

Houston Business

A Perspective on the Houston Economy

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Industrial Structure In Oil Cities: Diversification Revisited

The April issue of *Houston Business* presented a list of 29 cities that are home to a significant *number* of oil extraction employees. That article focused on the role of these cities within the oil industry, the number of oil and natural gas jobs, and the distribution of these jobs among oil production, services, machinery and headquarter establishments. In recent years, low and volatile energy prices, rising industry productivity and growing foreign, rather than domestic, exploration were found to have reduced the number of U.S. energy jobs and changed their geographic distribution.

The focus of this article shifts to the *share* of oil and gas extraction employment in these 29 cities and to the implications of significant oil employment for industrial structure. In particular, this article addresses the question of whether these cities, collectively or individually, had become so dependent on oil extraction that they were left with few growth alternatives when the oil bust arrived. The answer, it turns out, is that, as a group, these cities do not present an unusual industrial profile. A few oil cities remain highly dependent on oil extraction, but such dependence is also found in the ties between non-oil cities and industries such as autos, computers or steel. Strong regional economic linkages to a single industry are not unique to the oil extraction industry.

INDUSTRIAL DIVERSIFICATION

Any discussion of how any one industry affects a region quickly turns to industrial diversification. If this industry is hurt, what alternatives does the

region have? Diversification is difficult to measure, but for this study, we made an industry-by-industry comparison of earnings (wages, salaries and benefits) paid in each oil city with that paid in the United States as a whole. The United States represents near-perfect diversification in the sense of being a mix of all industries in all cities. The measure used in this study is large for cities where the shares of earnings across industries diverge widely from the U.S. norm. The measure also isolates those industries that make each city different from the United States. The measure is

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

where s_i is the city share of earnings in industry i , s_i^* is the U.S. share of earnings in industry i and n is the number of industries.

Table 1 shows this list of oil cities, rank-ordered from top to bottom according to their index value in 1987, which indicates how different they are from the U.S. norm.

Table 1
Diversification Indexes for 29 Oil Cities

City	Index	Made different by
Midland–Odessa	1,274	Oil and gas extraction
Houma, Louisiana	980	Oil and gas extraction
Lafayette, Louisiana	650	Oil and gas extraction
Casper, Wyoming	329	Oil and gas extraction
Wichita, Kansas	310	Transportation equipment, excluding automobiles
Bakersfield	256	Oil and gas extraction
Laredo	232	Oil and gas extraction
Longview–Marshall	188	Oil and gas extraction
Abilene, Texas	185	Military
Corpus Christi	170	Oil refining
Amarillo	163	Oil and gas extraction
Tulsa	144	Oil and gas extraction
New Orleans	144	Oil and gas extraction
Wichita Falls	141	Military
New York	121	Brokerage and finance
Houston	119	Oil and gas extraction
Tyler	75	Oil and gas extraction
Mobile	74	Paper manufacture
San Antonio	59	Federal military
Los Angeles	59	Motion pictures
Fort Worth	58	Transportation equipment, excluding automobiles
Oklahoma City	51	Oil and gas extraction
San Francisco	46	Air transportation
Pittsburgh	41	Primary metal
Shreveport	39	Oil and gas extraction
Denver	39	Oil and gas extraction
Salt Lake City	31	Metal mining
Dallas	29	Oil and gas extraction
Chicago	15	Wholesale trade
Average oil city	208	

When computed for 1993, the values were not much changed from those in Table 1. The industry that contributed most to making each city different from the United States is also listed. Midland–Odessa, Houma and Lafayette top the list, an indication that these are the cities most different from the United States as a whole. Oil and gas extraction is what makes these cities different; not much else is distinctive about their industrial structures. The No. 2 industry in Midland–Odessa, for example, turns out to be pipeline transportation.

A look down the list, at least as far as New York, reveals that if oil and gas extraction is not the No. 1 industry contributing to differences from the United States, it is No. 2. Cities ranked below the first three cities on the list almost always have some industrial alternative, other than oil and gas extraction, to fall back on; these alternative industries stand out in this measure and make each city distinctive.

Near the top of the list, Wichita, Kansas, stands out as a city where aircraft manufacture, even more than oil, pulls the city far from the national norm, and military employment does the same for Wichita Falls and Abilene, Texas. As second industries, Bakersfield, California, has agriculture; Laredo has transportation services; and Houston, Longview–Marshall and New Orleans have chemicals.

SOME PERSPECTIVE

To help interpret these results, we made a second list of 29 cities by rank-ordering all U.S. metropolitan areas by total 1987 earnings. For every oil city, the next smallest metropolitan area not already on the oil-city list was chosen. The result was a comparable list of 29 metropolitan areas, displayed in Table 2; these areas are similar in size to the oil cities but are not dependent on oil extraction.

Atlantic City is home to hotels and casinos and, with the largest index on either list, turns out to be most different from the U.S. norm. Instruments in Rochester, chemicals in Brazoria and autos in Detroit also pull the index values well off the norm. The average index in 1987 for the two lists is not very different (208 for oil cities versus 194 for non-oil cities), and the difference grew only slightly when the calculations were repeated for 1993.

Although some highly diversified cities, such as St. Louis, Buffalo, Philadelphia and Minneapolis, are on the alternative list, in many

instances a single industry pulls the city away from the United States' typical industrial structure. These results are not confined to smaller cities. Table 3 summarizes the index for the largest cities on the list and classifies them into diversified, intermediate and not diversified. On the intermediate list are many cities that serve as key regional distribution centers but are pulled from the norm by a single important industry; examples include oil extraction in Dallas, steel in Pittsburgh, air transportation in Miami and entertainment in Los Angeles.

On the "not diversified" list are four cities that serve as headquarters for large industries. It is difficult to know what the nation's four largest and most important industries might be, but autos (Detroit); financial services (New York); federal government (Washington, D.C.); and oil extraction, refining and petrochemicals (Houston) might be a good guess. These four cities stand atop a national hierarchy of smaller cities that play distinct regional roles in their

Table 2
Diversification Indexes for 29 Selected Cities

City	Index	Made different by
Atlantic City	2,054	Hotels
Rochester, New York	816	Instruments
Brazoria, Texas	697	Chemicals
Detroit	357	Motor vehicles and parts
Huntington, West Virginia	294	Oil refining
Victoria, Texas	209	Oil and gas extraction
Washington, D.C.	175	Federal civilian government
Monroe, Louisiana	98	Paper manufacturing
Barnstable, Massachusetts	81	Fisheries
Steubenville, New York	80	Coal mining
Orlando	79	Amusements
Lawrence, Massachusetts	75	State and local government
Joplin, Missouri	74	Trucking and warehousing
Evansville, Indiana	68	Coal mining
South Bend, Indiana	68	Rubber and plastic
Santa Rosa, California	61	Instruments
Miami	48	Air transportation
Omaha	47	Railroads
Raleigh-Durham	32	Tobacco products
Albany, New York	31	State and local government
Orange County, California	29	Electrical equipment, excluding computers
New Haven, Connecticut	27	Instruments
Knoxville, Tennessee	26	Apparel
Atlanta	21	Wholesale trade
Wilmington, Delaware	20	Transportation equipment, excluding automobiles
Minneapolis	19	Instruments
Philadelphia	12	Educational services
Buffalo	12	Fabricated metal
St. Louis	11	State and local government
Average city	194	

Table 3
Diversification Among Large Cities
(Index of Industrial Diversity)

Large cities on the list	Index value
Diversified (index < 25)	
St. Louis	10.9
Buffalo	12.0
Philadelphia	12.0
Chicago	15.2
Minneapolis	19.2
Atlanta	20.6
Boston	21.4
Intermediate (25 < index < 80)	
Dallas	28.7
Denver	38.5
Pittsburgh	40.6
San Francisco	46.4
Miami	48.3
Los Angeles	58.9
Not diversified (80 < index)	
Houston	119.2
New York	121.3
Washington, D.C.	175.2
Detroit	351.1

industries. And each of these four cities has suffered gains and losses in recent years with the ups and downs of its chief industry. If Houston's role in the nation's energy industry distinguishes it from other U.S. cities, it is a role that has parallels in other industries and among the nation's largest cities.

CONCLUSION

This study offers a perspective on industrial diversification among U.S. cities, including oil cities, that is based on industrial structure. Some metropolitan areas, such as Midland-Odessa and Lafayette, seem to be built on oil, with few alternatives. But the oil industry's results are hardly unique in concentrating in a certain area; gambling in Atlantic City and autos in Detroit are similar in that they contribute to a relatively narrow economic base. On average, the industrial structure of oil cities is not that different from that of non-oil cities.

Houston, as the nation's largest oil city, has an industrial structure that sets it apart from the U.S. norm. Yet even Houston's bond with oil has parallels among the nation's largest cities: Detroit and autos, New York and financial services and Washington, D.C., and federal employment. Houston may be unique as the nation's largest oil city, but other large U.S. cities play similar roles as headquarters for some of the nation's biggest industries.

Houston respondents to the Fed's April Beige Book survey saw a solid local economic expansion under way, and they expected continued good economic conditions. Retail sales, auto sales, and sales of new and existing homes all improved in recent weeks, and home and auto sales are running at record levels.

RETAILING AND AUTO SALES

Retailers reported that demand has improved and winter inventories have cleared out. The fundamentals remained unchanged to the extent that markdowns and heavy promotions are still needed to move goods, but consumers at least proved more responsive to major sales events.

Sales of autos and trucks climbed 9 percent in March, compared with 12 months earlier, then 29 percent more in April, the best April showing since 1982. Low interest rates, cool dry weather, tax refunds, rebates from national manufacturers and a good local economy boosted April figures.

PETROLEUM AND PRODUCT PRICES

Crude oil prices rose past \$20 per barrel in mid-March and ranged between \$23 and \$25 during most of April. The key factor pushing prices upward has been low inventories of crude oil and products. The threat of Iraqi crude's returning to market made the idea of building crude inventories unattractive because any resulting drop in crude prices would force markdowns in the value of the inventory.

In late April, the level of crude oil inventories was at a 15-year low. Heating oil inventories were stretched by one of the longest, coldest winters on record, which delayed production of gasoline for the summer driving season.

Refiners' margins have been volatile and mediocre. By not holding inventory, refiners often found themselves caught between wholesale prices and the rising cost of crude. High prices at the pump have benefited gasoline marketing more than refining.

Cash prices for natural gas have edged slowly down toward \$2.20, the lowest price in

several months. As the cold winter ended, however, storage was only 18 percent of capacity. Heavy storage injections are expected to hold prices at favorable levels.

PETROCHEMICALS

Petrochemical demand improved, inventories were in good shape, and prices were stable or rising. The industry's sharp slowdown in 1995 seemed to be over. Despite higher energy feedstock costs, the industry's margins were positive and respondents expected continued improvement over the summer.

OIL SERVICES AND MACHINERY

Respondents in oil services continued to report strong demand, good prices and solid profits. The key drivers remained offshore activity in the Gulf of Mexico and the North Sea, and growing activity in foreign markets. Domestic activity improved in recent weeks, led by a surge in natural gas drilling. The Gulf of Mexico, particularly well positioned to deliver gas to the East Coast, continued to attract strong interest.

HEALTH CARE SERVICES

The trend toward managed health care and away from traditional health insurance continued. Large employers and insurance companies continued to insist on better cost management, which often means shifting care out of hospitals and toward outpatient clinics and home care. Houston's overall health service employment continued to grow at about 4 percent, but industry restructuring resulted in large layoffs at some hospitals and strong local growth in home care.

HOME-BUILDING

Housing starts in March were at the highest level of the past 10 years, as home sales in the first quarter ran 35 percent higher than one year ago. Existing home sales hit the highest total ever registered for March. Despite the strong local market, prices of building material are stable, with lumber, plywood and wallboard prices level or falling.

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