our sacrifice in not using all our capacity'", [said a Saudi official]. WSJ 2-25-91:A1, emphasis added]

In fact, they did not get the cooperation, and were steadfast in refusing to be swing suppliers. The lesson had been learned. The alleged American influence is nowhere to be found.

THE POSTWAR MARKET IN 1991-1992

As Figure 1c shows, prices in the years 1991-1992 look like the rest of the post-1986 period, excepting June-December 1990. Measured excess capacity has stayed at practically zero. Yet as already noted, by November 1990 members felt burdened by it, and the feeling continued. We look at excess capacity below.

<u>Pricing methods show chronic oversupply</u> These did not change much. The lines between spot and term contracts remained unclear. [PIW 7-29-91:3] But a PIW survey found continuity from about the beginning of 1988. Term prices actually averaged below spot:

"For the past four years or so, since formula pricing was introduced, the long-term nature of supply contracts appears to have been more valuable to producers than to buyers. The producers are effectively willing to pay for the insurance of having steady customers by discounting their crudes relative to spot markets. The differences ... are not insignificant." [PIW 1-6-92:1]

This is strong evidence of an oversupplied market over the whole period, with the amount offered chronically in excess of the amount demanded. Yet during this time, the percent of capacity utilized was high and rising. By 1990, the apparent excess capacity was within the margin for measurement error - effectively zero. But prices declined more steeply than at any time since 1986.

Additional evidence is that an increasing number of suppliers signed "frame" contracts, which bound sellers but not buyers, who had "no obligation to take the oil if they don't want it" and "without canceling the contract". Prices were set cargo by cargo, and the exporter benefitted by keeping a wider customer list. [PIW 5-11-92:3, and SS] There is an obvious saving in transaction costs, but the buyer gained most.

There were price differentials according to cargo destination. These are usually but not always discriminatory. In spot markets, premia tended to be rapidly arbitraged away. But for term contracts on major Persian Gulf crudes, the advantage would last "anywhere from two to nine months at a time". In rising markets, Western buyers overpaid, in declining markets Asian buyers did. Apparently buyers expected the premia to balance the discounts. [PIW 4-13-92:1] This does not look like a permanent systematic difference. The prices of many crudes sold under term contracts were linked to one or another actively traded "benchmark" grade. In August 1992, PIW noted that for at least some important cases, the particular benchmark did not much matter, the result was nearly identical. [PIW 8-10-92:1]

Co-operation, dialogue, interdependence Japan briefly considered funding its commitment to a larger contribution to the Persian Gulf war by an import tax. "Some Saudi and Kuwaiti oilmen are furious. ... The energy tax proposal is seen as actively hostile." [PIW 2-4-91:3] The issue was kept alive partly at OPEC meetings. In March, some members said that

> "the group should publicly distance itself from old policies of large volume cutbacks aimed at creating price rallies in favor of an identity that emphasizes the need to prop up prices in time of surplus to ensure that capacity will be available to meet demands." [PIW 3-18-91:1, emphasis added]

This is a useful reminder of (1) what "old policies" had actually been: "large volume cutbacks" to boost prices; (2) the feeling of "surplus" even with Kuwait and Iraq shut down, when capacity seemed fully used; (3) exploiting consumer anxiety of not enough oil. In a May 1991 speech at Harvard, the Saudi Oil Minister Nazer called for "reciprocal energy security". In return for "even modest demonstrations of goodwill toward [Saudi Arabia] ... the US and other consumer nations would gain guaranteed access to a fairly priced ocean of oil." The modest goodwill was in financing of oil investment. [PIW 5-27-91:16] The terms of that investment, what "access" meant, or how it was to be "guaranteed", or "fairly priced" were all left unsaid.[59]

"Low oil prices are bad, some U.S. experts say." [NYT 3-12-91:D6] A Paris meeting of 21 consumer and producer nations was called for July 1991. The convening governments, France and Venezuela, said the conference would avoid pricing issues "focusing instead on finance and investment." [PIW 5-27-91:10] The journal itself saw not much of either form or substance at the meeting, but:

> "Rising European and Japanese oil product taxes were the target of the most intense attack by Saudi Arabia, Iran, and other producer countries. ... The producers shared their nightmare vision of billions of dollars in new investments--made partly at the behest of consumers--lying fallow because said consumers won't consume enough. ...the softer message being whispered in the corridors was that the clear battle lines from the oil wars of the 1970s and 1980s are becoming increasingly blurred." [PIW 7-8-91:1]

Money invested "at the behest of consumers" is the usual suggestion that producing countries invest to help consumers. But "clear battle lines" imply that there was organized resistance to the oil producers in 1970-1990, which could hardly be more untrue.

The International Energy Agency called a meeting of experts from producer and consumer countries. First scheduled for autumn 1991, it was held in Paris in March 1992. It also ignored prices and production, but addressed "industrial cooperation", and funding for upstream and downstream investment. [PIW 3-2-92:6] And a meeting of Ministers was called in Bergen in July 1992, to

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[59] The thesis is elaborated but not further clarified in Robert Mabro, "A Dialogue between Oil Producers and Consumers" (Oxford International Energy Studies, 1991)

pursue similar topics. Meanwhile the Asia-Pacific Economic Cooperation Conference set up an energy task force, which held at least four meetings to discuss Asian energy shortages. [PIW 5-25-92:4]

The surplus seemed permanent, and so did consumers' fear of shortage. Never the twain shall meet.

Foreign investment in OPEC Reports of foreign investment in the OPEC countries have been many and elusive after 1985, increasingly so in 1991-1992. But through 1992 there was mostly frustration.

Venezuela invited bids to reactivate old fields under service contracts, which did not require Congressional approval. [PIW 2-4-91:3; PIW 4-8-91:3] Nearly 90 bids were received, but only five bidders stayed because of the restrictions in the contracts. Negotiations dragged on over the amount of fees. [PIW 3-23-92:5][NYT 6-23-92:D4] But some contracts were signed in June. Foreign firms were guaranteed that production from the restored marginal fields would not be reduced by OPEC quotas. [PIW 9-21-92:3][60] One deal fell through because Shell's insistence on international arbitration of disputes would have required Congressional approval. [PIW 10-26-92:1] Finally, we may mention the Cristobal Colon liquefied natural gas (LNG) project, which seems to be uneconomic at prevailing natural gas prices in

[60] Similar provisions were being discussed in Iran, Iraq, and especially Abu Dhabi: "Companies say that they would be prepared to invest in further boosting capacity if the increased flows are guaranteed once the outlays are made."

the United States, the designated market.

There was also an attempt to form "strategic associations" with foreign companies, who would put up capital to build refineries to upgrade Orinoco crude, and thereby obtain "a better shot" at obtaining a conventional exploration contract, "although such ventures would be subject to approval by the Venezuelan Congress". That made it hopeless, especially with elections the following year. A proposed joint venture with Mitsubishi was not presented for Congressional approval. [PIW 4-20-92:6] [PIW 5-4-92:1] [WSJ 7-16-92:A7] By late 1992, time was running out for these "association" contracts. An attempt in the Venezuelan Congress to block them was in effect a warning that they might all have to wait until after the next elections, in late 1993. [PIW 8-17-92:3]

Venezuelan progress is slowed by political resistance to foreign investment. PDVSA receives insufficient funds for drilling, and makes uneconomic investment in oil refining and petrochemicals. They have come nowhere near their end-1991 target of 3 mbd capacity.

Kuwait was at first preoccupied with putting out the fires and capping the wells exploded by Iraqi forces before they withdrew. Outside the oil fields, things were soon normal. "Their nation saved, Kuwaitis now wait for someone to fix it." [NYT 4-5-91:A10] Diplomats now estimated the cost of rebuilding the oil industry at $5 billion to $10 billion--one tenth the sums being bandied about two months earlier. [WSJ 5-16-91:A1] It was a small part of their foreign assets.

Putting out all the fires was expected to take as long as two years. [WSJ 4-5-91:A11] "Experts here don't expect significant [oil] revenue for a year, perhaps longer. [WSJ 5-30-91:A11] Even at end-June 1991, the Kuwaiti Oil Minister expected only that more than half the fires would be out by end-March. [NYT 6-25-91:C4] In fact, all fires were extinguished and wells capped by November 6, in "less time than almost anyone expected, at less expense in lives and money, and with very few technical innovations." The first half of the work had taken six months, the second half less than two. The cost was variously estimated at from $1.5 to $2.2 billion. [NYT 11-7-91:A3] The incentive was strong. "The longer it takes Kuwait to get its industry up and running, ... the less clout it carries in OPEC power structure, where muscle is measured by oil output." [WSJ 2-24-92:B3C]

But Kuwait had "severe managerial problems". Had Kuwait Oil Company (KOC) installed downhole blowout preventers in wells, there might have been fewer fires. [PIW 5-6-91:1] In 1991, they were offered several equity deals, but refused them on principle. "Oil company expertise is essential for reservoir damage assessment and correction. ... Although KOC might be able to do much of the work itself, it does not have advanced reservoir-management experience." [PIW 9-30-91:3] BP as former operator had a natural inside track, asked for equity or production sharing, and was refused. The earlier-than-expected capping of wells improved KOC confidence. [PIW 11-18-91:3] But "Kuwait's lack of expertise in reservoir management" persisted, and an agreement was reached in March 1992, with BP reimbursement apparently both in cash and in crude oil. [PIW 3-23-92:1]

A trade publication, and Kuwait oilmen speaking privately, said future costs would be three times prewar because of damage and the need for pumping and secondary recovery. [WSJ 4-26-91:A1]

There are some rough cost indicators. "Some $2 billion to $2.5 billion of the near-term expenditures will be used to rebuild Kuwait's badly damaged oil fields." [WSJ 5-20-91:A8] This agrees with another report. "The total cost of rehabilitating Kuwait's oil industry is put at $8b to $10b". [NYT 5-4-92:A1] According to [CMB 1984], in the Middle East in 1980-1984 (the last five years available) expenditures on "crude oil and natural gas" were 23 percent of total oil industry capital expenditures. If so, then taking the high end of the range, crude oil production expenditures would have been $2.3 billion. If the newly established capacity is 2 mbd, the required investment would be $1,150 per daily barrel.

Kuwait recovery in production exceeded expectations. But they hoped to increase light crude oil output. This was believed to require the help of oil companies rather than engineering concerns, and there was no sign of lessening political resistance to oil companies. [PIW 7-13-92:1] Yet they remained hopeful of some kind of arrangement involving margins per barrel produced. [PIW 10-26-92:3]

As noted earlier, Algeria had been the first OPEC nation to begin trying to win back international companies. The prime minister floated a trial balloon, proposing to sell off part of the oil fields, but it was quelled by "vocal domestic opposition". [PIW 7-29-91:7] No more was heard of what was of course a red flag to the bull of fundamentalist Islam. By December 1991, Algeria claimed "expressions of interest from at least 19 firms in its plan to attract some $6 to $7 billion in cash bonuses for entry into enhanced oil-recovery programs", to increase oil production to 1.0 then 1.2 mbd. [PIW 12-23-91:3] But nothing more was heard of this interest. Algeria provided that foreign companies could take up to 49% of production of existing fields, but only after paying an amount equal to expenditures made by Sonatrach to discover and exploit the field. [NYT 12-2-91:D5] This was too clever by half. Nobody would reimburse Sonatrach for its notoriously improvident expenditures.

In 1992, the returning Oil Minister, Nordine Ait-Laouissine, successfully proposed to de-nationalize gas. "I had, 20 years earlier ... advocated the very measures that I was now proposing be overturned. But the national company was without money and the technical and human resources..." [PIW 3-9-92:6] The Minister was soon forced out, but the policy remained. However, there is as yet no evidence of an actual increase in Algerian investment. Drilling rigs active in 1992 were slightly below 1991, and one-fourth down from 1986.

Iraq remained cut off from foreign investment. But during August 1991, the USA suggested allowing the Kurds to use some of the Iraqi assets and funds held by Western governments "and to begin to exploit and export the huge oil resources in the north of Iraq." [NYT 8-20-91:A8] This would have added a formidable competitor to the market, with large resources, anxious to attract investment and sell oil. It would have endangered OPEC. Nothing more was heard of it.

Iraq actively negotiated with foreign companies.

"And unlike the flurry of talks before Iraq's takeover of Kuwait last August, this round is likely to bring equity positions for foreign companies and an active role for these firms well into the next century. ... Officials want to move quickly and seem likely to accept what was rejected out of hand 18 months ago [i.e., in April 1990] ... Baghdad would probably accept an agreement ... which would look a lot like a standard production-sharing contract but would be called something else." [PIW 10-28-91:1] [Nine months later:] "We are prepared to discuss all conditions, including production-sharing and profit oil, which will meet our requirement to increase production capacity to 5 to 6 mbd within four years", They were offering a production share of "5% and lower". [PIW 7-13-92:1, SS]

So said a senior official. (The reporter warned that not everyone in Baghdad agreed). A five percent fee is around $1 per barrel. It must provide a high rate of return for the unusual risk. That tells us much about Iraqi costs.

PIW reported after an on-the-ground tour that much of the Iraqi oil production industry had been restored. This paralleled other reports to the effect that "reconstruction efforts, financed by multibillion dollar slush funds still held by Iraq largely in Switzerland" have done much to repair infrastructure and provide food. [NYT 7-27-92:A7] It would be fascinating to know how the funds were built up. Iraq borrowing from foreign governments (over and above private banks and corporations) was estimated at from $86 billion to $90 billion. [WSJ 2-25-91:A5] [NYT 3-1-91:A8] It took some skill to divert a large proportion to safe havens. The cash reserve was estimated at nearly $30 billion before the war [NYT 4-25-93:14] and about $20 billion in early 1993. [Salomon Brothers International Oil 4-20-93] The use of the funds implies that Saddam Hussein and his government expect to remain in power. Total (formerly Compagnie Francaise des Petroles) has sent negotiators on frequent trips to Baghdad recently to discuss a return, particularly to develop the big Nahr Umr field in southern Iraq. [PE 1-93:5]

Iraq's willingness to accept foreign equity investment is unique among OPEC governments, a revolution in policy. We do not know how seriously to take it. Perhaps it will only prove that the Irish are right:

When the Devil was ill,
The Devil a monk would be.
When the Devil was well,
Devil a monk was he!

An increase in Iraq capacity, even to less than "5 or 6 mbd", financed and managed by foreign companies on equity contracts, would put overwhelming pressure on other OPEC producers to follow their example.

Iran is probably the most important example of attempts to link up with foreign companies. In May 1991, the goal was stated, of 5 mbd by 1993. [NYT 5-27-91:35] The method of association would be: "Long term crude sales contracts on favorable terms to companies that invest in exploration and development in Iran. However, [the Minister] ruled out any equity or production sharing agreements. ...Talks mainly involve existing discoveries that they can't afford to develop on their own." [WSJ 5-30-91:A6] There was even an NIOC-Total letter of intent on offshore oil field development. [WSJ 5-31-91:A10] No results are known.

Late in 1991, three offshore projects seemed "all remarkably close to equity deals". [PIW 10-14-91:1] Oil Minister Aghazadeh called them service contracts with a payout in crude oil.

What actually happened was a series of relatively short term loans. In about four years following the end of the war in 1988, Iran incurred roughly $25 billion of debt, by borrowing and by using suppliers' credits, for restoration of all kinds, including oil. Financing of this type tends to be expensive, and by end-1992 some interest and principal payment were in default. [PE 2:93:3]

It was not clear what if any kinds of oil development contracts had been signed. Iran and the companies were still far apart on the speed at which firms would be allowed to recover costs through crude liftings. Operators wanted 5 to 7 years, NIOC originally suggested up to 18. The fields would revert to NIOC after full recovery of all costs and a one-time return. [PIW 5-4-92:1] Two months later, Iran was said to be receptive to onshore exploration with foreign firms. Again equity could not be considered, but some risk-reward element might be. [PIW 7-27-92:1]

All this recalls the double-talk in Iraq over production-sharing "which would be called something else." It appears that Iran has had little help from foreign companies in restoring production. At end-November 1992, they could at most claim that "Iran expects to conclude negotiations soon on some" projects. As in Kuwait, questions have been raised about maximum sustainable capacity. "Wartime neglect, along with damage to surface facilities from Iraqi attacks, did greatly reduce pressure in oil reservoirs over the past decade." [WSJ 11-25-92:A1]

By their own efforts the Iranians have made slow but impressive progress. In 1989 they aimed for 4 mbd in one year, and they did get there in four years. In October 1992, Iran produced briefly at 4 mbd. This was not yet sustainable capacity. [PIW 10-19-92:1 [WSJ 11-5-92:A5] But even the forecast of 4.5 mbd in March 1993 [WSJ 10-19-92:A4] was treated with respect because Iran permitted a visit by foreign journalists, and gave estimates by individual fields, onshore and offshore. [OGJ 11-9-92:37] Such detail had not been released since 1978, although it was not audited. There might be slippage, but by no more than a quarter.

Moreover, NIOC said 60 drilling rigs were working or scheduled. [OGJ 11-9-92:37] By early 1943, 48 were reported operating. [OGJ 5-17-93:76] This is an impressive new departure. The previous (1978) high had been only 31 rigs. [AAPG-B, vol. 63, no. 10, October 1979, p. 1894] After zero rigs in 1980-1981, there had been only 3 in 1982, 13 in 1983, and thereafter a fairly steady 18-20 through 1991. [IPE] None of the big Gulf producers had ever exceeded 30 rigs, except for Iraq in 1980-1981. If maintained, the drilling rate promises a steady growth in Iran capacity. Iran aims to "convince OPEC colleagues that Iran--like Saudi Arabia--can turn up the taps unless it gets the price and quota that it desires." [PIW 10-19-92:1]

But an underlying 10 percent annual decline rate was also mentioned. Minister Aghazadeh said average output per well had steeply declined since the peak of the 1970s, but gave no data. He expected to exceed 5 mbd in the next five years. After that, it depended on demand. In the past two to three years, they had tried to compensate for war damage and underdevelopment. There were also some "enormous" prospects needing exploration. [PIW 10-26-92:7]

OPEC: MARKET SHARE CONTENTION AS USUAL

The 1991 meetings: "capacity is king" Capacity as a bargaining tool was again a major theme from the start of 1991. "Additions to capacity should ensure that Iran is better placed to argue for larger OPEC quota allocation the next time the issue is discussed." [PIW 1-28-91:3]

The first meeting was in March. Despite a 97 percent capacity utilization rate, and "despite all that has happened since Iraq invaded Kuwait ... [OPEC] delegates are making many of the same old arguments about the same thorny controversies that plagued them through most of the past decade." Should they restrict output, or was the price perhaps too high? Should the low-population Gulf producers make disproportionate cuts? Who was to blame for excess capacity? Should quotas be changed?

But there was one constant: "Saudi Arabia is adamant in its refusal to take on the swing-producer role even after the war." [PIW 2-25-91:1] "OPEC eyes hard job of allotting quotas as glut looms". [PIW 3-4-91:1] "They all recognize they have to cut output collectively for the second quarter. But how [to] do it? That's where the problems arise." [NYT 3-11-91:D1] The Saudis had been producing about 5 mbd, were now at 8 mbd, and would not consider going down to 7 mbd. If others insisted, there would simply be no agreement. [WSJ 3-11-91:A3] "As in the bad old days ... the key issues are whether oil glut and price collapse threaten and, if they do, who should bear the burden of fending them off." [PIW 3-11-91:1] The final decision was to cut by 5 percent, the Saudis keeping 8 mbd, with which others were discontented.

In form, quotas were suspended after the invasion. They were published, yet they were not considered quotas because they were voluntary. [NYT 3-13-91:D1] [WSJ 3-13-91:A3] That was a fig leaf. In fact, total output and its division continued as the obsessive interest of the group, no matter what the formal agenda (or lack of it) at the meetings. The pretense of non-quotas continued through November 1992. [WSJ 11-30-92:A2]

OPEC's "seemingly intractable conflict over how much each and all members should produce" remained. Any attempt to base quotas permanently on capacity would destroy OPEC, said two non-Gulf delegates. "Can the Saudis really afford to have us quit?" [PIW 3-18-91:1] Iran made "a stunning departure" from past policy to become a Saudi ally, a pricing "moderate", no longer calling for production cuts. [WSJ 3-18-91:A5] Nobody bothered to recall that only eight months earlier, "the general accord" of Saudi Arabia, Iran and Iraq had been a new dawn for the 1990s. (Above, p.165, NYT 7-25]

After the March 1991 meeting set the temporary quotas, "the burden of excess supply facing spot crude markets is keeping prices weak." [PMI 4-5-91:1] Saudi Arabia insisted that its capacity was 8.5 mbd, but many in the industry thought only 8 mbd was sustainable. Contractors tended to think it was below 7.5, but they were after all interested parties, "given the potential for lucrative contracts if more work is done." [PIW 5-20-91:1]

At the June 1991 meeting, "the conflict created by a shortage of customers now and a potential shortage of capacity later on could strain relations ... between Saudi Arabia and Iran." [PIW 6-3-91:1] There was worry over phasing in Kuwait and Iraq production, but neither issue had to be faced just then. [NYT 6-6-91:D6] It was "the shortest conference in more than a decade", and simply extended the production ceiling and the non-quotas. But sluggish demand led to inventory buildup and worry over prices. [WSJ 7-25-91:A2] Kuwait began exporting again, on a very small scale, and worries over the possibility of resumed Iraq exports depressed prices. [WSJ 7-30-91:A2]

In looking ahead to the September meeting, Saudi Arabia let it be known it wanted a higher OPEC ceiling, which would raise its non-quota to over 8 mbd. [WSJ 9-19-91:C14] It insisted that its sustainable capacity was 9 mbd. But "some insiders" worried that not enough maintenance work was being done. [PIW 9-23-91:1] The ministers disagreed on what level of demand to expect, but were gratified by a price increase since early September. [WSJ 9-24-91:C18] At the meeting, the big issue was:

"whether and how to move to a world without formal production quotas. ... But securing agreement from the others to supply 23.65 mbd--even given that this level implies little, if any shut-in capacity--was no easy task for the kingdom without formal quota allocations for individual countries. ... Riyadh managed to hold most of its ground, insisting that it would produce 8.5 mbd [whatever others did]. As always, the smaller producers would be expected to continue pumping at capacity." [PIW 9-23-91:1]

The last two sentences are not consistent. If smaller producers stay at capacity, the Saudi "ultimatum" is flouted. Yet the Saudis said they would make room for nobody. It had to be 8.5 mbd. [NYT 9-25-91:D10] The meeting agreed, with obvious reluctance. Other ministers were hostile to Minister Nazer's refusal to budge. [NYT 9-26-91:D1] [WSJ 9-27-91:A4] It was said that "all 13 countries now are living with a strong revenue imperative" [WSJ 9-30-91:A1] --as though they had ever lived with anything else.

The OPEC nations asked consumers for oil development aid. Secretary-General Subroto had said:

"OPEC is going to need substantial financing help if it is to expand capacity to meet the estimated growth in demand for its oil .... An increase in production capacity of five million barrels a day, over a five year period, would require investments amounting to $60 billion. ...[Including Iraq and Kuwait] a figure of $100 billion or more has been mentioned." [WSJ 4-9-91:A3]

In August 1992, the OPEC need was raised from $60 billion to $80 billion "in the next five years" and non-OPEC was said to need $170 billion. [OGJ 8-31-92:25] [WO 9-92:13] Requirements per country ranged from 2 to 30 thousand dollars per bd, but it was not explained whether the range included only OPEC or also non-OPEC. Such vague numbers are invulnerable.

In December 1991, there was the usual far-off glow of the day when demand would rise, perhaps beyond "technical capacity to produce." [NYT 11-25-91:D2] But in the meantime there was fear of weak prices in Spring 1992. [WSJ 11-25-91:A2] Accordingly, the end-November meeting agreed to continue at current production levels through the first quarter of 1992, but then cut in the second quarter. The non-quotas were expected to become quotas. [WSJ 11-27-91:C12] Saudi Arabia stated that their higher levels of output since the invasion were permanent, and that capacity would be raised to 10 mbd by 1994. [NYT 11-27-91:D1] There was "fear of a stormy spring. ... All, including Saudi Arabia, agree on the probable need for production cuts. But the abnormally fuzzy outlook for both supply and demand reinforced the usual conflicts ... to leave the group deeply divided on how best to cope with this prospect." [PIW 12-2-91:3]

IEA now reduced its estimates of expected demand. "The market consensus is that too much crude is being produced." [WSJ 12-5-91:A2] The Saudis refused to be the only ones to cut back, "holding oil taps wide open in soggy market. ... Oil prices may have dipped by several dollars in the past few weeks, but don't expect [production] cutbacks from Saudi Arabia as a result." [PIW 12-16-91:1] Algeria called for an emergency meeting, but was rebuffed. [NYT 12-24-91:D1] Another newspaper report gave some estimates by the respected Algerian oil minister of the effects of a production cut. They suggested a short-run demand elasticity at a very surprising 0.4. [WSJ 12-26-91:C12][61]

The Saudis were not bluffing. They made "a sharp rise" in December output. Some Iranians cried "treason", but the Saudis repeated that they would not cut output unless all other members did so. [WSJ 1-7-92:A3] Venezuela cut by 2 percent and said it hoped others would do so. [NYT 1-11-92:33] Others did, but by only small amounts. "Forecasts of a sharp drop in exports from the former Soviet Union...have not materialized. [NYT 1-21-92:D5] But on the eve of an emergency meeting, and after some more announcements of small cuts, the Saudis now said they would cut 100 tbd, or 1.2 percent. [WSJ 1-22-92:A2] Called in haste, the December meeting was "the most important for OPEC since December 1985". One estimate was that a cut of 2 mbd (from 24 to 22) would raise the OPEC "basket" from $17 to $21 [WSJ 2-10-92:A2], which implies elasticity of 0.41, again surprisingly high.

There was no formal debate over a proposal by the OPEC

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[61] Nordine Ait Laoussine said OPEC should immediately cut by at least 10 percent. Several oil analysts shared his view, one of them saying that without an output cut, prices would fall "quite possibly by as much as an additional $4 a barrel." [WSJ 11-26-91:C12]. Let the price ratio P equal $17.15/$13.15, the output ratio Q equal 0.9. Then if $Q=P^x$, and $.9 = (17.15/13.15)^x$, $x=-.397$. If we suppose a price decline of only $2, $x = -.85$

Secretariat: to fix second-quarter output to a given uniform percent below current output. The Saudis favored this, but Iran and others were unwilling. There were the usual puzzles over defining and measuring capacity. "Saudi Arabia will likely threaten to withdraw from the agreement and [produce more] if there is significant cheating by other members." [PIW 2-10-92:1]

"Capacity is king in OPEC efforts to overhaul quotas." The ministers agreed unanimously to cut output to raise prices. But the Saudis immediately said they wanted to retain their 35 percent of OPEC output. They recalled a bitter past when they were the only ones to honor an agreement to cut. They professed to want to keep prices "at a modest level--not much higher than...$18". [NYT 2-13-92:D6]

The Saudis wanted acceptance in principle of capacity or production as the basis for quotas. There was the rub. "Smaller members of OPEC such as Algeria ... want Saudi Arabia to account for most of the cutbacks because its production increased the most in the wake of the Persian Gulf crisis." The Saudis hinted they would be willing to reduce to 8 mbd, but only if others matched the percentage cuts. [WSJ 2-13-92:A2] After a few days' wrangling, OPEC agreed to reduce total output from 24.2 to 22.9 mbd, of which Saudi Arabia claimed over a third. The accord was viewed as "shaky". [NYT 2-16-92:19] Some wanted to come down to 22.5. [WSJ 2-18-92:A2]

It seems like a remarkably narrow range of disagreement, yet it had stretched out the meeting, and was never resolved. The

Saudis kept insisting that their capacity was 9 mbd, and backed this up by reaching that level in early February 1992. It was "a demonstration of capacity tied to the kingdom's demand during the Geneva OPEC meeting that new quotas and prorata cuts be based on production potential." [PIW 2-24-92:1]

Governments had an interest in overstating both capacity and production to get higher quotas. [PIW 2-24-92:1; see also PE 10-92:54] Minister Aghazadeh of Iran explained that its policy was to increase capacity, and it would have 4 mbd annual average capacity for the fiscal year beginning March 1992. "But it doesn't mean that we will need to produce at full capacity all the time. That depends on demand." [PIW 2-24-92:7] Like Saudi Arabia, Iran was making a demonstration of capacity for bargaining power against the others.

There was general disbelief of the 4 mbd; but as we will see later, Iran came close. In March, Saudi Aramco said it was actually awarding contracts for development to bring total capacity near 10 mbd. But they did not name a date. Current sustainable capacity was estimated officially at 9 mbd, unofficially at 8.6 to 8.7 mbd. [PIW 3-30-92:1]

The cuts agreed upon in February amounted to only 740 tbd, of which Saudi Arabia accounted for 500, short of the 1 mbd "seen as necessary to stabilize markets." [PIW 4-6-92:1]

Prices were up in early April 1992, on reports of actual OPEC March cuts of 0.9 mbd. But production was still considered too high, and Saudi Arabia, it was believed, would rebuff any suggestions that it produce less than 8 mbd. They had cut enough, and Iran had not. "Virtually all members agree that production restraint is still needed to preserve the fragile positive psychology found in oil markets."

Moreover, Kuwait was recovering faster than expected, reporting 920 tbd for the third week of April, and others would have to make room. [NYT 4-20-92:D2] "Although the high output declared is probably motivated in part by a need to increase [Kuwait's] quota allocation, there is no doubt that it is making rapid gains." But output data was becoming less trustworthy, and also less meaningful, since Saudi oil production might be going into its worldwide storage network. [PIW 4-20-92:1,SS]

There was a meeting late in April, and another meeting with 10 non-OPEC producers, not including Norway, Mexico, and Colombia, but including the oil-producing republics of the former Soviet Union. They had "a very useful exchange of views", said Minister Nazer. [WSJ 4-24-92:A4] An OPEC meeting the next day froze non-quotas--and they hoped output--at existing levels. [NYT 4-25-92:45] But they instructed the OPEC secretariat to report on "new ways to monitor effectively members' actual output." The market balance was considered as "fragile". [WSJ 4-27-92:A2]

By late May, prices had risen because of static output for three months despite rising demand. "Core Saudi policy goals remain intact, including ...at least 8 mbd." True, it had not been "legitimized" by the others, "but OPEC's poor track record in observing its ceiling undermines claims that Saudi Arabia made any major concessions." [PIW 6-1-92:1]

Their chief concern was the threat of taxes on oil products.

> "[The May agreement] is a `momentary signal' to Western governments that if higher oil prices are wanted to thwart demand, oil producers would be `perfectly happy to oblige'. ... [Saudi Oil Minister] Nazer recently warned the EC that adoption of an environmental, tax-oriented posture `introduces elements of uncertainty that would [negatively] affect investment to expand production capacities.'" [PIW 6-1-92:1]

At end-May, indeed, Saudi Arabia abandoned its "moderate oil pricing policy", and said it favored a $3 increase. Some observers considered it a show of disapproval of oil product taxes. Others said that having gained market share, Saudi Arabia was willing to see higher prices. Some Gulf oil officials cautioned that the Saudis were leaving much room for maneuver, and their policy was reversible. If other nations violated the "informal pledge" (the non-quota quota) they would raise their own output to retain their 35 percent share. Or, if Japan and the USA dissuaded the EC from product taxes, "the Saudis might reward the industrialized countries with lower oil prices." [NYT 5-27-92:D1] "This is a shot across their [Europeans'] bows", said a Saudi official. A carbon tax "wouldn't discourage energy use but would simply siphon off revenue rightfully [sic] due to the oil exporters." Others paraphrased OPEC sentiment: if they want higher prices, we'll give it to them. [WSJ 5-26-92:A3]

In fact, OPEC opposed taxes on oil products because they would depress demand, OPEC's market share, and crude oil prices. During 1990-1992, most consuming country governments made substantial increases in taxes on oil products: the twelve EEC members, by roughly $10 per barrel on average. They "scooped" the decreases in crude oil prices, diverting them from the producers and consumers into the national treasuries. [CGES, vol. 4, issue 3, May-June 1993, pp. 35-44] The Economist in 1985 had urged this particularly on the US, which however continued unable to tax gasoline. One must agree with the CGES warning that "the OPEC countries have far more reason to dread the fiscal demands of OECD governments than the introduction of environmental taxes."

The concern over consumer-country taxes was well founded. But the threats were ridiculous (see Table II: Effects of a Price Rise). They were made because OPEC knew many in the consuming countries would take them seriously. "The Bush Administration reacted with disappointment to the decision of its moderate Arab ally." [WSJ 5-27-92:A2] Daniel Yergin said that oil producers had sought higher prices after European countries had raised oil product taxes. [NYT 6-6-92:37] He seemed unaware that "after" was in fact decades after. But the ancient post hoc fallacy has no statute of limitations.

At any rate, OPEC's "surprise endorsement of an output ceiling below most estimates of the third-quarter call on its crude gave off a loud bang in oil markets last month. Now ... strong prices [are] the runaway favorite." [PMI 6-4-92:1]

They continued strong through August, and at the end of the month "winter looks tight". [PIW 8-24-92:1] But only a week later, the market was having difficulty absorbing OPEC crude.

[PIW 8-31-92:1] Prices began moving down. More than ever, at the September meeting, attention focussed on the basket, which was below $19.50 when it should have been $21. There was unusually good agreement on estimates of fourth-quarter demand, the range being only from 24.5 to 25.1 mbd. "The debate is more over what each country should produce to meet the demand." [WSJ 9-15-92:A4]

Iran warned that if others exceeded their quotas, they would produce an additional 800 tbd. It was now a credible threat, for they now claimed capacity of 4 mbd, and announced they would produce at that rate during some part of October. By March 1993 they would be up to 4.5 mbd. They claimed that the investment in new producing capacity had been entirely for cash; only refinery and petrochemical investment had been on suppliers' credit. [PIW 9-27-92:1]

At the September meeting, all members favored higher prices, but there would be "a sudden, if brief, tailspin should Saudi Arabia and Iran lock horns over their respective production capabilities and related claims for market share." They all agreed that the safest way to avoid a row over quotas was to extend the existing agreement, and let Kuwait have the increased production. Kuwait expected to (and did) reach 1.5 mbd by years-end. OPEC expected a strong winter. [PIW 9-14-92:1,5] But: "with the passage of time, the group's repeated inability to compromise in periods of comfort bodes ill for its chances of reexerting discipline when times get tough." [PIW 9-21-92:1] Prices declined on Iran's assurance that they "won't flood the market, but pump as much as the market will bear." [WSJ 9-22-92:C14]

Good news for the group was that Libyan plans to expand to 2 mbd by 1993 had slipped a year [PIW 9-28-92:4], and that Nigeria had refused to improve terms for resident companies, which could delay or derail plans to reach 2.5 mbd by 1995. But there was "a nagging source of uncertainty": just how far Saudi Arabia would go to defend the market share which it had formalized at 34.7 percent. [PIW 10-5-92:2] For the year 1992, however, it was just under 33 percent.

Iran's escalation was matched by its neighbors. Kuwait's claim for a 2 mbd quota "is seen as positioning in response to Iran's attempts to stake out a 4 mbd capacity figure. ... Recent UAE claims that it plans to expand its current 2.4 mbd capacity are seen in the same light." [PIW 11-3-92:1]

Prices had been strong throughout 1992, but futures began to decline in early October, and spot price fell more, going into "contango" by the beginning of December. This meant that prompt oil was selling at a discount, the usual symptom of overfull inventories. OPEC output in October had gone over 25 mbd, a 12-year high. At the November 25 meeting, they returned from non-quota quotas to real quotas. [NYT 11-4-92:D7] The Saudis called for lower output, but were not willing to be the only one to cut back, despite Iran and others urging that honor upon them. [WSJ 11-10-92:A2] [WSJ 11-23-92:C12]

Suggestions for an output cut were of the order of 2 to 3 percent. [WSJ 11-24-92:A2] But even this modest objective eluded them. All agreed on the need. "But no one wants to make the first or deepest cut." [NYT 11-27-92:D10] Finally they decided that all must make "temporary allocations" [11-28-92:34]. It took them another two days to arrive at an output cut of only 0.55 percent, which is of course effectively zero. Essentially it was a return to the pre-invasion schedules, except that Iran received 3.5 mbd instead of its old 3.2 mbd. It took Iran nearly a day to accept this. [WSJ 11-30-92:A2] "Saudi Arabia refus[ed] to budge from its 8.4 mbd allocation, although the kingdom did accept a modest drop in its percentage." Iran, which had gained respect with the 4 mbd output demonstration in October, again promised 4.5 mbd for March, and even implied it would be sustainable, and demanded that its quota be raised to 4 mbd. [PIW 12-7-92:1]

At any rate, November's quota reductions were negligible, and actual output was not reduced, "underscoring the 'you first' problem that members have when it comes to ceding tangible market share in order to defend prices." [PIW 1-11-93:1] It was estimated that perhaps 2 mbd additional capacity would be in place by midsummer, mostly in Saudi Arabia and Iran. "Others seem to be running to stay in place." [PIW 1-4-93:1]

Two constants remained. One was "the standing position of Saudi Arabia that production cuts must be shared proportionately, leaving it a one-third share of OPEC's output." [WSJ 1-26-93:A3]

The other was the chronic financial crisis. Only the UAE was still clearly a creditor nation. All the others currently "seek extra funds to finance budget deficits and industrial imports, ... or simply to subsidize layabout relatives. None of OPEC's main members is living within its means, nor is likely to any time soon." [WSJ 1-29-93:A11]

The most important was, of course, Saudi Arabia.

"The bloated public sector can no longer absorb every young Saudi, and the private sector prefers cheap, well-trained foreigners to Saudi graduates whose education still relies heavily on rote and on Islam. Private sector employment remains only 10% Saudi. ... The infrastructure and welfare state built in the boom years of the late 1970s and early 1980s also are starting to creak. Some Jidda streets get water only two days a week, doctors often deliver babies in the emergency room because hospital beds are scarce." [WSJ 1-13-93:A1]

From the week of October 12 to the last week of January 1993, the OPEC basket fell from $19.60 to $16.33; the Dubai Fateh marker, from $18.70 to $14.70. [PIW 10-19-92:8; 1-36-94:8] Everything now depended on the mid-February meeting.

Nigeria summed up the plight of the OPEC nations:

"Plagued by debts of nearly $30 billion, fear of civil unrest if subsidies are cut and IMF wrath if they aren't, ... the Nigerian government ... in hopes of reducing its deficit for 1993, ... is opening the crude taps every side and --despite earlier laments from partners that this would delay capacity expansion--cutting oil field budgets from 1992 levels." [PIW 1-25-93:1]

The private companies wanted to invest more, because it was profitable. It would have meant larger production and revenues in the future. But if the government could not match the outlays, its share of ownership would have been reduced. And this was intolerable.

THE SOVIET IMPLOSION[62]

We first briefly review what has happened inside the FSU (Former Soviet Union) oil industry, then its effect on the world oil market.

FSU oil industry The conventional wisdom, reviewed earlier in the article by Arbatov, was rising marginal cost, i. e. increasing capital expenditures per unit of incremental capacity. The Soviet Government had responded to growing scarcity in the 1980s by investing ever more heavily in order to maintain production and exports. A more rational system would mean much less investment and production, indeed a change from export to import.

The theory was right but a basic assumption was not: that aside from excessive investment and some incidental waste the Soviet oil industry was not radically inefficient as compared with the capitalist world. But this was not true.

Haste, lack of accountability, and rigid adherence to rules which nobody dared question had brought about a severe distortion of effort. An outsider might have suspected this.[63] But what

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[62] The following sketch is based on press reports, and on the references cited. It has benefited from the comments of Joseph S. Berliner.

[63] I may be permitted a personal reminiscence. In 1970, I chaired a session at a conference on Arctic oil and gas of the American Association of Petroleum Geologists. There was some Soviet attendance. After my session was over, two Soviet petroleum engineers walked up to the podium, where I was the only remaining person. I wish I could have had a tape recorder under the table. Their remarks were quite apolitical, but they were extremely

proved it, and made the idea of imports grotesque, was numerous private oil companies crowding into the FSU, trying to obtain production rights. Of course there had been a general deterioration of equipment and producing reservoirs. Much of the old FSU industry needed to be shut down, but there could be great expansion, to the profit of all concerned. It seemed providential: a large industry which could export and supply a stream of foreign exchange with which to buy badly needed consumption and investment goods.

Unfortunately, it has not worked that way. Underlying all the detailed mistakes, some to be noted shortly, was a complete absence of any notion of investment, and of the marginal efficiency of capital. No producing unit owned assets, with a value it would try to expand. It brought factors together by using funds made available by the next higher command unit, carried out its plan as best it could, and transferred revenues back to the command unit. There was no scanning mechanism to evaluate many possible courses of action and choose the most profitable in the long run. Managers might be rewarded with a bonus for output not return. The earlier discussion of regressive taxes based on output not profit (above, pp. 28) fits precisely.

Many have noted how similar was Soviet agriculture to the

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articulate and disgusted with the rigid rules they had to follow, where and how deep to drill, etc., and the waste it entailed, in time and capital equipment and supplies. Why use trained engineers, one of them asked, to do stupid things which revolted their knowledge and intelligence, because somebody had written them into the rule book for reasons which had long since ceased to make sense, if they ever had.

harsh paper-stacking bureaucracy of Ptolmaic Egypt. We need a similar perspective on industry. In antiquity there was trade, private property, and widespread laissez faire, but money capital did not exist. There was no banking system, no means of pooling savings, no negotiable credit instruments. There were not even the most rudimentary notions of investment, return and risk. Hence the lack of innovation, and of economic thought. There was no such thing as the value-maximizing firm, spending a present amount of money to generate a future income stream worth more than the outlay, seeking the better investment and shedding the worse. [Finley 1981, pp. 179-190] [Green 1990, pp. 362-375] [Schumpeter 1954, pp. 54-78]

No such things were known in antiquity, nor in the Soviet Union. The FSU oil industry is a fossil. But (cf. above, pp. 125), the OPEC and non-OPEC national oil companies are not strongly different. None of them has its own capital assets whose value it tries to increase. It is ironical that national companies account for over two thirds of world oil production at a time when Socialism is scorned everywhere as a bad idea whose day is gone.

The worst mistake in the FSU was probably to continue price controls, and then only gradually relax them. The same bad reason was given as in the USA in the 1970s: decontrol would promote inflation. But the effect was much worse in the FSU because of the strong or hyper inflation generated when the banking system extended unlimited credit and spending power to industries. The slowly decontrolled oil prices lagged the rise in other prices. The net result was a drastic fall in the real price of crude oil and products, which at end-1992 were about 5 percent of world prices, prevented producers from buying current supplies and services, and depressed living standards further in locations often harsh and remote. Until the end of January 1993, the national gas field price was 1.1 cents per mcf, industrial customers paid 5.7 cents, European customers $2.40. [WSJ 4-9-93:A6]

Failure to decontrol prices also meant failure to begin rationalizing consumption. Energy was grossly wasted in industry and households, e.g. overheated apartment buildings where the only way to lower the temperature was to open the windows. Energy costs were a small part of the total production or living cost, and increases could have been borne relatively easily. Hardship subsidies could have been provided at a small fraction of the cost. Private motorists were few, and grass-roots grumbles over gasoline prices accordingly faint.

The second mistake was a sort of squatters' privatization, de facto takeovers by the old management of regional producing groups or associations. Because of price controls, the associations lost heavily, and could not obtain supplies or keep labor. The associations were propped up by "loans" which kept them all going, the best and the worst. The most important task is to sort out the assets, and choose which wells and fields to shut in and which to expand. It has not begun.

The gap between the controlled and uncontrolled price levels now generated enormous rents. Of course the "owners" tried to sell all they could in non-controlled markets, particularly as exports, where some of the proceeds could be diverted into foreign bank accounts. The bizarre result was an FSU export of capital. These sales were often illegal, and huge sums were reported paid in bribes. This in turn provoked the FSU governments into heavy and haphazard taxation, in order to keep most of that income flowing into the national treasuries.

Many Western oil companies tried to obtain concessions in the FSU, but the great activity had generated little investment by the end of 1992. There was no legal framework within which companies could work, nothing they could take for granted. To work out terms of investment is difficult at best (above, pp. 27). Here it was made harder by unfamiliarity with concepts like risk-bearing and return. The tax system seemed to combine most of the bad features of tax systems around the world. Of course there was the usual populist suspicion of foreign capitalists, and fear of giving away the family jewels. The extreme devaluation of the ruble fed these fears, yet it was irrelevant, because foreign companies were not acquiring tangible assets, only rights to invest.

Moreover, domestic "squatters" wanted to have preference to exploitation rights. They could in part re-sell to foreign companies. The usual protectionist slogan was jobs for the local boys. In the great Stokmanovskoye gas field, a Russian company said it could do the job more cheaply, and provide "more jobs for Russians and ...a large part of its equipment orders with domestic enterprises." [OGJ 11-16-92:NL1] When the cheapness is seen to be illusory, it will be too late to avoid waste and delays.

There was contention between each FSU republic and its constituent regions, each of which tried to get its share of the investment spending and eventual income. Of course this is a familiar pattern worldwide, in any country with a federal or provincial system of government. Moreover, non-producer republics through which pipelines passed could play the robber baron and demand high fees for transit rights. In October 1992, Ukraine reduced the flow of Russian gas to make its threats credible, which jolted foreign customers, and injured both Ukraine and Russia. In March 1993, Russia was apparently doing the same thing to Kazakhstan. These power games involved direct immediate loss but the worst efforts were long run: increased risk made foreign and domestic investors more reluctant and determined to hold out for bigger returns.

Thus, although the FSU oil industry was shown in a very short time to be capable of much profitable expansion, its potential had not checked the decline in output by the end of 1992. Natural gas had so far held steady, but under-maintenance threatened a decline. Possibly Azerbaijan and Kazakhstan, free to make their own bargains with foreign companies, will show Russia the way.

World market The FSU industry is worth much more attention than we can give it because it is the largest non-OPEC segment. The problems are thrown up onto a huge screen. But the effects on the world market were already well advanced by the end of 1992. By dissolving the old Soviet enclave into the world market, they enlarged that market and decreased the OPEC share. As of 1992, OPEC exports were about 22 mbd (27 mbd production including natural gas liquids less 5 mbd OPEC consumption). Total non-Soviet consumption (the old "free world" less OPEC consumption) was 53 mbd (58 less 5). But total world consumption was about 60 mbd (65 less 5). Thus OPEC market share was 41 percent in the old market, 37 percent in the new.

This arithmetic anticipates a gradual process, of course. Shipments within an FSU republic will in time be paid for at world market prices, as exports are already. Urals crude has emerged as a marker or designator crude for Western Europe, analogous to West Texas Intermediate in the USA. It "already influences markets for dozens of crudes, including most Mideast barrels moving into Europe." [PIW 5-4-92:3] And in August 1992, "deliveries [by FSU republics] have risen ... to 2.4 mbd despite falling production levels, leading OPEC to complain of market disruption." [OGJ 8-17-92:NL3, emphasis added]

REFERENCES

[AAPG-B (date)] The American Association of Petroleum Geologists Bulletin, annual issue "Foreign Developments", later successor annual issue "World Energy Development". Ceased after 1991.

[Adelman 1972] M. A. Adelman, The World Petroleum Market (Baltimore: Johns Hopkins University Press for Resources For The Future)

[Adelman et al 1983] --, John C. Houghton, Gordon M. Kaufman, and Martin B. Zimmerman, Energy Resources in an Uncertain Future (Cambridge, Mass.: Ballinger Publishing Co.)

[Adelman 1985] --, "An Unstable World Oil Market", The Energy Journal, vol. 6, no. 1

[Adelman 1986] --, "Oil Producing Countries' Discount Rates", Resources and Energy, vol. 8, no. 4

[Adelman 1987] --, "Are We Heading Towards Another Energy Crisis?" (Remarks at the National Press Club, September 29, 1987, published as an Occasional Paper by MIT CEEPR)

[Adelman 1992] ------, "Finding and Developing Costs in the United States, 1945-1986", Advances in the Economics of Energy & Resources, vol. 7 pp. 11-58

[Adelman 1993] ------, "Problems in Modeling World Oil Supply", The Energy Journal (special issue in memoriam David O. Wood), April

[Adelman & Lynch 1986] ------ and Michael C. Lynch, "Natural Gas Trade in Western Europe: The Permanent Surplus," in Western Europe Natural Gas Trade:Final Report (MIT CEPR, December 1986)

[Akins 1981] James E. Akins, "The Influence of Politics on Oil Pricing and Production Policies", paper presented to International Herald Tribune-Oil Daily symposium "Oil and Money in the Eighties", London, September 28, 1981, p.9]

[Akins 1991] ------, "The New Arabia", Foreign Affairs, vol. 70, No. 3, Summer 1991, pp. 36

[API:SOGE] American Petroleum Institute, Survey on Oil and Gas Expenditures, annual, 1983-

[Arshi 1992] Ali Asghar Arshi, "Energy Swaps as Profit Motive Instruments in Oil Markets", OPEC Review, vol. 16, no. 2, pp. 201-216]

[Berndt & Wood 1987] Ernst R. Berndt and David O. Wood, "Energy

Price Shocks and Productivity Growth: a Survey", in Richard L. Gordon, Henry D. Jacoby, and Martin B. Zimmerman, eds. Markets and Regulation (Cambridge, Mass.: MIT Press)

[Balogh 1980] Thomas Balogh, "Oil Recycling--the Need for a New Lending Facility?", Lloyds Bank Review, No. 137, July 1980, pp. 16-25

[Binks 1992] Adrian Binks, "Price Reporting and price formulas: minimizing price risk", OPEC Bulletin, vol 23, no. 10, November/December, pp 13-16

[Blitzer Cavoulacos Lessard & Paddock 1985] Charles Blitzer, Panos Cavoulacos, Don Lessard, and James L. Paddock, "An analysis of financial and fiscal impediments to oil and gas exploration in developing countries", The Energy Journal, vol. 6. special tax issue, 59-72 (1985)

[Bradley 1986] Paul G. Bradley, Director, Report of the Mineral Revenues Inquiry in regard to The Study into Mineral (including Petroleum) revenues in Western Australia Two volumes, 203 and 243 pp. (Perth, Western Australia: Government Printer, 30 August 1986)

[Bradley and Watkins 1987] Paul G. Bradley and G. Campbell Watkins, "Net Value Royalties: practical tool or economist's illusion", Resources Policy, vol. 13, no. 4, December, pp. 279-288

[BP] British Petroleum , BP Statistical Review of World Energy, annual

[Canada 1980] Government of Canada. Department of Energy Mines & Resources. The National Energy Program (Ottawa: 1980)

[Canada 1982] ----- The National Energy Program: Update 1982 (Ottawa: 1982)

[CGES 1992] Center for Global Energy Studies [London], Global Oil Report, six issues per year

[Chase Manhattan] Chase Manhattan Bank, Capital Expenditures of the World Petroleum Industry, annual, ceased publication after 1987

[CIA-IESR] CIA, International Energy Statistical Review, monthly

[Dahl and Yucel 1991] Carol Dahl and Mine Yucel, "Testing Alternative Hypotheses of Oil Producer Behavior", The Energy Journal, vol. 12, no. 4, December, pp. 117-138.

[DOE-IPSR] US Department of Energy, International Petroleum Statistics Report, monthly

[DOE/EIA 1989] Department of Energy, Energy Information Administration, International Energy Outlook: 1989

[DOE/EIA 1991] Energy Information Administration, Symposium on Short-Term Energy Forecasting (November 21, 1991)

[Dominguez Strong & Weiner 1989] Kathryn M. Dominguez, John S. Strong, and Robert J. Weiner, Oil and Money: Coping with Price Risk Through Financial Markets (Cambridge, Mass.: Harvard College)

[Eckbo 1987] Paul Leo Eckbo, "Worldwide Petroleum Taxation: the Pressure for Revision", in [Gordon, Jacoby, and Zimmerman, eds. 1987], pp. 214-233

Energy Modeling Forum, EMF Report 11, International Oil Supplies and Demands (Energy Modeling Forum, Stanford University, Stanford California 94305, April 1992), pp. 154-155

[Fesharaki 1980] Fereiden Fesharaki, "Global Petroleum Supplies in the 1980s," OPEC Review, Summer 1980, pp. 27-49

[Finley 1981] M.I. Finley, Economy and Society in Ancient Greece (ed. Brent D. Shaw and Richard P. Saller) (New York: Viking Press 1981) [Inaccurate title: there is much on Roman times.]

[FTC 1952] The International Petroleum Cartel. Staff Report to the Federal Trade Commission submitted to the Subcommittee on Monopoly of the Select Committee on Small Business, United States Senate (Washington: US Government Printing Office, 1952]

[Garnaut and Clunies-Ross 1975] R. Garnaut and H. Clunies-Ross, "Uncertainty, Risk Aversion, and the Taxing of Natural Resource Projects", Economic Journal, vol. 85 , June, pp. 272-287

[Gordon Jacoby & Zimmerman 1987] Richard L. Gordon, Henry D. Jacoby, and Martin B. Zimmerman, eds., Energy: Markets and Regulation (Cambridge: MIT Press 1987)

[Green 1990] Peter Green, Alexander to Actium: the historical evolution of the Hellenistic Age (Berkeley and Los Angeles: the University of California Press, 1990)

[Griffin 1979] James M. Griffin, Energy Conservation in the OECD: 1980 to 2000 (Cambridge, Mass.: Ballinger)

[Griffin 1985] James M. Griffin, "OPEC Behavior: a test of "Alternative Hypotheses", American Economic Review, vol. 75, no. 5, pp. 954-963

[Hogan 1989] William W. Hogan, World Oil Price Projections: a Sensitivity Analysis (Cambridge, Mass.: Kennedy School of Government, 1989)

[Hogan 1992] William W. Hogan, Oil Market Adjustments and the New World Order (Cambridge, Mass.: Kennedy School of Government, rev. July 1992]

[Hubbard & Weiner 1989] R. Glenn Hubbard and Robert J. Weiner, "Contracting and Price Adjustment in Commodity Markets: Evidence from Copper and Oil", Review of Economics & Statistics, vol. LXXi, no. 1, February 1989

[IEA 1991] International Energy Agency, Energy and Oil Outlook to 2005, 25 April 1991

[IMF-IFS] International Monetary Fund, International Financial Statistics, annual

[IPE] International Petroleum Encyclopedia (Tulsa, PennWell Publishing Co., annual)

[Ali Jaidah 1988] Ali Jaidah, "Oil Pricing: a Role in Search of an Actor," paper at Oxford Energy Seminar, reprinted as Special Supplement to PIW 9-12-88

[Kaldor 1983] Nicholas Kaldor, "The Role of Commodity Prices in Economic Recovery", Lloyds Bank Review, July 1983, pp. 21-34

[Kemp 1987] Alexander Kemp (postscript by Campbell Watkins), Petroleum Rent Collection Around the World (Halifax, Nova Scotia: The Institute for Research on Public Policy)

[Kemp Reading and Macdonald 1992] Alexander Kemp, David Reading, and Bruce Macdonald, "The Effects of the Fiscal Terms Applied to Offshore Petroleum Exploitation of New Fields", North Sea Study Occasional Paper No. 37 (University of Aberdeen Department of Economics, April)

[Kouris 1983] George Kouris, "Energy Demand Elasticities in Industrialized Countries: A Survey", The Energy Journal, vol 4 no 3, July

[Lund 1992] Diderik Lund, "Petroleum taxation under uncertainty: contingent claims analysis with an application to Norway", Energy Economics, vol. 14, No. 1, January, pp. 23-31

[Lynch 1987] Michael C. Lynch, "The Underprojection of Non-OPEC Third World Oil Production", Proceedings Ninth International Conference, International Association of Energy Economists (Calgary, July 1987]

[Lynch 1989] ------, Oil Prices to 2000: the economics of the oil market (London: Economist Intelligence Unit, Special Report No. 1160), May 1989

[Lynch 1992] ------, "The Fog of Commerce: the Failure of Long-term Oil Market Forecasting," MIT Center for International Studies, September 1992.

[Mead 1986] Walter J. Mead, "Competition in Outer shelf Oil and Gas Lease Auctions", National Resource Journal, vol. 26, Winter, pp. 95-111

[Mead and Sorenson 1980] Walter J. Mead and Philip E. Sorenson, Competition and Performance in OCS Oil and Gas Lease Sales and Development, 1954-1969, report to U.S. Geological Survey (contract no. 14-08-0001-16552), March

[Moroney 1993] John R. Moroney, "Energy, Capital, and Technological Change in the United States", Resources and Energy, vol. 14, no. 4, pp. 363-380

[Odell 1978] Peter Odell, "Back to Cheap Oil?", Lloyds Bank Review, July 1978

[Ofurhie et al 1991] M.A. Ofurhie, M.C. Amaechi, A.O. Idowu, "How Nigeria looked at fiscal terms, prospects" OGJ 11-25-91:82

[OGJ month-day-year:page] Oil & Gas Journal, weekly

[OPEC-R] OPEC Review, monthly

[OPEC Stat Bull] OPEC, Annual Statistical Bulletin

[OPEC-B 1992] OPEC Bulletin, October 1992

[PMI month-day-year:page] Petroleum Market Intelligence, monthly supplement to PIW

[PIW month-day-year:page] Petroleum Intelligence Weekly

[PIW Swaps Report] Amy Jaffe, Sarah Miller, and Thomas Wallin, The Complete Guide to Oil Price Swaps (New York: Petroleum Intelligence Weekly Special Report, October 1990)

[Radetzki et al.] Marian Radetzki et al., Energy and Economic Reform in the FSU [Stockholm: SNS Energy 1993 - forthcoming publication by Macmillan]

[Sadowski 1992] Yahya Sadowski, "Sandstorm With a Silver Lining?", Brookings Review Summer 1992

[Schumpeter 1954] Joseph A. Schumpeter, History of Economic Analysis (Oxford University Press 1954)

[Smith 1987] James L. Smith, "International Petroleum Taxation: Reasons for Instability", World Energy Markets. Proceedings Ninth International Conference, International Association of Energy Economists, ed. John G. Rowse (Calgary), pp. 571-579

[Smith 1992] James L. Smith, "The Fuel that Came in From the Cold," unpublished.

[Smith 1993] James L. Smith, Rapporteur of The Russian Oil Industry: Foreign Investment Opportunities, conference convened by Petroleum Intelligence Weekly, Royal Institute of International Affairs, and Moscow Centre for Foreign Investment & Privatization, London (February 11 & 12, 1993)

[UN 1955] United Nations. Economic Commission for Europe. The Price of Oil in Western Europe (E/ECE/205, Geneva)

[Verleger 1987] Philip K. Verleger Jr., "The Evolution of Oil as a Commodity", in [Gordon Jacoby & Zimmerman 1987], pp. 161-186

[Watkins 1993] G. Campbell Watkins, "Unravelling a Riddle: the Outlook for Russian Oil and Gas," revised version of paper given at the 7th symposium on Pacific Energy Cooperation, Tokyo, February 1993

[Watt 1989] Donald Cameron Watt, How War Came: the immediate origins of the Second World War (New York: Pantheon Books]

[Weiner 1992] Robert J. Weiner, "The Oil Futures Market in the Gulf Crisis", Kennedy School Center for Business & Government, Energy 92-3

[Wood 1990] David A. Wood (of International Petroleum Corp.) "Appraisal of economic performance of global exploration contracts," Oil & Gas Journal, 10-29-90:48

[WO] World Oil, monthly

[WO-IOO] World Oil, annual International Outlook Issue

[Zannetos 1966] Zenon S. Zannetos, The Theory of Oil Tankship Rates (Cambridge: MIT Press, 1966)

CONCLUSION: A LOOK BACK AND AHEAD

Price turning point From War II to 1970, consumption grew by a factor of six. Not only was there no strain on supply--finding-developing-production costs declined.

OPEC was formed in 1960, and for its first ten years it increased its members' share of oil revenues at the companies' expense, without affecting prices. They converted income taxes to excise taxes, which were a floor to prices. This gave them a new option: by raising excise taxes, in concert, they could raise prices and receipts. They did this in 1970-1973. Then they carried out two price explosions and expropriated the multinational oil companies.

Defining the cartel Before the 1970s, low-cost output expanded rapidly at the expense of high-cost. That is how a competitive market works to economize resource use. Then a complete reversal: higher-cost areas expanded while lower-cost producers contracted. For over 20 years, high-cost producers have sold all they can produce, while the low-cost producers hold back and produce only what they can sell, at the current price.

Why do low-cost producers stand aside for high-cost, and let enormous cheap deposits lie untouched or underdeveloped? "Political explanations" make no sense in theory or history. Only a simple explanation works: low-cost producers restrict output to protect the price. But what price are they protecting?

Limits of OPEC power A rational monopoly tries for a price yielding maximum profits.

[FIGURE 4 -- REAL & ILLUSORY D-CURVES]

Figure 4 shows how the cartel set the price target in 1973, and again in 1979. They thought the price could be raised, with very little sales loss, up to where synthetic crude oils could be produced in large amounts.

This is a logical monopoly target. Only when oil-on-oil competition is suppressed can the price be fixed to the nearest alternative. So the theory was right, but the facts were not as expected. Consumers responded to price within a few years.

Even in 1981, OPEC saw itself as still on the upward path, and expected to raise the price again in time. By 1983, their real (inflation-adjusted) revenues were less than in 1978, before the second price hike. Seldom has a mistake been punished so quickly. OPEC members did not lose their power, they regained their wits.

[TABLE II -- RESULTS OF AN OPEC PRICE INCREASE]

The market share trap With the benefit of hindsight, we can see that the OPEC mission is to trade market share for a higher price. When market share gets too low, there's no more to trade. Table II shows the relation between market share and demand elasticity, both for total OPEC and for Saudi Arabia. The table can be used to trace the effects of the incessant pull and heave of the OPEC members trying each to get just a bit more, and the final impact on Saudi sales.

The far-right column shows the effect of a 10 percent tax on

Figure 4. Real & Supposed Oil Demand Curves

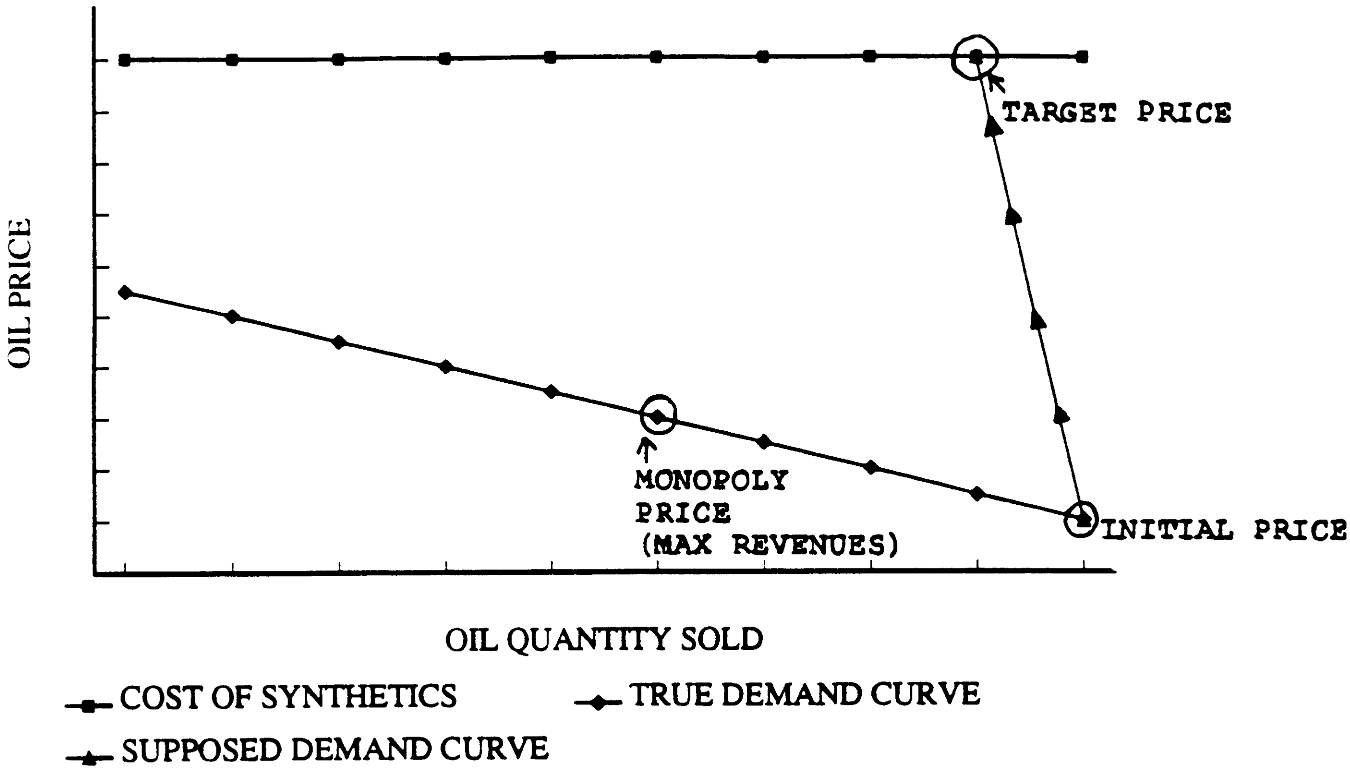

TABLE II. RESULT OF AN OPEC PRICE INCREASE

		(50 PERCENT INCREASE) CRUDE OIL ONE YEAR		CRUDE OIL FIVE YEARS		10 PCT TAX ON PRODUCTS (LONG TERM)
	notation					
AGGREGATE ALL SELLERS						
New price: ratio to old price	P	1.5		1.5		1.10
Price elasticity of demand	E	-0.10		-0.20		-1.00
New sales volume: ratio to old	Q=P^E	0.96		0.92		0.91
New revenues: ratio to old	PQ=P^(E+1)	1.44		1.38		1.00
SUB-GROUP			(Saudi)		(Saudi)	Total
Initial market share	G	0.37	0.12	0.37	0.12	0.34
New sales volume: ratio to old	Q(G) = Q-(1-G)/G	0.89	0.67	0.79	0.36	0.73
New revenues: ratio to old	PQ(G) = P^(E(G)+1)	1.34	1.01	1.18	0.54	- -
Sub-group elasticity of demand	lnPQ(G)/lnP =	-0.28	-0.97	-0.58	-2.51	-3.23

oil products. The long-run price elasticity is around unity, so total consumption would fall by 9 percent. But since the loss would be all at OPEC's expense, their sales and revenues would fall by 27 percent. Of course this would put the price under pressure. In fact, the non-OPEC producers would only keep their market share by undercutting OPEC.

There are occasional threats that if oil is taxed OPEC will "retaliate" by raising crude prices. The empty threat is taken seriously by some in the consuming countries. OPEC members' high time preference Members find it hard to resist cheating because their time horizons are short, and their discount rates are high. The conventional wisdom of their "low time preference" [IEA 1991] is the nice contrary of the truth. Members cannot wait, yet they must fear making another big mistake, because they are so dependent on oil income. There are no other export industries, despite heavy spending.[64]

Before expropriation The multinational companies had a much easier time of it. Since they were vertically integrated, they competed mostly in selling finished products in many local markets. Sellers at each point of sale were few. The value of a purchase (mostly gasoline at the pump) was very small in relation to the buyer's income, so he had no incentives to hunt for bargains. Hence competition was sluggish. Reactions to price changes were limited and slow, and provided little incentive to

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[64] Indonesia is the exception in achieving export-led growth, like their non-oil neighbors.

discount prices.

But OPEC members sell into a world market. Their customers are refiners, with thin profit margins, strongly affected by even small price differences. A buyer looks for better offers everywhere, like the thousand-eyed Argos in the Greek myth. Even a small discount attracts many buyers and more volume; being too high loses sales. Contrariwise, a member's increase in market share may show price cheating.

Cartel quota allocation Under competition, market sharing is automatic. Each operator produces all he can, up to the point where the cost of additional output would exceed the price. But a cartel exists for only one reason: to keep the price above the marginal cost.[65] Thereby the cartel shuts off the automatic market sharing mechanism. It must be replaced by a joint decision of the members. But market sharing is a zero sum game. Any member's gain is another member's loss. There is no principle to it, only luck and bargaining power, of which more later.

Even in the 1970s, when prices were being raised, market division was always Topic A at OPEC meetings. They progressed from the squabbles of 1976-1977 to the secret agreement of 1978, the proposed safety-net agreement in late 1979, the gentlemen's agreement of 1980 (mooted by the Iran-Iraq war), the quota agreement of March 1982, then the more binding quota agreement of March 1983, and since then the endless succession of annual and

[65] There is widespread misunderstanding of marginal cost as being something very low, only part of total cost, etc. See the next section, on excess capacity.

quarterly and special meetings and quota agreements.

The discord was worse because production and export data deteriorated after the companies left. It was hard to agree on what had already happened, let alone on what would happen if they took one or another action. In April 1993, OPEC members openly voiced their distrust over reported production numbers.

The bumpy road down: 1981-1985 A single monopolist might have reduced the price, early on. But the group feared that the spiral of price discounting and counter-discounting once started could not be stopped. Hence they preferred to hold the line, and let time work for them. It did not.

For nearly two years, while other members made more and deeper discounts, Saudi Arabia sold at the official price, but did not lose sales. The Aramco companies took their full allowances of overpriced crude, for the sake of "access" to Saudi reserves. But losses in the billions finally taught them that "access" was a mouthful of air. In 1982, they began cutting back on Saudi liftings, and in January 1983 they said they would no longer buy overpriced crude oil.

Within two months, OPEC had established the most explicit and binding quota system so far. The Saudis accepted the temporary role of swing producer, and assumed the burden of excess capacity. This was a sharp policy reversal. Saudi Arabia had discounted prices in 1976-1977, and in 1979-1980, and gained greatly thereby. They had always resisted the role of swing producer, and in 1983 could reasonably hope they would not long stay in that role.

They were disappointed. Demand for OPEC crude oil continued to drop, Saudi exports fell nearly to zero in August 1985. Threats of retaliation did not work.

The Saudis reject the burden of being "swing producer" The Saudi response in late 1985 and 1986 was not a price war. By using a "netback price", they would automatically meet the world price level, but would not beat anybody's price. [66] The Saudis could have offered much more oil than their quota, but almost invariably they stayed within it. The other members took nearly a year (roughly from August-December 1985 to August-December 1986) to come around to patch up an accord.

Since then, the Saudis have repeatedly rejected the role of swing producer. Despite constant pressure from the others, their constant theme is: if you won't cut in proportion, neither will we. They sometimes had to make good their threats. The net result was a chronically weak price.

EXCESS CAPACITY AND PRICE CHANGE

OPEC capacity after early 1974 was in excess, and all attention was focussed on the "surplus", as if it were some passing misfortune. Let only demand rise, and capacity shrink, and prices would inevitably rise. In fact, excess capacity declined greatly to 1986, and kept declining afterward, yet the price did not rise.

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[66] Purchase of downstream refining/marketing assets is simply permanent built-in netbacking.

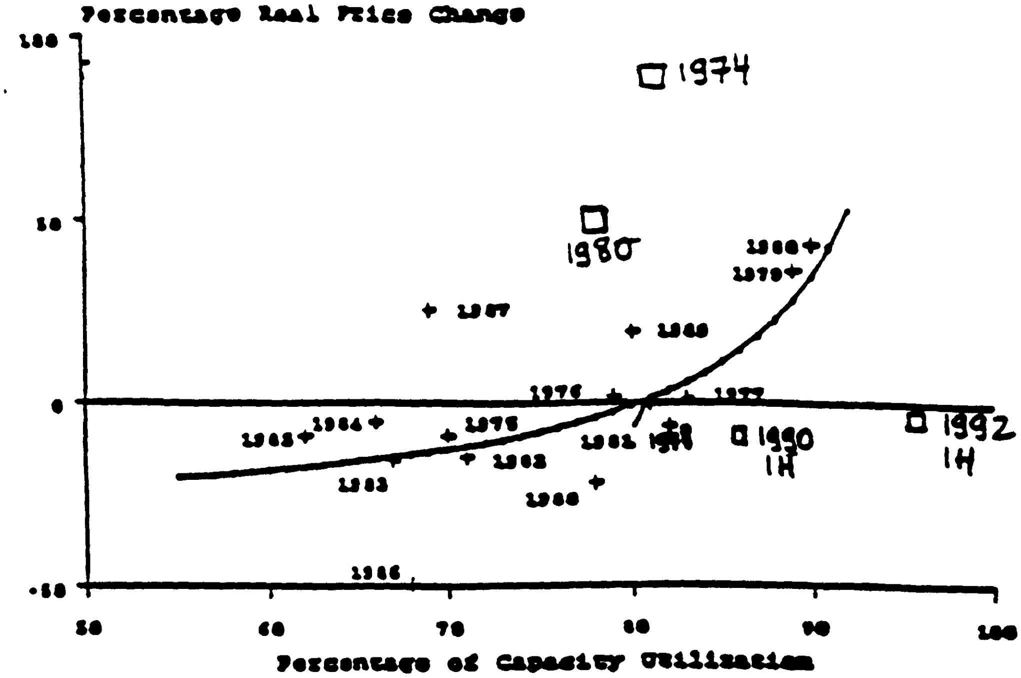
The economics of excess capacity Under competition, the percent of capacity utilization is a good proxy for short run marginal cost. Hence it is often used to measure inflationary pressure. High production calls into use the high-cost standby equipment, materials, and employees; and stops normal maintenance and downtime. The attempt to get more output than designed overloads the whole system. To produce an incremental unit makes every other unit more expensive. Thereby the total cost of an incremental unit goes up steeply, until the cost curve goes vertical. Hence the capacity utilization curve--assuming good data--shows the price under competition as the demand curve shifts up the right or down the left along the short run supply curve. (For a classic demonstration, see [Zannetos 1966] ch. 6, especially p. 172. There is a fairly abrupt bend in the curve at about 88 percent.)

[FIGURE 5: OPEC CAPACITY USE & PRICE CHANGE]

[TABLE XIII: OPEC CAPACITY USE & PRICE CHANGE

The supposed link of capacity with price change Figure 2 is often reprinted. (Our additions and corrections, in boxes, will be explained shortly.) The vertical axis shows, not the price but the annual price change, deflated. "OPEC is assumed to increase or decrease prices depending on whether capacity utilization is above or below the desired level [such as 80 percent]." [EMF 1992, p.173] A co-author had explained [EIA 1991, p.158]: "There is no fundamental serious economics driving this curve. However, it works."

Figure 5. OPEC Pricing Behavior, 1975-1989



From (EMF 1992, p. 173)
Additions and Corrections □ from data in table XII

TABLE XII OPEC PRICE CHANGE & CAPACITY USED, SELECTED YEARS.
(CORRECTIONS TO FIGURE 5)

	1973	1974	1978	1979	1980	1H 1989	1H 1990	1H 1992	1992
OPEC PRICE, $/brl, ANN AVG	5.43	11.33	13.31	19.88	32.21	16.7	16.33	16.34	
INCREASE, GNP-IPD		0.087		0.086	0.095		0.040	0.036	
PERCENT REAL PRICE INCREASE		91.9		37.5	48.0		-5.9	-3.5	
OPEC PRODUCTION, TBD		30616		30802	26804		23468	23900	26627
OPEC CAPACITY, TBD		38135		35235	34435			25550	
PERCENT USED		80.3		87.4	77.8			93.5	
CIA "SUSTAINABLE" CAPACITY, TBD				34430	34680		27440		
PERCENT OF "SUSTAINABLE"				89.5	77.3		85.5		

NB The CIA also uses a higher estimate, "installed" capacity, which I do not understand. In addition, they estimate: "Available capacity reflects production ceilings applied by" several large producers. This is not capacity at all, but deliberate restriction.

SOURCES: Prices, from Monthly Energy Review, "total OPEC"
GNP-IPD, from Economic Report of the President
Production and capacity, from PIW, 4-21-75:11, 2-4-80:9, 2-23-80:9, 0:9, 2-1-93:7
7-6-92:7. Capacity as indicated from CIA, International
Energy Statistical Review, various issues

It does not work. We have entered additional data points: for 1974, 1990 (first half, compared with 1989 first half), and 1992 (first half, compared with 1990 first half). We have also corrected the entry for 1980. Sources and calculations are in Table XII.

The new and corrected data points show that the only large price increase which may fit the curve is 1979, when capacity was uncertain, to say the least. In 1987, 1980, 1974, and 1989, there were large price increases despite capacity utilization under 80 percent. The years of highest utilization were first-half 1990 and first-half 1992, in both of which real prices decreased by comparison with the earlier period. (We avoid the second half of 1990 and the first half of 1991, the time of invasion and war.)

Excess capacity as bargaining tool The curve of aggregate excess capacity is best forgotten. But individuals' excess capacity is part of the bargaining process. The cartel member producing to full capacity bears no burden of restriction. It falls on those with excess capacity. But their grievance is also their bargaining power. If their demand for a larger market share is refused, they can damage the others by expanding output.

A cartel member who wants a larger quota must build excess capacity. Without it, he gets no respect. Hence the announcements of OPEC capacity expansion are generally exaggerated for effect.

The members with excess capacity are called price "doves", a rather misleading name. They demand higher quotas, which means the others must cut back or accept lower prices. The "hawks" want the current price, or a higher one, <u>but</u> they want the others to carry the burden. An impasse weakens the price, and teaches the "hawks" a lesson.

By February 1993, excess capacity was expected for the second quarter, even without Iraq. And by late March, 15 months after ground zero, Kuwait was threatening it would increase from 1.6 to 2.0 mbd if others didn't stay within quota. [WSJ 4-7-93:A2, C12] Perhaps the 25 percent excess was exaggerated; nobody wanted to find out. In 1990, many rejoiced over the Enforcer to threaten Kuwait. But Saddam Hussein is no longer heard from.

But there is a catch--capacity requires investment. We will need to look at it shortly.

WILL MARKET SHARE RISE AT CURRENT PRICE?

<u>Shaky stability since 1986</u> In 1979-1985, it was OPEC's painful task to divide up a shrinking sales total. In 1985-1992, on the contrary, exports soared from 12.5 mbd to 20.8 mbd. Yet repeated experience shows that a demand increase is almost as hard to handle because increase means a fresh contention over sharing the gain.

Prices since 1986, before and after the Iraqi piracy, have been very stable. Fluctuations are generated by inventory buildup and drawdown. Much of this variability has been generated not by expected consumer demand and by individual supply responses, but by expectations of what OPEC meetings would accomplish. But there has been chronic weakness. We saw that during 1987-1991 inclusive, before and after the Gulf war, contract prices were consistently below spot prices. The assurance of having a ready customer was more important to sellers than was the assurance of supply to buyers. This reflects chronic oversupply. In a recent summary of the past six years:

"OPEC's perennial dogfights over quotas and prices in recent times have reached dramatic peaks every two years. Reminded of the squabbling that preceded price collapses in 1986 and 1988 and helped to spark the Gulf war of 1990, traders are nervously mulling the possibility of another major price plunge as 1992 draws to a close." [PIW 12-14-92:6]

This should not be taken literally, as a two year cycle. But it sums up what has happened: from time to time collaboration breaks down, the trade "nervously" waits for it to be patched up again. Since the report, there has been another meeting, and the "basket" has regained the 1987 target of $18, but now lessened by inflation. The $21 set in July 1990 seems farther away than ever.

The return of Iraq will be a danger for OPEC, not chiefly because of more excess capacity but because of lower market shares for all the others. It will sharpen the confrontations with Saudi Arabia. The lower its share, the more adamant its opposition to higher prices.

OPEC cannot escape this trap by its own efforts. But it could be rescued, if the combination of demand growth and non-OPEC production decline would raise their market share high enough, so they could again trade some of it off against a higher price.

Consumption Of nine demand projections gathered by the Energy Modeling Forum [EMF 1992, p. 44], the two highest are already riding far above actual. We take the highest of the remaining seven, which seems about on target for 1991, high for 1992. It shows an increase of about 11.5 mbd from 1990 to 2005 in the market economies.

We assume the increase of 11.5 mbd for the whole world. In 1992, world consumption (ex-OPEC consumption) was 60.5 mbd, and adding 11.5 mbd makes it 72.0 mbd in 2005. Assume the increase of 11.5 mbd all goes to OPEC. Its 1992 exports were 21.8 mbd, or 35.2 percent of the world market. Its 2005 exports are assumed at 33.5 mbd, or 45.3 percent of the world market.

This assumes that the change in FSU consumption will equal the change in FSU production.[67] [Watkins 1993] suggests that uncertainty about the FSU could change the call on OPEC by as much as 3.3 mbd either way. Assuming it as an increase, it would be 36.8 mbd, or 49.8 percent. Such a difference, which would take place over a decade, is no promise of higher prices. When Saudi Arabia's share drops with the return of Iraq, that makes things worse for OPEC as a whole. But even this is a best-case scenario.

Natural gas back on track First, expanded natural gas output will displace some oil. The expansion of gas was knocked off course in the 1970s. In the USA, there were price ceilings and end-use control. Canada was reluctant to export the scarce precious stuff.

[67] FSU production and consumption will both decline for some years along with declining GDP. But with economic revival, rational pricing and conservation will keep reducing consumption. FSU prices have become even more irrational than Soviet prices because price regulation and inflation have lowered the real price of fuels.

In Europe, natural gas use had risen from 2.3 percent of total energy use in 1965 to 13 percent in 1975. But then gas prices were raised to match oil. The Dutch and others thought both were headed off into the blue, hence gas resources should be hoarded not used. In 1985, gas use was up only to 16 percent. [Adelman & Lynch 1986] explained why gas was plentiful and cheap.

Good sense has won out in North America, and to some extent in Europe and the Pacific Basin. The increase in natural gas consumption will be felt in a lower than expected oil growth rate.

<u>Non-OPEC expanding</u> More important, non-OPEC output will keep growing. Forecasters seem unable to kick the habit of expecting non-OPEC output to decline after a few years as they "use up their reserves". It makes as much sense as predicting that plants making bread or automobiles or computer chips will shut down in a few months as they use up stocks of materials and parts.

<u>Reserves are inventories</u> Non-OPEC reserves have been used up several times over since 1960, and are now larger than ever. After 1985, the price collapsed, yet outside the USA (and FSU) non-OPEC output has crept up and more than overborne the USA decline. The trend will continue because at current prices oil development is highly profitable pre-tax. The price decline promoted oil development, because it dashed the expectations of ever-rising prices and moderated taxes. As we saw above (pp. 28ffst), the supply curves have moved to the right. Lower costs

promise more expansion.

Regressive taxation: the real barrier The principal obstacle to non-OPEC production, slowly being overcome, is high and regressive taxation. As shown above, regressive taxes abort development and increase exploration risk. Because small fields are overtaxed, big fields go undiscovered.

Many non-OPEC countries have lowered rates and have moved, painfully slowly, toward a profits-based tax system, aimed to skim the rents, not abort them. That is the only way to explain why output has risen since 1981 and especially since 1985.

The other important obstacle is state ownership, discussed in more detail below. But past mistakes are present oppportunities. As both obstacles are slowly overcome, non-OPEC output will increase, and perhaps much more than since 1985.

BLOCKS TO OPEC EXPANSION: UNREAL AND REAL

OPEC "willingness" to expand In the consuming countries there has for decades been high anxiety, whether OPEC will build capacity "enough for our needs". The modelers' form of anxiety is to make OPEC capacity an exogeneous variable. The theory seems to be that OPEC would prefer less production and income, but chooses to accommodate the consumer nations. [EIA 1989] It is an important symptom of what's wrong with the consuming countries.

If the OPEC nations were reluctant, they would have run current-account surpluses every year and piled up ever-increasing foreign balances. In fact, they have overspent their oil revenues. All have been "high absorbers". The 1974 OPEC current-account surplus went to deficit in four years; the much larger 1980 surplus went to deficit in only two. Saudi Arabian foreign assets, in 1981 over $160 billion, may have been around $10 billion before the Gulf war. Each OPEC nation is not only willing, but eager, avid, and impatient for more money. OPEC members' production is set by demand at the price they fix. Then they build more capacity than they expect to use in order to have bargaining power against each other.

"Capital crunch?" Estimates are being repeated, with no explanation of how derived or what they mean, of tens and hundreds of billions of dollars of alleged capital requirements. Then comes the solemn rhetorical question, whether such huge investment would pay out.

My own estimates [Adelman 1993] are built up from USA data, adjusted for conditions elsewhere. The number can be replicated, and checked against independent data, e.g. the old Chase Manhattan Bank reports.

By my reckoning (see Appendix A), the highest-cost Persian Gulf member in 1989/1990 needed $2000 per additional daily barrel for crude oil development. To reckon profitability, we assume a $15 wellhead price, and operating expenses at $1 per barrel plus 5 percent of capital cost. We also reckon a decline rate from published data. The rate of return is about 240 percent per year.

In 1976-1987 (we have no earlier or later data), the OPEC nations of the Middle East and Africa used, on average, 1.7

percent of their oil revenues for oil and gas capital expenditures. Their problem is to reduce their non-oil spending from 98.3 percent to something in the mid-90s, or at worst low 90s. They find it very difficult. The complaints of an OPEC "capital crunch" are an important symptom: the weakness of state enterprise.

[TABLE XI - OPEC ME & AFRICA CAPEX]

The flabby national dinosaurs: OPEC OPEC national oil companies are chronically short of funds because they are not free to reinvest. The earnings go to the governments, which spend them. What each claimant draws out of the stream depends on his political clout. Each claimant wants others, not himself, to make room for oil investment. The state oil company is only one of many.

Oil revenues make countries more oil dependent. Farming and native industry decline. Towns fill up with people who need food and other imported necessities at subsidized low prices. To cut budget and foreign-exchange deficits by ending subsidies threatens revolution. So budgets are strained, and OPEC national companies are strapped.

Some of the OPEC countries will help themselves. Nobody else can. Higher prices would no more promote investment in the 1990s than they did in 1976-1987.

Bring back foreign companies? Engineering/ management expertise is usually even more important than money. Foreign oil companies have both. OPEC countries have been trying since 1986

TABLE XI OPEC OIL PRODUCTION AND CAPITAL EXPENDITURES
MIDDLE EAST AND AFRICA, 1976-1987

YEAR	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	TOTALS
MIDDLE EAST													
TOTAL RIGS	190	192	189	143	175	170	200	206	197	201	178	139	2180
OPEC RIGS	125	132	131	89	102	91	114	112	98	94	70	51	1209
PERCENT	66	69	69	62	58	54	57	54	50	47	39	37	55
AFRICA													
TOTAL RIGS	138	173	175	200	219	212	209	150	105	118	97	90	1886
OPEC RIGS	122	153	149	166	180	160	151	102	70	82	74	66	1475
PERCENT	88	88	85	83	82	75	72	68	67	69	76	73	78
ME+AFR CAPEX ($M)	2375	2290	2250	3120	4100	4820	6730	5970	4530	4010	3160	2770	46125
OPEC RIG PERCENT	75	78	77	74	72	66	65	60	56	55	52	51	65
OPEC ME+AFR CAPEX ($M)	1788	1788	1731	2320	2935	3167	4361	3589	2520	2212	1655	1415	29480
OPEC ME+AFR REVENUES	118565	129627	123916	187193	254952	234952	182784	140668	129189	117019	74882	92138	1787514
CAPEX/REVS PCT	1.51	1.38	1.40	1.24	1.15	1.34	2.39	2.55	1.95	1.89	2.21	1.54	1.65

SOURCES: Rigs operating, International Petroleum Encyclpedia (original source, Baker Hughes Corp.). Revenues, from OPEC Annual Statistical Bulletin. Capital Expenditures, from Chase Manhattan Bank, Capital Expenditures of the World Petroleum Industry (no finer breakdown available, publication ceases after 1987) to bring them back. This makes good economic sense, not only for new-field discoveries but because the companies could "stretch" old fields as they did in the USA. Between 1930 and 1970, very few big fields were found, but the original "remaining reserves" were produced several times over, and replaced. Development costs were steady to declining over 40 years.

But despite the great potential, there has been almost no foreign investment in OPEC. There are two great risks. First, fluctuations in OPEC output amplify the demand swings, and quota struggles add to the uncertainty. Second, there is the chance of confiscation like 20 years ago. [68] High risks can only be overcome by high rewards for equity investment, whatever name it is given.

But thus far the OPEC nations cannot bring themselves to accept equity investment in production, in name or in fact. Only Iraq, after the Gulf war, even said it would. Perhaps Saddam Hussein will set an example.

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[68] It is easily proved that if i is the normal discount rate for an oil project, p the probability of expropriation in each year, and r the rate which just compensates for total risk, then $r = (i + p)/ (1 - p)$. If a company's discount rate is 12 percent, and the chance of expropriation in any one year is (say) 1/20, then the necessary equity return is 18 percent.

THE FLABBY NATIONAL DINOSAURS

Today, Socialism is scorned everywhere as a bad idea whose time is gone. But most of the world's oil is produced by flabby national dinosaurs, usually wasteful and corrupt. Their "wider social purposes" at best are unrelated enterprises like local housing, but mostly contracts and jobs for friends: payoffs, kickbacks, and featherbedding. But even when clean, in or out of OPEC, they cannot have a rational capital budget because the money is not their own. The lesson is learned at an excruciatingly slow pace. The Indian Petroleum Ministry recently announced: "There is a decision <u>in principle</u> to <u>consider</u> proposals for developing discovered oil fields on a joint-venture basis" with the state company. [NYT 5-4-92:D11, emphasis added]

<u>The Former Soviet Union (FSU)</u> The most important state companies outside OPEC are in the Former Soviet Union (FSU). Their problems are a photographic blow-up of what happens in others.

The FSU situation is defined by two facts, which at first seem contradictory. (1) There was huge investment during the 1980s, yet Soviet production crept up only slowly, then stalled. This seemed to mean they were running smack into sharply rising investment per unit of additional capacity, and needed to cut back. But (2) as soon as they were permitted, foreign oilmen poured in, tried to sign various kinds of deals for exploration, development, and workovers (rehabilitation), and estimated that billions of barrels could be profitably developed, much more than current proved reserves.

The only way to reconcile these facts is to recognize that the problem with state enterprise was not just slackness and inefficiency all over the place. There was no rational investment, guided by the marginal efficiency of capital. No producing unit owned assets, with a value it would try to expand. The unit brought factors together by using funds made available by the next higher command unit, carried out its plan as best it could, and transferred revenues back to the command unit. There was no scanning mechanism to evaluate many possible courses of action and choose the most profitable in the long run. Managers might be rewarded with a bonus for output not return.

Aside from a number of errors in detail, especially on taxes, the FSU republics have not shown much understanding that they need a system which will sort out the assets according to marginal profitability, to see which wells, reservoirs, fields must be shut down and their manpower and supplies transferred to the wells worth maintaining or expanding, taking account of risk.

The FSU oil industry is a fossil. But the other OPEC and non-OPEC national oil companies are different only in degree. None of them has its own capital assets whose value it tries to increase. As for risk, one hears in OPEC, non-OPEC, and FSU: "There is no risk, you know the oil is there!" But if the investment needed is too great, or the flow too small, or tax too uncertain, etc, the oil is not there.

APPENDIX A. RATES OF RETURN ON OIL DEVELOPMENT INVESTMENT

To calculate the rate of return, we set up a break-even equation. The discounted present value of the flow of revenues over an indefinite time just equals capital expenditures: $PQ/(a+i) = K$, or $P/(a+i) = K/Q$ [1]

where *P* is the wellhead price net of operating expenses, *Q* is the peak output, assumed to be in the initial year, after which it declines at *a* percent per year. *K* is total capital expenditures, assumed all spent in the year before production starts.

The gross wellhead price P' is reduced by the variable cost *v* per barrel produced, and the fixed cost per well or per lease, which is a fraction *c* of the capital expenditures per barrel of initial output.

$$P = P' - v - cK/Q \qquad [2]$$

(The fixed cost constantly increases per unit as output *Q* declines. But these higher costs must be discounted. On balance, the present-value-equivalent is greater, depending on the decline rate and the discount rate; we reckon with c= .05 x 1.67 = .084).

The decline rate is approximated by Q/R, the ratio of initial output to reserves. This can be refined somewhat if necessary.[69]

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[69] A more precise rule is: $a= (Q-Q_f)/R$, where Q_f is final output. With no information, we appreciate $Q_f/Q=Q/R$. Then $a=Q/R-(Q/R)^2$. With more data, we can use the relation for the final year: $(P'-v-cK/Q)Q_f/Q=cK/Q$, hence $(cK/Q)/(P'-v-cK/Q)=Q_f/Q$

Moreover, since $Q_f/Q=e^{-aT}$, $T=-\ln(Q_f/Q)/a$ If some of the variables are known, we have a check on the others.

Substituting [2] into [1], and transposing:

$a+i = (P'-v)/(K/Q) -c(K/Q))/(K/Q)$

$$i = (P'-v)/(K/Q) -c - a \qquad [3]$$

For the OPEC example, we take the Persian Gulf member with the highest 1989/90 investment requirements, Abu Dhabi; K/Q=$2033/365 =$5.57. Since there are only a few fields, we can calculate the decline rate directly: 2.34 percent during 1962-1980. (We disregard later unstable years.) Assume a $15 wellhead price:

i = $14/5.57 - .084 - .023 = 2.41, or 241 percent per year.

For the non-OPEC country (upper quartile in 1990), K/Q = $10,210/365 = $28. We use conventional values: v = $1 per barrel, c = .067, a = 1/15 = .067. Then:

i = $14/$28 - .084 - .067 = .50-.151 = .349.

This is pre-tax. Assume now 50-50 production sharing, which amounts to the government taking half the wellhead price.

i' = $6.50/28 - .151 = .081

The pre-tax return is well worth investing for, and could be split to benefit both parties. The post-tax return is no more than marginal.

Example: West Siberia (Jack A. Krug and William Connelly, "Evaluating oil, gas ventures in W. Siberia:feasibility studies", OGJ 2-8-93:72-76) This is a hypothetical waterflood development project. The basic data are: R=120mb, capital expenditures K=$295m, and peak output Q=32.6 tbd. The price assumed in the paper is P=$20 per barrel.

By our simplified method:

K/Q= \$24.79 (\$9048/daily barrel)

The decline rate $a = Q/R - (Q/R)^2 = .089$

Using Equation [3]

$$i = (P'-v)/(K/Q) - c - a \qquad [3]$$

$$i = \$19/\$24.79 - .05 - .089 = .617 \qquad [4]$$

In fact, a is overstated. Since $Q_f/Q=e^{-aT}$, we have an equation with four unknowns, of which the paper gives us three, allowing us to calculate $3.08/11.9 = e^{-20a}$, and a = .0675. This would make i = .641.

But our basic assumption is far too pessimistic: that capital expenditures are all made at the outset, starting the project with a very large negative cash flow, whose discounted value is equal to its undiscounted value. In fact, the project capital expenditures take place over the first seven years, half of them in or after Year 4. Pretax revenues exceed costs starting in Year 3.

Using a conventional DCF, to bring the pre-tax net cash flow to zero takes a discount rate of 145.6 percent, which is far too high, and only shows up the limitations of conventional DCF, in discounting all outlays and receipts at the same rate.

However, the post-tax DCF discount is only 13.3 percent, which will be adequate in some such projects, not in others. Furthermore, the venture probably cannot survive a price below \$20. I think a \$20 price very unlikely even in Western Europe, and there is a freight disadvantage.

At a wellhead price of $15, a recalculated Equation [4] yields a pre-tax .426. But unless the parties begin with a much lower price, and a much more flexible tax schedule, there is no hope of such projects ever starting, despite their being highly profitable before tax.