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ECONOMIC DIVERSITY

How Much Does Texas Rely on Energy?

By Luis B. Torres

Through the years, Texans have enjoyed the gains and weathered the hardships resulting from expansions and contractions in the energy industry. Currently, the state is benefiting from a production boom in oil and natural gas from unconventional sources — primarily oil and gas shale (Figure 1). This rapid expansion helped the Texas economy recover from the Great Recession of 2008–09 faster than the U.S. economy. The state is the largest single producer of both oil and gas in the country, with crude oil and natural gas production representing 30.5 percent and 28.6 percent of national output in 2012, respectively.

Figure 1. Texas Oil and Natural Gas Production*
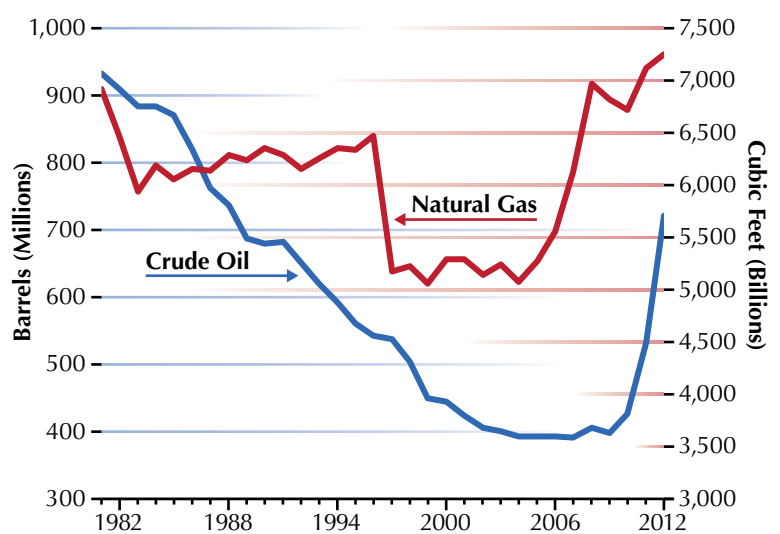
*Estimated by the Real Estate Center at Texas A&M University. Texas field production of crude oil and Texas natural gas marketed production.
Source: Energy Information Administration

Figure 2. Oil and Gas Extraction, Petroleum Manufacturing* Percent of Texas Gross State Product, Excluding Government

*Estimated by the Real Estate Center at Texas A&M University.
Source: Bureau of Economic Analysis
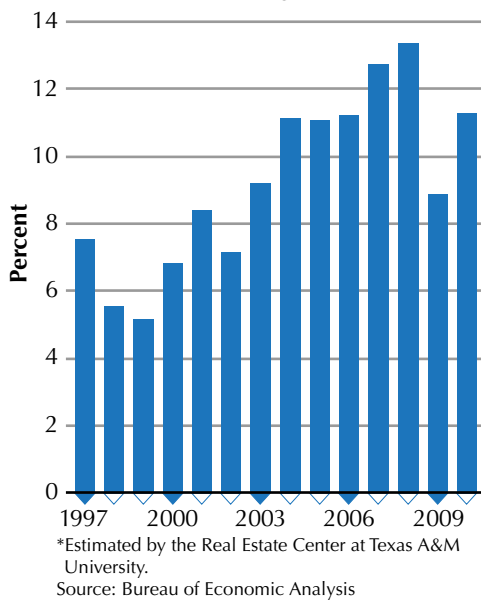
Not surprisingly, the technology-driven boom in the energy industry has affected the structure and diversity of the Texas economy. The share of oil and gas extraction and the petrochemical industry in the state's gross product, excluding government, increased from 7.5 percent in 1997 to 11.3 percent in 2010 (Figure 2); adding the chemical industry increases the share from 10.9 percent to 14.5 percent during the same period.

Why is Diversity Important?

Since the 1980s, Texas' economy has diversified away from the energy industry, reducing the economic instability caused by the variability of oil prices (Figure 3). Increased diversification allows an economy to achieve greater levels of stability and performance because a broader industry base protects the economy from a downturn in its major industry.

A highly concentrated economy in which the vast majority of the output, earnings and employment originate from a few key industries is susceptible to shocks to those industries. In the same manner as an investment portfolio is diversified to protect against risk, an economy with a broad mix of industries is protected from economic fluctuations.

Texas is an example of the economic costs of concentration and the benefits of economic diversification. It went from being highly concentrated in the oil industry during the 1970s and 1980s to a more diversified economy in manufacturing and services today. As energy prices increased during those decades, the Texas economy expanded at a rapid pace, accompanied by strong income and employment growth. In 1986, oil prices collapsed, causing a statewide recession and a significant fall in employment.

The increased volatility in the Texas economy during the 1980s started the discussion focusing on a change from a specialized state economy to a more diversified one. The shrinking of the energy sector and the growth of manufacturing and services allowed the economy to achieve a greater level of diversity.
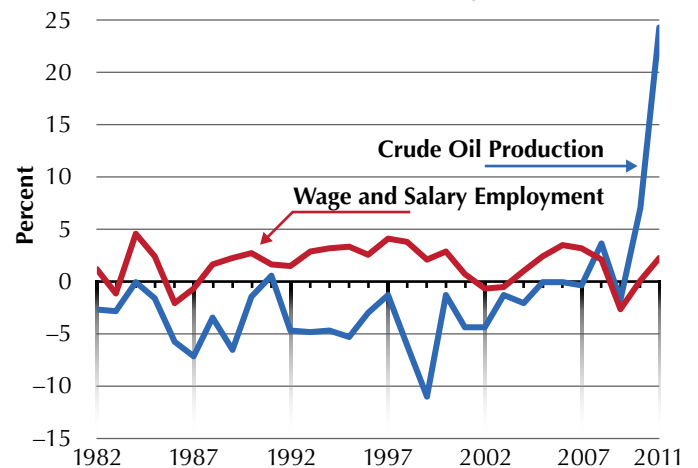
How Diversified is the Texas Economy?

Measuring economic diversity is not an easy task. A variety of measures are used

to check the reliability and consistency of the results (see Center publication 2030, *Texas Industrial Structure: How Much Does Texas Rely on Energy?*). Three different variables are used: output, earnings and employment. The various diversity measures are estimated for 19 private manufacturing industries from 1997 to 2011, with the exception of output for the manufacturing industry, which is only available disaggregated until 2010 (see publication 2030).

The estimated values during this period are relatively similar, with some tendency toward concentration in the major private state industries and manufacturing industries. The specialization trend has been accompanied by greater

Figure 3. Texas Oil Production and Employment* Annual Percent Change

Crude Oil Production

Wage and Salary Employment

*Estimated by the Real Estate Center at Texas A&M University. Texas field production of crude oil and Texas natural gas marketed production.
Source: Energy Information Administration

volatility, indicating that the major industries are relatively more unstable, with greater upswings and downturns, as in the case of the oil and gas industry. This was true during the Great Recession of 2008–09, during which output in the mining industry grew by 23.7 percent

in 2009 and decreased by 10.4 percent the following year.

Based on output, nonfarm employment and nonfarm earnings, the Texas economy is concentrated in seven private industries. These are mining (includes oil and gas extraction), utilities, construction, manufacturing, wholesale trade, transportation and warehousing, and administrative and waste management services. The manufacturing industry is categorized into nonmetallic mineral products, machinery, computer and electronic products, petroleum and coal products, and chemicals.

Some industries are specialized only in their output, employment or earnings. The manufacturing industry does not show a high level of concentration of jobs compared with the nation. In contrast, the retail sector shows a greater level of specialization in employment versus the nation. This is true for earnings generated by the real estate and rental and leasing industry, which show a greater level of concentration than the United States. Observing the manufacturing industry by employment and earnings concentration, other transportation equipment and leather and allied products stand out.

In general, research shows that the structure of the Texas economy has not changed a great deal with the recent oil and gas boom. While structural changes in any economy happen over long periods, there is some initial evidence that the Texas economy has been affected by the energy sector's recent expansion.

How Does the Texas Economy Compare?

To compare the structure of Texas' economy with that of other states, the disparity between the nation's and the states' industry distribution was estimated for the 50 states and the District of Columbia. This measure uses the

Table 1. Private Industry Diversity Rankings by Output and Nonfarm Employment

Output			Nonfarm Employment		
Ranking	**State**	**Index**	**Ranking**	**State**	**Index**
1	Illinois	8.8	1	Illinois	23.4
2	Utah	10.9	2	Missouri	24.7
3	Pennsylvania	11.8	3	Georgia	27.4
4	Georgia	12.6	4	Utah	32.3
5	California	12.9	5	Minnesota	33.8
6	Arizona	15.3	6	Washington	34.4
7	Missouri	16.5	7	California	37.5
8	New Hampshire	16.5	8	Pennsylvania	41.3
9	Minnesota	16.9	9	Oregon	41.9
10	New Jersey	19.7	10	Ohio	43.9
11	Michigan	22.1	11	Nebraska	45.5
12	Ohio	22.2	12	North Carolina	50.5
13	Virginia	23.2	13	Arizona	50.8
14	Alabama	24.2	14	New Jersey	51.0
15	Maine	25.4	15	Michigan	51.1
16	Kansas	27.3	16	New Hampshire	51.5
17	Washington	28.9	17	Kansas	52.3
18	Tennessee	29.4	18	Tennessee	54.1
19	Vermont	30.2	19	Virginia	58.3
20	Massachusetts	30.8	20	Connecticut	67.3
21	Wisconsin	31.1	21	Kentucky	67.8
22	Colorado	32.8	22	Alabama	72.8
23	Maryland	33.8	23	Idaho	73.9
24	Florida	34.3	24	Iowa	74.6
25	South Carolina	34.9	25	Colorado	76.9
26	Rhode Island	36.1	26	South Dakota	79.6
27	North Carolina	37.9	27	Maryland	80.9
28	Kentucky	41.1	28	Rhode Island	84.8
29	Oregon	42.3	29	Florida	84.9
30	Mississippi	44.0	30	South Carolina	97.3
31	Connecticut	46.6	**31**	**Texas**	**100.0**
32	Arkansas	54.8	32	New York	100.1
33	New York	57.9	33	Vermont	103.1
34	Indiana	71.0	34	Delaware	105.8
35	Idaho	78.2	35	Wisconsin	106.3
36	Iowa	83.4	36	Massachusetts	106.7
37	Montana	87.4	37	Mississippi	116.0
38	**Texas**	**100.0**	38	Indiana	121.9
39	Nebraska	109.5	39	Arkansas	124.2
40	Hawaii	125.6	40	Maine	127.2
41	Oklahoma	137.3	41	North Dakota	143.2
42	New Mexico	140.0	42	Louisiana	159.5
43	West Virginia	174.9	43	Montana	163.7
44	North Dakota	184.8	44	New Mexico	170.6
45	South Dakota	213.1	45	Hawaii	214.3
46	Louisiana	230.4	46	Oklahoma	331.5
47	Nevada	241.2	47	West Virginia	396.0
48	Delaware	315.2	48	Nevada	588.3
49	District of Columbia	390.6	49	Alaska	687.7
50	Alaska	1192.8	50	District of Columbia	1115.1
51	Wyoming	1512.7	51	Wyoming	1661.7

Estimated by the Real Estate Center at Texas A&M University. Average from 1997–2011.
Source: Bureau of Economic Analysis

Table 2. Manufacturing Industry Diversity Rankings by Output and Nonfarm Employment

Output			Nonfarm Employment		
Ranking	State	Index	Ranking	State	Index
1	Tennessee	58.6	1	Pennsylvania	66.9
2	Pennsylvania	68.1	2	Missouri	93.1
3	Maryland	73.0	**3**	**Texas**	**100.0**
4	Missouri	75.6	4	Tennessee	115.1
5	Minnesota	77.3	5	Virginia	122.1
6	Illinois	77.5	6	Illinois	136.4
7	New York	90.2	7	Florida	137.2
8	**Texas**	**100.0**	8	Maryland	158.2
9	Florida	102.9	9	New York	159.0
10	Colorado	104.5	10	Minnesota	175.5
11	Ohio	108.8	11	Wisconsin	203.8
12	California	125.9	12	Utah	206.2
13	Oklahoma	132.2	13	Oklahoma	211.4
14	Wisconsin	145.0	14	Ohio	241.7
15	Virginia	161.3	15	Vermont	242.0
16	Nebraska	161.5	16	Iowa	245.9
17	Iowa	161.7	17	California	246.9
18	Indiana	164.6	18	Alabama	253.4
19	Arkansas	176.4	19	Colorado	263.9
20	Alabama	177.6	20	Kentucky	266.5
21	North Carolina	178.5	21	South Dakota	272.0
22	Massachusetts	179.6	22	Massachusetts	283.7
23	Vermont	181.0	23	Connecticut	295.5
24	Utah	181.4	24	Arkansas	350.2
25	Kentucky	181.4	25	New Hampshire	368.6
26	Delaware	182.6	26	New Jersey	369.8
27	Mississippi	191.2	27	Kansas	378.5
28	New Jersey	197.1	28	Arizona	387.8
29	New Hampshire	205.9	29	New Mexico	401.8
30	Connecticut	221.2	30	Indiana	406.4
31	South Carolina	306.4	31	Delaware	414.9
32	West Virginia	336.0	32	Mississippi	428.2
33	Georgia	337.8	33	North Dakota	435.0
34	South Dakota	350.1	34	Washington	483.2
35	Rhode Island	360.8	35	Oregon	483.4
36	Kansas	382.0	36	Nevada	484.4
37	District of Columbia	404.6	37	Nebraska	515.9
38	North Dakota	409.8	38	Rhode Island	556.8
39	Arizona	442.9	39	Idaho	609.5
40	Idaho	476.9	40	North Carolina	653.0
41	Hawaii	583.3	41	Louisiana	675.3
42	Michigan	600.9	42	Georgia	676.7
43	Nevada	601.0	43	West Virginia	718.4
44	Maine	605.8	44	South Carolina	855.8
45	Oregon	642.8	45	Wyoming	981.2
46	Wyoming	733.2	46	Michigan	988.3
47	Louisiana	822.2	47	Hawaii	1123.8
48	Washington	902.6	48	Maine	1149.5
49	Montana	903.9	49	Montana	1155.3
50	New Mexico	916.7	50	District of Columbia	1727.2
51	Alaska	1084.5	51	Alaska	2733.1

Estimated by the Real Estate Center at Texas A&M University. Average from 1997–2011.
Source: Bureau of Economic Analysis

nation's industrial structure as the point of reference for diversity. By private firm output, Texas ranks 38th; by nonfarm employment, 31st. This is an overall higher level of concentration than half of the states (Table 1). The same calculation for the manufacturing industry shows it at 8th by output and 3rd by employment, demonstrating an overall higher level of diversification than 42 states (Table 2).

The composition of Texas' manufacturing industry is now more varied and much closer to the national composition. In contrast, the private industry structure of the state's economy is much more concentrated and less similar to the national composition compared with other states. Texas must continue to pursue industrial diversification while also taking advantage of its growing energy industry.

For more information, see Center publication 2030, *Texas Industrial Structure: How Much Does Texas Rely on Energy?* at recenter.tamu.edu/pdf/2030.pdf. ✦

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THE TAKEAWAY

Texas has benefited in recent years from a rapid expansion in the production of oil and natural gas from unconventional sources, primarily oil and gas shale. This increase in the importance of the petroleum and natural gas industry in the state's economy has had some initial effects on the structure and variability of the Texas economy, showing a tendency toward greater specialization and greater variance.

About the Real Estate Center

The Real Estate Center at Texas A&M University is the nation's largest publicly funded organization devoted to real estate research. The Center was created by the Texas Legislature in 1971 to conduct research on real estate topics to meet the needs of the real estate industry, instructors and the public.

Most of the Center's funding comes from real estate license fees paid by more than 135,000 professionals. A nine-member advisory committee appointed by the governor provides research guidance and approves the budget and plan of work.

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