

Chapter 7

Economic Trends in the Gulf States and the Future Course of the Petrochemical Industry Section

7.1 Characteristics of Oil-Producing Economies – Dependence on Oil

The economies of the Persian Gulf oil-producing countries depend heavily on exports of oil and their growth rates repeated ups and downs in accordance with fluctuations of oil prices. Table 1 shows the changes in the economic growth rate of the member states of the Gulf Cooperation Council (GCC). Though the response time varies by country, the table clearly indicates the tendency that the year-on-year growth rates rose when oil prices went up and declined when oil prices dropped, in line with the changes in oil prices shown at the right end of the table.

Let us take a general view here of economic developments in the GCC states in the 1990s pursuant to Table 1. During the 1990-1991 Gulf War, Kuwait, which had been invaded by Iraq, registered the substantial economic contraction of 25.3% in 1990 and 40.5% in 1991. On the other hand, thanks to the higher oil prices, Saudi Arabia, the United Arab Emirates (UAE), Qatar and Oman chalked up double-digit economic growth. But their fast economic expansion was just for 1990 only, except for Saudi Arabia. In 1991, Qatar and Oman slipped into negative growth. While Kuwait incurred the serious damage from the Iraqi occupation, it managed to achieve the sharp recovery with a whopping growth of 83.7% in 1992 due

Table 1 Change in Economic Growth Rates (in Real Terms) of GCC Nations

	Saudi Arabia	Kuwait	Bahrain	UAE	Qatar	Oman	GCC average	Iran	Oil price (\$ per barrel)
1990	21.8	-25.3	9.5	22.5	13.5	38.5	14.6	8.7	22.26
1991	14.8	-40.5	4.2	0.8	-6.5	-3.3	4.2	8.5	18.62
1992	4.4	83.7	3.3	3.9	8.6	11.0	9.5	4.4	18.44
1993	-3.8	9.7	4.0	1.1	-6.4	-1.2	-1.4	1.0	16.33
1994	1.3	13.8	7.4	3.1	2.5	6.3	3.5	0.6	15.53
1995	4.3	7.3	4.0	16.4	1.9	4.6	6.8	3.0	16.86
1996	8.7	16.5	6.1	11.0	12.0	10.7	10.3	5.1	20.29
1997	7.1	2.5	3.0	1.2	15.0	8.0	5.6	1.8	18.68
1998	-2.0	-1.2	1.0	-1.5	3.0	2.0	-1.3	1.6	12.28
1999	0.3	2.0	2.0	3.5	10.0	2.6	3.4	2.0	17.47
2000	6.0	4.2	4.0	6.0	18.0	4.0	7.0	3.0	27.22

Sources: IMF, IFS, MEED, etc. Oil prices are for OPEC basket prices (the January-March average for 2000). Growth rates for 2000 are estimates.

chiefly to reconstruction demand. With the nation-rebuilding efforts financed mainly by drawing on funded placed overseas, the Kuwaiti government's external assets are estimated to have dwindled to as low as \$35 billion in 1994 from over \$100 billion before 1990. As for the later years, the GCC states lifted the growth rates considerably in 1996 when oil prices (the average price for Arabian Light) climbed over \$20 per barrel. The economies of the GCC countries expanded rapidly again on the sudden rise in oil prices from the second quarter of 1999.

Table 2 shows the dependence on oil revenue for each of the GCC nations.

The country having an economic structure with the highest dependence on oil is Kuwait. As much as 45% of its gross domestic product (GDP) comes from oil, and the ratio of oil to total government revenue is also high at 95% and the ratio of oil to the total value of exports at 90%. In the UAE, the revenue ratio was high at 80%, but the ratio of oil exports to total exports and GDP was relatively low at 40% and 25%, respectively.

Qatar led the pack with 95% in the ratio of oil to total exports, followed by Saudi Arabia and Kuwait at 90% each.

On the other hand, Iran's dependence on oil in terms of the ratio to GDP was low at 10% because it has a large population, vast territory and a relatively large scale of the domestic economy. Also, partly because of Iran's stepped-up tax collection efforts, the ratio of oil revenue to total revenue was held at 45%. But the ratio of oil to total exports was high at 80% as the country has yet to

develop any viable export industry.

Iraq, under the current circumstances, has no other means than oil exports as sources of government revenue and foreign currency earnings. However, Iraq is an agricultural country capable of turning out an abundance of farm products and its ratio of oil exports to GDP was only 30%. The ratio could go down further once its economy recovers.

The economies of the Gulf nations are outlined in Table 3, with 1999 figures. Among the six GCC countries, Iran and Iraq, Saudi Arabia has the biggest GDP of nearly \$140 billion. Saudi Arabia is followed by Iran with a little over \$100, the UAE just over \$46 billion, Kuwait a little less than \$30, Iraq with \$17.8 billion, Oman with \$15.8 billion, Qatar over \$12.0 billion, and Bahrain the smallest GDP of some \$6.2 billion.

By population, Iran stood out among the Gulf nations with the largest number of 63 million. Iraq followed with a population of 22.8 million and Saudi Arabia with some 20 million. The other countries all have a very small population and a high proportion of foreign residents. Foreigners accounted for 600,000 to 700,000 of the total population of 2.8 million in the UAE, for 1.5 million of the 2.3 million in Kuwait, for 370,000 of the 700,000 in Bahrain, and for 350,000 of the 600,000 in Qatar. Foreign residents thus make up a majority of population in Kuwait, Bahrain and Qatar. In Saudi Arabia, the number of foreigners is some six million and is not declining despite the Saudi government's powerful policy to employ more Saudi people and replace foreign workers

Table 2 Overview of Oil Dependence of GCC States, Iran and Iraq

(%)

	Saudi Arabia	Kuwait	Bahrain	UAE	Qatar	Oman	Iran	Iraq
Ratio to GDP	40	45	30	25	35	30	10	30
Ratio to total revenue	70	95	60	80	70	70	45	95
Ratio to total exports	90	90	50	40	95	70	80	95

Sources: IMF, *IFS*, *MEED* and data from countries concerned (1998 figures rounded in 5 percentage points)

Table 3 Outline of the Economies of the Gulf Nations (1999)

(in millions of \$, %)

	Saudi Arabia	Kuwait	Bahrain	UAE	Qatar	Oman	Iran	Iraq
GDP	139,197	29,572	6,180	46,327	12,197	15,818	101,073	17,800
Population (m.)	19.9	2.3	0.7	2.8	0.6	2.5	63.0	22.8
Per-capita GDP	6,995	14,015	8,829	16,545	20,673	6,430	1,604	780
Exports	48,482	12,276	4,088	30,360	5,030	5,509	19,726	5,000
Imports	25,717	9,618	3,369	27,213	3,070	5,826	13,511	3,000
Trade balance	22,765	2,658	719	3,147	1,960	-317	6,215	2,000
Current account	-1,701	5,062	-421	1,784	-456	-2,995	4,726	
Fiscal balance	-12,270	-1,208	-400	-7,883	-13	-766	-1,053	
Ratio of fiscal deficit to GDP (%)	-9.0	-4.1	-6.5	-17.0	-0.1	-5.4	-1.1	
Inflation rate (%)	0.0	0.2	-0.4	2.0	2.0	-0.5	17.3	
Foreign exchange reserves	16,540	5,783	1,432	10,675	292	19,387	5,600	
Moody's rating	Baa3	Baa1	Ba1	A2	Baa2	Baa2	B2	
Exchange rate (against US\$1)	3.75	0.31	0.38	3.67	3.64	0.38	1,747	2,250

Sources: IMF, IFS, MEED, etc.

(expatriates) with Saudis. Foreigners account for two-thirds of Saudi Arabia's working population, a complete inversion in the ratio between Saudi and foreign workers. Partly because of the low rate of Saudi women's participation in the labor force, the country is finding it difficult to bring down its dependence on foreign labor.

For per-capita income, Qatar has the biggest amount in excess of \$20,000. The UAE follows with over \$16,000 and Kuwait with about \$14,000. Bahrain has over \$8,000, Saudi Arabia a little less than \$7,000, Oman over \$6,000, and Iran about \$1,600. Iraq has far less in per-capita income, at \$760.

Table 3 also shows the value of exports and imports, trade balances, current account balances, fiscal balances and the ratios of fiscal deficits to GDP. As indicated by the 1999 figures contained in the table, oil-producing countries tended to post

trade surpluses, with exports exceeding imports, in years when oil prices rose. Oman, however, had a trade deficit even in 1999 when oil prices increased.

Then, considering about the services balance, income balance and current transfer balance, which are all the components of the current account balance. The services balance is in the red as the Gulf oil-producing states pay a lot for services. The income balance is in the black as they have interest receipts from overseas deposits or investment of funds earned from exports of oil. The balance of current transfers is in the red because of massive remittances made by expatriate workers. Balancing these accounts with the trade balance, the current account balance produced a surplus in Kuwait and the UAE, but a deficit in Saudi Arabia, Bahrain, Qatar, Oman and Iran.

In developing countries that cannot take in

foreign direct investment so easily because of high risk involved, a continuation of current account deficits means an accumulation of foreign debts. Iran has foreign debts of \$12.1 billion, and Iraq's foreign debts have reached \$132 billion.

Regarding the fiscal balance and its ratio to GDP, all the Gulf nations recorded fiscal balance deficits. But fiscal deficits cannot be interpreted indiscriminately as the crisis of government finances. Kuwait, for example, finances its budget deficits with receipts of investment returns on external assets. As the Gulf states run fiscal deficits, they find it necessary to finance those deficits with domestic funds or borrowings from overseas in order to stabilize domestic prices. Saudi Arabia, Kuwait, Bahrain, Qatar and Oman have already issued development bonds or treasury bills, with a secondary market for these securities beginning to burgeon in each of them.

It is often the case that an oil-producing nation's revenue from the sale of oil is first put into the national treasury and then placed with domestic banks or invested in European or U.S. markets through offshore banks in Bahrain. When a large-scale project is undertaken in an oil-producing state, on the other hand, each project is screened for profitability and its implementation is usually financed with external funds called back via banks in Bahrain and other countries or domestic banks, with some financial support provided by development financial institutions of foreign countries. For that reason, for example, Qatar ran up debts that topped its GDP for a huge project to develop the North Dome gas field, claimed to be the world's largest as a single gas field. Until 2002 when its debt repayments peak out, therefore, Qatar is counting on smooth production without hitch of liquefied natural gas (LNG), petrochemicals and other projects and hoping for stability of crude oil and gas prices at higher levels.

Table 3 also lists the ratings assigned by Moody's Investors Service of the United States. The UAE, Kuwait, Qatar, Oman and Saudi Arabia have been given the investment-grade ratings ranging

from A to Baa. But Bahrain's domestic market was assigned a speculative rating of Ba1, while Iran's B2 rating was non-investment grade. Bahrain's offshore market has the high credit rating of A3, indicating that Bahrain still maintains the high degree of external credibility (Aaa is the highest rating assigned by Moody's, and the degree of credibility dwindles in the order of Aa, A, Baa, Ba and B. The ratings of Ba and B are considered speculative).

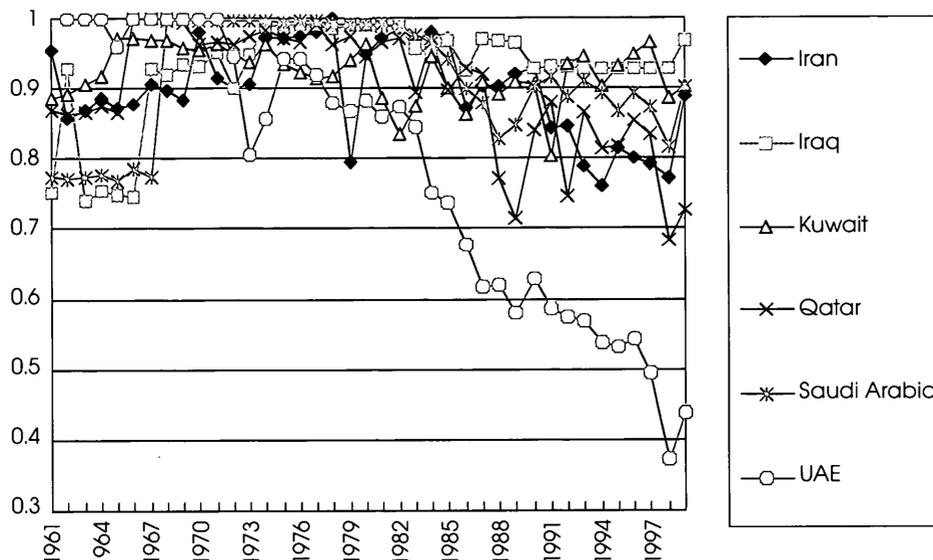
The next section examines the characteristics of the Gulf countries in the context of trade.

7.2 Trade of the Gulf States

The oil-producing countries in the Gulf region have a plenty of oil revenue, but at the same time have a high dependence on oil for fiscal revenue. As they have yet to develop non-oil industries that bring a large sum into the national treasury, how to spend the fiscal revenue from the sale of oil is virtually fixed before it arrives. The main spending items include employment security, infrastructure construction and security. Most of the Gulf states run fiscal deficits each year, and even with the prop from oil revenue, their economies still remain weak. Therefore, departing from the heavy reliance on exports of oil, gas and other unprocessed mineral resources for fiscal revenue and hard currency earnings, the Gulf states are under pressure for producing export items that generate as much value added as possible and contribute to an expansion of employment at home.

Figure 1 shows the ratio of oil exports to total exports from 1961 to 1997 for the Gulf nations including Iran. It can be seen that these countries showed the tendency of reducing the dependence on oil exports in the 1980s from the levels of the 1970s and that some of them further lowered that dependence distinctively in the 1990s.

Particularly remarkable is the sharp fall in the UAE's dependence on oil exports. The UAE saw the noticeable drop as shown in Figure 1 primarily because of a large proportion of re-exports through Jebel Ali and other free trade zones. The

Figure 1 Change in Oil Export Ratio of the Gulf Nations

Sources: IMF statistics, United Nations statistics

Note: UAE exports include re-exports.

oil ratio was on the decline for Qatar as well.

Meanwhile, Kuwait experienced the higher ratio of oil exports in the 1990s compared with the 1980s. The particular pattern for Kuwait can be interpreted as stemming from the departure of many foreign nationals who actually took care of the country's export industries amid the changing composition of its population after the Gulf War.

The breakdown of exports is examined next, with particular interest in the ratios of export items other than oil and gas.

First, in the case of Saudi Arabia, petrochemical products are gaining a growing share, other than oil-related exports. Of the non-oil exports, excluding re-exports, petrochemical products account for a majority share (see Figure 2).

Kuwait is characterized by the exceptionally high dependence on oil exports. While the country is building up petrochemical plant facilities, the ratio of oil-related exports tops 90% (see Figure 3).

In the UAE, other than trade in re-export

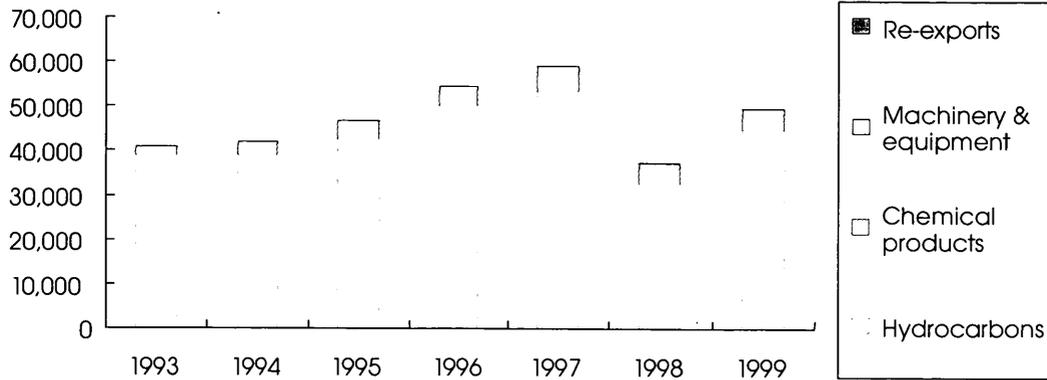
items such as machinery and electric appliances, about half of non-oil and non-gas exports, or nearly \$1 billion, are exports by aluminum smelter DUBAL in Dubai (1998). As this figure suggests, the UAE has yet to develop viable export industries in fields other than re-exports and aluminum smelting (see Figure 4).

In Qatar, its industrialization efforts paid off in the form of production of chemical products and bar steel, and petrochemical products and basic products grew into viable export industries to account for just under 20% of its total exports (see Figure 5).

In Bahrain, aluminum smelter ALBA has a big weight as a major exporter. ALBA and DUBAL of Dubai are the two most dominant players in the Middle East for aluminum exports (see Figure 6).

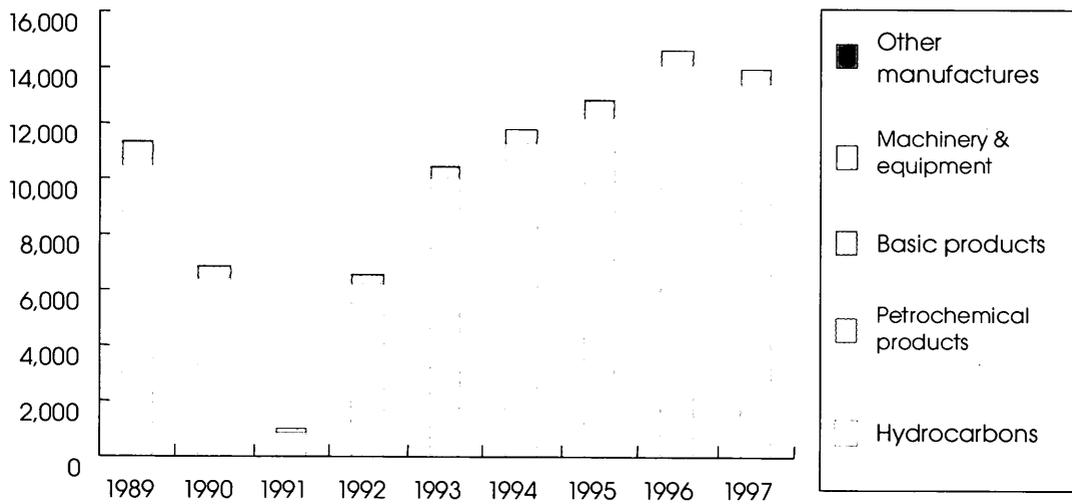
In Oman, a variety of petrochemical projects are on the drawing boards in parallel with the ongoing construction of pipelines for collecting and transporting gas. Also, the first stage is in progress for construction of an aluminum smelting plant (see Figure 7).

Figure 2 Change in Saudi Arabia's Exports (US\$1 m.)



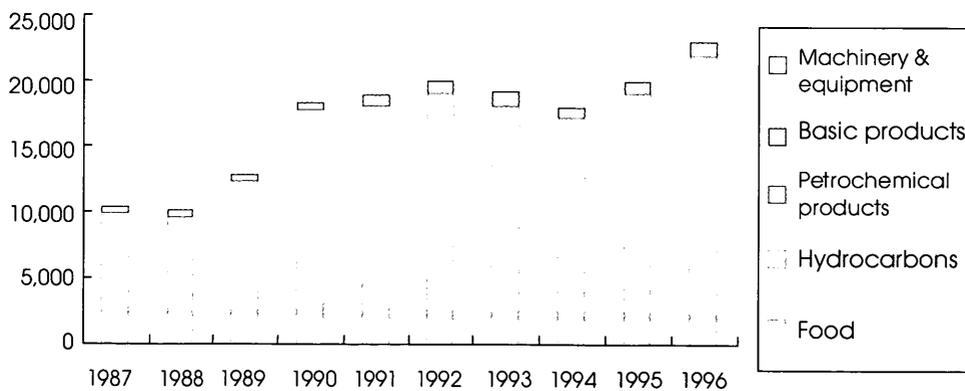
Sources: United Nations statistics and data from the Saudi government

Figure 3 Change in Kuwait's Exports (US\$1 m.)



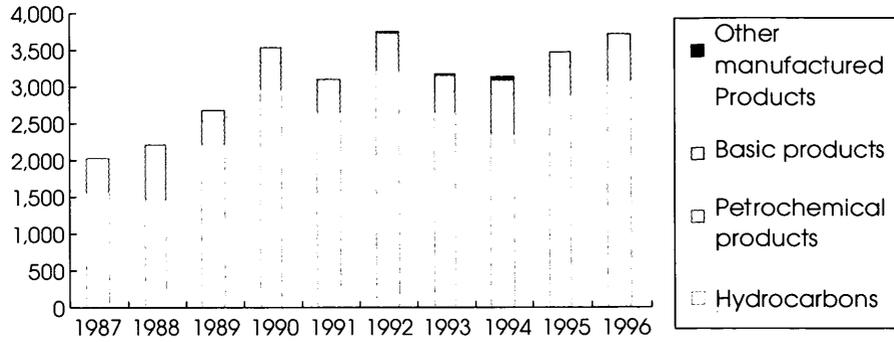
Source: United Nations statistics

Figure 4 Change in the UAE's Exports (US\$1 m.)



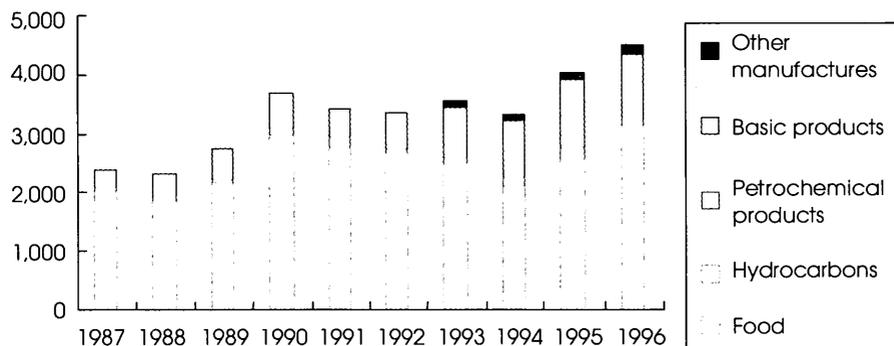
Source: United Nations statistics (excluding re-exports)

Figure 5 Change in Qatar's Exports (US\$1 m.)



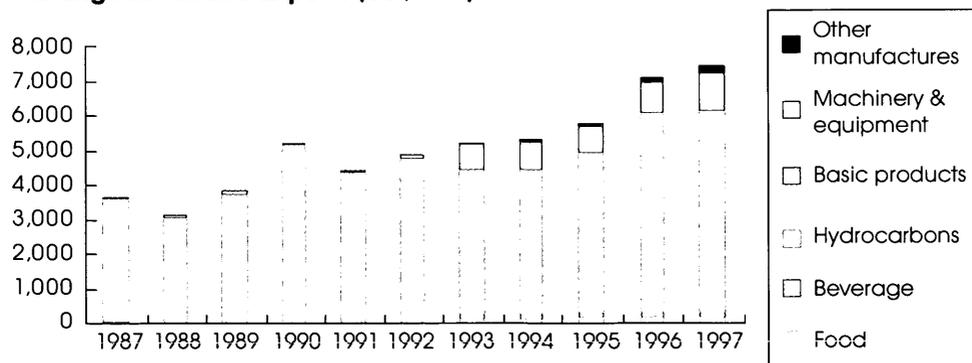
Source: United Nations statistics

Figure 6 Change in Bahrain's Exports (US\$1 m.)



Source: United Nations statistics

Figure 7 Change in Oman's Exports (US\$1 m.)



Source: United Nations statistics

The above-reviewed data and discussions brought home anew the consistently high ratios of oil-related exports to the Gulf nations' total exports. Even under such circumstances, development of non-oil industries in the Gulf states is of pressing need in order to provide employment opportunities for the sharply growing youth population in the region. For the Gulf countries rich in hydrocarbon resources, petrochemicals seem to be one of the promising fields where they can maintain international competitiveness. The following section examines the Gulf nations' approach to the petrochemical industry and a future course of the sector's development.

7.3 Petrochemical Industry

The changes in exports of petrochemical products from the GCC countries show that Saudi Arabia is by far the single largest exporter, with an annual value of exports reaching \$3 billion to \$4 billion. So, any study on the Gulf states' petrochemical exports needs to focus on developments in Saudi Arabia. Following Saudi Arabia comes Qatar, backed by the North Dome field, the world's largest as an individual gas field, but the annual value of its exports is still less than \$500 million.

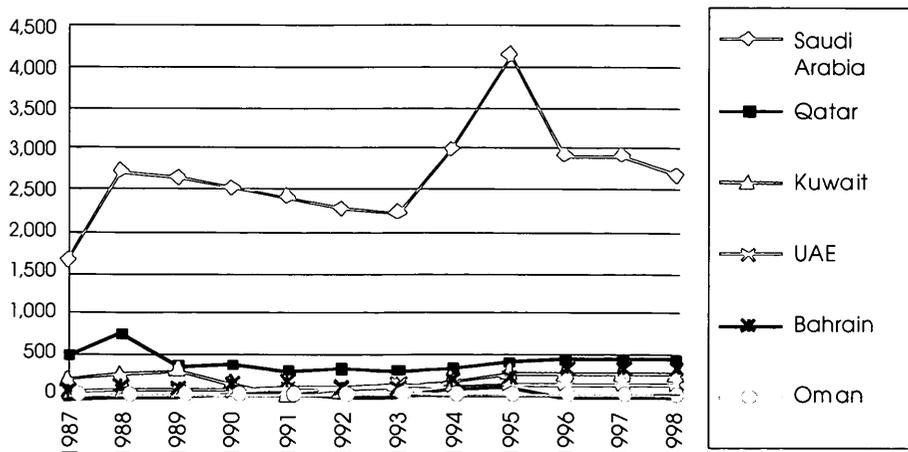
Qatar is followed by Kuwait, the UAE and Bahrain in that order (see Figure 8).

With about 10% for 1998, Qatar has the highest ratio of chemical products exports to total exports among the GCC nations, followed by Saudi Arabia, Bahrain, Kuwait, the UAE and Oman in that order. It is assumed that Qatar, which is not a major exporter of oil by any measure among the GCC members, is now reaping the fruits of its aggressive drive to invite petrochemical makers to the country in the form of a higher ratio of petrochemical exports (see Figure 9).

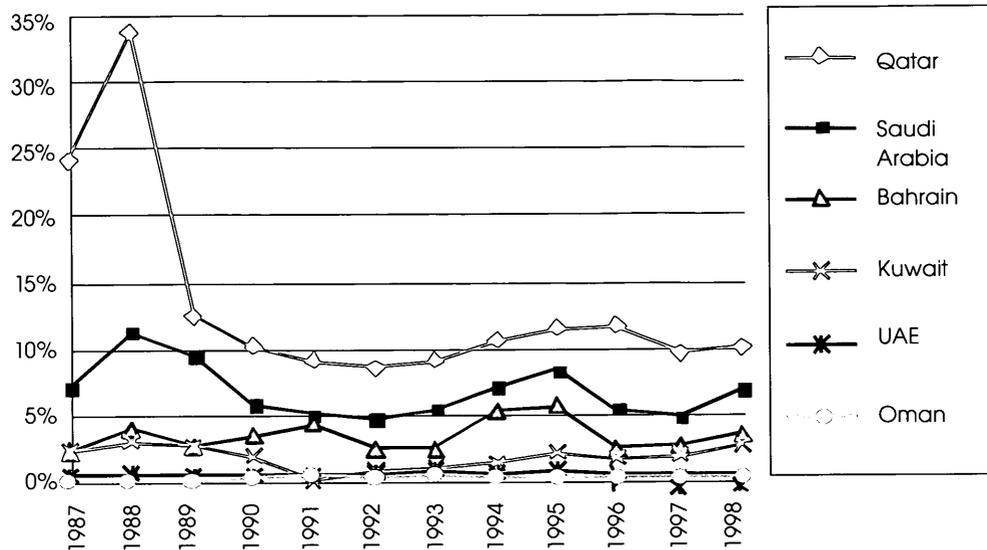
The following tables help us understand the position the Middle East holds in the global petrochemical industry. Tables 4-6 provide supply and demand forecasts for ethylene, propylene and aromatic compounds through 2004.

As for the shares of the Middle East in the global petrochemical products supply and demand, demand was 4.4 million tons (5% of the global total, the same hereafter) and supply capacity 5.5 million tons (6%) for ethylene in 1998. The forecast for 2004 is 7.9 million tons in demand (7.5%) and 9.3 million tons in supply (8%). Japan's ethylene supply capacity in 2004 is estimated to decline from the 1998 level and likely to become a net importer in an about-face from the current state of

Figure 8 Change in the GCC Nations' Petrochemical exports (US\$1 m.)



Sources: GOIC and statistical data from the GCC states.

Figure 9 Ratio of Chemicals to Total Exports of the GCC Nations

Sources: GOIC and statistical data from the GCC states.

overcapacity. The Middle East countries, with their expanding demand and supply capacity, are likely overtake Japan, which by 2004 is presumed to be increasing ethylene imports from the region.

Table 5 for propylene shows that the Middle East, which had demand of 700,000 tons (1.5% of the global total, the same hereafter) and supply capacity of one million tons (1.8%) in 1998, is forecast to expand the share in 2004 to 1.5 million tons in demand (2.5%) and 2.2 million tons in supply capacity (3%).

For aromatic compounds, the Middle East's shares are estimated to expand from 1.5 million tons in demand (2% of the global total, the same hereafter) and 2.7 million tons in supply capacity (3%) in 1998 to 3.6 million tons in demand (4.5%) and 5.4 million tons in supply capacity (5.5) in 2004.

Comparison of ethylene production capacity of the world's major petrochemical manufacturers put the Middle East as a whole just behind second-ranking Exxon Mobil with the 1998 total of 5.5 million tons. The forecast capacity total of 9.3 million for 2004 places the Middle East before

Dow Union Carbide, which was at the top of Table 7, indicating the steady expansion of the region's market share.

Next, the comparison between Saudi Arabia and Iran will be made to shed light on problems involved in nurturing a petrochemical industry. Table 8 shows the current state of Saudi Arabia's ethylene plants and Table 9 is for Iran's ethylene plants.

What is noteworthy about Saudi Arabia's petrochemical industry is an ambitious expansion of its production capacity for upstream general-use chemical products. Saudi Arabia is the world's most competitive producer of ethylene because of the cheap supply of ethane, a raw material for ethylene. As of the end of 1999, the country was the seventh largest producer of ethylene with 3.4 million tons. Saudi Arabia plans to boost the production to 5.7 million tons in 2001 to place itself in third place after the United States and Japan, and is scheduled to establish new ethylene production facilities in the coming years. It plans to complete an 800,000-ton ethylene cracking plant in Jubail in 2004, and another 800,000-ton cracker

Table 4 Ethylene Supply and Demand (m. tons)

		Global	Asia	(Japan)	Europe	North America	Middle East
1998	Demand	81.2	21.9	(7.1)	19.5	26.6	4.4
	Capacity	90.6	22.1	(7.3)	20.9	29.5	5.5
		9.4	0.2	0.2	1.4	2.9	1.1
2004	Demand	104.8	29.4	(7.4)	22.7	34.3	7.9
	Capacity	111.8	29.2	(7.1)	22.7	34.3	9.3
		7.0	-0.2	-0.3	0.0	1.8	1.4

Notes: Total global demand for ethylene derivatives was 80.9 million tons in 1998 and 104.6 million tons (forecast) in 2004.

Ethylene derivatives include LDPE, HDPE, SM, PVC, EG, etc.

Table 5 Propylene Supply and Demand (m. tons)

		Global	Asia	(Japan)	Europe	North America	Middle East
1998	Demand	47.2	14.8	(4.8)	13.4	13.7	0.7
	Capacity	56.7	15.9	(5.8)	14.7	18.5	1.0
		9.5	1.1	1.0	1.3	4.8	0.3
2004	Demand	59.6	18.7	(4.9)	16.0	16.9	1.5
	Capacity	70.0	19.4	(5.7)	16.3	24.4	2.2
		10.4	0.7	0.8	0.3	7.5	0.7

Notes: Total global demand for propylene derivatives was 30 million tons in 1989 and 42.3 million tons (forecast) in 2004.

Table 6 Aromatics Supply and Demand (m. tons)

		Global	Asia	(Japan)	Europe	North America	Middle East
1998	Demand	65.4	24.6	(9.8)	12.1	19.8	1.5
	Capacity	87.3	29.0	(12.4)	14.4	26.4	2.7
		21.9	4.4	2.6	2.3	6.6	1.2
2004	Demand	79.9	31.5	(10.2)	14.4	22.2	3.6
	Capacity	98.9	35.0	(12.7)	16.4	27.1	5.4
		19.0	3.5	2.5	2.0	4.9	1.8

Notes: Total global demand for aromatic compound derivatives was 80.9 million tons in 1989 and 104.6 million tons (forecast) in 2004.

Aromatic compound derivatives are a combined total of benzene, toluene and xylene.

Table 7 Ethylene Output Capacity of Major Global Makers (1998) (m, tons)

	Maker	Country	Capacity
1	Dow Union Carbide	U.S.	840
2	Exxon Mobil	U.S.	630
3	Equistar	U.S.	520
4	Shell Chemical	UK/Dutch	510
5	BP Amoco	U.K., U.S.	320
6	Nova Chemicals	Canada	230
7	BASF	Germany	220
8	Phillips	U.S.	210
9	EniChem	Italy	170
10	Chevron Chemical	U.S.	160

Notes: Shell and BASF are in a business tie-up.

Japan's production capacity is 7.3 million tons (a total for 11 ethylene centers).

In 1999, exports totaled some 2.5 million tons, while imports amounted to about 500,000 tons.

In terms of sales of the chemicals division, BASF topped with \$27.7 billion, followed by Dupont in second place with \$26.2 billion and Bayer in third place with \$17.9 billion.

For Japanese chemicals firms, Sumitomo Chemical Co. was ranked 13th with \$6.9 billion, Dainippon Ink & Chemicals Inc. 17th with \$6.2 billion, and Mitsubishi Chemical Corp. in 31st with \$4.9 billion.

Table 8 Scale, Raw Material Ratio of Saudi Arabia's Ethylene Plants (1999)

Plant name	Ethylene output (tons per year)	Ratio of raw materials (%)				
		Ethane	Propane	Butane	Naphtha	Total
Arabian Pet-chem.	650,000	100.0				100.0
Arabian Pet-chem	800,000				100.0	100.0
Saudi Pet-chem.	1,100,000	100.0				100.0
Yanbu Pet-chem.	800,000	100.0				100.0
Total	3,350,000					

Source: *OGJ*

Table 9 Scale, Raw Material Ratio of Iran's Ethylene Plants (1999)

Plant name	Ethylene output (tons per year)	Ratio of raw materials (%)				
		Ethane	Propane	Butane	Naphtha	Total
Arak	247,000				100.0	100.0
Bandar Imam	311,000	12.4		43.8	43.8	100.0
Tabriz	136,000		10.0	10.0	80.0	100.0
Total	694,000					

Source: *OGJ*

in Yanbu in 2006. With the capacities at the two new facilities added, Saudi Arabia will have a total ethylene output capacity of 7.3 million tons to make it the world's second biggest producer of ethylene.

Using ethane as raw material, Saudi Arabia possesses the world's strongest competitiveness for ethylene-based products, producing polyethylene and ethylene glycol at low costs. With the supply of ethane coming in the form of gas, however, output of propylene is small at some 300,000 tons a year. Besides, Saudi Arabia is not utilizing FCC propylene, leaving much to be desired in terms of effective utilization of resources.

In Saudi Arabia, Ibn Rushd started operating a production plant for aromatic compounds using LPG as raw material in September 1999. Benzene and cyclohexane plants are also in operation by SCPC, a joint venture with Chevron.

Let us look at Iran's petrochemical industry next. The petrochemical industry stands out in Iran as the top candidate sector with comparative advantage. The petrochemical industry seems to be the industry most suited to Iran because natural gas liquid (NGL) and natural gas, coming out in association with crude oil production, can be utilized as cheap materials when efficiently collected and Iran does have ample reserves of them.

Table 9 shows the production scale and the component ratios of raw materials for ethylene production in Iran's chemical industry. Iran has three ethylene-producing plants at Arak, Bandar Imam and Tabriz, with the Bandar Imam facility having the biggest capacity of 311,000 tons a year. Despite the fact that Iran has the second largest reserves of gas in the world, the outstanding feature of its ethylene production is the high ratio of naphtha being used as raw material at many plants. The Bandar Imam plant depends on butane and naphtha, while the Arak plant is totally reliant on naphtha. Tabriz also has a high dependence on naphtha. Despite the need to aim for sophisticated utilization of gas for the chemical industry on the

strength of the world's second biggest reserves, it is evident that Iran has yet to fully develop ways to collect gas and utilize it for the chemical industry.

Comparison of the operating scale of chemical industries between Iran and Saudi Arabia shows that the four Saudi plants are all bigger than Iran's rival facilities. The Bandar Imam plant, the largest ethylene plant in Iran, has the capacity of a little over 300,000 a year. The Saudi plants produce 600,000 tons to 800,000 tons a year, with one having the capacity of up to 1.1 million tons. Generally speaking, the larger production scale is advantageous in order to reap the benefits of the economies of scale as a process industry. In addition, what should be noted is that three out of the four Saudi ethylene plants use ethane, extracted from natural gas, as raw material. The remaining plant uses naphtha.

The Organization of Petroleum Exporting Countries (OPEC) sets production quotas for each of its members. Even when a portion of output is used in the petrochemical industry for higher value-added, it is still counted as part of oil output for exports and revenue from oil exports is reduced by that much. Moreover, demand for petroleum products is expanding steadily in Iran and other Gulf nations, rendering it increasingly important for oil-producing states to improve and expand facilities beginning with more effective use of gas. Iran has set up a special economic zone for chemical concerns at Bandar Imam as a policy to invite foreign companies. Similar endeavors should be pursued further.

Qatar, the UAE, Oman and Kuwait are also taking measures to promote their petrochemical industries. As they plan to produce more petrochemical derivatives in the downstream sector, they will face the greater need to seek capital participation by companies from the consuming countries to form joint ventures to help secure the markets for their products, and at the same time find it necessary to improve various systems for accepting foreign companies.

7.4 Conclusions

The Persian Gulf nations are conspicuously dependent on crude oil exports and cannot but respond restlessly to every ups and downs of oil prices. On the other hand, a further expansion of the distribution sector is expected in the Gulf region. The UAE, for example, has a far larger percentage of re-exports than the rest of export items combined in the non-oil sector. In that event, the Jebel Ali free trade zone (FTZ) and other FTZs will likely get into competition for the position of the hub FTZ to handle the flows of goods among the Gulf states, and probably including countries around the region.

The petrochemical industry, one of industry sectors a producer of oil and gas should consider entering first on the strength of resources it owns, is capital-intensive in its nature and expected to play only a role incidental to the oil-exporting sector. Surely, Saudi Arabia's Jubail plants have already become the world's largest petrochemical facility. Even so, it is demonstratively clear, by just looking at the value of trade involved, that the petrochemical industry by itself is not powerful enough to lead the development of an oil producing country as the engine of industrial development. It is therefore necessary for oil-producing countries to map out a strategy for more diversified development.

(Reiji Takeishi)