

the Southwest ECONOMY

THE FEDERAL RESERVE BANK OF DALLAS

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Energy and the Southwest Economy

The dramatic change in oil prices during the last two decades created much economic turbulence in the Southwest. As oil prices rose during the 1970s, the economy accelerated; but when prices fell, the economy faltered. Over the last several years the energy industry has played a reduced role in the Southwest. Relying more on growth in services and manufacturing, the Southwest is recovering from an energy-induced recession. Looking ahead, the energy industry will not likely return to its former degree of prominence. During the 1990s, however, the energy industry should capture a growing share of the Southwest economy.

Oil Price Volatility

The rise and fall in oil prices was dramatic (*Chart 1*). After a long stable period, the first big jolt in oil prices came after the 1973–74 oil embargo. The next big jump came on the heels of the Iran–Iraq war in the late 1970s. Between mid-1973 and early 1981 inflation-adjusted oil prices more than tripled. In 1980, near the peak in oil prices, many analysts were forecasting that oil prices would reach \$60 to \$70 per barrel by the end of the decade.

But beginning in 1981, inflation-adjusted oil prices began to slide. Increased energy conservation, increased usage of nuclear power and coal and increased oil production outside of OPEC caused a price retreat. In 1986, the downward movement in

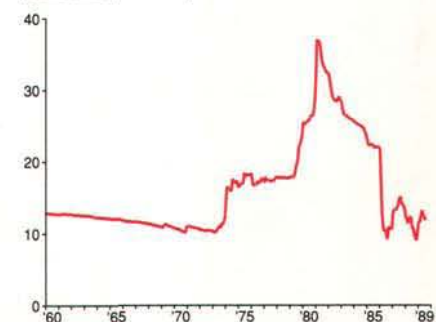
the oil price accelerated when discontent within OPEC caused excessive cheating on supply quotas. By mid-1986, inflation-adjusted oil prices had returned to their pre-1974 levels. The dramatic change in oil prices during this period played an important role in the growth of the energy-producing states of the Southwest.

Past Performance of the Southwest

Chart 2 shows the percentage of U.S. output originating from each of the Southwest's energy-producing states. In this chart, an increasing line signifies that the value of the state's output is growing faster than the nation's. During the period of rising oil prices, all four of the energy-producing states in the Southwest grew faster than the nation. When prices fell during the 1980s, however, the states grew more slowly than the nation.

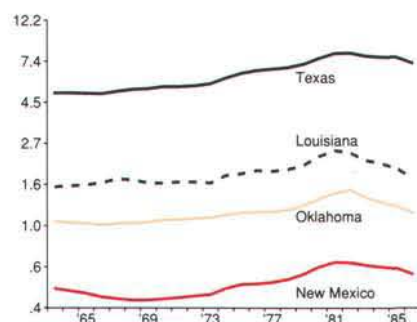
Chart 1
Real Oil Price

(1981 dollars per barrel)



Much of the change in output growth in the Southwest over the last two decades can be directly attributed to changes in output in oil and gas extraction. As shown in Chart 3, oil and gas extraction was an important part of the Southwest economies even before the initial jump in oil prices in 1974. With the rise in energy prices, oil and gas extraction captured an increasing share of the region's economy. By 1981 the share of output from oil and gas extraction had risen to 30 percent in

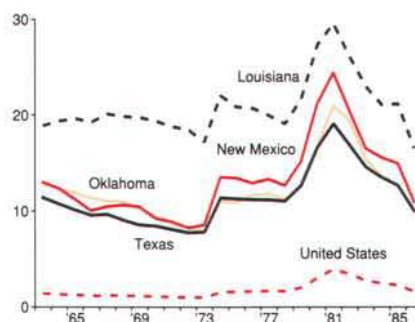
Chart 2
State Output as a Percent of U.S. Output



Louisiana, 25 percent in New Mexico, 21 percent in Oklahoma and 19 percent in Texas. Since 1981, however, the dramatic decline in energy output reduced these shares to about half of their peak levels.

The large swings in energy's share of output also played a significant role in employment growth in the Southwest. An earlier study showed that from 1972 to 1982 growth in the energy industry was responsible for 45 percent of total employment growth in Texas.¹

Chart 3
Oil and Gas Extraction as a Percent of Output



During this period the energy industry had a significant effect on employment growth in every major sector of the Texas economy (*Table 1*). For example, the construction sector grew by 172,000 workers, and 96,000 of these new jobs (about 56 percent) were related to the growth in the energy sector.

In a related study, two economists looked at the total effect on state employment of a change in the oil price.² *Table 2* shows the percentage decrease in employment resulting from a permanent \$5 per barrel decrease in the oil price. A \$5 decline occurring in 1985 would cause an employment decline of 3.1 percent in Oklahoma, 1.9 percent in Louisiana, 1.7 percent in Texas and 1.1 percent in New Mexico. These figures represent significant declines in these states' employment. The decline in energy and the growth of other sectors, however, have decreased the effect of an oil price change.

Energy and Economic Diversification

Changes in the energy industry over the last two decades have affected economic diversification in the Southwest (*Chart 4*).³ From 1970 to 1979 Texas shifted into highly volatile industries and into industries whose performance moved together. The shift caused diversification to decline. Since 1979, however, the state has moved to more stable and more independent industries, increasing economic diversification.

Much of the change in diversification over this period was the result of the growth and subsequent decline of

Table 1
Importance of Energy to Texas Employment Growth, 1972-82

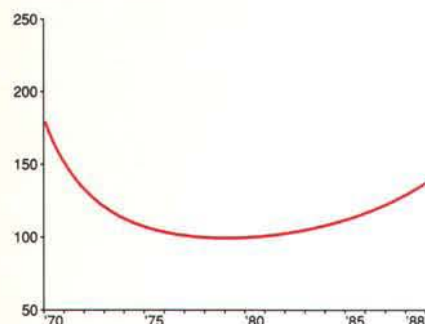
Sector	Change in employment (thousands of workers)		Energy-related as percent of actual
	Energy-related	Actual	
Mining	203	200	101.5
Construction	96	172	55.8
Nondurable manufacturing	35	82	42.7
Durable manufacturing	84	225	37.3
Transportation and public utilities	50	121	41.3
Wholesale trade	44	172	25.6
Retail trade	185	437	42.3
Finance, insurance, and real estate	59	156	37.8
Services	179	506	35.4
Total private nonagricultural employment	935	2,071	45.1

Table 2
Percent Decreases in Employment
Resulting from a \$5 Oil Price Decrease

State	1985	1989
Oklahoma	3.12	2.27
Louisiana	1.90	1.39
Texas	1.66	1.21
New Mexico	1.10	0.80

Chart 4
Texas Economic Diversification

(Index: January 1979=100)



the energy sector. A growing share of the volatile energy sector during the 1970s decreased economic diversification in the Southwest, while a growing share of other industries during the 1980s increased diversification. During the last two decades, out of 59 industries, the two most volatile industries in Texas were oil field machinery manufacturing and oil and gas extraction.

Today's industrial structure in the Southwest is concentrated more in manufacturing and services and less in energy than earlier in this decade. Because manufacturing and services are less volatile than energy, today's industrial structure provides a more stable economic environment. However, if the energy industry returns to its level of dominance as seen in the early 1980s, the Southwest could return to a less stable economy.

Oil Prices Rise — Production Declines

To estimate the role of energy in the future of the Southwest, we must first consider the future demand for oil. Chart 5 shows estimated paths of oil consumption to the year 2000 for various oil prices, assuming that world output grows at a 2.5-percent annual rate.⁴ The chart also shows current world oil capacity. As the chart indicates, current oil prices are too low to be sustained over the next decade unless capacity grows sharply.

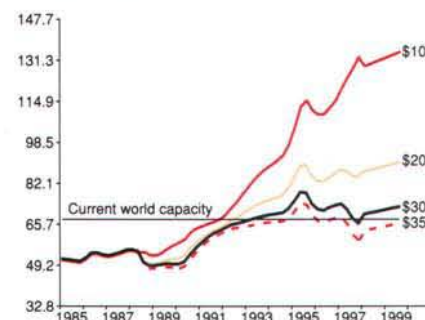
Oil consumption takes many years

to fully adjust to changes in oil prices. Much of the decrease in oil consumption during the 1980s was in response to oil price increases that occurred from 1979 to 1981. Currently, oil consumption is below its long-run equilibrium and, at current prices, can be expected to increase. To keep consumption at or below current world capacity, oil prices (in 1988 dollars) must rise to at least \$35 per barrel by the year 2000. If capacity rises in the future, the oil price is likely to be closer to \$30 per barrel.

Even with growing consumption and price, the oil industry is unlikely to regain its former prominence in the Southwest economy because the Southwest is running out of oil. Despite

Chart 5
World Oil Consumption at Various Oil Prices

(Millions of barrels per day)



Note: Oil Prices are 1988 Dollars

sharp increases in oil prices and drilling activity from 1979 to 1981, proven oil reserves in the Southwest failed to turn around from their long decline.

Oil production in the Southwest has also declined since the early 1970s. For example, in 1981, at the peak in oil prices, crude production in the Southwest was at its lowest level in 20 years. A continuing depletion of reserves will limit future oil production. While a growing demand will likely drive inflation-adjusted oil prices to nearly \$30 per barrel by the year 2000, oil production in the Southwest will likely decrease by 17 percent. The combination of a higher price and lower production will increase slightly

the oil industry's current share of the Southwest economy. However, the oil industry's share will remain significantly below peak levels reached in the early 1980s.

The Growing Importance of Natural Gas

Although oil extraction's importance in the Southwest economy is unlikely to increase much from recent levels, natural gas production may become increasingly important. There are four principal reasons why natural gas is likely to gain an increasing share of the Southwest economy.

The first reason is natural gas deregulation. The excess supply of natural gas over the last several years has prompted legislation to create a more competitive environment for the supply and demand for natural gas. Legislation reducing the restrictions on natural gas usage by power plants and industries, the elimination of federal price controls on natural gas and new federal regulations deregulating the natural gas pipeline industry should encourage a greater supply and demand for gas in the future.

The second reason is that the Southwest has substantial natural gas resources. It is estimated that at current production levels, the U.S. has up to a 34-year supply of natural gas. More than half of these estimated resources lie in the Southwest. Oil, on the other hand, is estimated as having only a 26-year supply and less than 40 percent of these resources are estimated to be in the Southwest.⁵

The third reason is environmental. The Bush administration's proposed revision of the Clean Air Act is indicative of recent increased environmental concerns. The burning of natural gas emits less soot, carbon monoxide, sulfur oxides and other pollutants than does the burning of other fossil fuels. Concerns about smog, acid rain and a warming of the earth's atmosphere should stimulate the demand for natural gas in the future.

The fourth reason is technological. Recent advances have increased the demand and supply of natural gas. Developments in highly efficient gas-fired turbines have made the cost of natural gas-generated electricity favorable relative to the use of other fuels. Also, advances in drilling technology have increased the production of natural gas from unconventional sources.

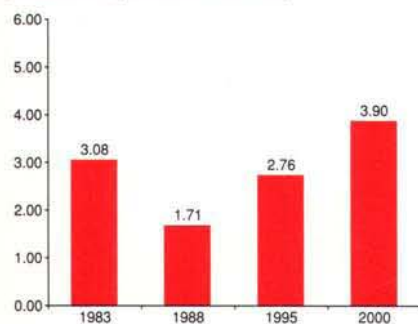
As demand increases, the price of natural gas is likely to rise. The projected average wellhead price of natural gas in 1988 dollars is shown in Chart 6. This forecast was produced by the U.S. Department of Energy and assumes that the oil price (in 1988 dollars) increases to \$28 per barrel by the year 2000.⁶ The rising price of natural gas reflects increased demand and the elimination of the excess supply of natural gas that has existed in the market since the early 1980s. By the year 2000 the inflation-adjusted gas price should double its 1988 level and should exceed its early 1980s peak of about \$3 per thousand cubic feet. Under this scenario, natural gas production will reverse its long decline, rising at an annual rate of about 1 percent.

The Future of Energy in the Southwest

If energy prices increase as projected, oil and gas extraction should become more important to the Southwest. By the year 2000 the natural gas industry could add (in inflation-adjusted

Chart 6
Average Wellhead Price of Natural Gas

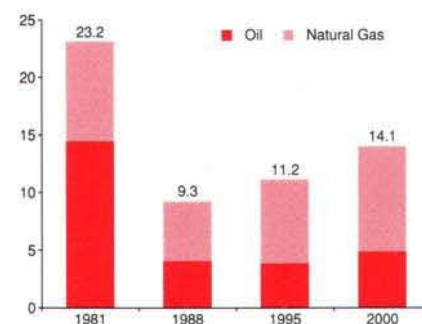
(In 1988 dollars per thousand cubic feet)



dollars) as much as \$61 billion a year to the Southwest economy. Taking into account declining oil reserves and increasing oil prices, oil will add an additional \$32 billion to the Southwest economy. If total real output grows 3 percent annually, oil and gas extraction's share of output in the Southwest will likely increase from about 9 percent in 1988 to about 14 percent by the year 2000 (Chart 7).

While energy extraction's share of the Southwest's output is likely to be significantly higher than in 1988, it should remain well below the peak level of 1981. By 2000, oil's share of output will increase only slightly and

Chart 7
Energy Extraction as a Percent of Southwest Output



should be only about one-third of its peak level. The share of output from natural gas, however, should increase strongly and actually surpass its earlier peak.

Conclusion

Energy extraction has become a smaller part of the Southwest economy in recent years, and oil is not likely to regain much of its previous importance. Gains in the demand and price of natural gas, however, may lead energy extraction to a more significant role in the future. Although energy extraction's share of the Southwest economy may not be as large as it was in the early 1980s, it should increase from the depressed level of 1988.

While a growing energy industry

will provide significant gains in jobs and output, it could also reverse much of the recent economic diversification in the Southwest. Because the energy industry is more volatile than other sectors, a growing energy sector could increase the volatility of the Southwest economy. As the energy industry grows, the Southwest must provide a favorable business climate to promote growth in all areas of the economy. Continuing growth in manufacturing and service industries that are not tied to energy will assure the Southwest of healthy, stable growth in the future.

—Keith R. Phillips

¹ See John K. Hill, "Energy's Contribution to the Growth of Employment in Texas, 1972–1982," Federal Reserve Bank of Dallas *Economic Review*, May 1986, 11–18.

² See S.P.A. Brown and John K. Hill, "Lower Oil Prices and State Employment," *Contemporary Policy Issues*, July 1988, 60–66.

³ This measure is the inverse of the instability index presented in William C. Gruben and Keith R. Phillips, "Diversifying Texas: Recent History and Prospects," Federal Reserve Bank of Dallas *Economic Review*, July 1989, 1–12.

⁴ This chart was derived from Stephen P.A. Brown and Keith R. Phillips, "Oil Prices and Consumption in the 1990s," Federal Reserve Bank of Dallas *Economic Review*, January 1989, 1–8.

⁵ Reserves for oil and gas include measured, inferred, indicated and economically recoverable resources. See "Estimates of Undiscovered Conventional Oil and Gas Resources in the United States—A Part of the Nation's Energy Endowment," 1989, U.S. Department of the Interior, U.S. Geological Survey, Minerals Management Service.

⁶ Ibid.