REAL ESTATE CENTER
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Contribution of Upstream and Downstream Oil and Gas Industries in Texas

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Given the current headwinds faced by the oil industry, the Real Estate Center did an analysis to measure the oil industry's contribution to the regional economies of the State of Texas, the Houston Metropolitan Statistical Area (MSA) and the Midland MSA. Looking at both the upstream (e.g., oil and gas extraction) and downstream (e.g., petrochemicals) sectors of the industry gives an idea of the net effect on economic performance during a period of falling oil prices.

The Takeaway

When declining oil prices cause employment and output to fall in the upstream sector of the oil industry, the decline cannot be fully mitigated by increases in downstream industries. This is because the upstream sector is much more labor intensive than the downstream.

An economic contribution analysis describes the portion of a region's economy attributed to an existing industry. Data in the model look backward to identify and consider all the potential linkages that contribute to the impact of a particular industry. In a contribution analysis, the model uses total output as a measure to establish the multiplier effect of that industry on the region's economy. When compared with the entire economy, the results offer insights into the relative impact of the industry in the study area.

This is a summary of the findings:

- Extraction of oil and natural gas is the major contributor of direct employment and production of the upstream and downstream industries analyzed (Tables 1–6).
- The oil and natural gas industry's contribution to employment and production is highest in Midland, followed by Houston and Texas as a whole (Tables 1–6).

- When the indirect and induced effects are considered to arrive at the total effects of the contributions to employment and production, both the extraction of oil and natural gas, and petroleum refineries and petrochemical manufacturing are similar in impact (Tables 1–6).
- The Midland MSA is highly dependent on the contribution of the upstream oil and gas industry (Tables 3 and 6).
- Employment in upstream industries requires less industry revenue compared with downstream industries, possibly reflecting the higher use of labor in the upstream industries compared with downstream industries (Tables 7–12).
- Creation of direct jobs in downstream industries requires more revenue to be generated to support those new jobs (Tables 7–12).
- The multiplier effect in the creation of indirect and induced jobs is higher in downstream industries (Tables 7–12).

Based on the findings, researchers conclude that when declining oil prices cause employment and output to fall in the upstream sector of the oil industry, the decline cannot be fully mitigated by an increase in downstream industries. This is because the upstream sector is much more labor intensive than the downstream. It would take an inordinately large increase in the level of sales in the capital-intensive downstream industries to offset the losses in the upstream sector.

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Table 1. Contribution to Texas Employment

Industry Code	Description	Employment (Thousands)				
		Direct	Indirect	Induced	Total	Percent Texas Total
20	Extraction of oil and natural gas	148.9	117.7	174.0	440.5	3.0
28	Drilling oil and gas wells	27.0	35.8	34.7	97.5	0.7
29	Support activities for oil and gas operations	58.0	30.2	45.5	133.6	0.9
115	Petroleum refineries	12.6	206.8	161.3	380.6	2.6
120	Petrochemical manufacturing	7.0	149.4	83.9	240.3	1.6
121	Industrial gas manufacturing	2.0	3.4	4.0	9.3	0.1

Source: Estimated by Real Estate Center at Texas A&M University using IMPLAN data

Table 2. Contribution to Houston MSA Employment

Industry Code	Description	Employment (Thousands)				
		Direct	Indirect	Induced	Total	Percent Houston Total
20	Extraction of oil and natural gas	76.0	47.1	75.0	198.1	5.5
28	Drilling oil and gas wells	10.8	12.1	12.0	34.9	1.0
29	Support activities for oil and gas operations	15.2	6.6	11.6	33.4	0.9
115	Petroleum refineries	6.6	98.4	70.3	175.3	4.9
120	Petrochemical manufacturing	5.1	97.4	47.3	149.8	4.2
121	Industrial gas manufacturing	1.3	2.0	2.2	5.5	0.2

Source: Estimated by Real Estate Center at Texas A&M University using IMPLAN data

Table 3. Contribution to Midland MSA Employment						
		Employment (Thousands)				
Industry Code	Description	Direct	Indirect	Induced	Total	Percent Midland Total
20	Extraction of oil and natural gas	11.0	4.4	5.1	20.5	16.7
28	Drilling oil and gas wells	2.2	1.7	0.9	4.8	3.9
29	Support activities for oil and gas operations	5.6	1.9	1.8	9.2	7.5

Source: Estimated by Real Estate Center at Texas A&M University using IMPLAN data

Table 4. Contribution to Texas Gross State Product						
		Value Added (Gross State Product, Millions)				
Industry Code	Description	Direct	Indirect	Induced	Total	Percent Texas Total
20	Extraction of oil and natural gas	$30,471.4	$13,418.4	$14,526.6	$58,416.4	4.2
28	Drilling oil and gas wells	$9,962.6	$4,287.6	$2,909.2	$17,159.4	1.2
29	Support activities for oil and gas operations	$5,078.5	$3,067.8	$3,807.8	$11,954.0	0.9
115	Petroleum refineries	$12,573.0	$32,146.2	$13,471.6	$58,190.7	4.2
120	Petrochemical manufacturing	$14,203.7	$26,188.6	$7,020.0	$47,412.3	3.4
121	Industrial gas manufacturing	$1,103.1	$583.5	$333.2	$2,019.9	0.1

Source: Estimated by Real Estate Center at Texas A&M University using IMPLAN data

Table 5. Contribution to Houston MSA Gross Metropolitan Product						
		Value Added (Gross State Product, Millions)				
Industry Code	Description	Direct	Indirect	Induced	Total	Percent Houston Total
20	Extraction of oil and natural gas	$18,014.2	$6,136.3	$6,708.4	$30,858.9	7.5
28	Drilling oil and gas wells	$4,395.9	$1,682.0	$1,077.5	$7,155.4	1.7
29	Support activities for oil and gas operations	$1,971.0	$792.8	$1,038.0	$3,801.8	0.9
115	Petroleum refineries	$6,997.8	$18,113.6	$6,290.1	$31,401.6	7.6
120	Petrochemical manufacturing	$10,456.3	$19,269.1	$4,238.9	$33,964.3	8.2
121	Industrial gas manufacturing	$782.2	$407.0	$196.2	$1,385.3	0.3

Source: Estimated by Real Estate Center at Texas A&M University using IMPLAN data

Table 6. Contribution to Midland MSA Gross Metropolitan Product						
		Value Added (Gross State Product, Millions)				
Industry Code	Description	Direct	Indirect	Induced	Total	Percent Midland Total
20	Extraction of oil and natural gas	$2,324.9	$422.1	$367.2	$3,114.2	25.0
28	Drilling oil and gas wells	$779.1	$164.3	$64.2	$1,007.5	8.1
29	Support activities for oil and gas operations	$498.7	$155.3	$127.2	$781.2	6.3

Source: Estimated by Real Estate Center at Texas A&M University using IMPLAN data

Table 7. Texas Employment Multipliers of Oil and Natural Gas Industry Number of Jobs per Million Dollars of Sales					
Industry Code	Description	Direct	Indirect	Induced	Total Jobs
20	Extraction of oil and natural gas	2.7	2.1	3.1	8.0
28	Drilling oil and gas wells	1.4	1.9	1.8	5.2
29	Support activities for oil and gas operations	5.5	2.9	4.3	12.7
115	Petroleum refineries	0.1	1.6	1.3	3.0
120	Petrochemical manufacturing	0.1	2.0	1.1	3.2
121	Industrial gas manufacturing	0.9	1.5	1.8	4.1

Source: Estimated by Real Estate Center at Texas A&M University using IMPLAN data

Table 8. Houston MSA Employment Multipliers of Oil and Natural Gas Industry Number of Jobs per Million Dollars of Sales					
Industry Code	Description	Direct	Indirect	Induced	Total Jobs
20	Extraction of oil and natural gas	2.5	1.5	2.5	6.5
28	Drilling oil and gas wells	1.4	1.5	1.5	4.4
29	Support activities for oil and gas operations	4.5	2.0	3.4	10.0
115	Petroleum refineries	0.1	1.5	1.0	2.6
120	Petrochemical manufacturing	0.1	1.8	0.9	2.7
121	Industrial gas manufacturing	0.9	1.3	1.4	3.5

Source: Estimated by Real Estate Center at Texas A&M University using IMPLAN data

Table 9. Midland MSA Employment Multipliers of Oil and Natural Gas Industry Number of Jobs per Million Dollars of Sales					
Industry Code	Description	Direct Effects	Indirect Effects	Induced Effects	Total Effects
20	Extraction of oil and natural gas	2.7	1.1	1.2	4.9
28	Drilling oil and gas wells	1.5	1.1	0.6	3.2
29	Support activities for oil and gas operations	5.5	1.8	1.7	9.0

Source: Estimated by Real Estate Center at Texas A&M University using IMPLAN data

Table 10. Texas Employment Multipliers of the Oil and Natural Gas Industry Indirect/Induced Jobs Created by One Direct Job			
Industry Code	Description	Direct	Indirect and Induced
20	Extraction of oil and natural gas	0.8	2.0
28	Drilling oil and gas wells	1.3	2.6
29	Support activities for oil and gas operations	0.5	1.3
115	Petroleum refineries	16.5	29.3
120	Petrochemical manufacturing	21.4	33.5
121	Industrial gas manufacturing	1.7	3.8

Source: Estimated by Real Estate Center at Texas A&M University using IMPLAN data

Table 11. Houston MSA Employment Multipliers of the Oil and Natural Gas Industry Indirect/Induced Jobs Created by One Direct Job			
Industry Code	Description	Direct	Indirect and Induced
20	Extraction of oil and natural gas	0.6	1.6
28	Drilling oil and gas wells	1.1	2.2
29	Support activities for oil and gas operations	0.4	1.2
115	Petroleum refineries	14.8	25.4
120	Petrochemical manufacturing	19.0	28.3
121	Industrial gas manufacturing	1.5	3.1

Source: Estimated by Real Estate Center at Texas A&M University using IMPLAN data

Table 12. Midland MSA Employment Multipliers of the Oil and Natural Gas Industry Indirect/Induced Jobs Created by One Direct Job			
Industry Code	Description	Direct	Indirect and Induced
20	Extraction of oil and natural gas	0.4	0.9
28	Drilling oil and gas wells	0.8	1.2
29	Support activities for oil and gas operations	0.3	0.6

Source: Estimated by Real Estate Center at Texas A&M University using IMPLAN data