



Houston Business

A Perspective on the Houston Economy

If Houston's dependence on oil and natural gas is defined broadly to include petrochemical production and refining as well as oil production and oil services, the share of local economic activity attributable to the oil and gas industry remains near 50 percent.

Diversification of Houston's Economic Base

How dependent is the Houston economy on the oil and natural gas industry? An input-output study that might definitively answer that question has never been done. The resources required to survey local businesses and compute the multipliers would be huge. In this article, we achieve a rough approximation using the location quotient and an associated measure of the economic base to identify the local economy's dependence on oil.

The July 1994 issue of *Houston Business* analyzed Houston's job growth and tracked several measures of industrial diversification from 1969 to the early 1990s. This article updates parts of that report through 1999. The conclusion drawn in 1994 remains fundamentally unchanged: If Houston's dependence on oil and natural gas is defined broadly to include petrochemical production and refining as well as oil production and oil services, the share of local economic activity attributable to the oil and gas industry remains near 50 percent. Apart from the boom and speculative excesses of the 1970s and early 1980s, this percentage has changed little in 30 years.¹

THE ECONOMIC BASE

The idea of the location quotient is quite simple. Differences between Houston's and the United States' industrial structures show up in the distribution of employment, income or production by industry. In this analysis we use employment, although our past studies have shown similar results using personal income. We use the United States as the standard for comparison because it is a good proxy for the perfectly diversified community.

The location quotient is sometimes used to identify an area's export activity, which is crucial

in defining the regional economy's role. The term *local export* encompasses any export that leaves the local area, whether it's going to a neighboring state or halfway around the world. Exports are critical because they pay for imports from other cities—such as financial services from New York or autos from Detroit—and they support such local activities as dry cleaners and grocery stores.

The location quotient (LQ_i) compares the percentage distribution of jobs in Houston, for $i = 1, \dots, n$ industries, to the percentage distribution in the United States for the same industries:

$$LQ_i = \frac{\% \text{ share of Houston jobs in industry } i}{\% \text{ share of U.S. jobs in industry } i}$$

The combined group of industries accounts for all local employment. We use the 53 industrial categories released each month by the Texas Workforce Commission for the Houston metropolitan area. Together, these categories account for all metro area wage and salary employment. We tracked the data annually from 1988 through 1999.

If a sector's location quotient is greater than 1, the sector has a larger than normal concen-

tration of employment in Houston, and we assume Houston is a net exporter from that sector. If a sector has a value of LQ_i less than 1, we assume Houston is a net importer for that sector. For a variety of nontraded, or inherently local, goods, most cities will have a similar share of dry cleaners, bars or driving schools, and the LQ_i will have a value of approximately 1.

Table 1 shows location quotients for the Houston industries that have an LQ_i of 1.1 or greater, indicating significant export activity. The selected years are 1991 and 1998, peak years in the Houston business cycle as defined by basic activity. The list of export industries is highly predictable: oil production, oil services, fabricated metals, oil and gas machinery, chemicals, refining and an array of services. The list has shrunk over time. No new industries joined the export list after 1988, at least as defined by these broad industrial categories.

How many jobs are associated with each industry? It is standard procedure to assume *all* jobs in mining and manufacturing sectors are part of the export base, but for other sectors (for example, durable wholesale trade), we estimate the "excess employment" associated with exports as:

$$\text{Export jobs in sector } i = \frac{LQ_i - 1}{LQ_i} \times \text{Total sector employment}$$

The export jobs associated with each sector are shown as excess employment (in thousands of jobs) in Table 1 for 1998.

What share does oil take of these export-related jobs? We define upstream oil as oil production, oil services, oil and gas machinery, other industrial machinery and electronic machinery. The share of base employment taken by these industries in Houston has been fairly constant at 27 percent to 28 percent since 1988 (*Figure 1*); the dip under 27 percent in 1999 reflects the serious downturn in drilling activity last year, not necessarily the beginning of a long-term trend.

Downstream oil consists of chemicals, refining and plastics, plus excess employment in the construction industry—jobs we assume are associated with local construction and maintenance of large refineries and petrochemical plants. Petrochemical construction surged on the Texas Gulf Coast in 1990–91, pushing the downstream share of basic

Table 1
Industries Contributing to Houston's Economic Base

Industry	Location quotient		Excess employment (thousands)
	1991	1998	1998
Construction	1.6	1.5	43.1
Mining			
Oil production	15.1	17.9	38.2
Oil services	8.7	10.3	30.4
Manufacturing			
Fabricated structural metal	1.7	2.2	15.7
Other fabricated metal	1.1	1.2	19.2
Oil and gas machinery	23.0	25.7	20.2
Chemicals	1.7	1.8	30.0
Refining	4.0	4.1	8.8
TCPU			
Electric, gas utilities	2.0	2.0	13.8
Other	1.6	1.6	24.6
Durable wholesale trade	1.4	1.4	22.9
Retail apparel	1.3	1.1	—
Services			
Personal	1.1	1.1	2.5
Business	1.5	1.2	23.9
Auto repair	1.1	1.1	2.9
Legal	1.3	1.2	2.6
Engineering and management	1.6	1.6	30.4

NOTE: TCPU is transportation, communications and public utilities.

SOURCES: Texas Workforce Commission and authors' calculations.

employment over 20 percent, where it has stayed.

After 1990, the share of combined upstream and downstream activity has held steady at 48 percent to 49 percent of local export activity. This share could easily approach 60 percent if sectors such as fabricated metals and utility industries were added to the energy export sectors. These rough economic-base calculations show no sign of economic diversification but rather substantial stability in the base, given the two major downturns suffered by upstream oil industries in 1990–91 and 1997–98.

DIVERSIFICATION INDEX

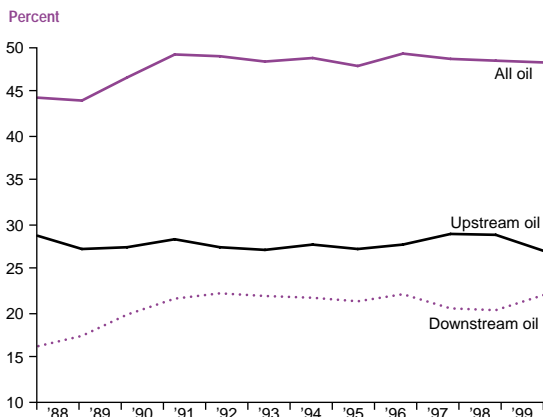
An alternative and widely used diversification index, similar to other broad measures of economic diversification, looks at all sectors in the local economy without regard to economic base or export assumptions. It simply asks which $i = 1, \dots, n$ sectors make Houston different from the United States by computing an index using the following equation:

$$I = \sum_{i=1}^n \frac{(s_i - s_i^*)^2}{s_i^*} \times 100,$$

where S_i^* is the share of each industry in the United States and S_i is the share in Houston. Again, using the same employment data, this index will shrink as the industrial structure of Houston matches that of the United States ($S_i^* = S_i$) or grow as Houston becomes different from the United States.

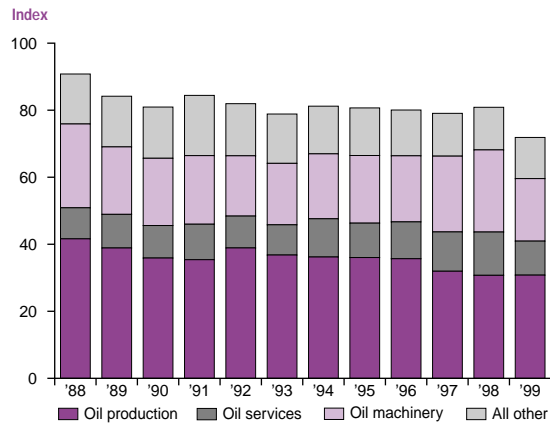
The index is plotted in Figure 2. Not surprisingly, it is quite flat, mirroring the results of

Figure 1
Upstream and Downstream Oil in Houston's Economic Base



SOURCES: Bureau of Labor Statistics and authors' calculations.

Figure 2
Diversification Index for Houston, 1988–99



SOURCES: Bureau of Labor Statistics and authors' calculations.

Figure 1. A list of sectors that make Houston different from the United States in this index is virtually identical to the list in Table 1 (that is, the list of basic industries). In fact, just three industries—oil production, oil services, and oil and gas machinery—consistently made up 79 percent to 85 percent of the index's value in the late 1980s and 1990s, with no trend toward the “all other” residual category displacing them in this measure. Houston's nonbasic, or local, industries should add little or nothing to the index because their share of employment is generally expected to be the same as in all cities throughout the United States, that is, $S_i = S_i^*$ in the above formula.

The conclusion is the same as derived above. There has been little diversification of employment in Houston in the 1990s and certainly little movement away from the oil and gas industries, at least based on the rough measures of industrial structure we use in this report.

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NOTES

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¹ Readers concerned about the consequences of heavy dependence on a single industry are referred to other issues of *Houston Business*. “Industrial Structure in Oil Cities,” May 1996, looked at the many other cities that depend heavily on oil or another single industry and yet seem to thrive. Also, “Oil and the Houston Economy Today,” January 2000, discussed the resilience of the Houston economy in the face of two major downturns in oil markets in the 1990s.

Good news continues to stream into Houston from the drilling industry, but signs of slower national growth are cropping up in petrochemicals and other local manufacturing. Although expansion is very strong, the Houston Purchasing Managers Index is pointing to loss of momentum in local mining and manufacturing; this contrasts with the national index, which indicates a stagnant manufacturing sector. Overall, local job growth over the past six months is at a 3 percent annual rate and accelerating.

RETAIL AND AUTO SALES

Local retailers continue to experience sluggish sales, failing to meet projections. The tax holiday provided a nice boost to retail sales, but even this proved to be less than expected. Retailers report it has become somewhat easier to hire entry-level workers in Houston.

Auto sales, in contrast, continue to soar, up 45 percent this July over the same month last year and up 19 percent over the first seven months of 1999. Contributing to recent strength are factory incentives, such as low interest rates, and clearance sales to reduce inventory before new models arrive.

ENERGY PRICES

Energy prices heated up in recent weeks, as low inventories pushed prices sharply upward. Crude prices jumped to over \$33 per barrel, wholesale heating oil to 99 cents per gallon and natural gas to \$4.50 per thousand cubic feet. Crude oil inventories have hit a 24-year low; heating oil inventories are 42 percent below the levels experienced at this time last year; and natural gas is 15 percent below last year's level. As winter approaches, heating oil has become the key product in moving crude oil demand and oil product prices.

DRILLING AND OIL SERVICES

The number of U.S. working rigs topped 1,000, spurred by natural gas exploration. More than 150 rigs are drilling in the Gulf of

Mexico, and day rates for rigs are climbing rapidly. Recent months show a nice improvement in international activity, although work available outside North America remains well below the previous peak of 1997-98. Slack international drilling has allowed domestic work to rise faster and higher than anticipated, although constraints on further U.S. expansion are quickly emerging in the form of worker and equipment shortages.

PETROCHEMICALS

Petrochemical producers watched their inventories build, making it difficult to raise prices. For the important ethylene chain, this was the result of a combination of new capacity coming on line and slower demand for product. For the case of polyvinyl chloride, a significant inventory problem arose throughout the supply chain, beginning with end users cutting orders. The result in all cases is an inability to raise prices at a time when feedstock prices have risen dramatically, thus seriously hurting profit margins. In some cases, negative cash margins are forcing plants to shut down, and lower operating rates are widely anticipated in the industry if the current situation continues.

SINGLE-FAMILY HOUSING

The trends continue toward strong sales of new homes and a weaker market for existing homes. New home sales in July were up 34 percent over sales in July 1999, a time when shortages of workers and materials were constricting new home delivery. Existing home sales, artificially hot in July 1999 because of constricted new home supply, were down 7 percent this year. The inventory of existing homes for sale swelled by 11 percent compared with last year. Corporate transfers into Houston, some driven by energy mergers, continue to be cited as important to the strength of the housing market. Many building material prices are reported falling, including big-ticket items such as framing sets.

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