May 1992 FEDERAL RESERVE BANK OF DALLAS HOUSTON BRANCH

Houston Business

A Perspective on the Houston Economy

As Rig Count Hits Record Lows, Who Is Hurt in Houston?

Despite much brave talk about headquarter activity and industry consolidation, Houston is hardly immune to a decline in oil-field activity.

Hard times have returned to the oil patch. Perhaps the mostly widely followed indicator of domestic oil-field activity is the weekly count of drilling rigs in search of oil and gas. Baker Hughes Inc. has been conducting the rig count for more than 50 years. The April count of 623 working rigs was the lowest level ever, even lower than the levels induced by the rationing of critical materials in World War II.

The rig count is not the only indication of problems in the oil fields. Offshore activity has plummeted. The horizontal drilling boom, virtually in Houston's backyard, has subsided to half the level of late 1990 when activity peaked. Between the last quarters of 1990 and 1991, both the number of active seismic crews seeking new geophysical prospects and the number of domestic well completions fell by more than 25 percent.

How did the rig count fall to such low levels, and how does the rig count affect the local economy? This article offers insight into both questions. Although greatly reduced by the 1982–87 bust, upstream oil remains a potent force in Houston. More than 82,000 jobs and $4 billion in annual wages, salaries and employer-paid benefits are linked directly to oil-field activity.

THE LOCAL IMPACT OF A DECLINING RIG COUNT

The Texas Employment Commission provides three data series on oil and gas employment in the Houston metropolitan area: crude petroleum and natural gas mining, oil- and gas-field services and oil- and gas-field machinery. The current division of

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the 82,000 jobs in these sectors is roughly 50 percent in crude petroleum and natural gas mining, 30 percent oil- and gas-field services and 20 percent oil- and gas-field machinery. The most recent peak in oil-field activity was in July 1991, and by March of this year the combined group had lost 4,020 jobs.

Figure 1 plots the path of employment in each sector, with all series indexed so that January 1987 = 1.00. The figure shows significant growth in both oil- and gas-field services and oil- and gas-field machinery in 1989 and 1990. These two sectors also became the source of decline in 1991, with the services category turning down first and falling the farthest. Crude oil and gas mining remained comparatively stable.

To describe the reaction of each sector to a change in the rig count, we used the following simple relationship. It recognizes that the rig count is a less than perfect indicator of oil-field activity, and adjustments to employment are made only as evidence of significant change accumulates. Assume the chief executive officer of each energy business has in mind some trend value of the rig count, R_t^*, and this trend value is used to make hiring decisions. If E_t represents industry employment, it is related to the trend rig count, R_t^*, as follows:

$$E_t = a + bR_t^*$$

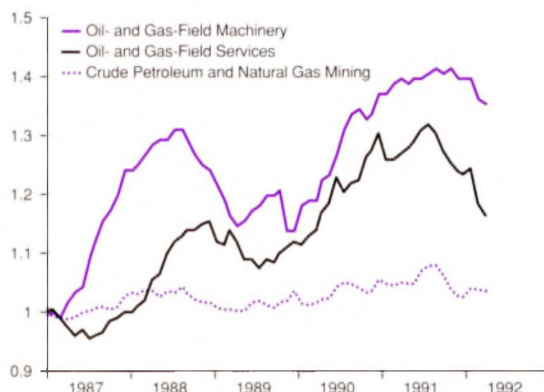
As new data arrives concerning the actual rig count, R_t, it is compared to the expected trend, and employment is revised accordingly.

$$R_t^* = wR_t + (1-w)R_{t-1}^*$$

If w=1, only current events matter to this CEO, and an immediate and complete adjustment is made to the new data, and history is judged meaningless; if w=0, current events are meaningless and no adjustment is made to the trend assessment. This overall approach is called an *adaptive expectations* model.

Table 1 shows the results of estimating these values for the three upstream energy sectors in Houston, using *quarterly* observations from 1985 to 1992. The first column is the value of w, which indicates that quarterly updates rely on current data for 30 percent to 40 percent of the adjustment, and the last quarter's trend assessment still carries 60 percent to 70 percent of the weight. The second column shows the immediate percentage adjustment that will be made in each sector in response to a 10-percent change in the rig count; the third column shows the long-run response that would

Figure 1
Employment Change in Three Houston Energy Sectors, 1987–92



SOURCE: Texas Employment Commission.

eventually be made if that 10-percent response were to persist for several quarters. Clearly, crude oil and gas mining is the least responsive sector in Houston in either the short- or long-run. A 10-percent change in the rig count eventually leads to a 6.4-percent cut in oil services and a 7.1-percent drop in oil-field machinery.

CRUDE PETROLEUM AND NATURAL GAS MINING

It is not surprising that this sector is the least sensitive to the rig count. In fact, this sector contains the producer/operator segment of the industry and can be viewed as the source of much current turmoil in the oil fields. It is the producers and operators who keep the inventory of existing wells, decide how to develop this inventory and form plans to replace depleted inventory. Domestic drilling programs are laid out by these companies for future explorations and oil-field development. A sweeping reformation of these companies' strategy for domestic oil and gas properties seems to be taking place. The result is job reductions and restructuring in the sector, as well as gridlock at this key decision-making level.

The new strategy formulated by many producers and operators, particularly the major oil companies, involves a sharp turn from domestic oil exploration. A panel of oil firms that reports to the Energy Information Administration indicated that from 1980 to 1985 just over 30 percent of their exploration and development activity was abroad; by 1990, nearly 50 percent was

foreign. The past two years have brought a very sharp acceleration of that trend.

As an oil-bearing nation, the United States is increasingly perceived as "drilled-out." Despite drilling rates that hit their highest levels in the 1980s, only three giant fields of 100 million barrels or more of new recoverable reserves have been discovered since 1980. During the previous 20 years, 36 such fields were discovered.

Further, increasing environmental restrictions at home, along with decreased political risk abroad, make foreign drilling more attractive. At home, the environmental movement seeks to confine offshore drilling to the western Gulf of Mexico, leaving off-limits comparatively unexplored offshore areas where giant oil fields might yet be found, especially on the East and West Coasts. The Alaska National Wildlife Refuge, home to a potentially giant field, is similarly off-limits.

Meanwhile, political risk abroad is perceived as diminishing. The fall of the Iron Curtain and the economic liberalization in Latin America, for example, open many new opportunities.

An important side effect of this decision to move drilling and exploration abroad is the down sizing of domestic exploration and production staffs. Indeed, many of the biggest headlines concerning staff cutbacks at major oil companies originate here. Widely dispersed inventories of existing production capacity are being consolidated for better management, and properties that are marginal—remote or expensive to manage relative to other holdings—are being sold. So, many properties are coming to market at the same time that reserves are available at prices below the cost of a new drilling program. Independent producers still interested in acquiring domestic properties have put aside exploration in favor of shopping among these bargains. The market for these excess properties has proved very strong, but their availability has cut heavily into the rig count.

OIL AND GAS SERVICE AND MACHINERY INDUSTRIES

Perhaps the major cause of the depressed rig count is the price of natural gas. During the summer of 1990, industry consultants and forecasters predicted sharply increased prices for natural gas. Reality, of course, proved very different, with natural gas prices down 13 percent in 1991. The futures market is currently forecasting prices for 1992 that will be comparable to those of 1990. The over supply of natural gas, sometimes called the "gas bubble," continues.

The miscalculation of natural gas prices posed serious problems for the oil services and machineries industries. There, the number of rigs at work is absolutely crucial. The build-up in oil-service and oil-machinery employment in 1990 and early 1991, as seen in Figure 1, was largely in anticipation of a drilling boom for natural gas. When it became clear by mid-1991 that this boom was not going to materialize, the cutbacks by drillers and service firms were under way.

CONCLUSION

Despite much brave talk about headquarter activity and industry consolidation, Houston is hardly immune to a decline in oil-field activity. Oil services and oil-related machinery make up half the direct employment in upstream energy in Houston. These sectors remain highly dependent on the rig count.

What about a revival in the rig count? Improvement will come soon, but it will be modest and slow. The sale of excess domestic properties is proceeding well, and natural gas prices have improved modestly in recent months. The key long-run factor, however, is the outlook for natural gas. Natural gas consumption by industry has continued to grow despite the recent recession; natural gas has become the fuel of choice for new residential construction or heating system conversion; the recent amendments to the Clean Air Act give natural gas a role in powering fleet vehicles and as a feedstock for many alternate fuels. The catch is that this bright future seems likely to unfold slowly, with improved gas prices several years away.

Table 1
Response of Oil and Gas Employment in Houston to Changes in the Rig Count

	W	Percent Adjustment* Short-Run	Percent Adjustment* Long-Run
Crude Petroleum and Natural Gas Mining	.363	.5	1.5
Oil- and Gas-Field Services	.372	2.4	6.4
Oil- and Gas-Related Machinery	.307	2.2	7.1

* Percentage adjustment to employment in each sector in response to a 10-percent change in the rig count. A short-run adjustment is one quarter; long-run adjustments assume the reported rig count persists for several quarters.

SOURCE: Calculations of the author.

Overall conditions are little changed in Houston. Modest improvements in nonenergy sectors continue, only to be offset by declines in oil-related activity. On a seasonally adjusted basis, nonagricultural employment has been down slightly in recent months. Gains in retail trade and services largely offset significant cuts in oil exploration and oil-field services. Construction activity continues strong, led by residential construction, new school construction and several major office projects.

RETAIL SALES

After good March sales and a good start in April, retail sales flattened to produce a mediocre Easter shopping season. Highly publicized layoffs taking place immediately before the Easter and Passover holidays were cited as a factor in the slowdown. Inventories remain under control, and most retailers remain modestly optimistic. Auto and truck sales, up 7 percent in March 1992 compared with March 1991, rose a very strong 15 percent in April. Auto sales showed a weak start in 1992, and dealers hope this recent improvement points to a solid second quarter, a crucial time of the year for auto sales.

CHEMICALS AND REFINING

Beige Book respondents report demand for chemicals stable at fairly high levels, with inventories remaining under control. Flat or softening prices are also reported, with petrochemical producers describing very poor margins due to weak prices. Ethylene, propylene and other commodity petrochemicals suffer from growing over capacity. Even a solid economic recovery will bring little more than temporary relief, as several billion more pounds of capacity are scheduled to come on line in 1993, 1994 and 1995. The least efficient plants will continue to be squeezed out of service as prices fall and as their margins turn negative.

Price increases for wholesale gasoline increased in April, improving margins slightly for refiners. Demand for refined products was little improved, apart from seasonal factors.

OIL AND NATURAL GAS

The futures market steadily improved its assessment of natural gas prices in coming months, bolstered by depleted storage and surprisingly cold weather late in the season. The current futures prices are now roughly comparable to prices last seen during 1990. Improved energy prices have yet to be reflected in the rig count, however, as very low levels of activity continue in the oil fields.

Restructuring of domestic operations by the integrated companies and large independents continues, resulting in both layoffs and large quantities of oil and natural gas reserves being placed on the market. Sales of these reserves are reported to be surprisingly strong.

WOOD AND PAPER PRODUCTS

Demand for lumber and all building products is reported to be strengthening along with Texas construction markets. Prices for some key grades of lumber are up by 30 percent or more since last January, with spot shortages reported. Environmental restrictions and countervailing duties on lumber imported from Canada are cited as reasons for the price increases. Paper products are generally holding their own or improving slightly; producers are cautiously optimistic, citing slow but sustained increases in their markets.

REAL ESTATE

Houston's single-family housing market remained quite strong through March but may have weakened in April. Markets for both new and existing homes in March showed marked improvements over last year and were strong by any historical standards. However, preliminary April reports indicate a decrease in interest in new homes, and walk-throughs and sales were reported to have slowed.

The vacancy rate for Houston office space remains flat at about 20 percent, but restructuring has returned a number of large blocks of space to downtown and the Galleria area. Overall leasing activity is down sharply. Reported rents are not down, but concessions have begun to slip into leasing agreements that would not have been made last year.

The industrial market is reported much softer in recent months, as both oil-field equipment and chemical companies return leased space to the market. The build-to-suit market is also softening as occupancy rates fall and oil-related cutbacks continue.

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