



THE JAMES A. BAKER III
INSTITUTE FOR PUBLIC POLICY
OF
RICE UNIVERSITY

JAPANESE ENERGY SECURITY AND CHANGING GLOBAL ENERGY MARKETS:
*AN ANALYSIS OF NORTHEAST ASIAN ENERGY COOPERATION AND JAPAN'S
EVOLVING LEADERSHIP ROLE IN THE REGION*

IMPACT OF THE REOPENING OF PERSIAN GULF UPSTREAM
SECTORS TO INTERNATIONAL INVESTMENT IN INTERNATIONAL OIL
MARKETS

AMY MYERS JAFFE
SENIOR ENERGY ANALYST
JAMES A. BAKER III INSTITUTE FOR PUBLIC POLICY
RICE UNIVERSITY

AND

RONALD SOLIGO
PROFESSOR OF ECONOMICS
RICE UNIVERSITY

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INTRODUCTION

As history has shown, rising oil prices will encourage investment in new productive capacity outside the Persian Gulf. Not only do international companies receive higher cash flows enabling them to make incremental investments but marginal projects also are rendered profitable. Increased investment in countries outside of Organization of Petroleum Exporting Countries (OPEC), following the 1970s oil price shocks, brought about a steady deterioration in OPEC's market share. In the ensuing years, OPEC has not regained its market share, which is less than 40% currently, as compared to over 50% of world oil markets before the price shock of 1979. Low prices on the other hand discourage investment in expanding and maintaining production capacity. With a time lag of one to two years, growth in demand has reduced unutilized capacity to levels that result in higher oil prices, as is the case today.

The concept of a reopening of the Persian Gulf upstream sector to international private investment was revived in the 1980s as part of the debate about the breakdown in the international oil price regime. As world oil price levels began to deteriorate and volatility became a major feature of oil markets, discussion surfaced about the "reintegration" of the international oil industry as one means to create stability. Observers speculated that the disconnection between the tremendous oil production in the Persian Gulf which in 1980 represented roughly half of world output and private marketing and refining businesses in the end-user markets of the Western industrialized nations had contributed to destabilizing competition and oil oversupply.

While the first step in the process of disconnecting reserves from the international refining industry was initiated in 1971 with the signing of the "Tehran Agreement," that reduced foreign Western interests share in Iranian oil fields from 100% to 50%, the process of nationalization of Persian Gulf and Venezuelan oil reserves continued into the early 1980s. It wasn't until the early 1980s that Saudi Arabia completed its agreement to end its relationship with the four Aramco partner companies, Exxon, Chevron, Texaco and Mobil. This long evolutionary process transformed oil markets in the 1980s, culminating in the 1985 price war that drove oil prices below \$10 a barrel from the low \$30s just five years earlier.

One suggested solution to the disconnect that characterized volatile oil markets in the 1980s was to reopen key OPEC countries like Saudi Arabia, Kuwait, Iraq and Iran to Western oil company investment. The assumption (or speculation) was that by doing so, investments by the international oil companies (IOCs) would be diverted from non-OPEC (the "competitive fringe") to these OPEC countries. This, in turn, would increase their share of world oil markets, reduce entry in the fringe and allow OPEC to sustain its "market power." Thus, it was thought, OPEC would be freed from a cycle of periodic price fluctuation.

This paper examines the impact on the global oil market of a Middle East policy permitting investment by IOCs. It investigates whether OPEC can remove itself from price cycles with IOC investment and how this would affect the price structure in global oil markets. We examine the dynamics of shifting capital away from non-OPEC to OPEC by the IOCs and the impact of the shift on non-OPEC production trends both in the short and longer term.

We conclude that OPEC's attempt to free itself from the intractable price cycles in oil markets is unlikely to succeed in the long run. However, the shift of IOC capital to OPEC from non-OPEC can prolong the time it takes for new investment to generate increased competition to OPEC. Finally, we discuss how a diversion of IOC capital to OPEC might increase market competition among OPEC countries. Such competition could under certain circumstances erase the oil price premium currently paid by Asian buyers by limiting Saudi Arabia's ability to price discriminate among geographic markets.

Background to the Reopening Process in Kuwait and Saudi Arabia

The first form "reintegration" took in practice was in the 1980s acquisitions of refining and marketing assets in the West and eventually Asia by major oil producing countries such as Kuwait, Venezuela, Libya and Saudi Arabia. Some ventures such as the Saudi purchase of Texaco assets were structured as a joint venture. In other cases, such as Libya and Kuwait's investments in Europe, a full-fledged acquisition of assets and eventual change of management resulted. During this period, when downstream "reintegration" was being discussed, senior government officials in Saudi Arabia

considered the idea of “upstream/downstream” swap arrangements. These involved international majors or French state oil companies exchanging ownership in downstream assets in the West for ownership by the Western companies in oilfields or oil reserves in Saudi Arabia. Exxon, France’s Elf Aquitaine and Total, and others forwarded proposals to the Saudi elite but these ideas were never implemented due to the complicated nature of such arrangements and Saudi reluctance to relinquish ownership and control over its oil fields.

After a brief success on an oil production sharing agreement in 1987, competition for market share intensified within OPEC, particularly between Kuwait, Iraq, Saudi Arabia and Iran. Although not widely reported at the time, Iraq began to break ranks and negotiate new upstream investment deals with Western firms. The invasion of Kuwait and subsequent United Nations sanctions against Iraq scotched any investment plans for Western firms in Iraq in the early 1990s. However, following the Gulf War, the idea of reopening upstream sectors to international investment began to gain favor elsewhere. In 1992, OPEC heavyweight Venezuela, which also has oil resources comparable to the major Middle Eastern producers, reopened to foreign investment to bring in badly needed capital and to acquire technology needed to develop its more difficult oilfields containing hard to produce, heavy oil. The trend spread to Persian Gulf countries, starting with discussions of oil buyback agreements with Western firms for new natural gas and oil field development in Iran whose domestic economic hardships greatly limited investment in its upstream sector. The Iranian program was slowed by initially unattractive investment terms and U.S. economic sanctions that targeted firms investing more than \$20 million in Iran’s energy sector. But several European firms, most notably French Total and Royal Dutch Shell, have concluded deals for developing fields in Iran in recent years.

In the early 1990s, Kuwait and eventually Saudi Arabia also began to float the idea of a reopening their oil or natural gas sectors to foreign investment. A key argument for this policy initiative was that it would help OPEC countries regain their share of world oil markets by diverting investment away from high-costs regions outside the Middle East and shift it into increasing the productive capacity of the Gulf Arabs. In

doing so, OPEC would regain some of its lost market share and gain more market power to influence prices.

But, Saudi Arabia and Kuwait each also have more specific, individual motivations to reconsider a reopening of their upstream sectors. These perceptions may dominate government thinking regardless of trends in non-OPEC competition and the nominal price of oil.

In the case of Kuwait, security considerations loom large in the debate about reopening oilfields to foreign investors, particularly American firms. While Kuwaiti oil policy-makers see some benefit to a reopening as a means to stimulate competition and efficiency into the country's oil industry by lowering costs and increasing technological know-how, the strategy is mainly aimed to create an obstacle to potential Iraqi aggression on Kuwait's northern border. This is why, in soliciting proposals for technical and exploration participation from Western oil companies, Kuwait has focused mainly on four northern fields along the Iraqi border. But Kuwait has had difficulty selling these ideas to its own population as reflected in opposition expressed by the Kuwaiti Parliament, which has blocked implementation of a major reopening program.

Kuwait has announced it would like to expand its oil production capacity from 2.5 million barrels a day currently to 4 million barrels a day by 2010. Kuwait has been discussing the possibility of a major reopening of its upstream sector to foreign participation since 1992, holding out the possibility for equity participation but for the most part, offering only "super" service contracts that do not allow the participating company to take control of any Kuwaiti reserves. In March 1992, British Petroleum (BP) became the first Western oil company to sign a technical services agreement to assist state Kuwait Petroleum Corp. (KPC) in developing its northern fields. Other contracts include Chevron for assistance with the Burgan field, Shell for offshore fields, Exxon for Karaa al-Marou in western Kuwait. France's Total/Fina/Elf advises KOC on development of Kuwait's onshore neutral zone fields. Some of these companies, such as BP, are broadening to exploration activities inside Kuwait, but KPC and the Western companies have continued to discuss arrangements that would involve increased compensation beyond technical service fees for their effort and investment. Companies

pursuing oilfield investment deals in Kuwait including British Gas, B P, ExxonMobil, Chevron, Conoco, ENI, Marathon, Phillips, Royal Dutch Shell, Texaco and Total.

Kuwait's oil ministry and KPC have indicated that four northern Kuwaiti oilfields, Raudhatain, Ratqa, Abdali, and Sabriyah, will be open to international participation, with production capacity at the fields expected to be expanded from 400,000 b/d to 900,000 b/d by 2005. There has also been discussion of expansion work to be assigned for the Minagish field and the Umm Gudair fields in western Kuwait. Of the fields that might come on offer, Ratqa and Abdali together are thought to hold 14 billion barrels of heavy crude (12-15API) and 5 billion barrels of Arab Medium type crude. Raudhatain is estimated to have 7.5 billion barrels. ExxonMobil and BP have shown interest in development work at the Raudhatain and Sabriyah fields while Shell and Total have focused on Minagish.¹ Texaco and Chevron are pursuing Umm Gudair while Phillips and Total have looked at the Ratqa and Abdali fields.

The companies have asked Kuwait to consider operating service agreements that will combine fixed margins of risk service agreements with performance-related bonuses such as those used in production sharing agreements. Such bonuses would still give foreign firms no equity claim to oil reserves. The foreign investors would carry the cost of development but receive a fee for profits that would take into account cost savings, capital expenditure savings and reserve additions. The proposed Oil Service Agreements (OSAs) were still under review in Kuwait as of this writing.

Saudi leadership sees similar benefits to reopening its oil sector. Although the same arguments about competitive influences, technological improvement and strengthening security ties to Western governments can be made about a reopening in the Saudi as well as Kuwaiti oil and gas sectors, Saudi leadership has latched onto the potential economic benefits such a reopening would have on the Saudi economy. The Saudi government is under pressure to stimulate broad-based economic development. One obstacle is potential feedstock and fuels needed for industries to be developed on the West coast of the country and fuel needed to meet increasing power demands across the country. Huge investments in natural gas and other resources will be required in the coming years to meet these needs. It has been argued in high government circles that

¹ Authors interviews with oil company officials

foreign participation could simultaneously lighten the government's load in providing such supplies while at the same time creating new jobs.

Saudi Arabia has no stated oil capacity expansion goals for the coming decade but has entertained the possibility of a reopening to IOCs in its upstream sector. The kingdom first aired publicly its interest in discussing such a program at a well-publicized meeting between Saudi Crown Prince Abdullah and chief executives from American oil companies in Washington DC in October 1998. By the spring of 1999, many American firms had submitted proposals for investment plans in Saudi Arabia but all proposals were rejected as deficient, mainly for specifying oil projects or failing to identify broad enough opportunities for creating jobs. A new round of proposals, geared mainly toward the natural gas and power sectors, was submitted in the spring 2000.

Most recently, a Saudi government committee, led by Saudi Foreign Minister Prince Saud al-Faisal and set up to oversee the negotiation process with Western oil companies, met with a variety of companies and indicated that the Saudi government would like to finalize Memorandum of Understanding agreements for several key investments by year end 2000. Several IOCs submitted proposals entailing investments of a total of \$6 to \$12 billion.² Among the IOCs submitting detailed specifications on major programs this August are Chevron Corp., Exxon Mobil Corp., Royal Dutch/Shell and Texaco Inc. and Total/Fina/Elf. Phillips Petroleum, Conoco Inc., BP Amoco, ENI-Agip, Marathon Oil, and Occidental Petroleum Corp/Enron Corp. are also pursuing investment deals in the kingdom.

One challenge to successful negotiations of IOC investments in Saudi Arabia will be the structure of compensation. Saudi domestic natural gas and electricity markets currently fail to offer an attractive rate of return for a foreign investor. Thus, oil companies have proposed different kind of arrangements. Some companies have proposed payments in oil as a means to recoup investment returns. For example, companies have proposed developing natural gas supplies for power stations currently burning crude oil as fuel. Under such deals, companies would be paid for natural gas supplies with the oil replaced by that gas. For development of natural gas fields that yield valuable condensates and other byproducts that can be used as petrochemical

² For detailed discussion of the meetings, see website www.oilnavigator.com

feedstocks, companies would be compensated in these more easily monetized commodities.

Saudi planners are receptive to development proposals for non-associated gas reserves at Haradh. This program, put forward by Royal Dutch Shell among others, would involve construction of a gas-oil separating plant (GOSP) (possibly by Saudi Aramco), gas handling facilities and a new power station. Companies such as Texaco, Chevron and Total/Fina/Elf have also proposed participation in oil and gas fields in the Neutral Zone including the Durra gas field, offshore Red Sea fields such as Barqan, and the Midyan natural gas field in northwestern Saudi Arabia. Proposals for enhanced recovery projects at oil fields inside Saudi Aramco's main operational area, such as ARCO's plans to upgrade the Berri field, have been shelved for now. However, Saudi Aramco officials tell the authors in recent interviews that proposals to develop large natural gas reserves at the Hilwa field in Central Arabia and a new power station there might be considered in the future. Added electrical power is needed in the region and repayment could come in the form of the surrounding fields' condensate flows.

IMPACT OF THE REOPENING ON OIL MARKETS 2010-2020

In this section, we examine the impact on the global oil market resulting from a proposed reopening to IOC investment in the Middle East. We begin by showing the impact if only Saudi Arabia reopened to foreign investment. This makes it easier to model and illustrate the possible impact of foreign investment in the Persian Gulf. Once the Saudi case is discussed, we then explore scenarios under which new investment would increase market competition for the Asian market.

In analyzing new IOC investment in Saudi Arabia, it is important first to distinguish between short and long run effects. In the short run, the effects of shifting IOC investments to Saudi Arabia from the "fringe" will have little effect on output from producers in the "competitive fringe." This is because a significant portion of the production costs is fixed and must be borne regardless of the output level. Output in the longer run will decline if no new investment in capacity expansion is forthcoming as old oil fields are depleted. However, even if firms intend to phase out an oil field in the long

run, they may continue to invest some resources in it so long as the rate of return on those investments are at least equal to the return on new investments.

Given the existence of developed producing fields, IOCs will shift their investments to Saudi Arabia gradually. If they were to move aggressively to increase output in Saudi Arabia without waiting for fields in the fringe to deplete (or alternatively, for demand to grow in order to absorb increased production), aggregate oil output would increase relative to demand and prices would fall.

To examine the effect of IOC investment in Saudi Arabia, it is necessary to specify assumptions about the structure of the oil exploration services market as well as the international capital market.

Throughout the following we assume that the oil exploration market is competitive in the sense that there are a reasonably large number of companies with expertise (or access to the expertise) to explore, develop and produce oil. This assumption is realistic given the increased use of sub-contracting by even the largest of the IOCs.

We consider two opposing assumptions about the competitiveness of international capital markets. First we assume that international capital markets are competitive in the sense that there are a sufficiently large number of sources of capital to finance oil field development and production, so that the supply of capital to oil companies is elastic. This implies that if some IOCs shift investment resources away from “fringe” areas to Saudi Arabia, the scale of investment in the fringe areas would not change. This is because other smaller or new firms would enter projects abandoned by IOCs for as long as prices remained relatively stable ensuring return on investment equal to the opportunity cost of capital.

We then consider the case of inelastic supply of capital. In this case, the withdrawal of investment from the “fringe” by IOCs would be offset by other firms either partially, or perhaps, not at all. This case is plausible to the extent that exploration and development is typically financed by retained earnings of existing firms. Indeed, with the out-sourcing of much of the actual oilfield work, IOCs are increasingly specializing in the coordination and financing of development and production. However, the assumption of an inelastic supply of capital is likely to make sense only in the shorter run. In the longer

run, credit constraints are likely to be much weaker and the supply of capital more elastic. If profitable investment opportunities arise, investors will eventually find a way to finance them.

Figure 1 shows the aggregate world demand for oil and the supply curve for all countries other than Saudi Arabia. We assume that Saudi Arabia is a “dominant firm” or swing producer.³ It faces a demand curve that is derived by taking the difference between these two curves as a function of price. For example at price P_0 the demand for Saudi oil is $Q_0 - Q_1$ and at price P_1 the demand is $Q_3 - Q_2$. Using this demand curve, the Saudis choose the price/output combination consistent with their long-term goals. Since high prices will induce other producers to expand and reduce the market for Saudi crude, it is not in the interests of the Saudis to maximize short run profits.⁴

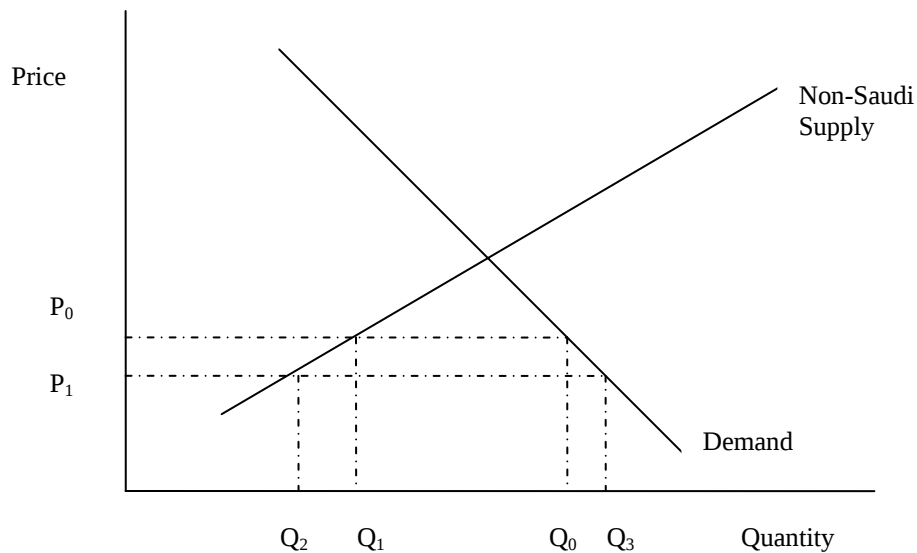
In figure 1, assume that the initial equilibrium is one where the world price is p_0 , total demand and supply is Q_0 , fringe output is Q_1 and Saudi output (the “dominant firm”) is $Q_0 - Q_1$. Further let us assume that this price/output combination has been constrained by capacity limits in Saudi Arabia and that in order to discourage capacity additions by other producers, the Saudis prefer to increase their capacity and output and lower prices. (Accepted opinion is that the Saudis have neglected investments in additional capacity in recent years reflecting low crude prices and growing domestic revenue needs. This issue is discussed further elsewhere in this paper). To finance capacity additions, as well as for other reasons discussed above, the Saudis invite the IOCs to develop projects and produce oil in Saudi Arabia.

Now assume that the international oil companies (IOCs) respond to this invitation by shifting investment resources out of the fringe and into Saudi Arabia. (For now we do not allow foreign investment in other Middle Eastern countries. This latter case is dealt with separately below). The shift of investment to Saudi oil fields, holding all other factors constant, will increase Saudi production (assuming that investment by the IOCs in Saudi Arabia is not offset by a decline in output by Aramco), say to $Q_3 - Q_2$ and price will

³ See A.F. Alhajji and David Heutyner, "OPEC and World Crude Oil Markets from 1973 to 1994: Cartel, Oligopoly or Competitive", The Energy Journal, Vol. 21, No. 3, 2000 for evidence in support of this hypothesis.

fall to P_1 . If the supply curve of capital markets is perfectly elastic, output (at each oil price) of other suppliers will not change. That is, as the IOCs shift investments out of the "fringe," other companies will replace them so that total investment and output in the "fringe" is not affected. These changes are illustrated in figure 1 where, in response to the investment by IOCs, the new equilibrium price falls to p_1 , and output increases to Q_3 - Q_2 .

Figure 1



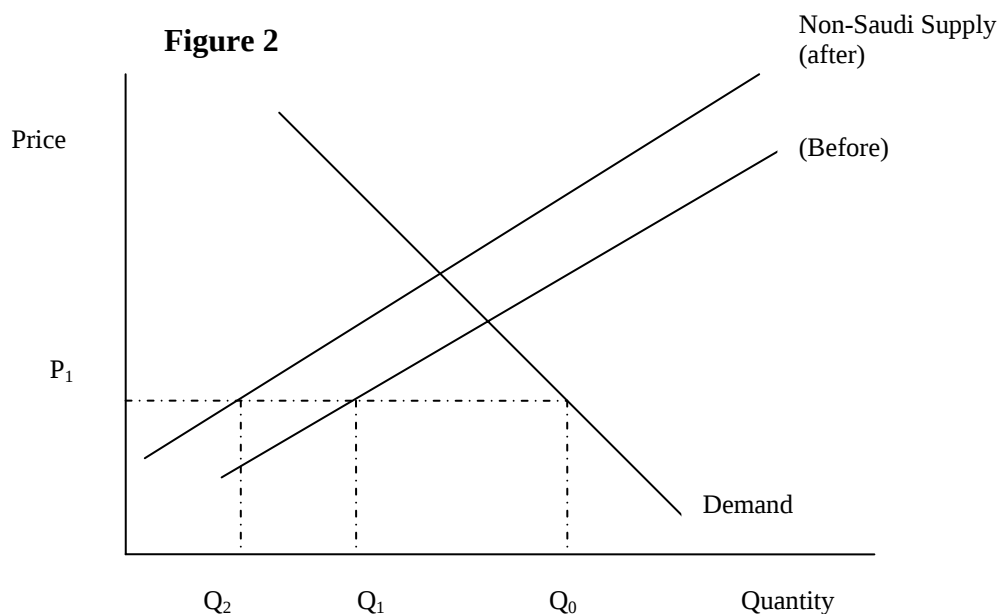
Note that, although the non-Saudi supply curve does not shift, fringe output declines because the lower oil price discourages some output (fringe firms move down their supply curve). The net result then, would be an increase in aggregate output of oil and a lower price, with an increase in the Saudi market share.

Over time, the demand for oil will increase as GDP rises in consuming countries. The supply of non-Saudi oil will increase (the supply curve will shift to the right) as costs fall due to improvements in technology. While foreign investment will allow the Saudis to increase capacity to accommodate the growth in demand, the increase in non-Saudi supply will absorb some of the demand increase. The effect on price and Saudi output will depend on the relative degree to which these curves shift. If the Saudi goal is to keep

⁴ An exception may be as in the present situation where few producers have spare capacity. In this case the Saudis could reap a short run advantage by setting higher prices. However, they will be unable to sustain these higher prices for long since doing so will induce expansion of capacity by others.

prices from getting "too high" (to discourage the increase in non-Saudi supply), their output will increase sufficiently to prevent prices from rising above P_1 , the price that by assumption limits incentives of other countries to increase capacity. If the Saudis chose a P_1 that is too high, it is conceivable that non-Saudi oil supply would increase so much that the Saudi price/output combination would allow for little increase in its output, and would produce a decline in its market share. Presumably, if this were to happen, Saudi Arabia would re-calibrate the value of P_1 to prevent large expansions in capacity by other producers.

Now consider the case of imperfect capital markets – that is, where other firms who might wish to invest in the fringe are unable to find the capital to expand their investments when the IOCs shift resources to Saudi Arabia. In this case, the non-Saudi supply curve will shift to the left: fringe investment – and output – will be lower at each oil price than it would have been if the IOCs had not reallocated their investment resources. Figure 2 shows this effect. The effect on fringe and Saudi output will depend on the magnitude of the shift in the fringe supply curve as well as the increase in Saudi output resulting from increased IOC investment. If the Saudi goal is to maintain a price of P_1 (as discussed above), non-Saudi supply falls to Q_2 and Saudi output increases an additional amount equal to $Q_1 - Q_2$.



Because fringe output would decline for want of investment capital, Saudi output would increase even without any increase in world demand. In the longer run, when world demand increases, the increase in Saudi output will be greater and the increase in non-Saudi output will be smaller than where capital markets are imperfect. Hence, the increase in the Saudi market share and Saudi market power will be larger. Again however, technological improvements that lower costs of non-Saudi producers will work in the opposite direction, allowing non-Saudi producers reclaim a part of their market share lost initially due to the reduction in foreign investment.

In the case of imperfect (but not perfectly inelastic) capital markets, the reaction of governments in the fringe to the shift of investment by the IOCs to Saudi Arabia can affect the results. If these governments react by lowering taxes and royalties on production or provide other subsidies in order either to reduce the transfer of investment by the IOCs or to entice new investors, the shift of the fringe supply curve to the left (in figure 2) would be reduced or possibly even offset. Governments of fringe producing countries would be willing to accept a lower per barrel royalty in exchange for a greater output. If Saudi Arabia responds by lowering its taxes and royalties, the result will be a shift in distribution of profits towards the IOCs and away from the producing countries. Clearly, competition among producing nations for the investments of IOCs benefits the IOCs and other oil firms.

As pointed out at the beginning of this section, the assumption of imperfect capital markets makes most sense in the “short run.” Investments in Saudi Arabia by IOCs will gradually result in increased Saudi output and declining fringe output. Saudi market share will increase; giving the Saudis enhanced market power. Should Saudi Arabia use this increased market muscle to boost prices, the result would, in the long run, encourage investment in the “fringe” areas previously abandoned. In this longer run scenario, the supply of capital is likely to become more elastic and investments in such “fringe” areas will be restored and even increased. The revival of production in the “fringe” will once again generate competition with Saudi Arabia for market share, reducing Saudi Arabia’s leverage on crude prices.

COMPETITION FROM OTHER MIDDLE EAST COUNTRIES

As discussed above, recently, several major Middle East oil producers have announced their intentions to invite IOCs to explore, develop and produce their hydrocarbon resources. In the case of Iran, this decision was prompted by capital constraints and the need for advanced Western technology. Iran's oil output capacity will likely decline in the coming years if it fails to attract new investment. Iraq is also seeking to get the United Nations to remove sanctions prohibiting foreign oil company investment in its oil fields in order to restore lost productive capacity. The United Arab Emirates, which already is open to foreign oil investors, has discussed expanding its productive capacity to increase future market share. Libya, too, would like to increase its capacity and is trying to negotiate the return of American oil companies banned from furthering investments in Libya by a U.S. government decree since the 1980s.

To the extent that reopening to foreign investment is spread over a number of Middle Eastern producers, Saudi Arabia will gain less market power from the shift in investment to the Persian Gulf from fringe producers. To assert the kind of monopoly power discussed in the Saudi model above, Saudi Arabia would have to garner the long-term co-operation of the other key Mideast producers that are similarly considering reopening their oil sectors to foreign investors and have them agree to limit production. Historically, such production sharing arrangements have been difficult to maintain over a long period of time.

During the 1980s, for example, competition among Mideast members of OPEC for political power and leadership prerogatives pitted Iran, Iraq, Saudi Arabia, Libya, Kuwait and the United Arab Emirates against each other in a struggle to delineate who was entitled to increase output under OPEC's production allocation system. Each player wanted to maximize the gain in its market share in a complex zero sum interaction, which generally resulted in quota cheating and oil price competition. Similar conditions could be expected to emerge, as IOC investment would expand the productive capacity of each of these countries if this expansion exceeds the growth in world oil demand. The latter condition is considered likely. Therefore, we conclude that stiff competition for market

share is still the most likely result of the reopening of the Middle East to IOC investment regardless of whether capital shifts away from fringe production areas.⁵

IMPLICATIONS OF THE REOPENING OF MIDDLE EAST OIL FIELDS TO FOREIGN INVESTMENT FOR OIL PRICE CYCLES

While the Saudis, either alone or as part of a cartel, are unlikely to maintain market power over the long run, the nature of investment patterns in oil production capacity, if sustained in the future, will periodically give them such power. Sustained periods of low prices as seen in 1998 tend to reduce investment in expansion of oil production capacity, curtailing the amount of spare productive capacity available. Low prices reduce the resources that oil producers have to reinvest in their fields as well as the rate of return on those investments. Some projects will be deferred; others may be stretched out over a longer period of development. The reduction in spare capacity will ultimately facilitate cooperation among producers who now have less excess capacity and thereby less incentive to cheat on production quotas required by any cartel agreement. Augmented power of producer cartels will lead them to increase price. The power of the cartel is particularly enhanced if the reduction in spare capacity should coincide with a crisis or disruption. Indeed, such crises often are the trigger that brings producers together to agreement on pricing strategies. Limited spare capacity was one factor that helped OPEC forge its historic agreement of 1999 that raised prices from \$8 a barrel to over \$30 over the course of several months.

In the longer term, sustained high oil prices will generate increased revenues, some of which will be invested in increasing future oil production capacity. As producers bring capacity on stream, global production rates will increase. Unless world demand is increasing as fast as capacity, OPEC will be forced to shut in increasingly higher volumes of capacity to maintain prices. Eventually, there will be a weakening of the consensus amongst producers necessary to sustain the power of the cartel and prices will begin to fall (Horsnell). Over time, this process will generate a cyclical pattern of

⁵ Mabro, Horsnell, Seymour, Yamani and others have written about the role excess capacity and “cheating” plays in hindering OPEC production-sharing agreements. See Mabro, Middle East Economic Survey, March 13, 2000. Vol. XLIII, No. 11.

spare capacity development with low prices and low oil field investments which will lead to higher prices and higher investment, which leads to increasing spare capacity and price decreases.

Despite the cyclical pattern describes above, some observers doubt that the process will work to reverse the rise in oil prices in 1999 and 2000 in a reasonable time framework. In particular, questions remain about whether the proper amount of investment will be made to expand current capacity sufficiently to cover rising demand over the next year or two. The barriers to this investment are less economic than political. There are some key producing countries whose ability to expand capacity has been constrained by sanctions or lack of access to capital, especially Iran, Iraq and Libya. Moreover, within the Arab Persian Gulf, some of the key fields that have provided the mainstay of production are now showing signs of aging, but regimes, pressed to allocate budgets to social spending, are not making the necessary investments in their oil sectors. These factors have left oil markets today with a dangerously low margin of spare productive capacity and have given a few large producers the ability to control the rate of capacity expansion.

Within this context of more limited spare productive capacity and current low world oil inventories, the impact of any short-term supply disruption could potentially be greater today than at any time since 1951. At present, less than 2 million b/d of spare capacity is immediately available to oil markets should a crisis arise, compared to over 4 million b/d in 1990 when Iraq invaded Kuwait and less than the 3 million b/d or so that was available in oil markets just prior to the 1973 oil embargo. The following table details the locations and amounts of OPEC's current spare capacity:

CURRENT OPEC PRODUCTION AND SPARE PRODUCTION CAPACITY

MILLION BARRELS A DAY

	PRODUCTION JUNE 2000	SPARE PRODUCTIVE CAPACITY
SAUDI ARABIA	8.4	1.1
IRAN	3.65	0.0
IRAQ	2.6	0.2
KUWAIT	2.15	0.05
UAE	2.3	0.1
QATAR	0.7	0.0
VENEZUELA	2.9	0.0
NIGERIA	2.05	0.05
INDONESIA	1.3	0.0
LIBYA	1.4	0.05
ALGERIA	0.82	0.06
<u>TOTAL</u>	28.27	1.61

Source: Petroleum Intelligence Weekly; Industry estimates

While current obstacles to increasing capacity may prolong the current cyclical phase of high prices, it is unlikely to change the overall pattern of price and spare capacity changes observed in the past.

There are, however, some scenarios that might result in at least a dampening of these fluctuations. First, to the extent that OPEC or the Saudis have control over prices, they are constrained in the range that they should prudently allow prices to vary. Sustained high prices, say over \$25/b, will invite, not only investments in additional production capacity, but also, investments in technologies and life style changes that permanently reduce the amount of oil it takes to generate a unit of gross national product, the so-called energy intensity of the economy. On the other hand, sustained low prices, say less than \$10/barrel, will reduce oil revenues. In Saudi Arabia, high population growth rates combined with low to moderate oil prices have resulted in a decline in per capita income from \$16,650 to \$6,526 over the past 20 years. Saudi public debt has reached “120% of national income, which is about the same level as Lebanon’s, impoverished after its long years of civil war.”⁶ Furthermore, with close to half of the Saudi population under the age of 15, the Saudi government is under enormous pressure to increase investment in other sectors of the economy to provide employment for the coming explosion in the labor force. Other Middle East countries face similar problems. As a consequence, IOCs and other private oil investors can be reliably confident that large Middle East producers will try to increase prices and maintain as high a level as possible over the long term. Private producers will base investment decisions on their

expectation of what oil prices will average over the life of the investment and hence may add to production capacity even when prices are (temporarily) low.

A second factor that may reduce investment lags is the development of new technologies that reduce the cost of exploration, development and production of oil. When these costs were high for “fringe” area producers (non-OPEC), the prospect was real that OPEC (or the Saudis) would drive prices down to levels significantly below non-OPEC costs (technically referred to as “limit pricing”). New technologies have now reduced costs of producing oil in deep water and other “difficult” areas, requiring much deeper price cut than comfortable for Middle Eastern producers on sustained basis. Full cycle costs for new deepwater prospects in the U.S., for example, have fallen to below \$4.00 a barrel compared to \$1.50 to \$4.00 a barrel typical of many Saudi oilfields. In other words, new technology has significantly reduced both the threat and the consequences of an OPEC (or Saudi) price war to curtail production in the “competitive fringe.”

New technologies will also lower entry barriers to new firms. While these technologies require very high fixed costs, they reduce an important element of risk for an investment, namely that existing producers would engage in “limit pricing” and other predatory practices. And while high capital costs are themselves an entry barrier, it is one that is increasingly easier to surmount given efficiency gains through subcontracting of exploration, development and production services, the consolidation and mergers of oil firms, including the smaller firms and the increased sophistication of financial markets.

IMPLICATIONS OF THE REOPENING OF MIDEAST OIL FIELDS TO FOREIGN INVESTMENT FOR SAUDI PRICE DISCRIMINATION PRACTICES

Over the past decade and a half, Saudi Arabia has used its market power to dictate certain sales terms to its customers. Saudi Arabia’s marketing practices have created an anomaly in crude oil markets whereby the price of Saudi oil sold to Asia on an fob basis has on average been more expensive than the price of oil sold fob to other markets. Saudi Arabia has three separate fob crude oil price formulas for shipments from the kingdom’s main export port of Ras Tanura. These formulas reflect the kingdom’s three main

⁶ See references below (The Economist, April 22, 2000).

markets of Asia, Europe and the U.S. For Asian markets, Saudi prices for fob shipments from the kingdom have, on average, been 83 cents per barrel higher than similar shipments from the kingdom for European delivery and 93 cents higher than for U.S. delivery. This practice is possible because competition for marginal sales to Asia among Middle East producers is currently constrained. It is then reasonable to inquire whether a reopening to IOC investment in the Middle East would affect this “Asian premium.”

In a recent paper, Jaffe and Soligo (Jaffe, Soligo 2000) argue that the Saudis are motivated to pursue this pricing policy by their desire to maximize revenues (and profits) and do not sacrifice profits in order to maintain market share in the West (Jaffe, Soligo 2000). They argue that the observed price premium of differentials reflect revenue maximizing prices in the various markets, given different elasticities in each market and given the ability to prevent arbitrage between markets.

Price trends for Saudi oil sales over the last decade are consistent with this profit maximization hypothesis. The ability of Saudi Arabia to charge a higher fob price for Asian markets than elsewhere depends on the fact that the elasticity of the demand curve facing Saudi Arabia from Asia is lower than that from other parts of the globe. The differences in the demand elasticities facing the Saudi oil marketers reflects the fact that the Saudi market share is higher in Asia than elsewhere. It also reflects the fact that Saudi Arabia can currently prevent buyers of their oil and other producers from exploiting the price differential between Western and Eastern markets and hence reducing or eliminating the premium.

Saudi power to constrain buyers stems from its “dominant firm” or residual supplier position with the most spare-capacity. Saudi power relative to other Middle East oil producers arises because most of them have not had significant spare capacity and are limited in how much oil they can profitably shift from European to Asian buyers in response to price differentials. Some countries such as the UAE and Qatar sell almost all of their oil to Asia already. Other producers like Kuwait continue to supply their own refineries in Europe. Iraq, which is capacity constrained by United Nations sanctions, exports a large portion of its oil via pipeline to Turkey to the Mediterranean Sea. Since the pipeline already exists, marginal costs of transporting Iraqi oil to Europe are low. In

the case of Iran, export capacity is limited and marketing efforts are constrained by U.S. sanctions, which prevent U.S.-owned facilities in Asia from using Iranian oil. As a result, these countries have no incentive to undercut Saudi prices in Asia at the present time.

But these current conditions that favor price discrimination might not last beyond the next few years. A wide spread reopening of upstream investment to foreign investors in Iraq, Iran, Libya, Kuwait and the United Arab Emirates could reduce Saudi Arabia's lock on spare capacity and render it unable to enforce the restrictive contract terms necessary to keep its markets separated.

Moreover, as discussed above, many Persian Gulf producers are currently constrained from selling more oil to Asia, but if they manage to attract sufficient new investment, the increased output could compete with Saudi Arabian oil for the Asia market. If the growth in Asian demand is less than the growth in Middle East supply, countries such as Iraq, Iran or Kuwait that have the capacity, will take advantage of the Asian price premium and increase exports to Asia. The resulting competition for market share will erode the Asian premium.

To continue its market segmentation policies in the face of higher output capacity of its neighbors, Saudi Arabia will have to collude with other Middle Eastern producers. All will have to agree to Asian export quotas in order to establish and maintain a higher price for Asian delivery as compared with the price for other parts of the globe. Given the past experience within OPEC and other similar cartels, a collusive agreement would likely be unstable. Different economic conditions and political priorities will ultimately induce some countries to violate any Asian export quotas, diminishing the Asian premium.

By 2010, it is quite possible that capacity expansion in the Middle East will include an additional 1 million barrels a day of OPEC condensate liquids production as well as another 7.3 million b/d of capacity expansion from Iran, Iraq, Kuwait and the United Arab Emirates (UAE). This expanded capacity will free up more oil to be exported to Asia in competition with Saudi shipments. As discussed above, these suppliers do not currently have incremental barrels to ship eastward to take advantage of

the current Asian price premium. But the authors expect this market condition to change over time. The breakdown in expected capacity expansion in the Persian Gulf is as follows:

<u>Projections for Capacity Expansion in the Persian Gulf</u>		
	(million b/d)	
COUNTRY	CURRENT CAPACITY	CAPACITY IN 2010
Iraq	2.8	6.0
Iran	3.6	5.0
Kuwait	2.2	4.0
UAE	2.4	3.5

Besides increasing supply from the Persian Gulf, Asian buyers may also have increasing amounts of African and North African oil that could serve as potential supply sources. Renewed Western investment in Algeria and Libya could also add another 1 million b/d or more of incremental sweet crude supplies in the next five years. American companies have recently begun discussions with Libya about reestablishing operations once U.S. economic sanctions are eased.

Over 1.5 to 2 million b/d in gains are also expected from offshore Africa and from inland markets such as Sudan, Chad and Nigeria. In the next two to three years, Angolan output could increase by over 500,000 b/d while Shell's offshore Nigerian fields could yield an additional 350,000 b/d or more by 2005. If political obstacles can be overcome, Chad's production could hit 225,000 b/d in the next two to three years.⁷

The interplay between flows eastward of newly available Middle East supply and African supply is quite complex and will depend on a wide variety of factors including: 1) the actual rate of growth in oil use in Asia and the ensuing deficit in regional oil supply, 2) OPEC politics and production sharing agreements in effect, 3) tanker rates, 4) worldwide refinery configurations, 5) the rate of installation of desulfurization equipment in Asia and Europe and 6) product specifications in Europe and Asia. However, some generalizations are possible.

In amply supplied oil markets expected in the coming years, oil will increasingly move on the basis of transportation economics rather than political relationships. For

⁷ These estimates are in line with those published by consultants WoodMackensie, PIRA Energy and Energy Intelligence Group.

Asia, this is likely to mean increased access to Persian Gulf supplies. Reopening of Iraqi and Iranian oil fields to Western investment will not, in our opinion, influence the market of final destination for this oil. Rather, investors will want to sell into markets where the largest profits can be realized, and this is likely to be the Asian market given the relatively large supply deficit expected there as compared to Europe and for commercial reasons related to both pricing and transportation costs.

CONCLUSION

It has been postulated that a reopening to foreign private investment of oil fields in key Persian Gulf countries such as Saudi Arabia, Kuwait, Iran and Iraq could be an effective strategy to lessen market share competition from “fringe” producers in non-OPEC and strengthen oil prices in OPEC’s favor. This paper discusses the potential for such a strategy to free OPEC from the uncomfortable consequences of the oil industry’s volatile price and investment cycle.

We conclude that while a reopening of the Persian Gulf to foreign investment could potentially shift investment patterns temporarily in OPEC’s favor, resulting in a boost in the cartel’s market share for a period of time, it will not succeed in permanently reallocating market share to OPEC.

Initially, IOC’s may shift investment from non-OPEC to newly opened Persian Gulf opportunities. This change in investment patterns would translate into higher output potential in the Persian Gulf and a drop in the growth in output from non-OPEC producers, lending more market power to Persian Gulf producers.

Over time, however, other investors would likely to be able to raise capital to invest in oil fields in non-OPEC left behind by IOCs that become more active in the Persian Gulf. The amount of capital available for expansion of production capacity will depend on the level of oil prices. Thus, while reopening to foreign investment might assist OPEC in gaining market power for a while, any rise in oil prices that may accompany this trend would eventually accelerate the pace for the rise of new investors and new capital to be deployed in abandon prospects in non-OPEC.

OPEC could try to extend the life of its market share gains for a while by utilizing capacity expansion and accepting lower prices. But eventually, technological advances

**Impact of the Reopening of Persian Gulf Upstream Sectors to
International Investment In International Oil Markets**

and efficiency gains will again permit investments in the “fringe” oilfields at lower costs, driving prices to a lower long-term equilibrium level. Moreover, domestic social and economic expectations of growing populations and political forces in the Persian Gulf may make it difficult for OPEC countries to stomach sustained price levels low enough to discourage substantial investment in “fringe” non-OPEC areas.

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**Impact of the Reopening of Persian Gulf Upstream Sectors to
International Investment In International Oil Markets**

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