

Federal Reserve Bank of Dallas July 1982

Business Cycle Hits the Oil and Gas Industry

In contrast with its experience in the early seventies, the oil and gas industry appears to have become more cyclical since 1978—possibly the result of greater exposure to market forces. This has important implications for the industry outlook as the economy recovers. Petroleum refining and natural gas production appear poised for recovery, while drilling faces more trouble and crude oil extraction holds a steady course.

Cyclical Behavior

Isolating cyclical behavior as deviations from long-term trends reveals the behavior of various components of the energy industry over the business cycle—as is shown by the charts on page 2. Total industrial production is used as a monthly indicator of overall economic activity.

Since the removal of oil price controls began in mid-1979, deviations from the trend in drilling have begun to follow the national business cycle more closely. This is somewhat of a surprise because drilling activity had been regarded as countercyclical. Drilling was booming during the 1973-75 recession and appeared to fare well during the 1980 recession. However, drilling performance during the 1980 recession was more a product of the rise in oil prices than the business cycle.

The emergence of cyclical weakness in drilling lagged the onset of the 1980 recession by three to five months. In the current recession, a decline in

deviation from the drilling trend led the downturn in the economy by two months. While oil price decontrol has stimulated drilling to new heights, it has also exposed participants to a greater fluctuation in drilling incentives, increasing the volatility of marginal producers' entry and exit, and heightening sensitivity to the business cycle.

In comparison with drilling, crude oil extraction has exhibited only slight cyclical weakness in the current and 1980 recessions. OPEC-maintained world oil prices have established fairly stable incentives for domestic production, and therefore most of the variation in oil consumption, which is strongly cyclical, is at the expense of imports.

During the 1980 recession, deviations from the trend in refining closely matched those of total industrial production, with recovery lagging by one month. During the 1973-75 recession refining lagged recovery by two months. The downturn in deviations from the refining trend lagged the current recession five months. But refining had been declining in absolute terms before that.

Excluding variation in weather from the norm, seasonally adjusted natural gas extraction generally tracks the economy closely, with recovery lagging one month.

Trends

Increases in the prices of oil and gas relative to other productive inputs have

encouraged exploration for these fuels and discouraged their consumption. Oil consumption has fallen sharply since decontrol, while gas consumption has risen at a rate below that of the general economy since implementation of the Natural Gas Policy Act in 1978. Meanwhile, rapid adjustment to price incentives sent the drilling trend skyrocketing at about a 50 percent annual pace following decontrol. As adjustment matured, however, the rate of increase slipped to about 10 percent a year in late 1981.

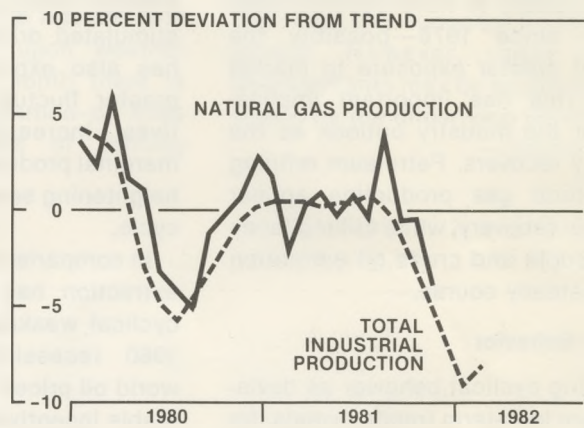
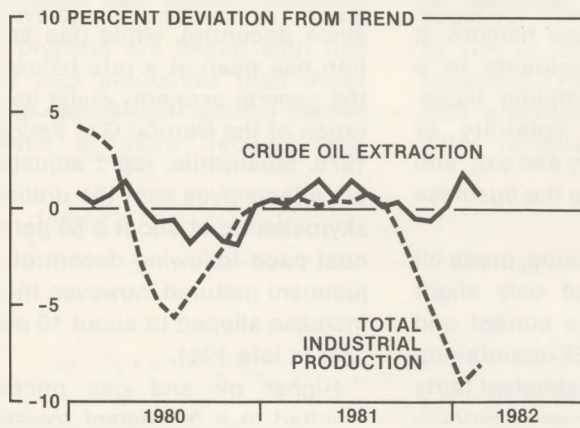
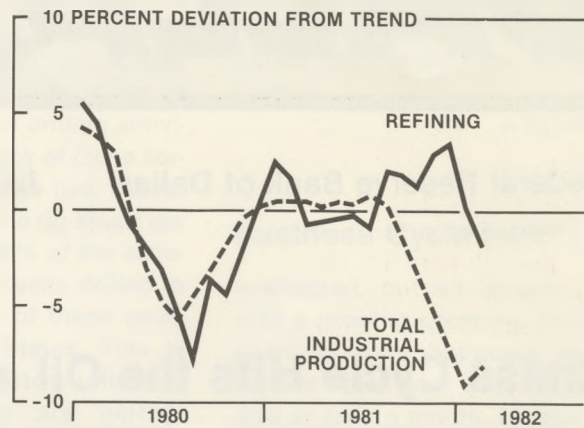
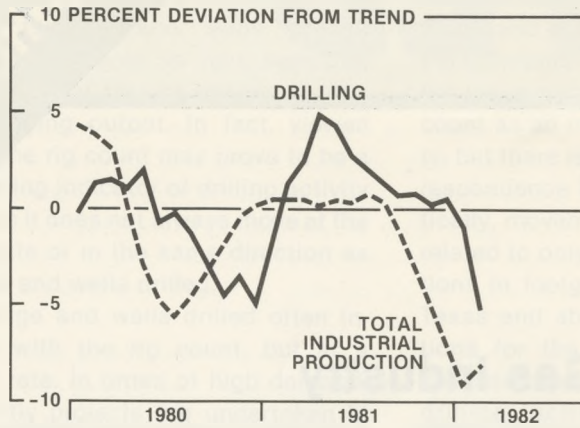
Higher oil and gas prices have resulted in a movement toward alternative energy sources such as coal. Furthermore, evidence is mounting that higher energy prices have led to increased conservation and a changing composition of demand for final goods. Goods produced in less energy intensive industries now represent a larger share of total sales. While the energy intensive industries can be generally counted upon to recover more strongly than other sectors as a recession ends, these long-term trends toward alternative fuels, conservation and a changing composition of final demand cannot be ignored in examining the prospects for expansion in the oil and gas industry.

Outlook

If previous patterns are any guide, the recovery in drilling should lag the economy by three to five months. Crude oil extraction will remain largely

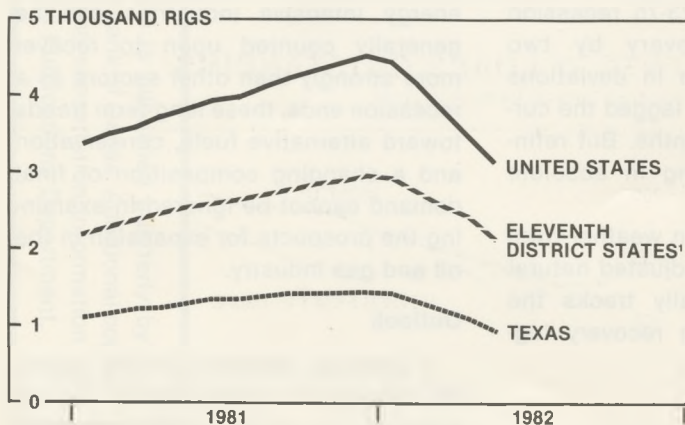
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CYCLICAL BEHAVIOR (Adjusted to remove seasonality and trend)



SOURCES: Board of Governors, Federal Reserve System.
Federal Reserve Bank of Dallas.

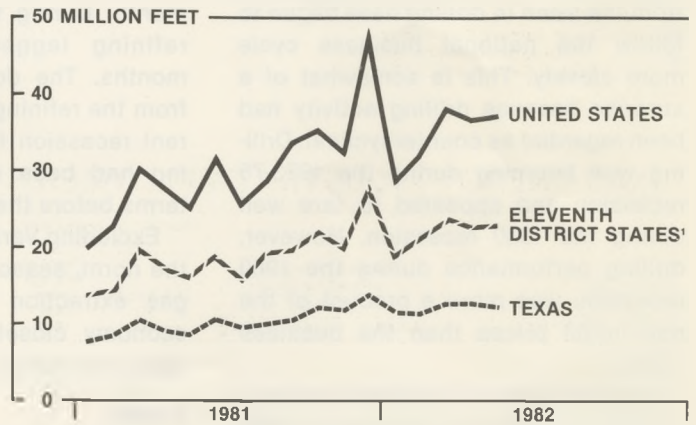
ROTARY DRILLING RIGS RUNNING



1. Louisiana, New Mexico, Oklahoma, and Texas.
SOURCE: Hughes Tool Company.

FOOTAGE DRILLED

(Excluding service wells, stratigraphic and core tests)



1. Louisiana, New Mexico, Oklahoma, and Texas.
SOURCE: American Petroleum Institute.

ENERGY BRIEFS

Some portions of the oil and gas industry appear to be poised for a turnaround while others are in for more trouble.

- The good news is in refining. While capacity utilization in Texas refining exhibited weakness in the first quarter, falling from 61.5% in December to 61.1% in March, it jumped to 68.1% from 65.8% in the week ended June 18, following a weak but steady upward trend through April and May.
- The decline in refining employment has stabilized. Texas's May figure of 38,600 was the same as in April and February and just 100 workers less than in March. However, May's figure was almost 12 percent below December 1981's peak.
- The bad news is in drilling. The Texas rig count in May was 34% below the December high of 1449. However, footage drilled in Texas declined only 9% from December to April while wells drilled fell by only 1%.
- Employment in Texas oil field machinery manufacturing dropped sharply in May, as it became evident that large inventories of oil field equipment were accumulating. This drop followed a smaller April decline, which was preceded by 25 months of nearly continuous growth.
- During the five month period from December 1981 to May 1982, weakness in the oil and gas industry was accompanied by rapid increases in the dollar amount of energy loans outstanding from commercial banks in the Eleventh Federal Reserve District, possibly suggesting increased distress borrowing.

CRUDE OIL PRODUCTION AND NATURAL GAS EXTRACTION

	Percent change from four quarters earlier				Daily average 1982:Q1 Thousands of barrels
	1981			1982	
	Q2	Q3	Q4	Q1	
Oil					
Texas	-2.9	-2.3	-3.5	-8.8	2,400
District states ¹	-3.3	-2.1	-2.4	n.a.	n.a.
United States	-.8	.0	.5	1.2	8,683
Gas					
Texas	-1.1	-3.0	-5.1	-2.7	18,845
District states ¹	-.9	2.3	-4.0	-1.4	46,619
United States	1.9	6.0	-2.5	-.1	55,762

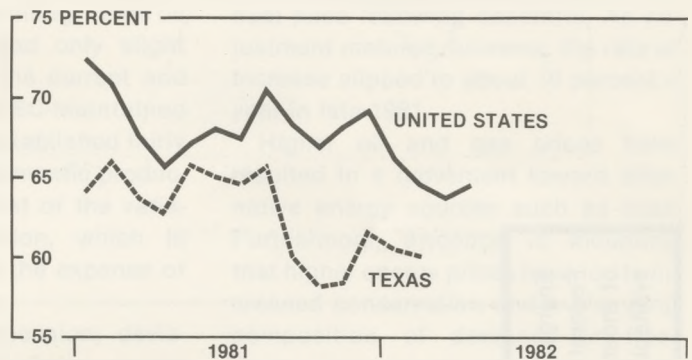
1. Louisiana, New Mexico, Oklahoma, and Texas.
n.a.—Not available.
SOURCES: Texas Railroad Commission.
U.S. Department of Energy.
Federal Reserve Bank of Dallas.

TEXAS ENERGY INDUSTRY EMPLOYMENT

Industry	Percent change from preceding month			Number of employees May 1982 Thousands of persons	Percent change from May 1981
	1982				
	March	April	May		
Oil and gas extraction . . .	0.3	-1.1	-1.5	289.8	7.9
Petroleum refining3	-.3	.0	38.6	-10.0
Oil field machinery5	-.9	-4.2	82.5	5.5

SOURCES: U.S. Bureau of Labor Statistics.
Federal Reserve Bank of Dallas.

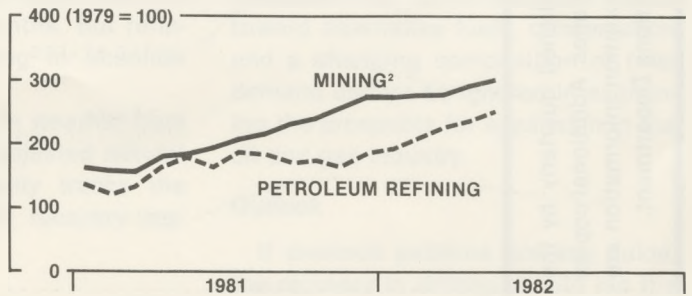
REFINERY CAPACITY UTILIZATION



SOURCES: U.S. Department of Energy.
Federal Reserve Bank of Dallas.

ENERGY LOANS OUTSTANDING¹

Eleventh Federal Reserve District



1. Based on survey of largest banks in the District.
2. Includes crude petroleum and natural gas.
SOURCE: Federal Reserve Bank of Dallas.

Rig Count: An Incomplete Indicator of Drilling Activity

The rig count is frequently used as an indicator of drilling activity because it is widely available and reported before footage and wells drilled. However, it is only an input measure, one of several factors needed to produce drilling output. In fact, viewed alone, the rig count may prove to be a misleading indicator of drilling activity because it does not always move at the same rate or in the same direction as footage and wells drilled.

Footage and wells drilled often increase with the rig count, but at a slower rate. In times of high demand, frequently projects are undertaken in areas where drilling is more difficult or where a shortage of skilled drilling crews develops. In addition, as drilling climbs, projects are begun with rigs that are less productive than those already in use. A tight drilling market also leads to more frequent mis-

matches between equipment and projects.

If the relationship between the rig count and drilling activity was stable, the difference in rates change between the two would not hinder use of the rig count as an indicator of drilling activity, but there is also a lack of close correspondence between the two. Statistically, movements in the rig count are related to only about 60% of the variations in footage and wells drilled in Texas and about 75% of these variations for the United States. This is because other input factors influence drilling activity that are neither measured by nor related to the rig count. For example, the number of hours per month that the rigs are able to run is dependent upon weather variations. For each month there is also a different distribution of sites with various degrees of drilling

difficulty.

Though the rig count is the most timely and convenient indicator, it is not a measure of footage or wells drilled and should be viewed with caution.

—Nancy Packer

Business Cycle (cont.)

unaffected, but oil imports will rise with a growing economy. Refining appears to have bottomed and could recover coincident with the economy, give or take a month. Natural gas extraction can be expected to follow its historical pattern of a strong recovery that lags the economy by about one month. However, these cyclical developments may be masked to some extent by the underlying trends.

—Stephen Brown

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