UNIVERSITY OF ARKANSAS
SAM M. WALTON COLLEGE OF BUSINESS

Center for Business and Economic Research

Revisiting the Economic Impact of the Natural Gas Activity in the Fayetteville Shale: 2008-2012

Center for Business and Economic Research
Willard J. Walker Hall 545
Sam M. Walton College of Business
1 University of Arkansas
Fayetteville, Arkansas 72701-1201
(479) 575-4151
Contacts: Kathy Deck, Director
Viktoria Riiman, Research Associate

May 2012

Executive Summary

In 2008, the Center for Business and Economic Research released a study that estimated the economic impact of projected Fayetteville Shale activities from 2008 to 2012. This updated report revisits the assumptions of the initial study, reviews the impact of actual activities in the Fayetteville Shale from 2008 to 2011, and delivers some insights into projected impacts for 2012.

Exploration and production of natural gas in the Fayetteville Shale area generates direct effects from drilling wells and causes the need for supporting activities such as construction, transportation, storage, and distribution. Moreover, investments made by oil and gas companies produce indirect (supply chain oriented) and induced (personal expenditure related) economic impacts.

Fayetteville Shale activities and the oil and gas industry have been **important to the state of Arkansas** because:

- **Average annual pay in the oil and gas extraction industry** was **$74,555 in 2010**, twice the average pay of all industries in the state. High paying jobs are essential for the economic development of the state because Arkansas consistently ranks in the lowest quintile among all states in terms of annual per capita personal income.

- **Mineral leases and royalty payments** provide **additional income** to Arkansas residents. These are important sources of income to citizens of a state that depends more on personal current transfer receipts than the average in the United States: 24.0 percent of total personal income in Arkansas was contributed by transfer receipts as compared with 18.0 percent in the country in 2011.

- **Higher average annual pay, additional income received from mineral leases and royalty payments, and other induced impacts result in higher personal incomes, which lead to larger personal expenditures.** As the growth rates of state sales tax collections declined during the recession from the growth rates of 2004 to 2006, additional personal expenditures helped bring sales tax revenues to the state and local governments.

- **The mining, quarrying, and oil and gas extraction industry had the highest growth rate in payroll employment** among all other industries in Arkansas. This industry contains the oil and gas extraction sector and support activities for the mining sector (which, in turn, includes drilling oil and gas wells and support activities for oil and gas operations). **From 2001 to 2010, mining, quarrying, and oil and gas extraction industry employment increased from 3,855 to 8,358 payroll employees** or **by 116.8 percent**, while overall employment in the state increased only by 0.6 percent or by 6,920 employees. Similarly, from September 2010 to September 2011, payroll employment in the mining, quarrying,

and oil and gas extraction industry increased by 11.1 percent or by 942 employees, while overall payroll employment in the state increased by 0.4 percent (or by 4,022 employees).

Fayetteville Shale development generated **additional activities in the state**. For example, the construction of the Fayetteville Express Pipeline cost **$1.0 billion**. Also, Welspun Corporation opened its pipe manufacturing factory in Little Rock in 2009 and plans to expand in 2012, raising the company's total overall investment in the state to **$280 million**. Saint-Gobain Group built a new plant in Saline County costing $100 million that manufactures ceramic proppants, used in underground fractures in oil and gas wells, and expanded an existing plant in Fort Smith. During 2011, American Railcar Industries, Inc. added 1,000 employees to its two plants in Arkansas and one plant in Missouri that build cars for hauling sand used in hydraulic fracturing.

From 2008 to 2011, natural gas production occurred in the following nine counties[1]: Cleburne, Conway, Faulkner, Franklin, Independence, Jackson, Pope, Van Buren, and White County.

Historically, Fayetteville Shale counties had lower per capita personal income and average annual pay than the state. Fayetteville Shale activities have helped to improve the economic situation in these counties, providing necessary industrial diversification and supplementing personal income. **The local economic benefits from the development of the natural gas industry in the Fayetteville Shale** include:

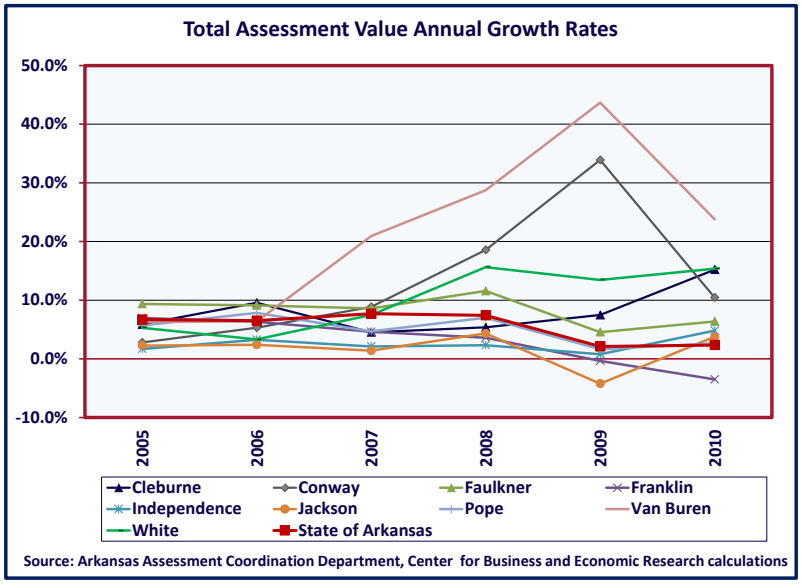
- **The number of business establishments** in Fayetteville Shale counties **increased at a higher rate than in the state overall** for the past ten years: by 20.2 percent as compared with 17.0 percent in the state from 2001 to 2010.

- Fayetteville Shale counties depended on manufacturing jobs to provide the backbones of their economies for much of the past century. Due to the recession and structural economic change, a large number of manufacturing jobs were lost from 2001 to 2010 in these counties (9,558 jobs) and the share of manufacturing employment out of total employment declined from 21.8 percent to 13.5 percent during this time. Despite this significant obstacle, **five out of nine Fayetteville Shale counties** experienced **higher than the state payroll employment growth from 2001 to 2010**. These five counties were Cleburne, Conway, Faulkner, Pope, and White County with 5.5 percent, 3.2 percent, 15.5 percent, 5.7 percent, and 7.1 percent employment growth rate, respectively (compared with the growth rate of 0.6 percent in the state during this time period). Increased natural gas production and supporting activities such as pipeline construction created new jobs in the counties.

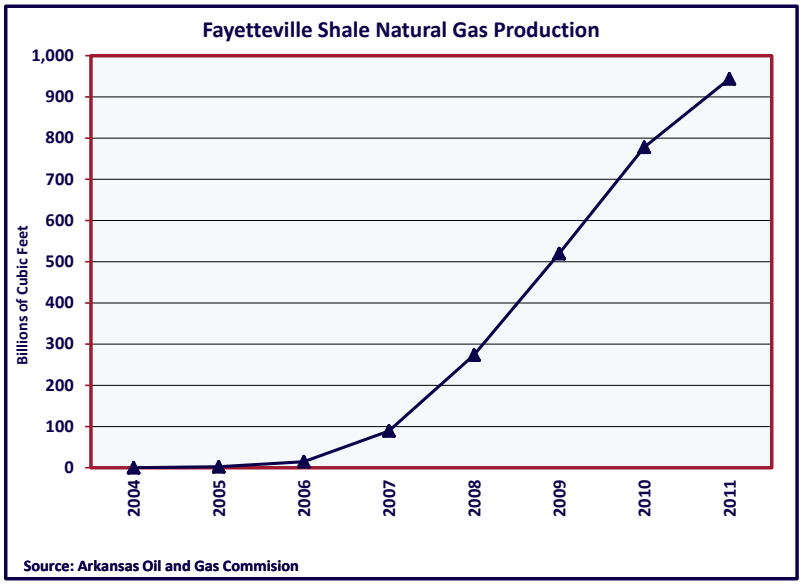
[1] These counties are defined as Fayetteville Shale counties for the purpose of this report. Although production occurred also in Johnson County in 2008, that total accounted for only 0.01 percent of total natural gas produced that year in the Fayetteville Shale area.

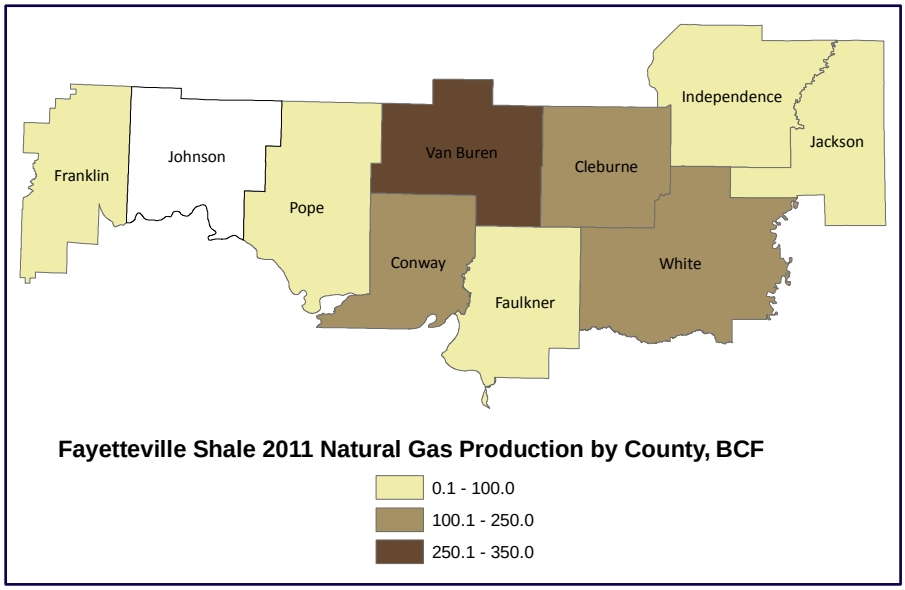
- While taxable sales in the state increased by 5.7 percent, **taxable sales in Fayetteville Shale counties increased by 20.0 percent from 2006 to 2011**. Although the economic recovery following the national recession was slow, seven out of nine Fayetteville Shale counties experienced an increase in taxable sales from 2010 to 2011.

- In 2010, all Fayetteville Shale counties except Franklin County had faster **than state average growth** in their **total property assessment values**.



- **Production of natural gas** in Fayetteville Shale counties increased significantly from 100.6 million cubic feet in 2004 to **almost 943.6 billion cubic feet in 2011**. The highest level of natural gas production in 2011 occurred in Van Buren County, followed by White, Conway, and Cleburne counties.





Sources: Arkansas Oil and Gas Commission, Center for Business and Economic Research calculations

- In 2008, exploration and production (E&P) companies planned to invest almost $9.9 billion in Fayetteville Shale activities from 2008 to 2011. According to the 2012 survey of E&P companies, **more than $12.7 billion were invested** during that time or **29.0 percent more than was planned** in 2008. This indicates that companies made conservative estimates in 2008 and natural gas production in Fayetteville Shale increased more than projected, despite lower than expected gas prices.

Year	*Expenditures Projected in 2008*	*Actual Expenditures*	*Increase/Decrease in Actual Expenditures*
2008	$2,403,100,000	$2,826,305,746	17.6%
2009	$2,312,800,000	$3,132,245,509	35.4%
2010	$2,548,020,000	$3,228,336,598	26.7%
2011	$2,634,312,000	$3,583,976,111	36.0%
Total	**$9,898,232,000**	**$12,770,863,965**	**29.0%**

Source: 2008 and 2012 Center for Business and Economic Research surveys

- According to the Center for Business and Economic Research Survey, from 2008 to 2011 **more than $1.2 billion of mineral leases and royalty payments** were made by E&P companies to mineral owners residing in all 75 Arkansas counties.

Mineral Leases and Royalty Payments Made by Oil and Gas Companies for Production from the Fayetteville Shale

	2008	*2009*	*2010*	*2011*	*Total 2008-2011*
Fayetteville Shale Counties	$244,264,556	$247,664,393	$373,536,452	$346,443,172	$1,211,908,574

Sources: 2012 Center for Business and Economic Research survey and estimates, IMPLAN

- **From 2008 to 2011**, **total economic activity of more than $18.5 billion** was generated as a result of Fayetteville Shale activities in the state. **Value added** from Fayetteville Shale activities was **more than $12.4 billion** during that time.[2] **Total annual state employment** impacts increased **from more than 14,500 people to more than 22,000 people** during that time period. Among Fayetteville Shale counties, total employment impacts were largest in Faulkner County, followed by White, Cleburne, and Conway counties.

- The estimated total output impacts were consistently higher than the impacts projected in 2008 (projected total output impact of about $14.2 billion and annual total employment impacts between 11,000 and 12,000 people), following higher than projected expenditures in the Fayetteville Shale.

[2] Value added is defined as the difference between an industry's total output and the cost of its intermediate inputs.

Year	Direct Output Impact	Indirect Output Impact	Induced Output Impact	Total Output Impact	Average Multiplier
2008	$2,826,305,639	$276,217,212	$662,650,133	$3,765,172,984	1.33
2009	$3,132,245,416	$499,040,374	$1,067,517,206	$4,698,802,996	1.50
2010	$3,228,336,640	$494,614,363	$1,076,406,937	$4,799,357,940	1.49
2011	$3,583,975,967	$528,293,873	$1,159,086,862	$5,271,356,703	1.47
Total	**$12,770,863,662**	**$1,798,165,822**	**$3,965,661,138**	**$18,534,690,623**	**1.45**

Sources: 2012 Center for Business and Economic Research survey and estimates, IMPLAN

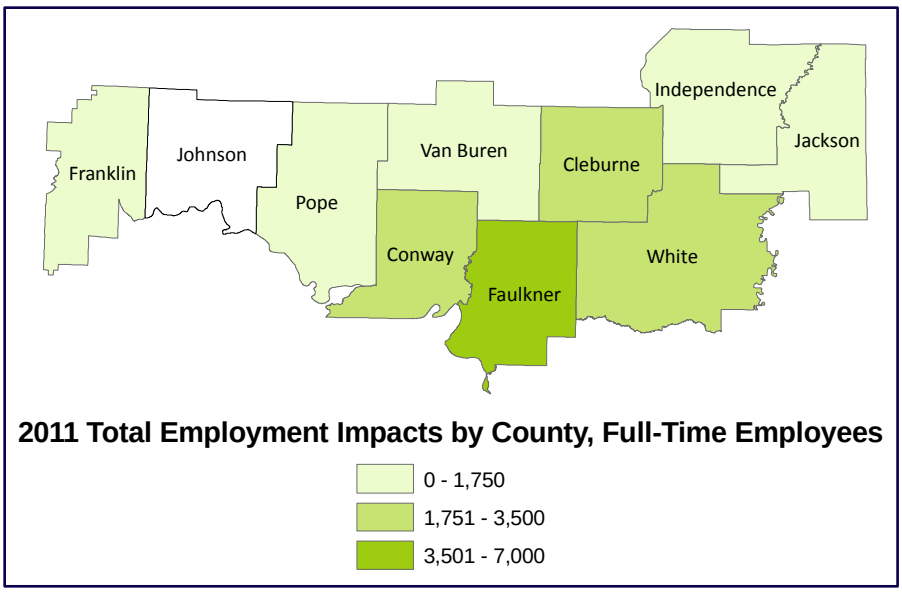
Year	Direct Value Added Impact	Indirect Value Added Impact	Induced Value Added Impact	Total Value Added Impact	Average Multiplier
2008	$1,499,092,806	$140,907,743	$393,800,483	$2,033,801,031	1.36
2009	$2,478,709,392	$268,881,297	$640,642,475	$3,388,233,164	1.37
2010	$2,470,791,675	$262,281,682	$644,969,414	$3,378,042,771	1.37
2011	$2,661,345,036	$278,003,865	$698,949,732	$3,638,298,633	1.37
Total	**$9,109,938,909**	**$950,074,587**	**$2,378,362,104**	**$12,438,375,599**	**1.36**

Sources: 2012 Center for Business and Economic Research survey and estimates, IMPLAN

Year	Direct Employment Impact	Indirect Employment Impact	Induced Employment Impact	Total Employment Impact	Average Multiplier
2008	5,948	1,934	6,629	14,511	2.44
2009	6,592	3,669	10,673	20,933[3]	3.18
2010	6,794	3,537	10,622	20,953	3.08
2011	7,544	3,674	11,282	22,499	2.98

Sources: 2012 Center for Business and Economic Research survey and estimates, IMPLAN

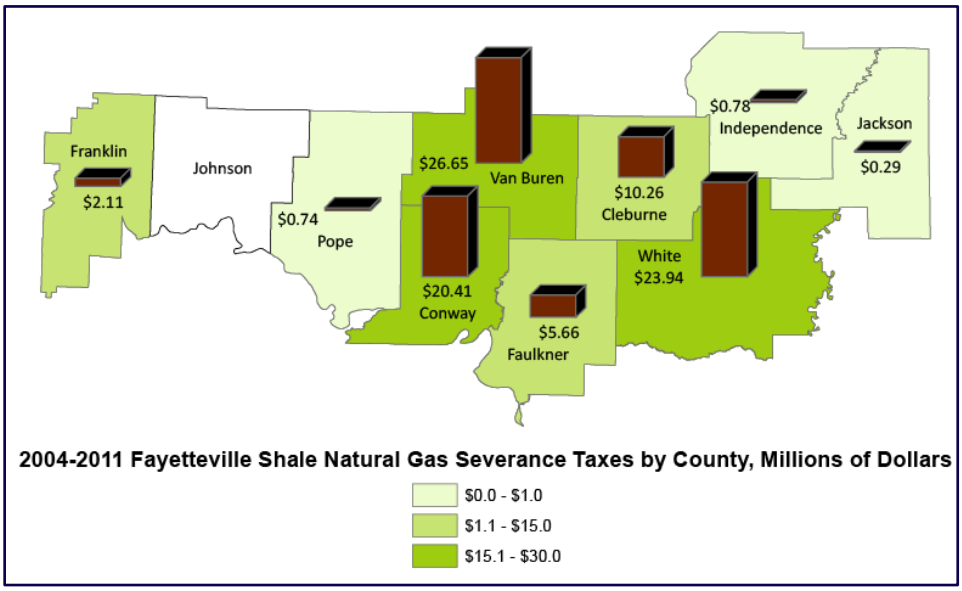
[3] Due to rounding, the sum of direct, indirect, and induced impacts differs from the total employment impact.



Sources: IMPLAN, Center for Business and Economic Research estimates

- **From 2004 to 2011**, a total of **4,878 drilling permits** were issued in Fayetteville Shale counties by the Arkansas Oil and Gas Commission, generating fees to the state of **almost $1.5 million**.

- **From 2004 to 2011**, the state of Arkansas received **more than $90.8 million** in **severance tax revenues from Fayetteville Shale activities**.



Source: 2012 Center survey, Center for Business and Economic Research calculations

- **From 2008 to 2011**, **almost $109.2 million** in **total property tax revenues** were generated **from natural gas production** in the Fayetteville Shale.

Property Taxes from Fayetteville Shale Production, 2008-2011 Assessment Years

County	*School District Property Taxes*	*Total Property Taxes*
Cleburne	$9,530,545	$10,913,725
Conway	$19,852,594	$25,252,338
Faulkner	$6,158,965	$7,699,301
Franklin	$23,906	$31,728
Independence	$768,033	$987,692
Jackson	$268,629	$345,068
Pope	$419,179	$480,885
Van Buren	$27,532,017	$35,180,426
White	$25,145,277	$28,290,543
Fayetteville Shale Counties	**$89,700,048***	**$109,182,898***

*Totals include property taxes that occurred from natural gas production in Johnson County in 2008.
Sources: Arkansas Oil & Gas Commission, Arkansas Coordination Department, Center for Business and Economic Research calculations

- **Overall, from 2008 to 2011**, **almost $2.0 billion** in state and local taxes from **permit fees and severance, property, income, sales, and other taxes** were collected as a result of Fayetteville Shale activities. This amount is higher than $1.2 billion of state and local taxes projected for this time period in 2008, following higher than projected expenditures of E&P companies in the Fayetteville Shale area and higher total employment.

Tax Category	*2008*	*2009*	*2010*	*2011*	*Total 2008-2011*
Employee Compensation	$1,690,344	$2,305,688	$2,395,751	$2,653,867	$9,045,650
Indirect Business Taxes and Fees	$183,726,187	$368,667,117	$386,055,978	$412,720,807	$1,351,170,089
Households Taxes	$100,732,153	$132,720,679	$150,276,443	$159,410,819	$543,140,094
Corporation Taxes	$8,939,369	$14,852,317	$14,663,124	$15,703,921	$54,158,731
Total State and Local Taxes	**$295,088,053**	**$518,545,801**	**$553,391,296**	**$590,489,414**	**$1,957,514,564**

Sources: IMPLAN, 2012 Center for Business and Economic Research survey and estimates, Arkansas Oil and Gas Commission

- Enumerating each of the many revenue streams that resulted from the Fayetteville Shale activities is not feasible. Other payments such as overweight permit fees and restricted road fees, motor fuel taxes, and increased hotel, motel, and restaurant taxes were also received by governmental organizations as a result of the Fayetteville Shale development. Additionally, increased residential and commercial property values resulted in increased assessment values and, thus, in increased property taxes.

- According to the 2012 survey responses of E&P companies, expenditures are projected to be lower in 2012 than in 2011 by 23.8 percent due to the sustained low natural gas price environment. However, these projected expenditures are still 5.8 percent higher than the level of expenditures that the companies projected for 2012 in 2008.

Year	*Expenditures Projected in 2008*	*Expenditures Projected in 2012*	*Increase/Decrease in Expenditures Projected in 2012*
2012	$2,582,333,200	$2,731,667,478	5.8%

Source: 2008 and 2012 Center for Business and Economic Research surveys

- **In 2012**, **total economic activity of almost $4.0 billion** and **value added of almost $2.7 billion** are projected to occur as a result of Fayetteville Shale activities in the state. **The total annual state employment** impact is projected to be **more than 16,000 people** during 2012.

Projected Output, Value Added, and Employment Impacts of Fayetteville Shale Activities, 2012

Impact Category	*Direct Impact*	*Indirect Impact*	*Induced Impact*	*Total Impact*	*Average Multiplier*
Output	$2,731,667,460	$387,583,098	$858,611,745	$3,977,862,303	1.46
Value Added	$1,969,864,942	$202,328,325	$520,679,847	$2,692,873,115	1.37
Employment	5,750	2,620	8,237	16,607	2.89

Sources: 2012 Center for Business and Economic Research survey and estimates, IMPLAN

- The biggest risk factor to the 2012 projections continues to be sustained low natural gas prices. While the current low price environment is assumed in the estimates, further price declines and unanticipated operational cost increases could have significant effects on overall economic product and employment impacts statewide.

Table of Contents

List of Tables

Table of Figures

Acknowledgements

This study was made possible through the financial support of the Arkansas State Chamber of Commerce/Associated Industries of Arkansas. The authors would like to thank all of the companies and organizations that responded to our requests for information.

The research team for this project at the Center for Business and Economic Research consisted of Kathy Deck, Viktoria Riiman, and Mervin Jebaraj. Maryam Guppy and Nick Flocks provided excellent student research assistance.

Independence of Results

This study was conducted by the research staff at the Center for Business and Economic Research in the Sam M. Walton College of Business at the University of Arkansas. This project could not have been completed without the data provision from companies who are actively involved in the Fayetteville Shale natural gas industry. However, the choice of methodology, the type of analysis, and the conclusions reached in this report are the authors' own and have not been directed by any outside party.

Introduction

In the late 1990s and early 2000s, technological innovations made possible the economic extraction of natural gas from dense shale formations. Using horizontal fracturing techniques, natural gas production companies gained the ability to produce natural gas at a cost that was competitive with or better than conventional drilling. Horizontal fracturing was pioneered in the Barnett Shale in Texas, but in the mid-2000s, natural gas production began in the Fayetteville Shale, located in central Arkansas.

The economic activity associated with the natural gas production in the Fayetteville Shale was a boon for the regional and state economies. Many of the counties where natural gas production became possible had been dependent on the manufacturing sector to provide employment opportunities. As manufacturing employment declined in the state, these counties were fortunate to experience the introduction of a completely new industry sector. The timing of the initial investments made in the Fayetteville Shale were particularly beneficial to the region and state, as the global recession accelerated employment losses across a variety of industries. However, even as the recession impacted demand for natural gas, production in the Fayetteville Shale region increased in an accelerated fashion.

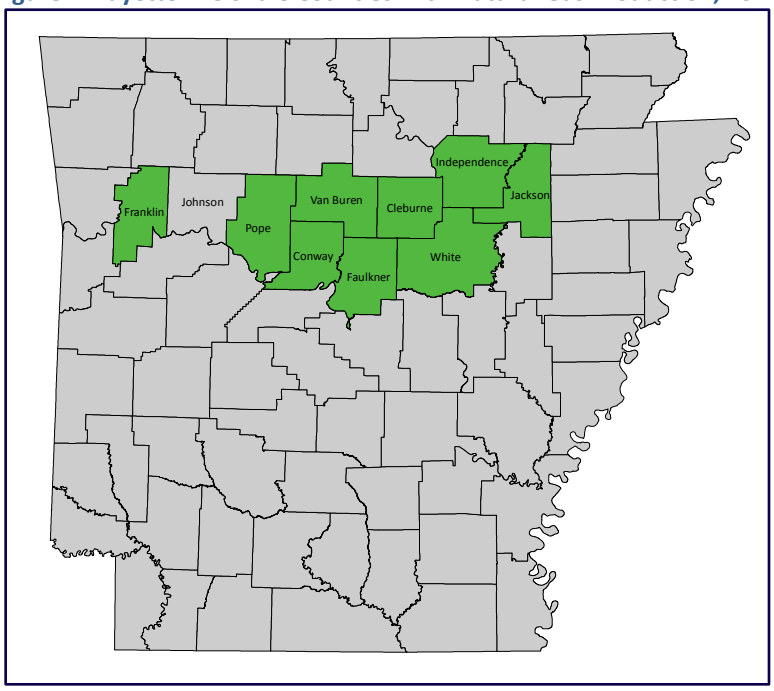
The introduction of the natural gas industry in Arkansas affected more than just employment in the natural resources and mining sector. Indirect and induced effects from the substantial investments in the region have touched every sector including manufacturing (examples are the Welspun pipe manufacturing facility in Little Rock, the Saint-Gobain proppants manufacturing, and American Railcar Industries, Inc. plants), transportation (the largest project being the Fayetteville Express Pipeline), hospitality, professional and business services, education and finance.

Natural gas production and its supporting activities remain an important industry in Arkansas. This report reconsiders a 2008 study conducted by the Center for Business and Economic Research of the economic impact of Fayetteville Shale. The current (2012) report includes new information gathered by surveying oil and gas producers, by reviewing recent case studies about the Barnett Shale in Texas and the Marcellus Shale in Pennsylvania, by assembling relevant economic information from available resources, and by conducting economic impact analysis using best practices and the IMPLAN input-output model.

The report is organized as follows. First, the economic profile of the state is presented, including a description of employment and average pay in the natural resources and mining industry (and the mining, quarrying and oil and gas subsector in particular). Next, the economies of Fayetteville Shale counties and the importance of the natural gas exploration and production industry in these counties are described. For the purpose of this report, Fayetteville Shale counties are defined as Cleburne, Conway, Faulkner, Franklin, Independence, Jackson, Pope, Van Buren, and White County (i.e. counties where natural gas production occurred from

2008 to 2011). Such economic and demographic county characteristics as population, per capita personal income, employment, average annual pay, number of business establishments, and local sales are provided. Fayetteville Shale statistics such as natural gas production and the number of drilling permits issued to date are provided next. Fayetteville Shale economic output, employment, and tax impacts are described after that. Specifically, severance tax, property tax, sales tax and income tax collections relating to Fayetteville Shale activities are estimated. Detailed output and employment impacts tables are provided in the Appendix.

Figure 1: Fayetteville Shale Counties with Natural Gas Production, 2011



Source: Arkansas Oil and Gas Commission

Arkansas Economic Profile

The natural resources and mining industry accounted for a relatively small portion of total payroll employment in Arkansas. However, this industry sector and, in particular, the mining, quarrying, and oil and gas extraction subsector and its supporting activities is a high value industry with strong employment growth. The importance of economic diversification in raising the relatively low per capita personal income in the state makes this industry particularly important to Arkansas, especially in an environment of slow economic recovery from the national recession.

Population Growth

According to U.S. Census Bureau intercensal population estimates, more than 2.9 million people resided in the state of Arkansas as of July 1, 2011. From 2000 to 2011, the state population increased by 259,391 people or by 9.7 percent. This is lower than the average increase of 10.4 percent in the country overall. However, in 2005, 2006, and in 2010, the state population increased at a slightly higher rates that the nation on average.

Figure 2: State of Arkansas Population, 1990-2011

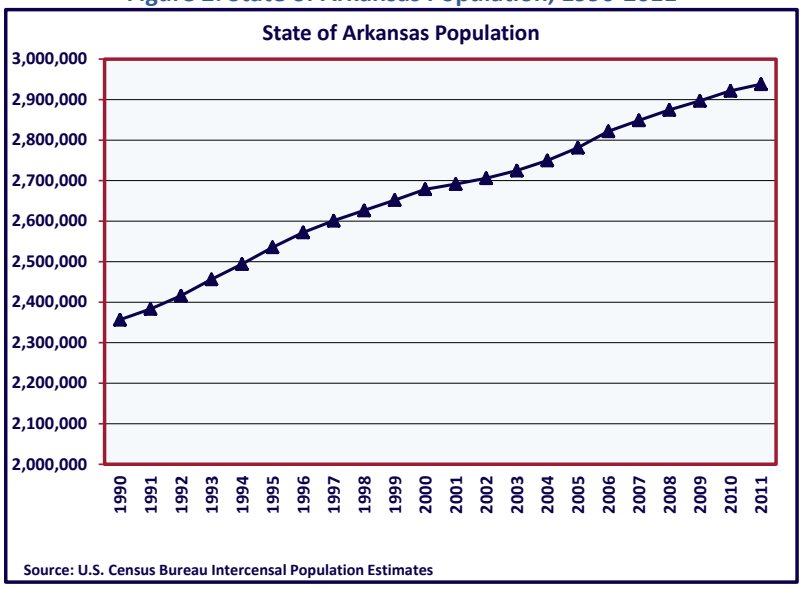
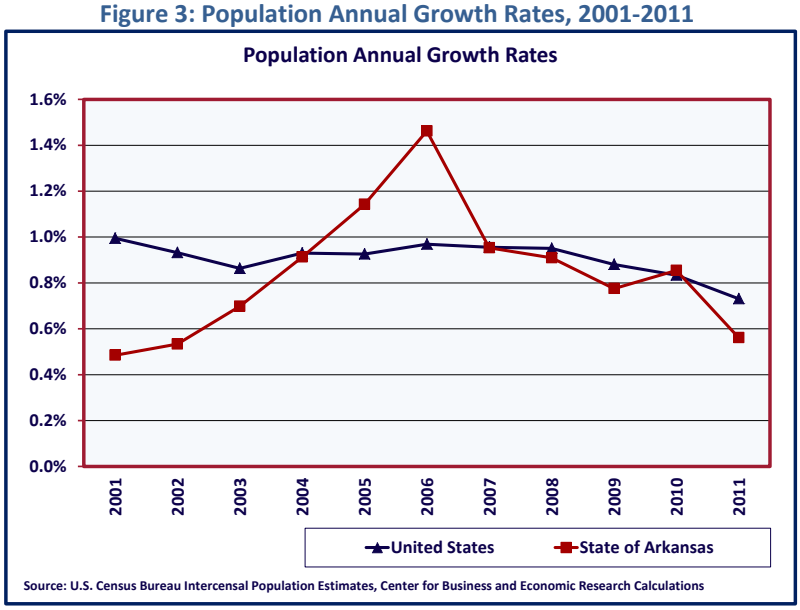


Figure 3: Population Annual Growth Rates, 2001-2011



Personal Income

From 2000 to 2011, Arkansas total personal income increased by 4.3 percent, while U.S. total personal income increased by 5.1 percent.[4] Total net earnings rose by 4.5 percent in the state from 2010 to 2011, while the annual growth rate for total net earnings in the country was higher at 5.6 percent. Dividends, interest, and rent also increased at a pace slower than the national rate (by 5.1 percent as compared with the national rate of 5.9 percent), while personal current transfer receipts increased faster than the national rate (by 3.1 percent as compared with 2.4 percent in the nation). As shown in Table 1, from 2001 to 2011, the share of net earnings out of total personal income continued to be smaller in the state than on average in the United States, while the share of personal current transfer receipts continued to be larger than the national average. Because Arkansas is so dependent on transfer payments from the federal government, increasing income from private industry like the companies involved in the Fayetteville Shale is critical to increasing prosperity in the state.

[4] According to the U.S. Bureau of Economic Analysis (BEA)

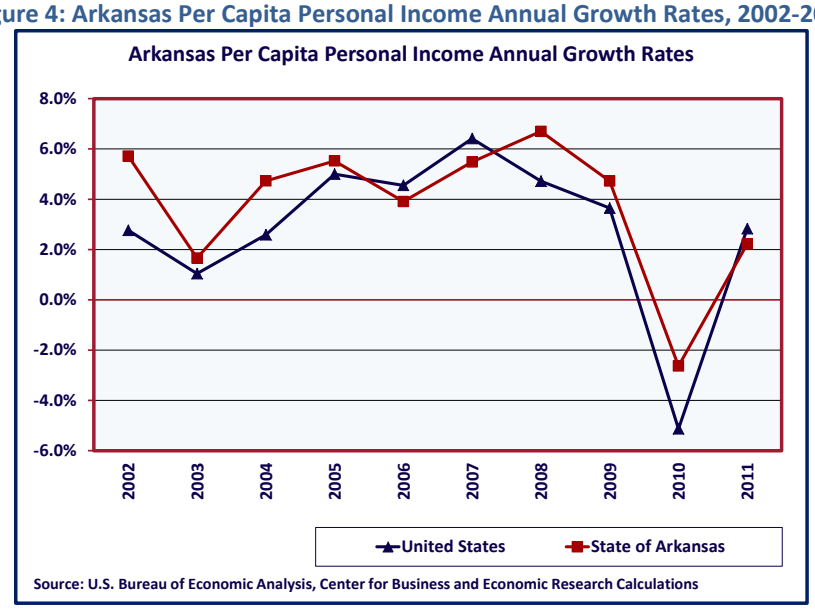
Table 1: Percent Contribution to Total Personal Income, 2001 and 2011

Category	Arkansas			United States		
	2001	2011	2001-2011 Average Annual Growth Rate	2001	2011	2001-2011 Average Annual Growth Rate
Net Earnings	65%	58%	3.4%	69%	65%	3.3%
Dividends, Interest, and Rent	17%	17%	5.0%	18%	17%	3.3%
Personal Current Transfer Receipts	18%	24%	7.3%	13%	18%	7.0%
Total Personal Income	100%	100%	4.5%	100%	100%	3.9%

Source: U.S. Bureau of Economic Analysis

Per capita personal income in the state of Arkansas was $34,014 in 2011, or 81.6 percent of the national per capita personal income of $41,663. The growth rate of per capita personal income in the state totaled 50.7 percent from 2000 to 2011, higher than the national growth rate per capita, which was 37.4 percent. As a result, the state's ranking increased from 49th to 45th among other states during this time period. The increase in ranking occurred since 2006 with Arkansas per capita personal income increasing at a higher annual growth rate than the national average from 2007 to 2009 and at a slightly lower annual growth rate in 2010 and 2011. The increase in per capita personal income rankings coincides with the highest activity years in the Fayetteville Shale.

Figure 4: Arkansas Per Capita Personal Income Annual Growth Rates, 2002-2011

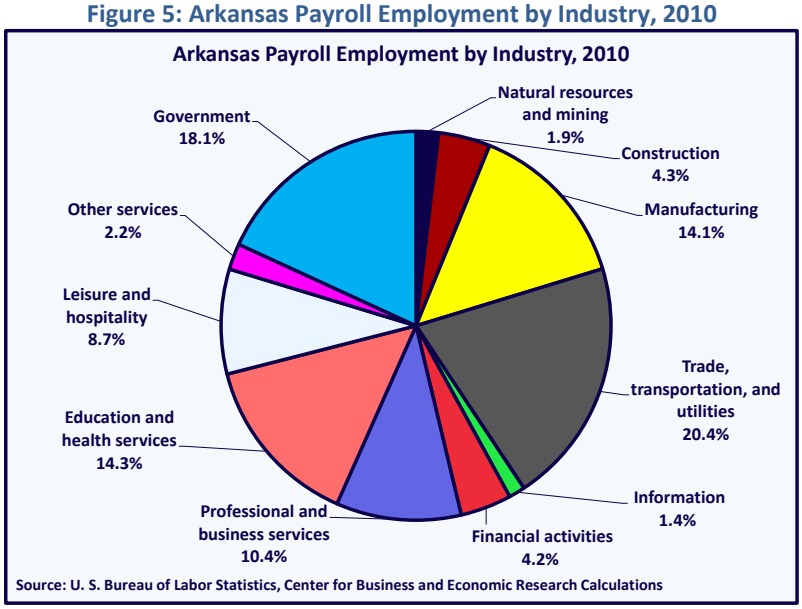


Job Growth by Sector

The unemployment rate in Arkansas was better than the national unemployment rate in 2011, according to the Bureau of Labor Statistics (BLS): 8.0 percent as compared with the national rate of 8.9 percent. In March 2012, the Arkansas unemployment rate was a preliminary 7.4 percent, lower than the national unemployment rate of 8.2 percent.[5]

Total payroll employment in Arkansas was 1,134,071 in 2010.[6] The trade, transportation, and utilities sector had the largest number of payroll employees in Arkansas in 2010. This sector accounted for 20.4 percent of total employment in the state, followed by government (18.1 percent), education and health services (14.3 percent), and manufacturing (14.1 percent). About 1.9 percent of Arkansas payroll employees worked in the natural resources and mining sector in 2010.

Figure 5: Arkansas Payroll Employment by Industry, 2010



Among the employees that worked in the natural resources and mining sector in 2010, 39.6 percent or 8,358 employees worked in the mining, quarrying, and oil and gas extraction subsector. This industry contains the oil and gas extraction subsector and support activities for mining subsector (which, in turn, includes drilling oil and gas wells and support activities for oil and gas operations). From 2001 to 2010, the number of payroll employees in the mining, quarrying, and oil and gas extraction subsector increased from 3,855 to 8,358 employees or by 116.8 percent.

[5] These numbers are seasonally adjusted rates from the Current Population Survey and Local Area Unemployment Statistics programs at the BLS.

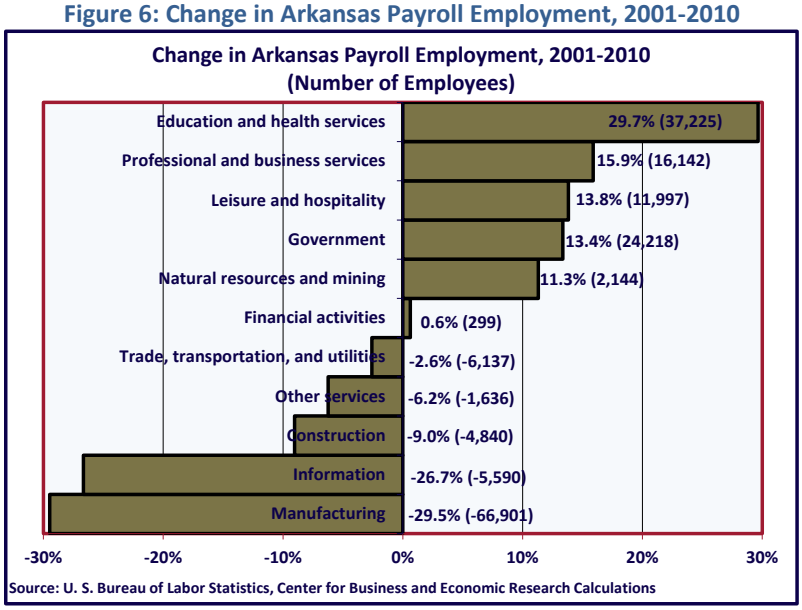
[6] These are the latest Quarterly Census of Employment and Wages (QCEW) annual data available from the BLS. These data allow state and county comparisons.

Table 2: Number of Arkansas Payroll Employees by Industry, 2001 and 2010

Industry	*2001*	*2010*	*2001-2010 Change*	*2001-2010 % Change*
Natural resources and mining	18,950	21,094	2,144	11.3%
Mining, quarrying, and oil and gas extraction	3,855	8,358	4,503	116.8%
Construction	53,566	48,726	-4,840	-9.0%
Manufacturing	226,992	160,091	-66,901	-29.5%
Trade, transportation, and utilities	237,569	231,432	-6,137	-2.6%
Information	20,965	15,375	-5,590	-26.7%
Financial activities	47,670	47,969	299	0.6%
Professional and business services	101,572	117,714	16,142	15.9%
Education and health services	125,513	162,738	37,225	29.7%
Leisure and hospitality	86,782	98,779	11,997	13.8%
Other services	26,241	24,605	-1,636	-6.2%
Government	181,331	205,549	24,218	13.4%
Total all industries	**1,127,151**	**1,134,071**	**6,920**	0.6%

Due to the national recession and the slow pace of recovery, the state of Arkansas experienced only 0.6 percent growth in annual payroll employment from 2001 to 2010 (or by 6,920 employees). The industry sector with the highest growth rate of employment was education and health services (29.7 percent or 37,225 employees), followed by professional and business services (15.9 percent or 16,142 employees), and leisure and hospitality (13.8 percent or 11,997 employees). The natural resources and mining sector increased by 11.3 percent while the mining, quarrying, and oil and gas extraction subsector increased by a whopping 116.8 percent or by 4,503 payroll employees from 2001 to 2010. State level data were also available on the oil and gas extraction and on the support activities for mining subsectors: employment increased by 142.6 percent and by 272.6 percent or by 569 and 3,885 employees in these subsectors during that time period, respectively. In stark contrast, the largest declines in the decade were in the manufacturing sector (29.5 percent or a loss of 66,901 jobs), followed by the information sector (26.7 percent or a loss of 5,590 jobs) and the construction sector (9.0 percent or a loss of 4,840 jobs).

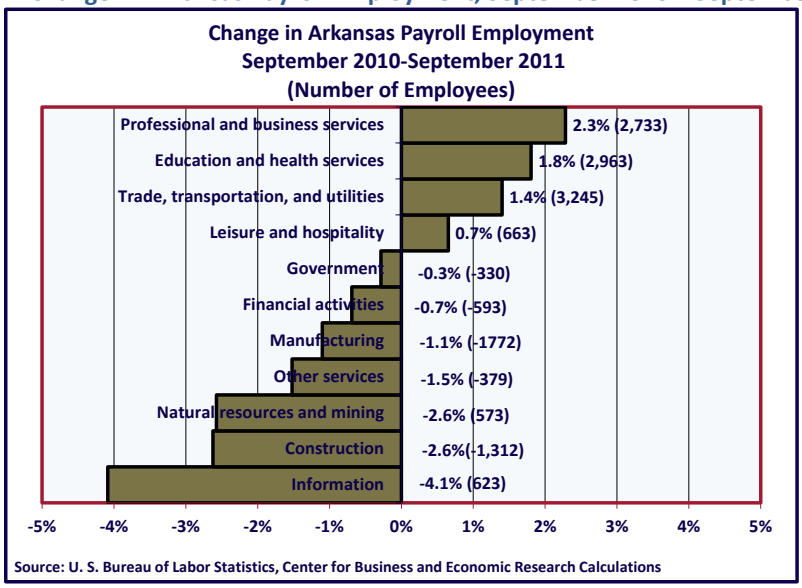
Figure 6: Change in Arkansas Payroll Employment, 2001-2010



From September 2010 to September 2011, Arkansas experienced a 0.4 percent increase in payroll employment.[7] Employment increased in four industry sectors: professional and business services (by 2.2 percent or by 2,733 payroll employees), education and health services (by 1.8 percent or by 2,963 employees), trade, transportation, and utilities (by 1.4 percent or 3,245 employees), and leisure and hospitality (by 0.7 percent or by 663 employees). Although employment in the natural resources and mining industry sector declined by 2.6 percent, employment in the oil and gas extraction subsector increased by 72.2 percent during this time period, by 688 payroll employees.

[7] These are the latest QCEW data available for year-over-year comparisons.

Figure 7: Change in Arkansas Payroll Employment, September 2010 – September 2011



From 2001 to 2010, Arkansas netted a gain of 12,380 business establishments, a 17.0 percent increase in the number of businesses in the state.[8] The number of establishments in 2010 (85,194) was higher than the level seen in 2007 and before that year, but was somewhat lower than the levels seen in 2008 and 2009. From the second to the third quarter of 2011, the number of Arkansas establishments grew by 0.9 percent to 86,233. The number of business establishments in the oil and gas extraction industry subsector increased by 12.9 percent (to 96 establishments) from 2001 to 2010, although the number of establishments peaked in 2008 (103 establishments). The slight decline likely represents consolidation in the sector due to the extended period of low natural gas prices.

Average Annual Pay

Average annual pay in Arkansas was $36,254 in 2010 or $10,497 less than the national average pay.[9] The difference between the average state and national pay remained large in spite of the higher growth rate of the Arkansas average: 33.0 percent as compared with 29.1 percent in the country from 2001 to 2010. The average pay in the oil and gas extraction industry subsector was $74,555 in Arkansas in 2010, 205.6 percent of the overall average pay in the state. From 2001 to 2010, average pay in the oil and gas extraction industry subsector increased by 74.9 percent, almost twice as fast as overall average pay increased in Arkansas during that time period.

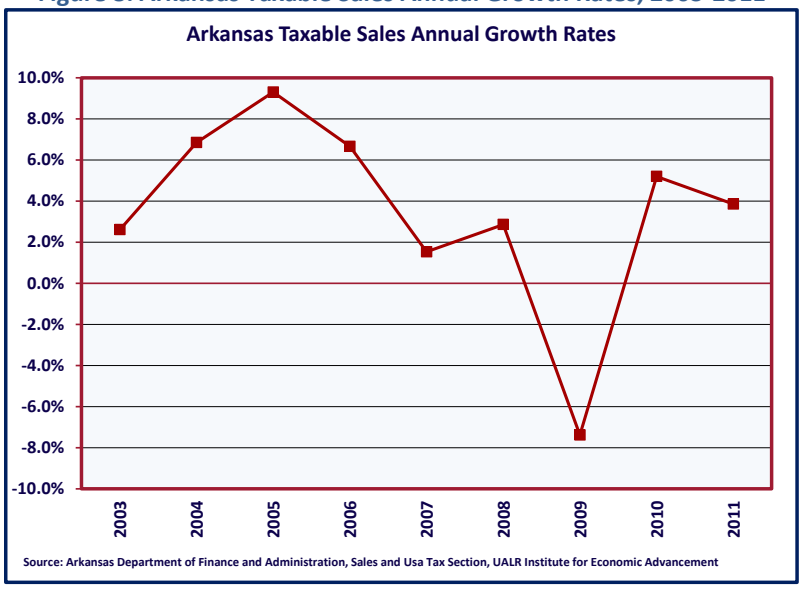
[8] Establishment data come from the BLS QCEW program.

[9] Average annual pay statistics come from the BLS QCEW program.

Taxable Sales

Almost $54.3 billion of total sales occurred in the state of Arkansas in 2011.[10] Due to the recession, Arkansas sales declined from 2008 to 2009. The rate of sales growth increased since the bottom of the national recession. From 2006 to 2011, total state sales increased by an average annual rate of 1.1 percent. From 2010 to 2011, Arkansas sales increased by more than $2 billion or by 3.9 percent.

Figure 8: Arkansas Taxable Sales Annual Growth Rates, 2003-2011



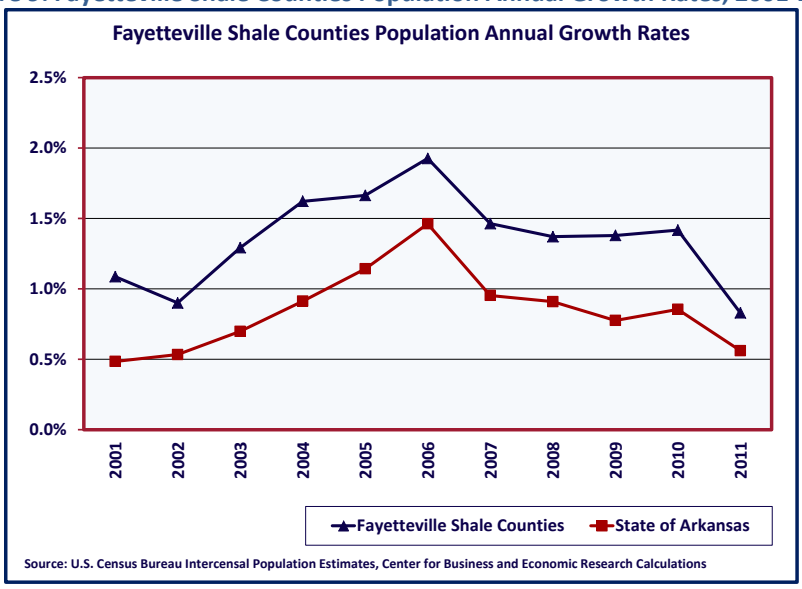
[10] Taxable sales data come from the Arkansas Department of Finance and Administration and UALR Institute for Economic Advancement estimates.

Fayetteville Shale County Economic Profiles

Fayetteville Shale Counties Overview

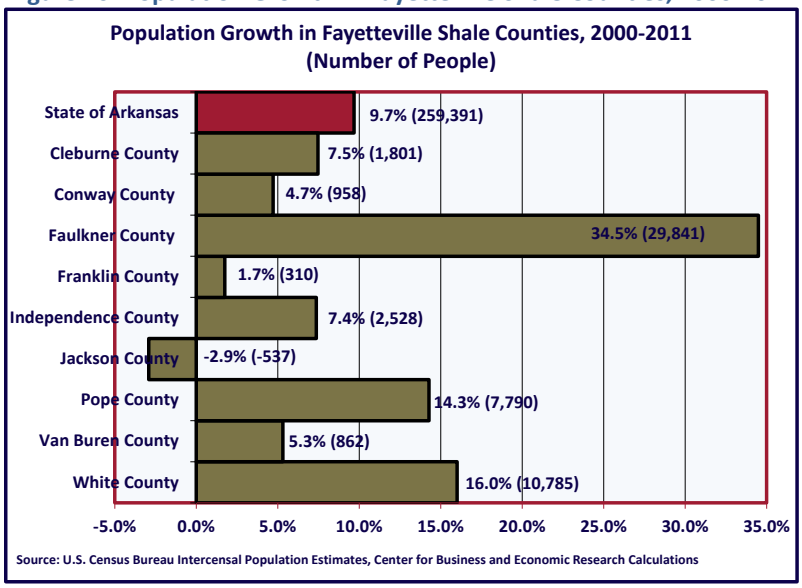
According to the U.S. Census Bureau intercensal population estimates, 393,868 people resided in Fayetteville Shale counties[11] as of July 1, 2011. From 2000 to 2011, the population increased by 54,338 people or by 16.0 percent. In Faulkner, Pope, and White Counties, the population increased much more quickly than the state average growth rate of 9.7 percent during that time: by 34.5, 14.3, and 16.0 percent, respectively. These three counties also experienced the largest increase in the number of people in the Fayetteville Shale region from 2000 to 2011: by 29,841; 7,790; and 10,785 people in Faulkner, Pope, and White Counties, respectively. The population in other Fayetteville Shale counties increased more slowly than the state average rate and by a smaller number of people. Only Jackson County in the Fayetteville Shale area had a decline in its population from 2000 to 2011, by 2.9 percent or by 537 people.

Figure 9: Fayetteville Shale Counties Population Annual Growth Rates, 2001-2011



[11] For the purpose of this report, Fayetteville Shale counties are defined as Cleburne, Conway, Faulkner, Franklin, Independence, Jackson, Pope, Van Buren, and White County (i.e. counties, where natural gas production occurred from 2008 to 2011).

Figure 10: Population Growth in Fayetteville Shale Counties, 2000-2011

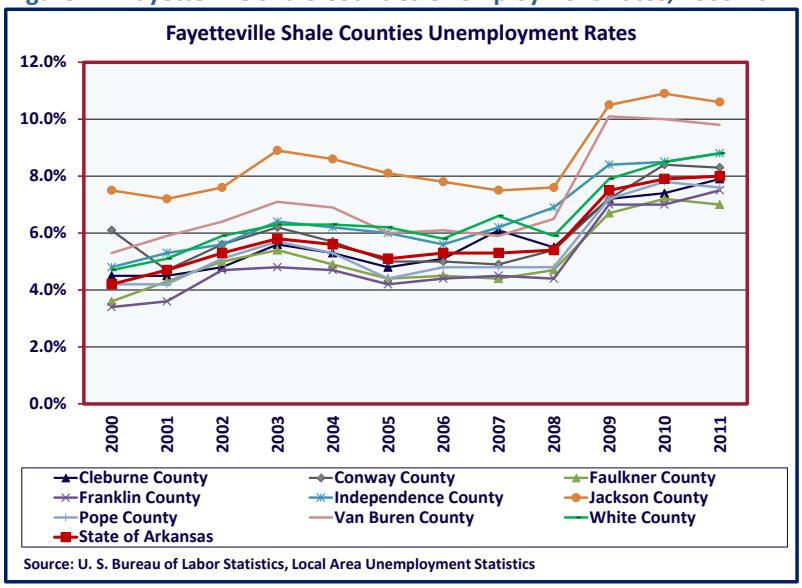


Per capita personal income in almost all Fayetteville Shale counties was consistently lower than the state average from 2002 to 2010. This was despite the fact that the growth rate of per capita personal income in seven out of nine counties was higher than the state average growth rate during that time period. Among Fayetteville Shale counties, only Cleburne County had higher than the state per capita personal income, from 2008 to 2010.

The unemployment rate in Fayetteville Shale counties increased from 2000 to 2011, primarily due to the national recession and following the overall Arkansas trend. Unemployment rates in Jackson, Independence, Van Buren, and White Counties have been consistently higher than the state average rate, while unemployment rates in Cleburne and Conway Counties varied, and unemployment rates in Faulkner, Franklin, and Pope Counties have been consistently lower than the state unemployment rates. These trends were the same in February 2012, the latest preliminary monthly unemployment data available for counties from the BLS. During that month, unemployment rates in both Cleburne and Conway Counties were 8.4 percent, or 0.1 percentage points higher than the state unemployment rate.[12]

[12] These are not seasonally adjusted rates.

Figure 11: Fayetteville Shale Counties Unemployment Rates, 2000-2011



Five out of nine Fayetteville Shale counties had higher than the Arkansas average payroll employment growth from 2001 to 2010. In contrast, payroll employment in Franklin, Independence, Jackson, and Van Buren County declined during the past decade by 0.5, 5.6, 12.5, and 5.9 percent, respectively. Employment in the natural resources and mining industry sector increased in all Fayetteville Shale counties except Van Buren County from 2001 to 2010. Van Buren County, however, experienced an increase in payroll employment in the mining, quarrying, and oil and gas extraction subsector from 0 employees in 2001 to 20 employees in 2009.

Fayetteville Shale counties historically depended heavily on the manufacturing industry for employment opportunities. However, a large number of manufacturing jobs (9,558 jobs) were lost in these counties from 2001 to 2010. Recent losses of manufacturing jobs meant that the sector's share of payroll employment declined, but manufacturing remained more important than the state average employment share in five out of nine Fayetteville Shale counties in 2010. During this period, some jobs were gained in the natural resources and mining industry. This industry sector, although relatively small, had a larger than the state average employment share in seven out of nine Fayetteville Shale counties in 2010.

Average annual pay in Fayetteville Shale counties was consistently lower than the state average annual pay from 2002 to 2010. In four out of nine Fayetteville Shale counties, average annual pay grew more quickly than the state average pay during that time. Additionally, average annual pay in the mining, quarrying, and oil and gas extraction subsector in all Fayetteville Shale counties was almost twice the average pay across all industries in these counties.

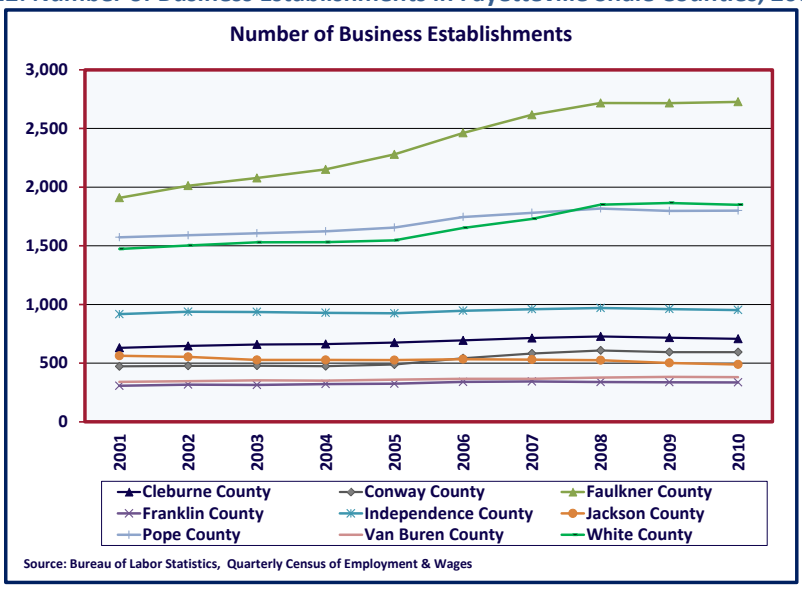
Table 3: Average Annual Pay in Fayetteville Shale Counties, 2010

County	All Industries	Mining, Quarrying, and Oil and Gas Extraction Industry	Percentage of MQ&OGE Industry over All Industries
Cleburne	$28,376	$49,649	175.0%
Conway	$31,977	$55,961	175.0%
Faulkner	$35,297	$82,578	234.0%
Franklin*	$31,354	$55,492	177.0%
Independence	$30,974	$47,496	153.3%
Jackson	$30,774	ND[13]	--
Pope	$32,797	$67,788	206.7%
Van Buren*	$25,952	$46,572	179.5%
White	$33,397	$60,639	181.6%
State of Arkansas	**$36,254**	**$61,422**	**169.4%**

Source: Bureau of Labor Statistics, Center for Business and Economic Research calculations
*The latest available industry data for these counties is for 2009.

From 2001 to 2010, Fayetteville Shale counties netted a gain of 1,650 business establishments. This is an increase of 20.2 percent, compared to the 17.0 percent increase in the state overall during that time period. The number of establishments in the mining, quarrying, and oil and gas extraction subsector in Fayetteville Shale counties increased from 26 in 2004 to 136 in 2010 following increased natural gas production.

Figure 12: Number of Business Establishments in Fayetteville Shale Counties, 2001-2010



While total taxable sales in Arkansas increased from 2006 to 2011 by 5.7 percent, taxable sales in all Fayetteville Shale counties increased at a higher rate during that time period. Although

[13] Not disclosable i.e. data do not meet the BLS or State agency disclosure standards.

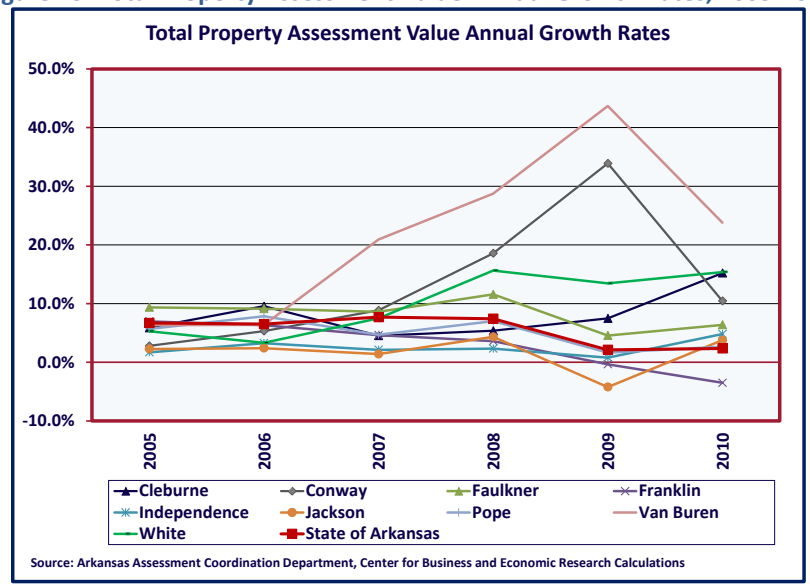
the economic recovery was slow, only Cleburne and Van Buren Counties experienced declines in sales from 2010 to 2011.

Table 4: Change in Taxable Sales in Fayetteville Shale Counties, 2006-2011

County	*2006-2011 Change*	*2010-2011 Change*
Cleburne	24.2%	-4.0%
Conway	24.9%	2.9%
Faulkner	23.3%	5.7%
Franklin	18.5%	4.1%
Independence	7.1%	3.8%
Jackson	14.1%	0.5%
Pope	9.9%	0.3%
Van Buren	14.2%	-13.3%
White	32.6%	3.9%
State of Arkansas	**5.7%**	**3.9%**

Total property assessment value growth in Fayetteville Shale counties varied depending on the county. In 2010, all counties except for Franklin County had higher than the state average increase in their assessment values.

Figure 13: Total Property Assessment Value Annual Growth Rates, 2005-2010



In summary, the aggregated Fayetteville Shale area experienced above average growth in a wide variety of economic statistics during the initial years of activity in the regional natural gas industry. Population, average annual pay, new establishments, taxable sales, and property assessments all grew more quickly in the Fayetteville Shale counties than in the state of Arkansas during the 2001 to 2010 time period.

Cleburne County

According to U.S. Census Bureau intercensal population estimates, 25,901 people resided in Cleburne County as of July 1, 2011. From 2000 to 2011, the county population increased by 1,801 people or by 7.5 percent (at a lower rate than the 9.7 percent in the state).

Figure 14: Cleburne County Population, 1990-2011

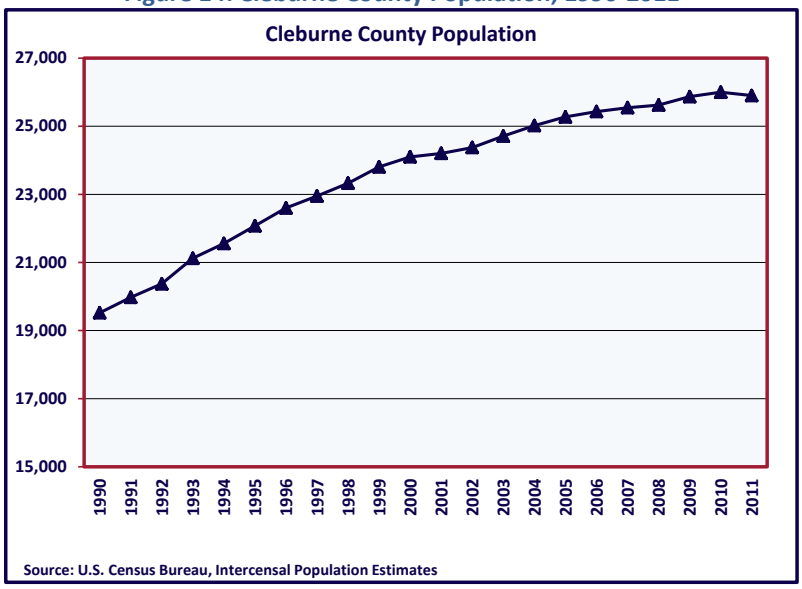
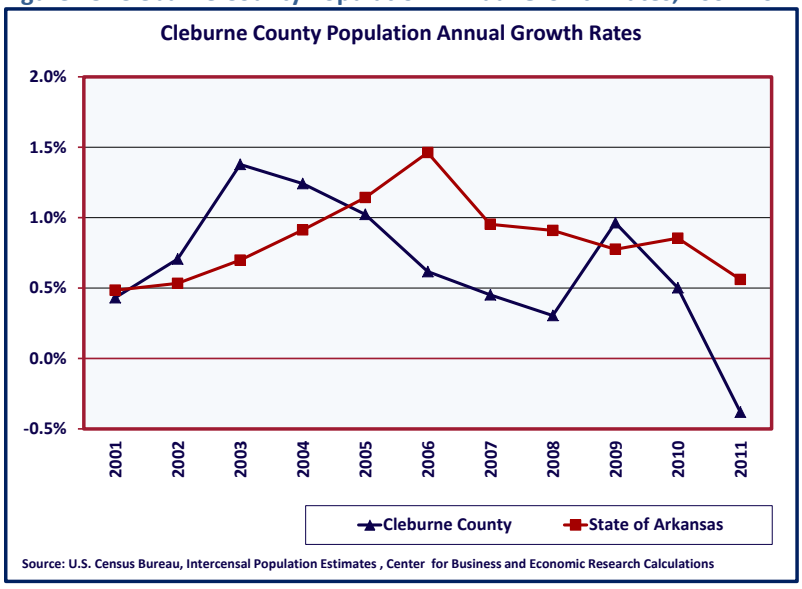


Figure 15: Cleburne County Population Annual Growth Rates, 2001-2011

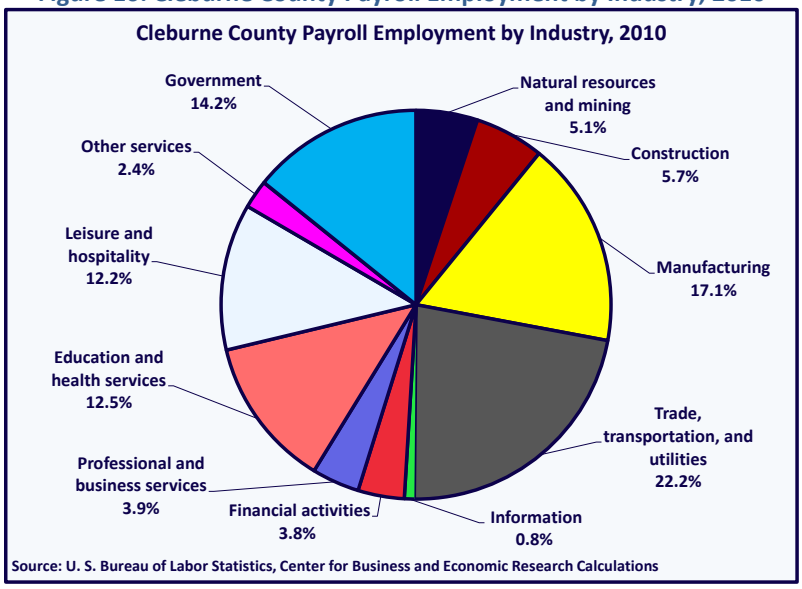


Cleburne County had the highest per capita personal income among Fayetteville Shale counties in 2010. Average personal income was $33,618 or $813 higher than the state average that year. The growth rate of the county per capita personal income was 40.3 percent from 2002 to 2010, higher than the growth rate of the state per capita personal income of 35.2 percent.

The unemployment rate in Cleburne County was 8.4 percent in February 2012, slightly higher than the state average unemployment rate of 8.3 percent that month, according to preliminary not seasonally adjusted estimates from the BLS.

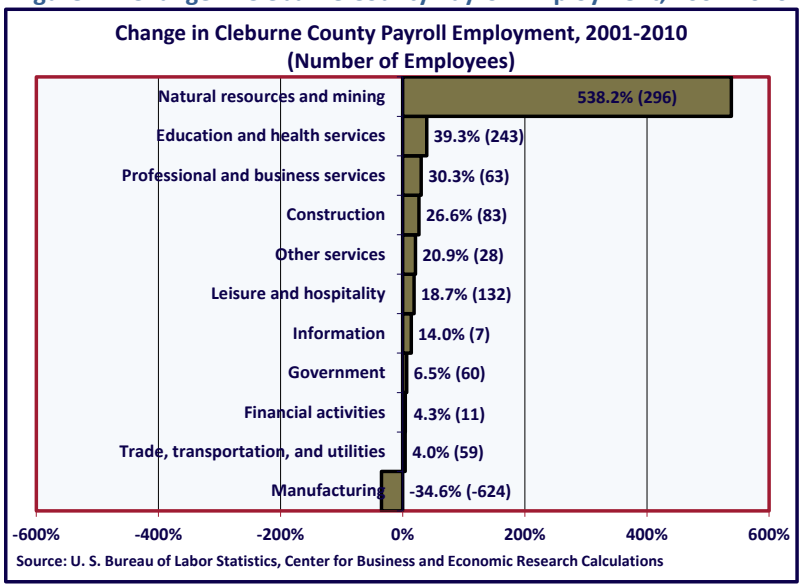
Total payroll employment in Cleburne County was 6,878 in 2010. The largest number of payroll employees in Cleburne County worked in the trade, transportation, and utilities sector in 2010. This sector accounted for 22.2 percent of total employment in the county, as compared with the state average of 20.4 percent. The second largest industry was manufacturing, with 17.1 percent of county employees. This was higher than the state average of 14.1 percent. The natural resources and mining industry was larger in Cleburne County than in the state: 5.1 percent of people were employed in this industry in the county, while 1.9 percent were employed in the state.

Figure 16: Cleburne County Payroll Employment by Industry, 2010



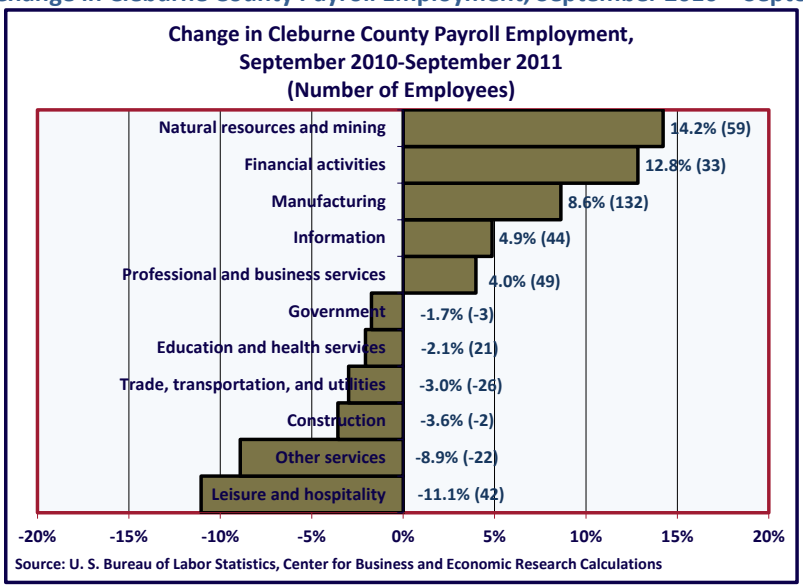
Cleburne County had faster payroll employment growth than the state from 2001 to 2010: 5.5 percent, while the Arkansas average growth rate was 0.6 percent. The industry sector with the highest growth rate was natural resources and mining (538.2 percent or 296 employees), followed by education and health services (39.3 percent or 243 employees), and professional and business services (30.3 percent or 63 employees). The mining, quarrying, and oil and gas extraction subsector comprised 71.2 percent of the natural resources and mining industry sector and increased by 575.7 percent or by 213 payroll employees from 2007 to 2010. Manufacturing was the only industry sector in Cleburne County that experienced an employment decline in the decade (by 34.6 percent or 624 payroll jobs).

Figure 17: Change in Cleburne County Payroll Employment, 2001-2010



From September 2010 to September 2011, Cleburne County had a 2.8 percent increase in payroll employment, larger than the average 0.4 percent increase in the state. Payroll employment in the natural resources and mining industry had the largest growth rate: 14.2 percent, an increase of 59 employees, during that time period.

Figure 18: Change in Cleburne County Payroll Employment, September 2010 – September 2011

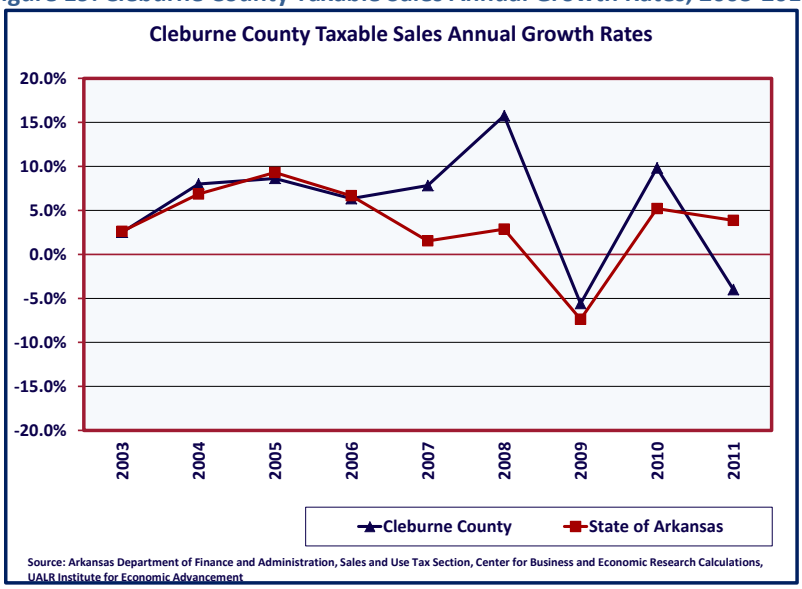


The average annual pay in Cleburne County was $28,376 or 78.3 percent of the state average in 2010. Average pay in the county grew slightly faster than in the state from 2001 through 2010: by 34.5 percent as compared with an increase of 33.0 percent in the state overall. Average pay in the mining, quarrying, and oil and gas extraction subsector in Cleburne County was $49,649 in 2010, almost twice the average pay across all industries in the county.

From 2001 to 2010, Cleburne County netted a gain of 77 business establishments. The number of businesses in 2010 (708) was higher than the 2006 level of 694, but lower than the levels seen from 2007 to 2009. The number of establishments in the mining, quarrying, and oil and gas extraction subsector in the county increased from 2 in 2004 to 16 in 2010.

More than $361 million of local taxable sales occurred in Cleburne County in 2011. From 2006 to 2011, local sales increased by 24.2 percent, while total state sales declined by 32.4 percent. From 2010 to 2011, Cleburne County sales declined by 4.0 percent. This performance was worse than the 3.9 percent increase in total Arkansas sales during the same time period.

Figure 19: Cleburne County Taxable Sales Annual Growth Rates, 2003-2011



Conway County

According to U.S. Census Bureau intercensal population estimates, 21,270 people resided in Conway County as of July 1, 2011. From 2000 to 2011, the county population increased by 958 people or by 4.7 percent. The state population increased at a higher 9.7 percent rate and population in all Fayetteville Shale counties increased at a higher average 16.0 percent rate during this time period.

Figure 20: Conway County Population, 1990-2011

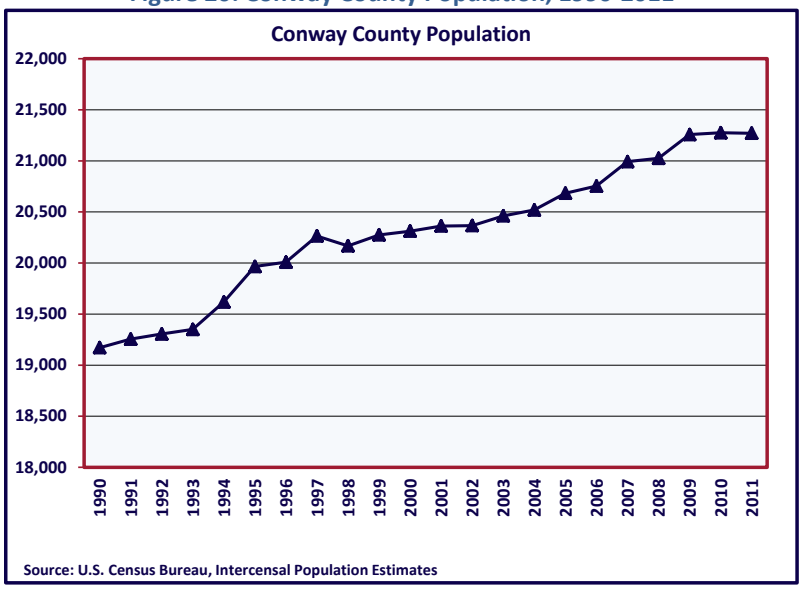
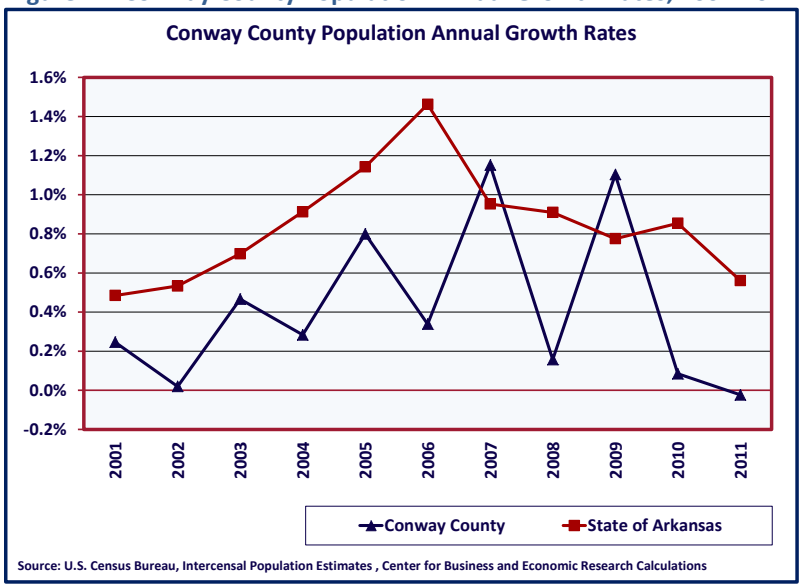


Figure 21: Conway County Population Annual Growth Rates, 2001-2011

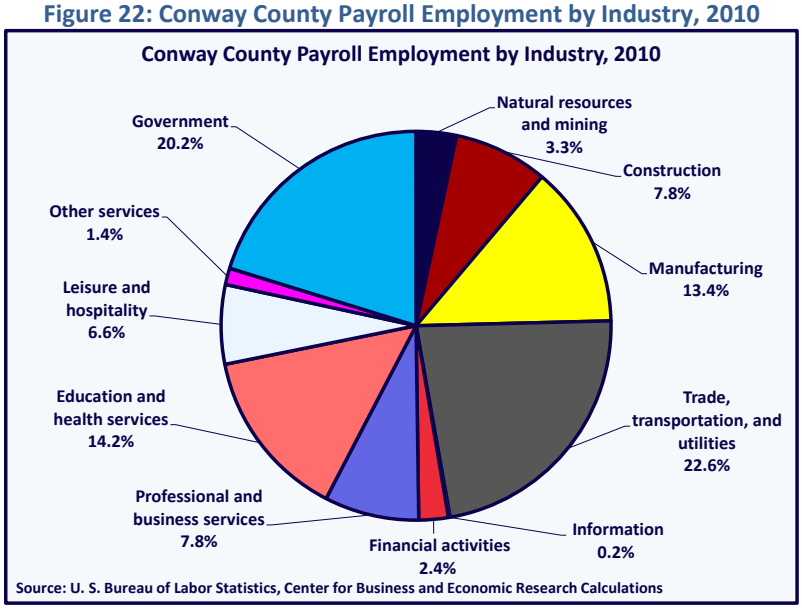


Per capita personal income in Conway County was $31,892 or $913 lower than the state average in 2010. From 2002 to 2010, county per capita personal income increased by 36.8 percent, while the state average growth rate was 35.2 percent.

The unemployment rate in Conway County was 8.4 percent in February 2012, slightly higher than the unemployment rate in the state of Arkansas that month (which was 8.3 percent), according to preliminary not seasonally adjusted estimates from the BLS.

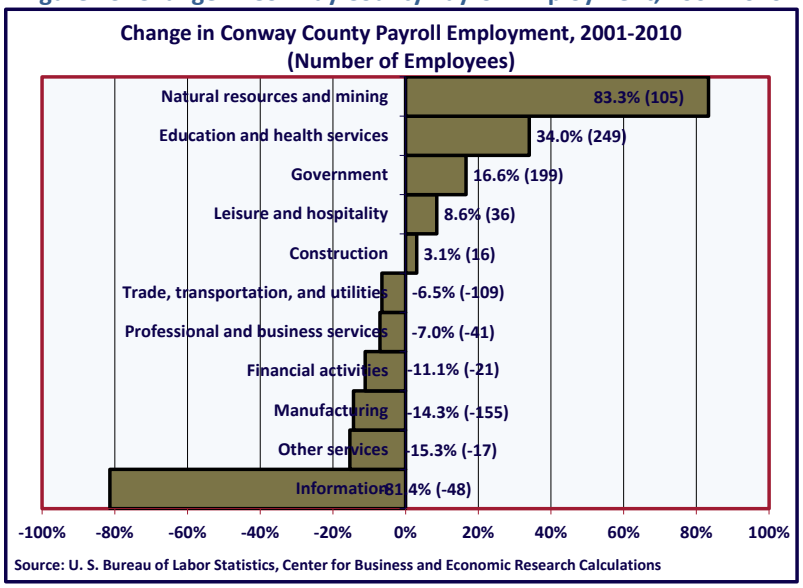
Total payroll employment in Conway County was 6,904 in 2010. The largest number of payroll employees in Conway County worked in the trade, transportation, and utilities sector in 2010. This sector accounted for 22.6 percent of total employment in the county, as compared with the state average of 20.4 percent that year. The second largest sector was government (20.2 percent), followed by education and health services (14.2 percent) and manufacturing (13.4 percent). Payroll employment in the natural resources and mining sector was higher in Conway County than on average in the state: 3.3 percent as compared with the state's average 1.9 percent.

Figure 22: Conway County Payroll Employment by Industry, 2010



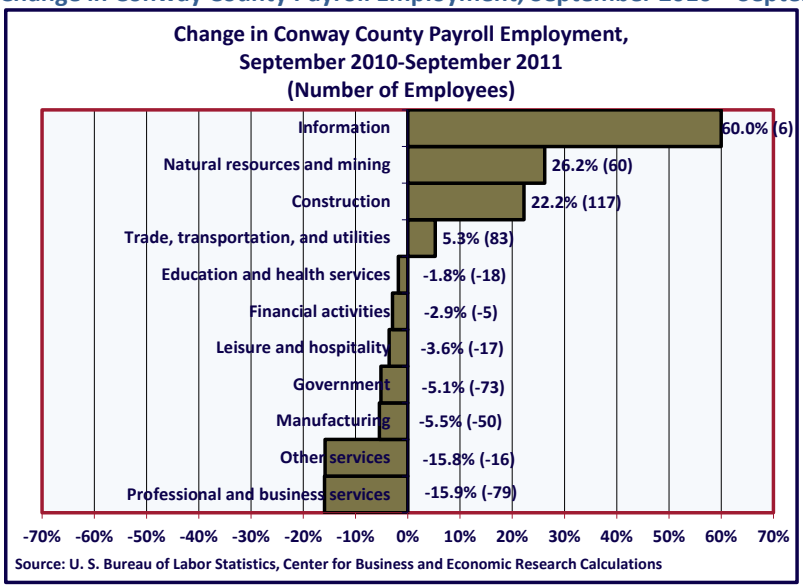
From 2001 to 2010, Conway County had a higher than the state average increase in payroll employment (3.2 percent as compared with the state average growth rate of 0.6 percent). However, the change in number of payroll jobs in the county varied depending on the industry sector. The natural resources and mining industry sector had the highest growth rate (83.3 percent or 105 employees), followed by education and health services (34.0 percent or 249 employees), and the government sector (16.6 percent or 199 employees). The mining, quarrying, and oil and gas extraction subsector comprised 53.2 percent of the natural resources and mining industry sector and increased by 434.8 percent or by 100 payroll employees from 2006 to 2010. Leisure and hospitality and construction both had small increases in payroll employment from 2001 to 2010. The largest number of payroll jobs was lost in the manufacturing sector (155 jobs), while the information sector experienced the largest rate of decline (a negative 81.4 percent or 48 jobs lost).

Figure 23: Change in Conway County Payroll Employment, 2001-2010



From September 2010 to September 2011, Conway County had a 0.1 percent increase in payroll employment, smaller than the average 0.4 percent increase in the state. Payroll employment in the natural resources and mining industry had the second largest growth rate: 26.2 percent or an increase of 60 employees.

Figure 24: Change in Conway County Payroll Employment, September 2010 – September 2011

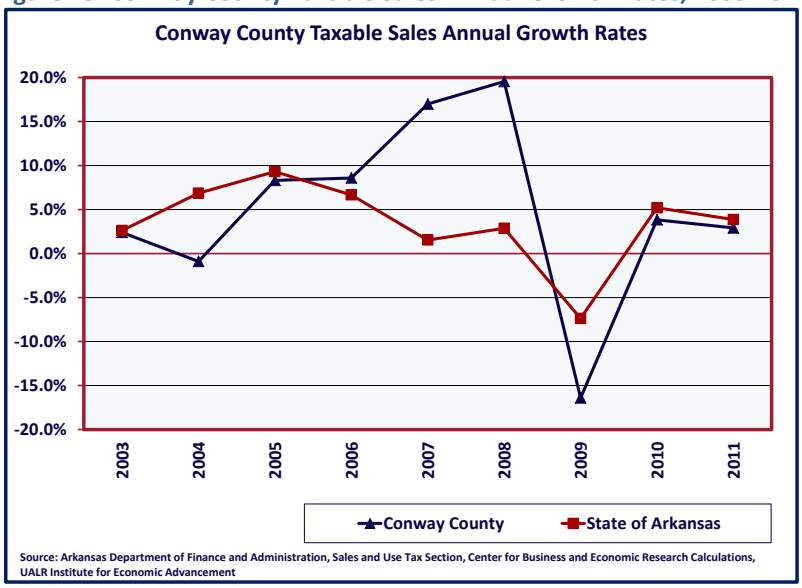


The average annual pay in Conway County was $31,977 or 88.2 percent of the state average in 2010. Average pay in the county grew 28.0 percent from 2001 through 2010, or somewhat more slowly than the state average growth rate of 33.0 percent. Average pay in the mining, quarrying, and oil and gas extraction subsector in Conway County was $55,961 in 2010, almost twice the average pay across all industries in the county.

From 2001 to 2010, Conway County netted a gain of 121 business establishments. The number of establishments in 2010 (594 establishments) was the second largest in the past ten years (the level was the same as in 2009), while the peak number of establishments, 608, in Conway County was in 2008. The number of businesses in the mining, quarrying, and oil and gas extraction subsector in the county increased from 2 in 2004 to 19 in 2010.

About $294 million of local taxable sales occurred in Conway County in 2011. From 2006 to 2011, local sales increased by 24.9 percent, while the increase in state total taxable sales was only 5.7 percent. From 2010 to 2011, Conway County sales increased by 2.9 percent, while total Arkansas sales increased by 3.9 percent during that time period.

Figure 25: Conway County Taxable Sales Annual Growth Rates, 2003-2011



Faulkner County

According to U.S. Census Bureau intercensal population estimates, 116,342 people resided in Faulkner County as of July 1, 2011. From 2000 to 2011, the county population increased by 29,841 people or by 34.5 percent. This was the highest increase among Fayetteville Shale counties and was substantially higher than the population growth rate in the state (9.7 percent). Due to this high population growth, Faulkner County remains the most populous county in the Fayetteville Shale region. Faulkner County is also part of a metropolitan statistical area, in this case, the Little Rock-North Little Rock-Conway MSA.

Figure 26: Faulkner County Population, 1990-2011

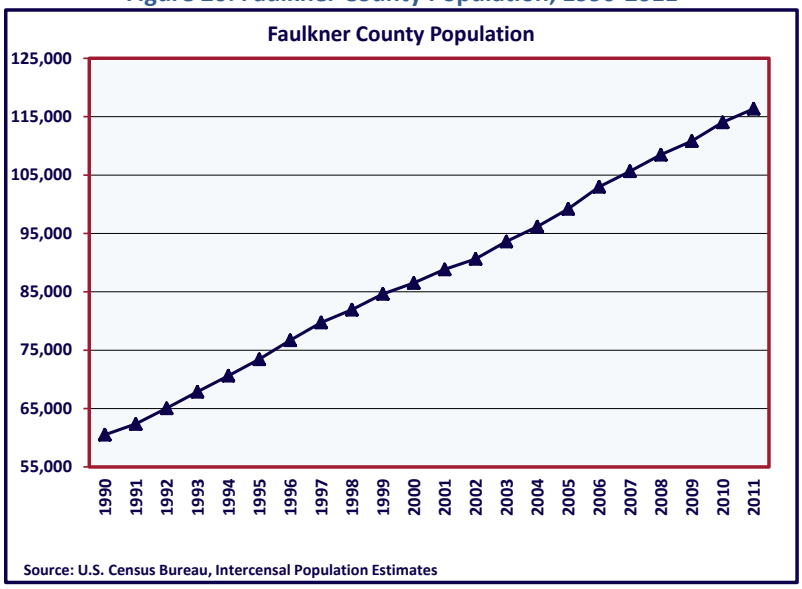
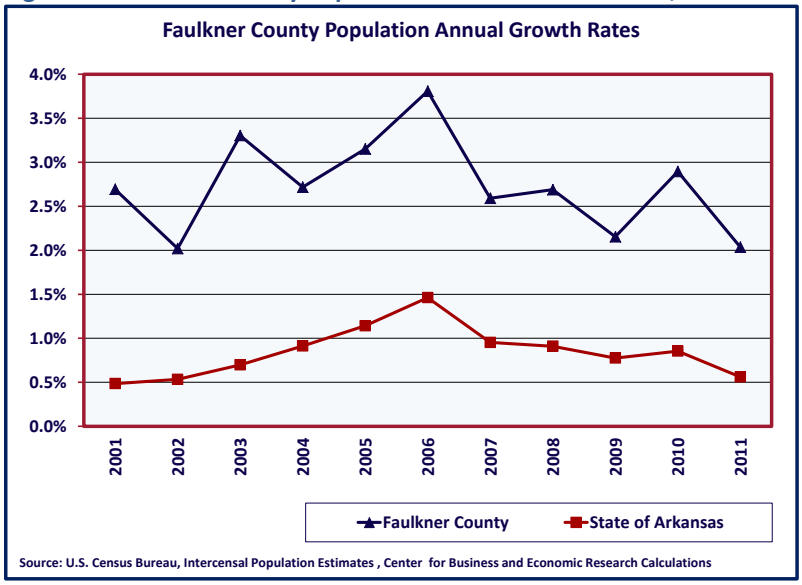


Figure 27: Faulkner County Population Annual Growth Rates, 2001-2011

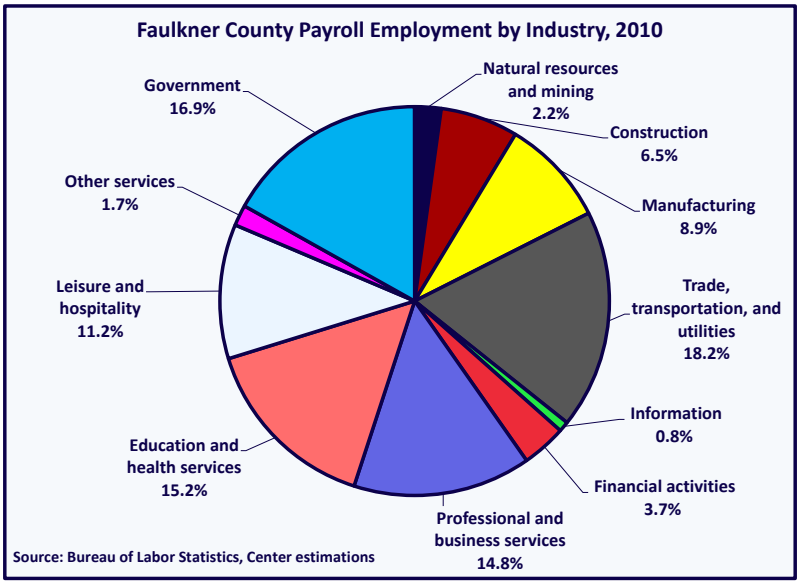


Per capita personal income in Faulkner County was $31,556 or $1,249 lower than the state average in 2010. The growth rate of county per capita personal income was 30.6 percent from 2002 to 2010, while the growth rate of the state per capita personal income was higher at 35.2 percent.

The unemployment rate in Faulkner County was the lowest among Fayetteville Shale counties in February 2012: 7.5 percent, according to preliminary not seasonally adjusted estimates from the BLS. Meanwhile, the state average unemployment rate was 8.3 percent that month.

Total payroll employment in Faulkner County was 39,442 in 2010. The largest number of payroll employees in Faulkner County worked in the trade, transportation, and utilities sector in 2010. This sector accounted for 18.2 percent of total employment in the county, while the state average was 20.4 percent. The second largest employment sector in the county was government (16.9 percent), followed by educational and health services (15.2 percent) and professional and business services (14.8 percent). Natural resources and mining industry payroll employment was slightly higher share in Faulkner County than on average in the state: 2.2 percent as compared with the state's 1.9 percent.

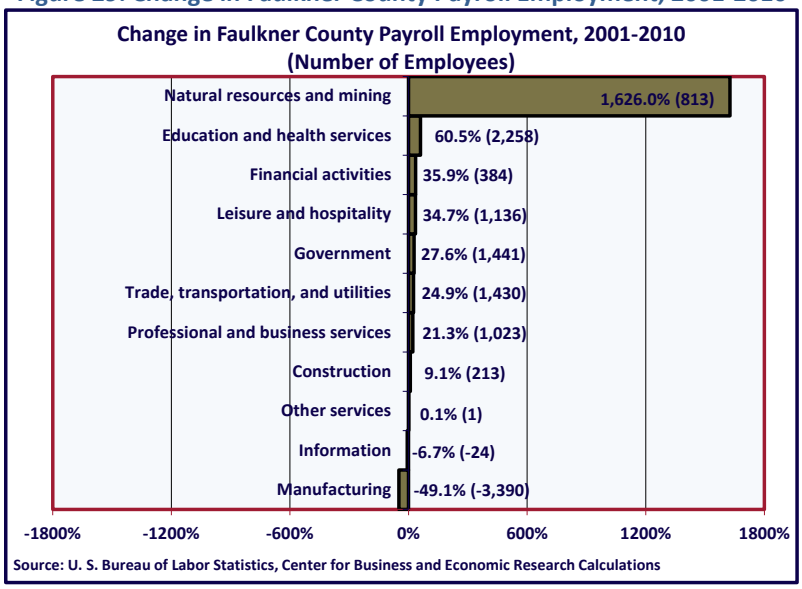
Figure 28: Faulkner County Payroll Employment by Industry, 2010



Among Fayetteville Shale counties, Faulkner County experienced the highest increase in payroll employment in the decade from 2001 to 2010. The increase was substantially higher that the growth rate of the state payroll employment: 15.5 percent as compared with the state average 0.6 percent. The natural resources and mining industry had the highest employment growth rate (1,626 percent or 813 employees), followed by education and health services (60.5 percent or 2,258 employees), and the financial activities sector (35.9 percent or 384 employees). Mining, quarrying, and oil and gas extraction subsector employees comprised most of the natural resources and mining industry sector (95.6 percent). The number of payroll employees

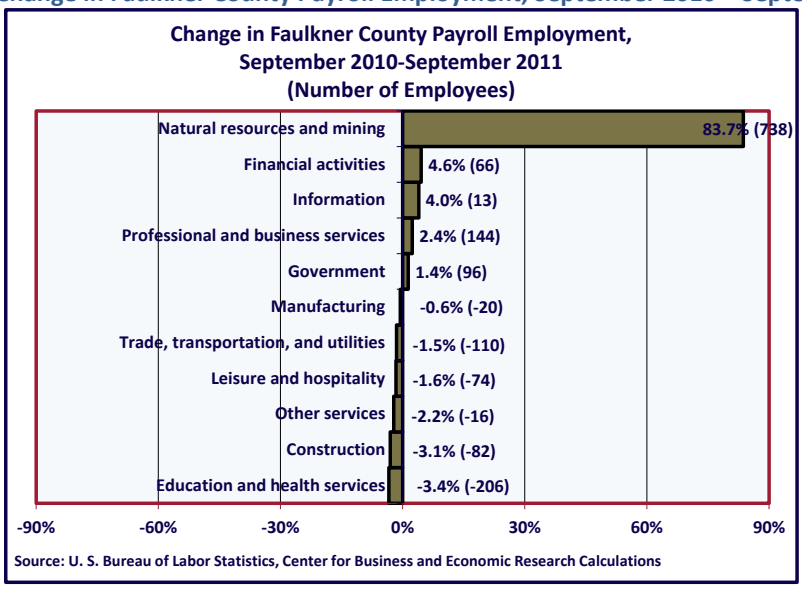
in this subsector increased substantially by 2,129.7 percent or by 788 employees from 2002 to 2010. The manufacturing and information sectors were the only industries in Faulkner County that experienced declines in the past decade, by 49.1 percent and 6.7 percent or by 3,390 and 24 payroll jobs, respectively.

Figure 29: Change in Faulkner County Payroll Employment, 2001-2010



From September 2010 to September 2011, Faulkner County had a 1.4 percent increase in overall payroll employment. In comparison, the state payroll employment increased by a smaller 0.4 percent during that time period. Payroll employment in the natural resources and mining industry had the highest growth among all industries in the county: by 83.7 percent or by 738 employees.

Figure 30: Change in Faulkner County Payroll Employment, September 2010 – September 2011

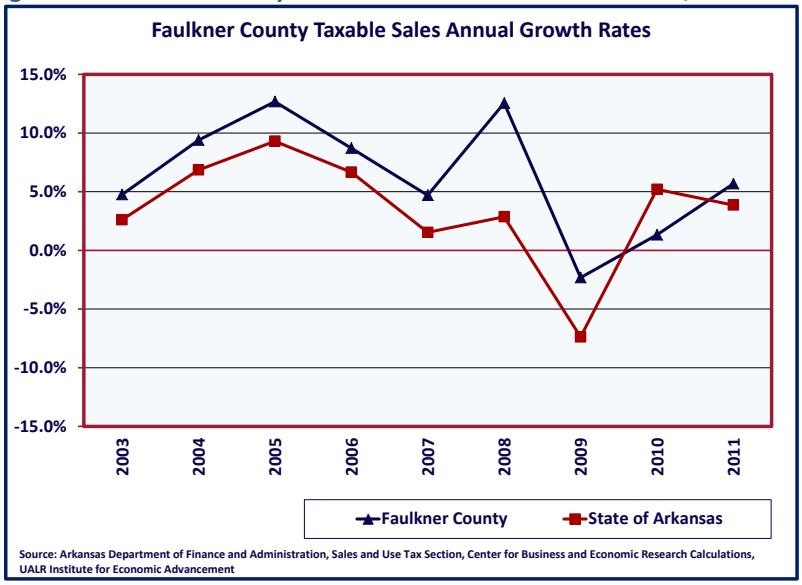


Average annual pay in Faulkner County was the highest among Fayetteville Shale counties: $35,297 or 97.4 percent of the state average annual pay in 2010. Average pay in the county increased by 29.0 percent from 2001 to 2010, somewhat more slowly than the state average growth rate of 33.0 percent. Average pay in the mining, quarrying, and oil and gas extraction subsector in Faulkner County was $82,578 in 2010, more than twice the average pay across all industries in the county.

From 2001 to 2010, Faulkner County netted a gain of 818 business establishments. There were 2,727 establishments in 2010, which was the highest level since 2001. The number of businesses in the mining, quarrying, and oil and gas extraction subsector in the county increased from 4 in 2004 to 37 in 2010.

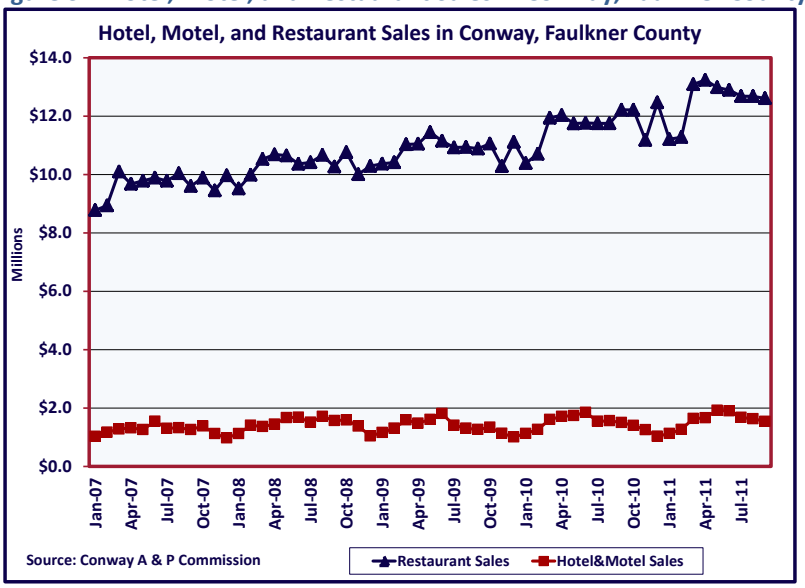
Almost $1.6 billion of local sales occurred in Faulkner County in 2011. As the most populous county in the region, Faulkner County had the highest level of sales among Fayetteville Shale counties. From 2006 to 2011, local taxable sales increased by 23.3 percent, while state taxable sales increased by 5.7 percent. From 2010 to 2011, Faulkner County sales increased by 5.7 percent, while total Arkansas sales increased by 3.9 percent during that time period.

Figure 31: Faulkner County Taxable Sales Annual Growth Rates, 2003-2011



The county seat of Faulkner County, Conway, levies a 2.0 percent tax on food and lodging. From 2007 to 2011, restaurant sales in the city had a visible increasing trend. More than $144.6 million were spent in city restaurants in 2011. This is an increase of 3.4 percent from the same time period in 2010. Lodging sales, however, declined in 2009 by 6.2 percent, followed by a significant increase of 16.9 percent in 2008. In 2011, almost $18.7 million were spent in hotels and motels, an increase of 6.1 percent from 2010.

Figure 32: Hotel, Motel, and Restaurant Sales in Conway, Faulkner County



Franklin County

According to U.S. Census Bureau intercensal population estimates, 18,047 people resided in Franklin County as of July 1, 2011. The county population increased by 310 people or by 1.7 percent from 2000 to 2011. This increase was lower than both the state population growth rate (9.7 percent) and the average population growth rate in all Fayetteville Shale counties (16.0 percent) during the time period. Franklin County is also part of a metropolitan statistical area, in this case, the Fort Smith MSA.

Figure 33: Franklin County Population, 1990-2011

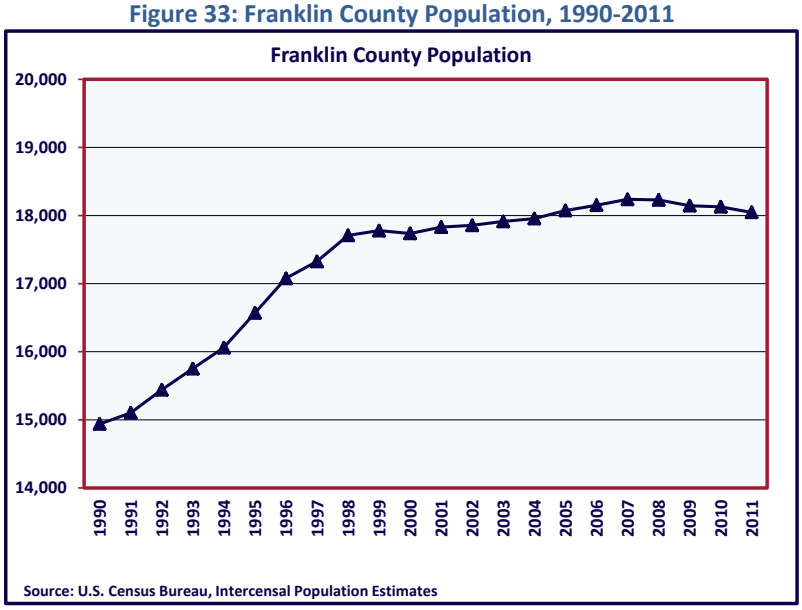
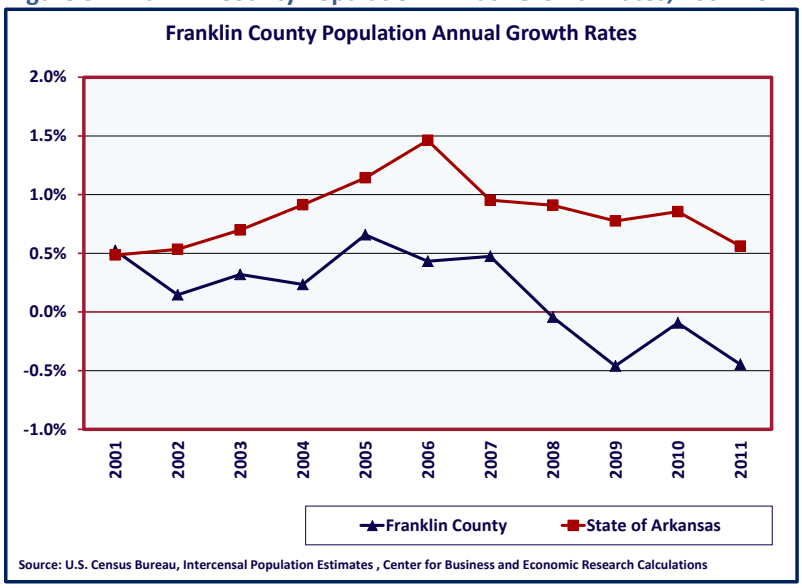


Figure 34: Franklin County Population Annual Growth Rates, 2001-2011

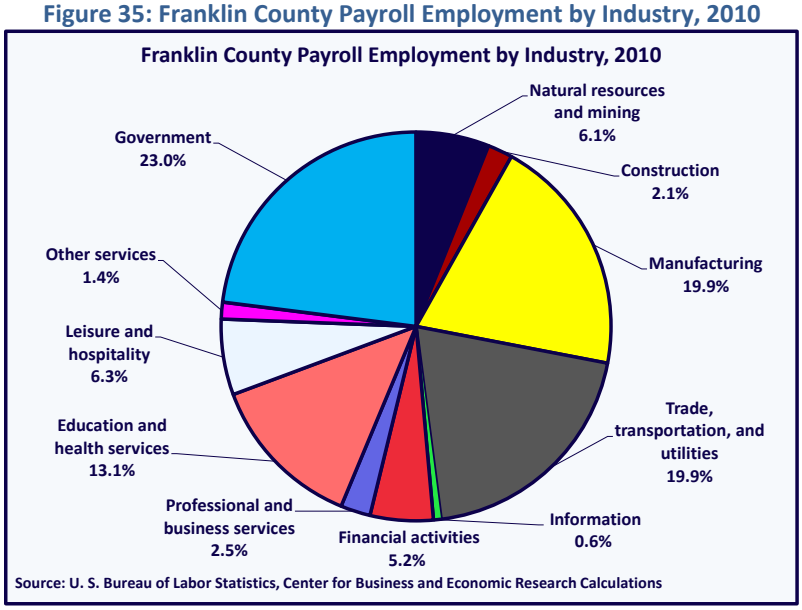


Per capita personal income in Franklin County was $29,284 or $3,521 lower than the state average in 2010. From 2002 to 2010, the growth rate of the county per capita personal income (36.2 percent) was slightly higher than the growth rate of the per capita personal income in the state (35.2 percent).

The unemployment rate in Franklin County was 7.9 percent in February 2012, lower than the state average unemployment rate of 8.3 percent that month, according to preliminary not seasonally adjusted estimates from the BLS.

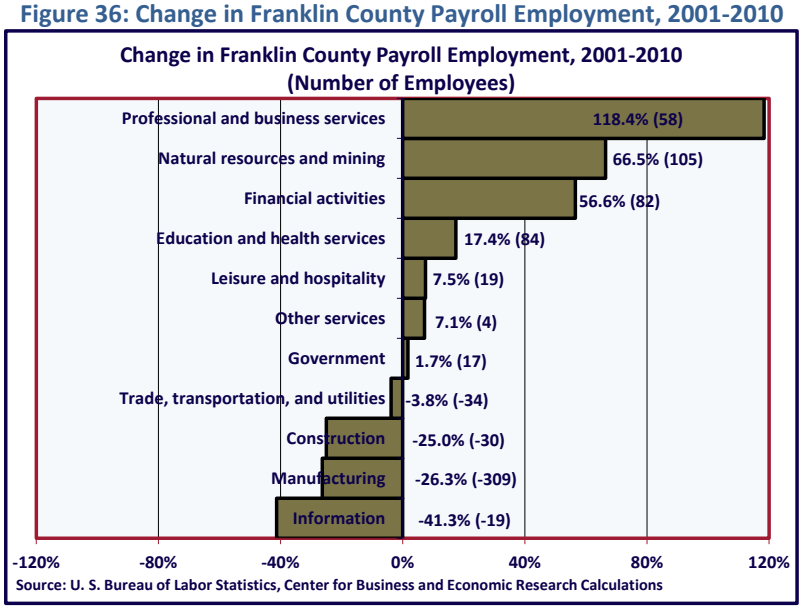
Total payroll employment in Franklin County was 4,343 in 2010. The largest number of payroll employees in Franklin County worked in the government sector in 2010 (23.0 percent as compared with the state average of 18.1 percent). The trade, transportation, and utilities and manufacturing industry sectors both accounted for 19.9 percent of payroll employees. Manufacturing payroll employment was higher than the state average share of 14.1 percent that year, while the trade, transportation, and utilities employment share was slightly smaller (the Arkansas average was 20.4 percent). The share of payroll employment in the natural resources and mining sector was significantly higher in Franklin County than in the state: 6.1 percent as compared with the state average 1.9 percent.

Figure 35: Franklin County Payroll Employment by Industry, 2010



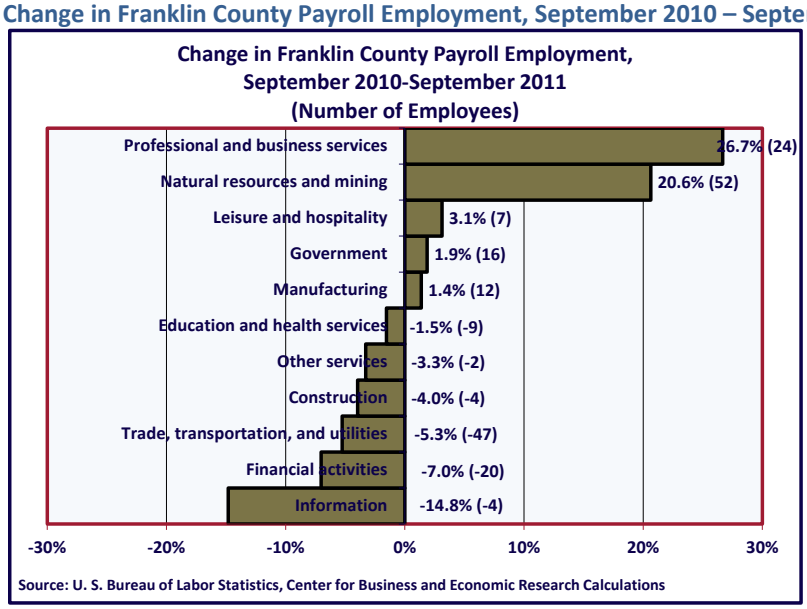
Franklin County experienced a slight decline of 0.5 percent in payroll employment from 2001 to 2010, while the state average payroll employment increased slightly by 0.6 percent. The natural resources and mining industry sector gained more payroll jobs than any other sector in the county during this time period (105 jobs or an increase of 66.5 percent). The mining, quarrying, and oil and gas extraction subsector comprised 84.0 percent of the natural resources and mining industry sector in 2009 and increased by 104.6 percent or by 91 payroll employees from 2001 to 2009. The professional and business services sector had the highest rate of growth, 118.4 percent or an increase of 58 payroll employees in the decade. The information, manufacturing, construction, and trade, transportation and utilities employment sectors declined in payroll employment. Among these, the manufacturing sector lost the largest number of payroll jobs, 309, from 2001 to 2010.

Figure 36: Change in Franklin County Payroll Employment, 2001-2010



From September 2010 to September 2011, Franklin County had a 0.5 percent increase in payroll employment, slightly higher than the average 0.4 percent increase in the state. The natural resources and mining industry increased in payroll employment by 20.6 percent or by 52 employees. Detailed industry subsector data are not available to describe the trend in the oil and gas extraction subsector during that time period.

Figure 37: Change in Franklin County Payroll Employment, September 2010 – September 2011

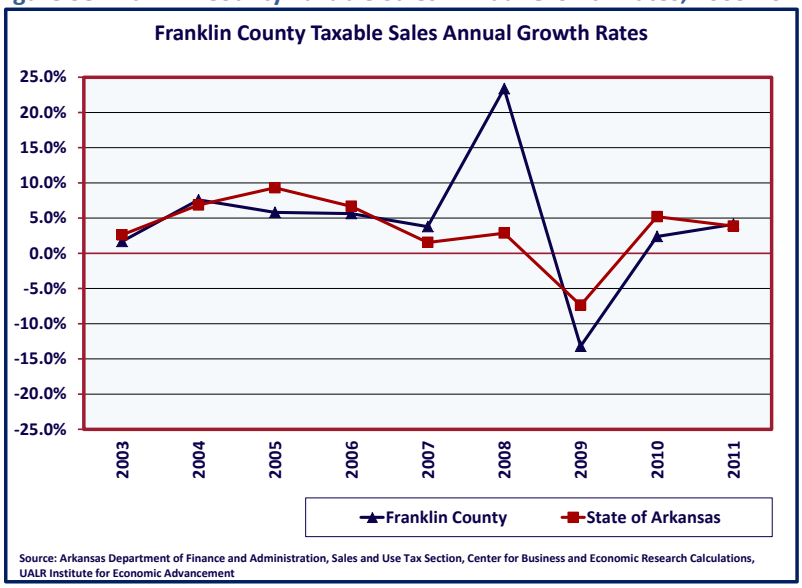


Average annual pay in Franklin County was $33,081 or 91.2 percent of the state average in 2010. Average pay in the county increased by 49.2 percent from 2001 to 2010, or significantly more quickly than the state average growth rate of 33.0 percent. Average pay in the mining, quarrying, and oil and gas extraction subsector in Franklin County was $55,492 in 2009, almost twice the average pay across all industries in the county that year.

From 2001 to 2010, Franklin County netted a gain of 29 business establishments. The number of establishments in 2010 (336) was higher than the 2005 level of 325 establishments, but was lower than the levels seen from 2006 to 2009. The peak establishment level was in 2007 at 344 establishments. The number of establishments in the mining, quarrying, and oil and gas extraction subsector in the county increased from 5 in 2004 to 10 in 2010.

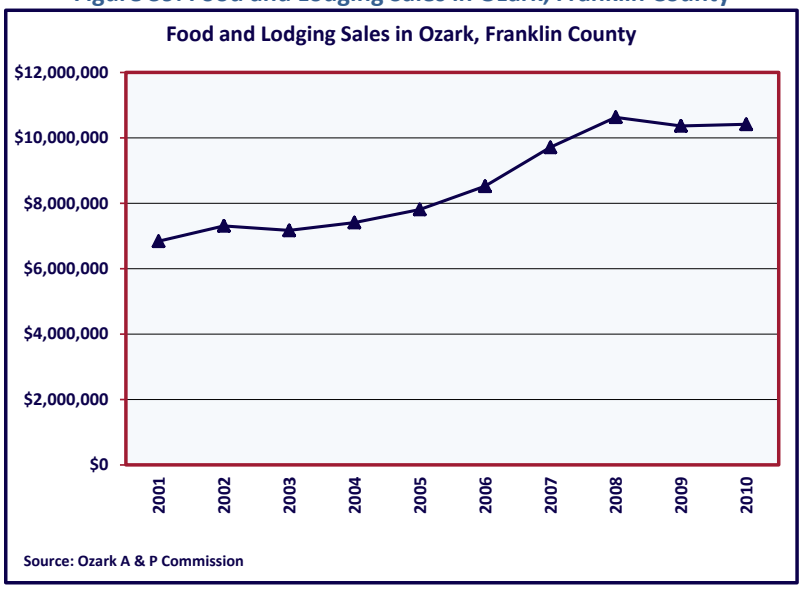
More than $176 million of local taxable sales occurred in Franklin County in 2011. From 2006 to 2011, local sales increased by 18.5 percent, while total state taxable sales increased by only 5.7 percent. From 2010 to 2011, Franklin County sales increased by 4.1 percent, while total Arkansas sales increased by 3.9 percent during that time period.

Figure 38: Franklin County Taxable Sales Annual Growth Rates, 2003-2011



The city of Ozark in Franklin County collects an additional 1.0 percent tax on food and lodging. 2009 was the first year since 2003 when food and lodging taxes declined (by 2.5 percent). However, hotel, motel, and restaurant sales increased again in 2010 by 0.5 percent up to $10.4 million. From January to September of 2011, $8.8 million were spent on food and lodging in the city, an increase of 0.9 percent from the same time period in 2010.

Figure 39: Food and Lodging Sales in Ozark, Franklin County



Independence County

According to U.S. Census Bureau intercensal population estimates, 36,861 people resided in Independence County as of July 1, 2011. From 2000 to 2011, the county population increased at a lower rate than the state average population growth rate: by 7.4 percent or by 2,528 people. Meanwhile, the state population increased at an average 9.7 percent rate and population in Fayetteville Shale counties increased at an average 16.0 percent during the same time period.

Figure 40: Independence County Population, 1990-2011

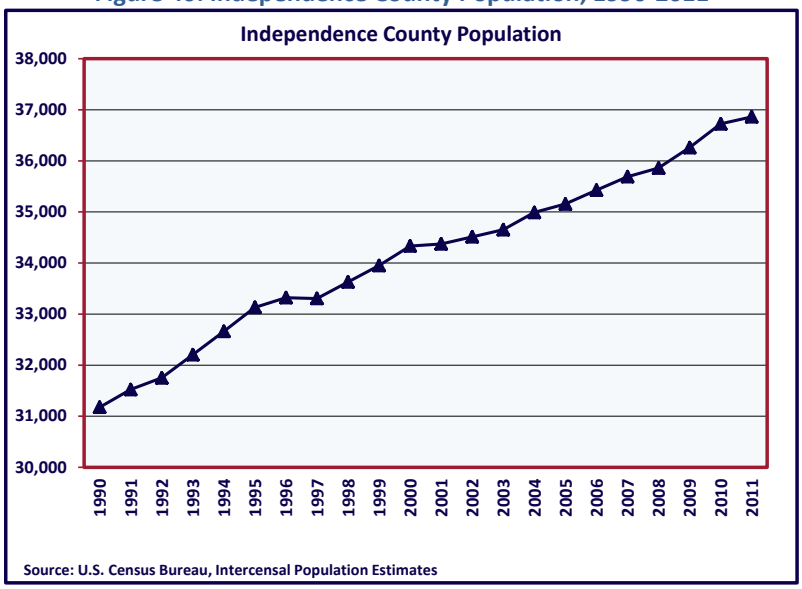
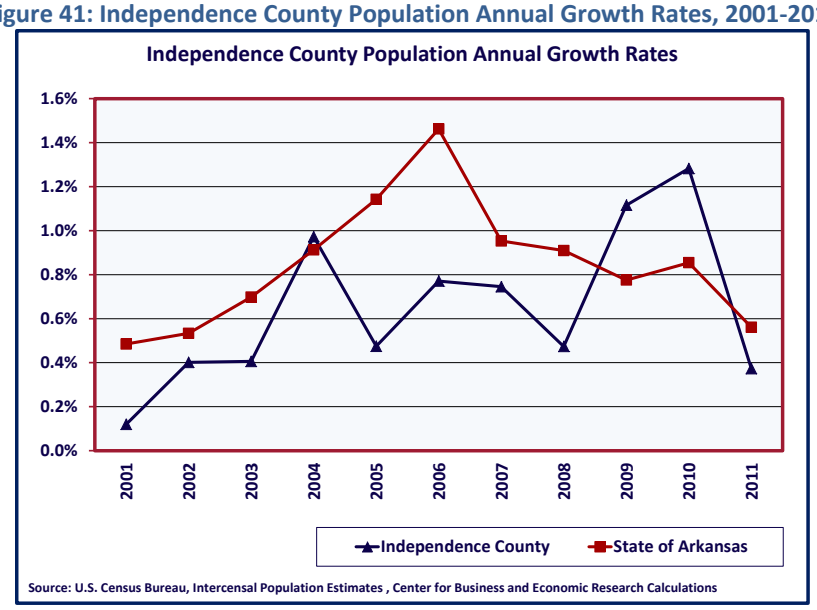


Figure 41: Independence County Population Annual Growth Rates, 2001-2011

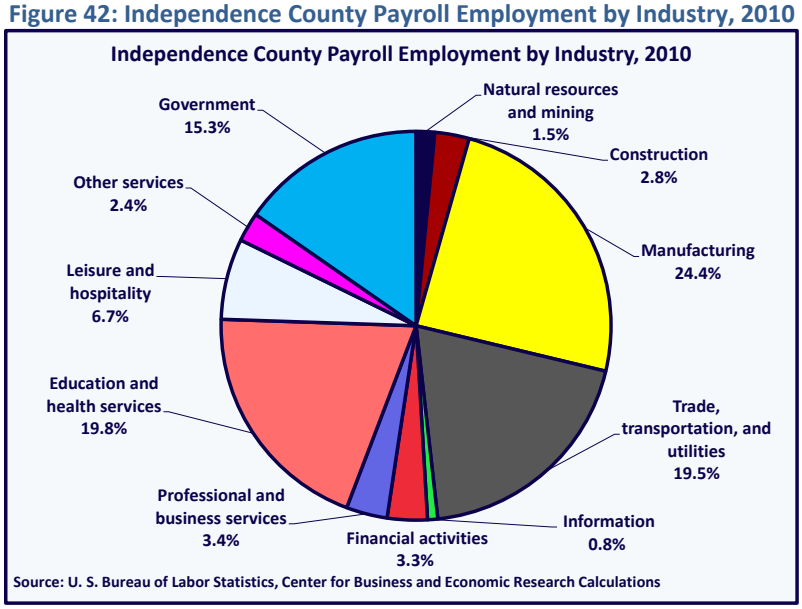


Per capita personal income in Independence County was $30,748 or $2,057 lower than the state average in 2010. The growth rate of per capita personal income in the county was 36.3 percent from 2002 to 2010, slightly higher than the state growth rate of 35.2 percent.

The unemployment rate in Independence County was 9.3 percent in February 2012, higher than the state average unemployment rate of 8.3 percent that month, according to preliminary not seasonally adjusted estimates from the BLS.

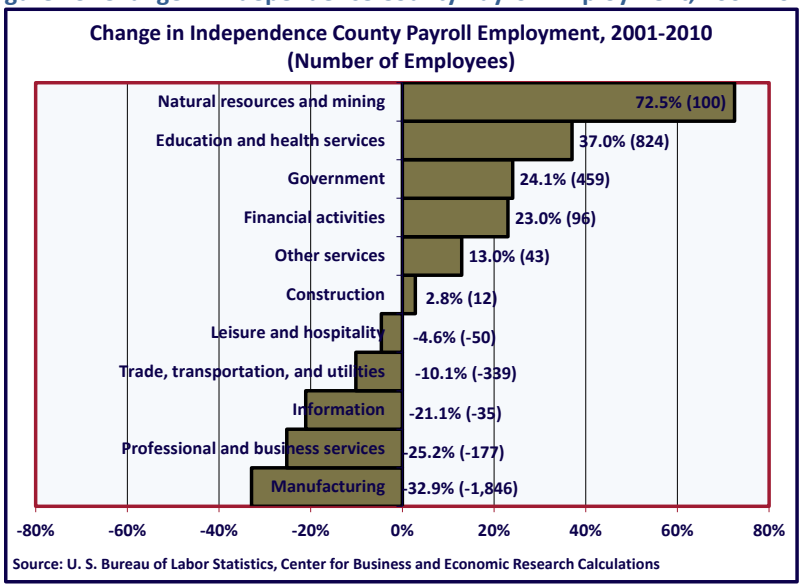
Total payroll employment in Independence County was 15,441 in 2010. The largest number of payroll employees in Independence County worked in manufacturing in 2010. This sector accounted for 24.4 percent of total payroll employment in the county, much higher than the state average of 14.1 percent. The second largest employment sector was education and health services (19.8 percent), followed by the trade, transportation, and utilities industry (19.5 percent). The share of payroll employment in the natural resources and mining industry was slightly smaller in Independence County than in the state: 1.5 percent as compared with the state average of 1.9 percent.

Figure 42: Independence County Payroll Employment by Industry, 2010



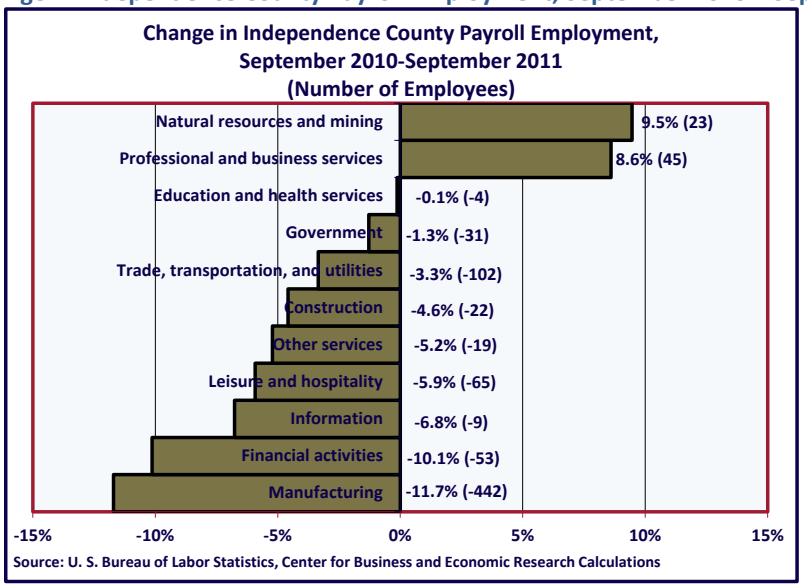
Independence County lost 914 payroll jobs in the decade from 2001 to 2010, a decline of 5.6 percent, even as the county population increased. In comparison, state payroll employment increased by 0.6 percent. Most of the employment decline was caused by layoffs in the manufacturing sector, the largest industry sector in the county. Manufacturing experienced the highest rate of decline (32.9 percent) and lost the largest number of payroll jobs (1,846 jobs) from 2001 to 2010. The natural resources and mining industry sector had the highest growth rate (72.5 percent or an increase of 100 employees), while the largest increase in the number of payroll employees was in the education and health services sector (an increase of 824 employees or by 37.0 percent) during that time period. Payroll employment in the mining, quarrying, and oil and gas extraction subsector increased by 375.7 percent or by 139 employees during the same time period. This subsector accounted for 73.9 percent of the natural resources and mining industry sector.

Figure 43: Change in Independence County Payroll Employment, 2001-2010



From September 2010 to September 2011, Independence County had a 4.3 percent decline in payroll employment. Meanwhile, state payroll employment increased by 0.4 percent during that time period. The natural resources and mining industry had an increase in payroll employment: 9.5 percent or of 23 employees. Detailed industry subsector data are not available to describe the trend in the oil and gas extraction subsector during that time period.

Figure 44: Change in Independence County Payroll Employment, September 2010 – September 2011

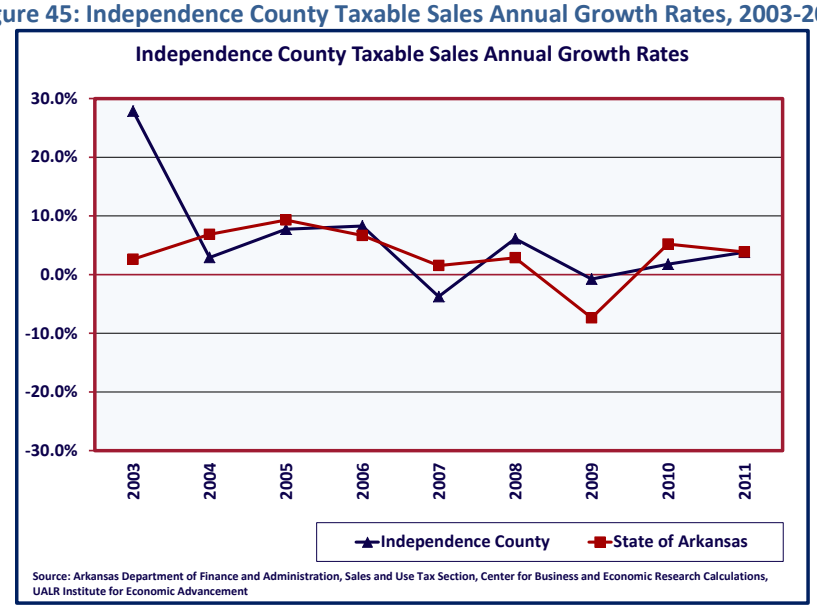


Average annual pay in Independence County was $30,974 or 85.4 percent of the state average annual pay in 2010. Average pay in the county increased by 26.8 percent from 2001 to 2010, or more slowly than the state average growth rate of 33.0 percent. Average pay in the mining, quarrying, and oil and gas extraction subsector in Independence County was $47,496 in 2010, $16,522 more than the average pay across all industries in the county.

From 2001 to 2010, Independence County netted a gain of 35 business establishments. The number of establishments in 2010 (953) was higher than the 2006 level of 947 establishments, but was lower than the levels seen from 2007 to 2009. The number of establishments in the mining, quarrying, and oil and gas extraction subsector in the county increased from 4 in 2004 to 6 in 2010.

Almost $529 million of local taxable sales occurred in Independence County in 2011. From 2006 to 2011, local sales increased by 7.1 percent, while Arkansas taxable sales increased by just 5.7 percent. From 2010 to 2011, Independence County sales increased by 3.8 percent, close to the Arkansas taxable sales increase of 3.9 percent.

Figure 45: Independence County Taxable Sales Annual Growth Rates, 2003-2011



Jackson County

According to U.S. Census Bureau intercensal population estimates, 17,866 people resided in Jackson County as of July 1, 2011. Jackson was the only county among Fayetteville Shale counties, where the population declined from 2000 to 2011. During that time, the population in Jackson County decreased by 2.9 percent or by 537 people.

Figure 46: Jackson County Population, 1990-2011

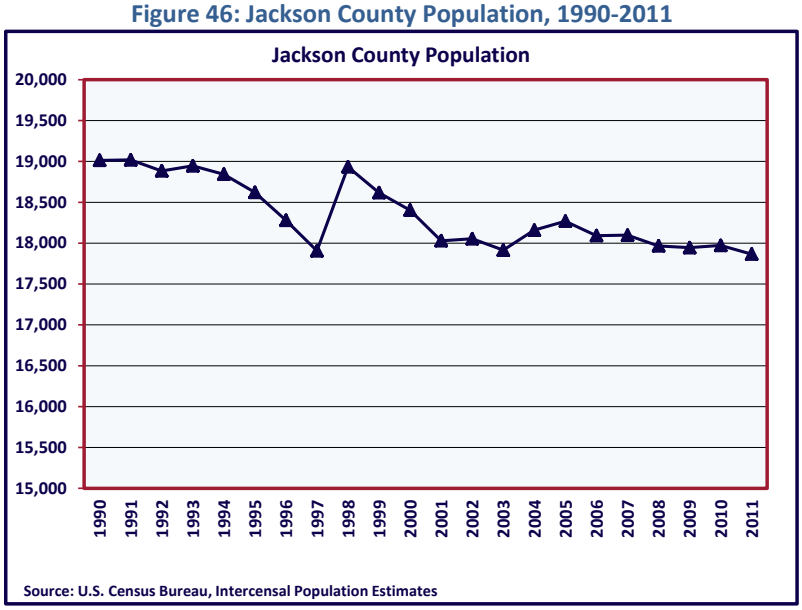
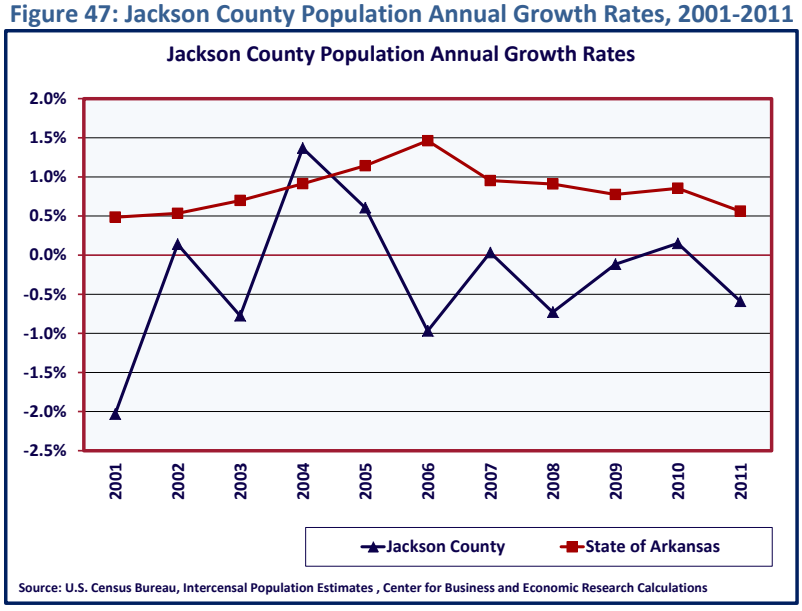


Figure 47: Jackson County Population Annual Growth Rates, 2001-2011

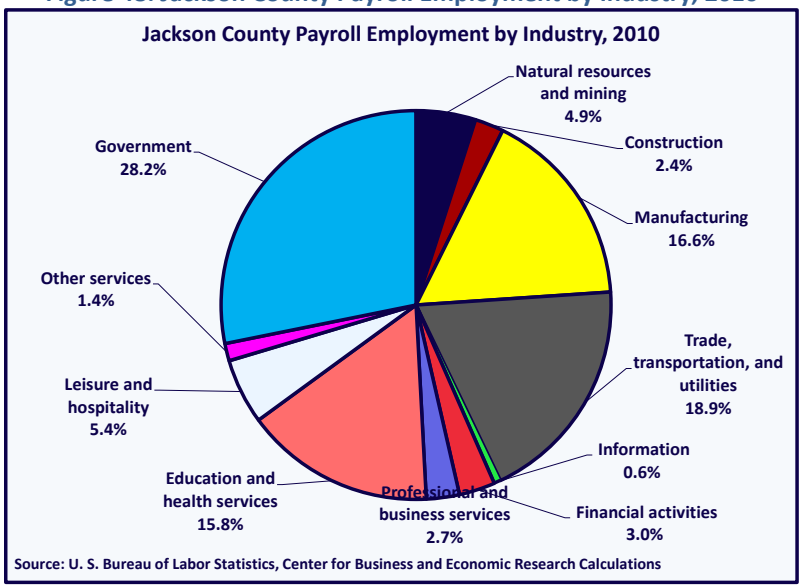


Per capita personal income in Jackson County was $32,328 or $477 lower than the state average in 2010. Among Fayetteville Shale counties, Jackson County experienced the highest growth rate of per capita personal income at 52.4 percent from 2002 to 2010, while the state growth rate was 35.2 percent.

Jackson County had the highest unemployment rate among Fayetteville Shale counties in February of 2012: 11.2 percent, according to preliminary not seasonally adjusted estimates from the BLS. This was substantially higher than the state average unemployment rate of 8.3 percent that month.

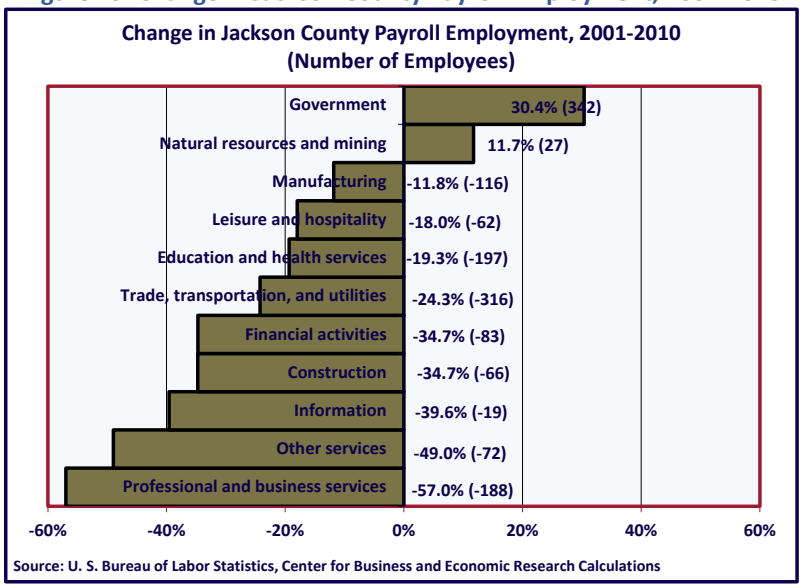
Total payroll employment in Jackson County was 5,210 in 2010. The largest number of payroll employees in Jackson County worked in the government sector in 2010 (28.2 percent). This was significantly higher than the state average share of 18.1 percent that year. The second largest employment sector was trade, transportation, and utilities industry (18.9 percent), followed by manufacturing (16.6 percent). The natural resources and mining sector share of employment was much larger in Jackson County than in Arkansas: 4.9 percent of people were employed in this industry in the county, while on average 1.9 percent were employed in the state.

Figure 48: Jackson County Payroll Employment by Industry, 2010



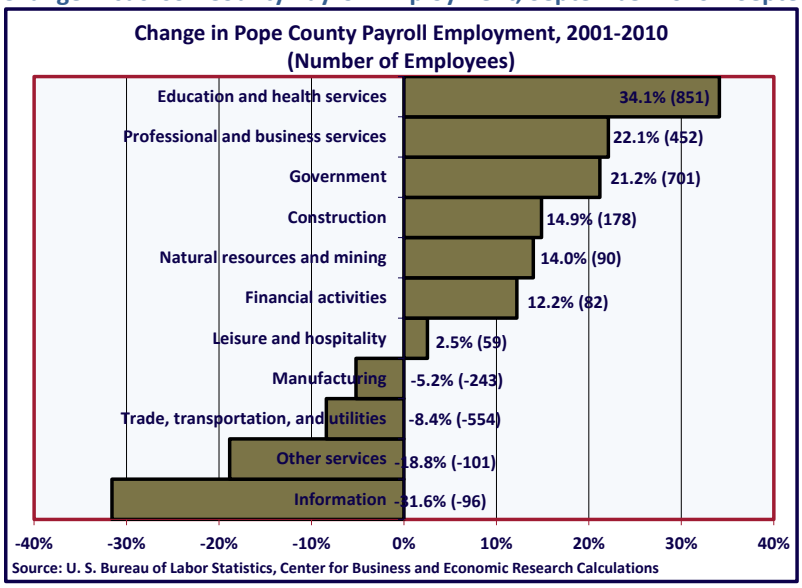
Among Fayetteville Shale counties, Jackson County experienced the largest decline in payroll employment from 2001 to 2010: 12.5 percent. In comparison, the growth rate of employment in the state was 0.6 percent. Payroll employment increased in only two industry sectors during that time period: government (30.4 percent or 342 employees) and the natural resources and mining sector (11.7 percent or 27 employees). Information on employment in the mining, quarrying, and oil and gas extraction subsector is not available for this county. All other industry sectors in the county experienced declines in payroll employment from 2001 to 2010.

Figure 49: Change in Jackson County Payroll Employment, 2001-2010



From September 2010 to September 2011, payroll employment in Jackson County increased by 2.8 percent. This was much higher than the 0.4 percent increase in payroll employment in the state. The natural resources and mining sector experienced a decrease in payroll employment of 2.3 percent or 7 employees. Detailed industry subsector data are not available to describe the trend in the oil and gas extraction subsector during that time period.

Figure 50: Change in Jackson County Payroll Employment, September 2010 – September 2011

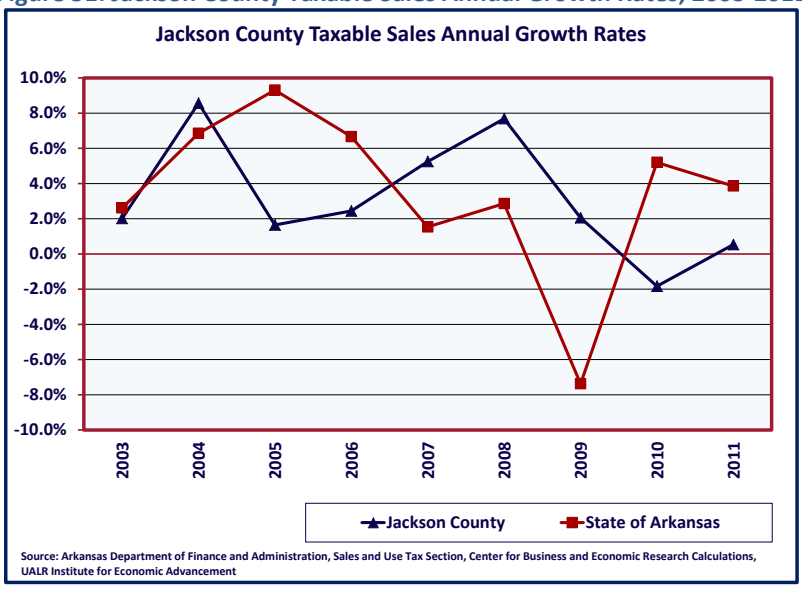


Average annual pay in Jackson County was $30,774 or 84.9 percent of the state average annual pay in 2010. Average pay in the county increased by 36.9 percent from 2001 to 2010, or more quickly than the state average growth rate of 33.0 percent. Detailed average pay data by subsector are not available for Jackson County.

Jackson County was the only one among Fayetteville Shale counties that netted a loss of business establishments from 2001 to 2010 (a net loss of 74 establishments). The number of businesses in the county in 2010 (489) was the lowest for the past ten years. There continued to be a single business establishment in the mining, quarrying, and oil and gas extraction subsector in the county in 2010.

More than $195 million of local taxable sales occurred in Jackson County in 2011. From 2006 to 2011, local sales increased by 14.1 percent, while Arkansas taxable sales increased by only 5.7 percent. From 2010 to 2011, Jackson County increased by only 0.5 percent, while total Arkansas sales increased by 3.9 percent during that time period.

Figure 51: Jackson County Taxable Sales Annual Growth Rates, 2003-2011



Pope County

According to U.S. Census Bureau intercensal population estimates, 62,331 people resided in Pope County as of July 1, 2011. From 2000 to 2011, the county population increased by more than the state growth rate: 14.3 percent or by 7,790 people (the state average rate was 9.7 percent). Pope County had the third fastest growing population in the Fayetteville Shale region after Faulkner and White Counties.

Figure 52: Pope County Population, 1990-2011

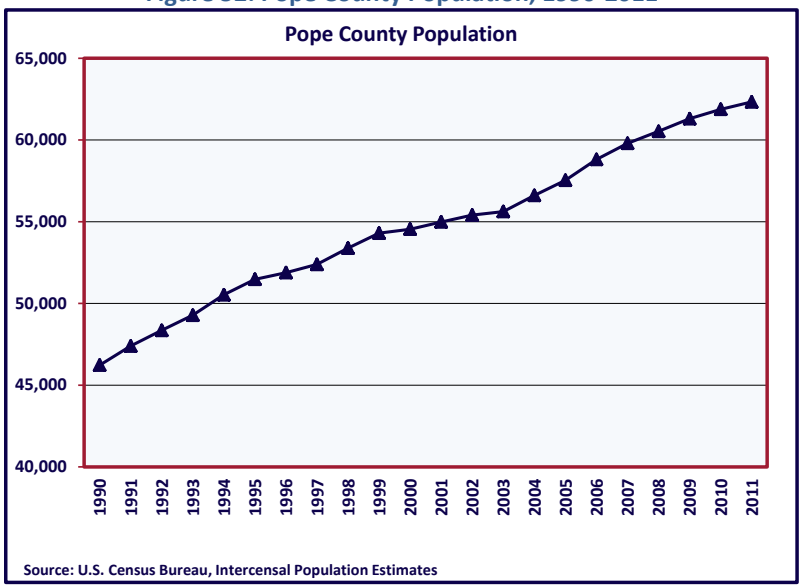
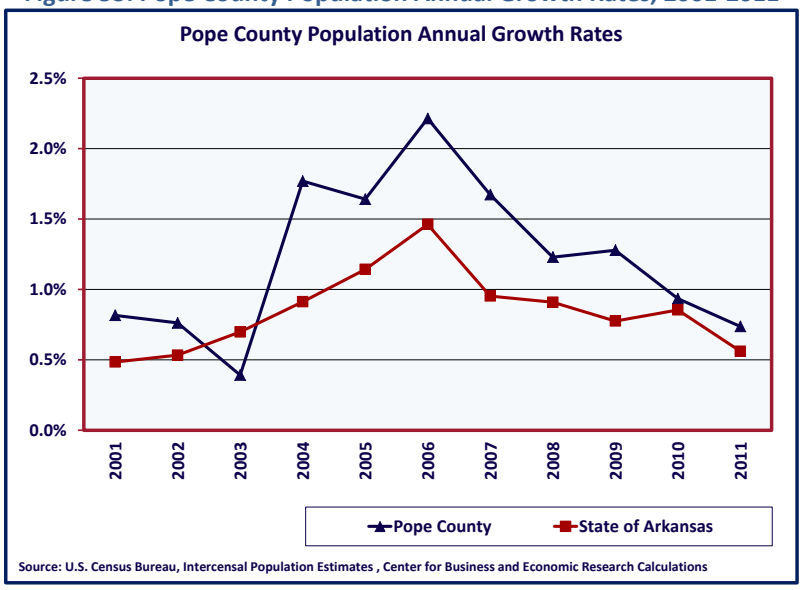


Figure 53: Pope County Population Annual Growth Rates, 2001-2011



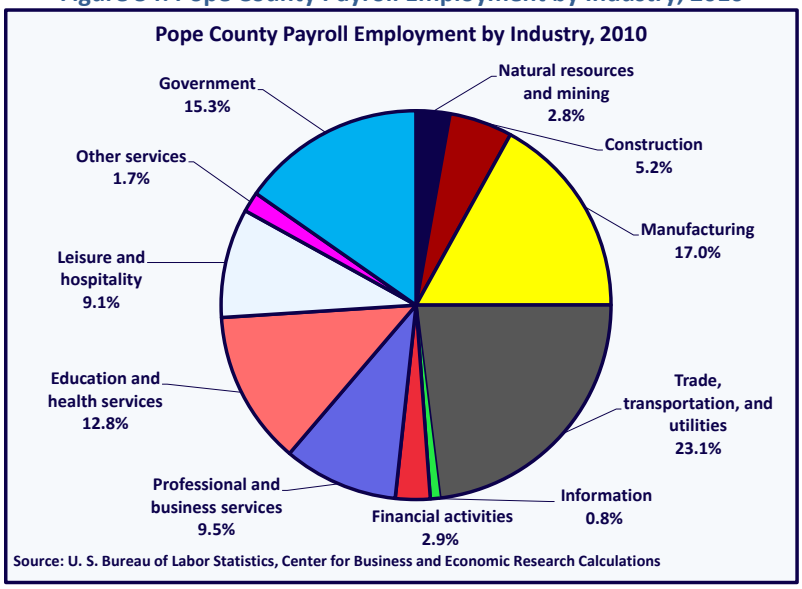
Per capita personal income in Pope County was $28,234 or $4,571 lower than the state average in 2010. Among Fayetteville Shale counties, Pope County experienced the lowest growth rate of

per capita personal income at 26.7 percent from 2002 to 2010, while the state average growth rate was a higher 35.2 percent.

The unemployment rate in Pope County was 7.8 percent in February 2012, lower than the state average unemployment rate of 8.3 percent that month, according to preliminary not seasonally adjusted estimates from the BLS.

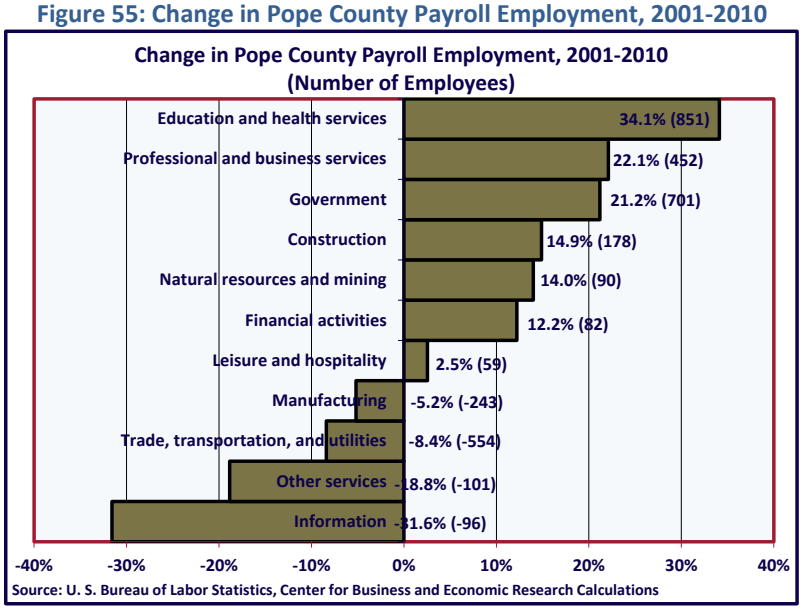
Total payroll employment in Pope County was 26,233 in 2010. The largest number of payroll employees in Pope County worked in the trade, transportation, and utilities sector in 2010. This sector accounted for 23.1 percent of total payroll employment in the county, as compared with the state average of 20.4 percent. The second largest employment sector was manufacturing, with 17.0 percent. Employment in this industry was also higher than the state average share, which was 14.1 percent that year. The share of payroll employment in the natural resources and mining industry was larger in Pope County than on average in the state: 2.8 percent as compared with the state average of 1.9 percent.

Figure 54: Pope County Payroll Employment by Industry, 2010



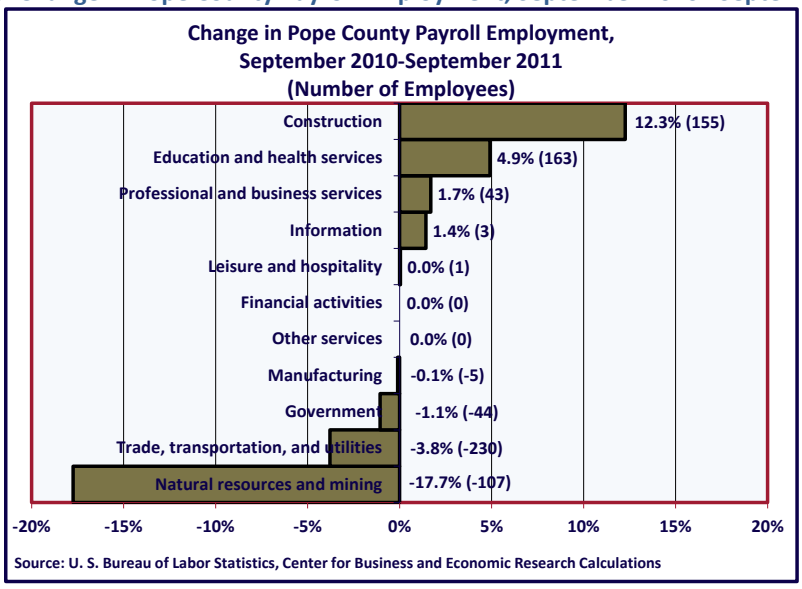
Pope County experienced faster than the state average payroll employment growth from 2001 to 2010 or 5.7 percent (the state average growth rate was 0.6 percent). However, several industry sectors such as manufacturing; trade, transportation, and utilities; other services; and information had declines in employment. The natural resources and mining sector was the fifth fastest growing industry sector in the county with an increase of 14.0 percent or 90 payroll employees from 2001 to 2010. Most of the new payroll jobs in this industry sector occurred in the mining, quarrying, and oil and gas extraction subsector. According to the available data, employment in this subsector increased by 202.3 percent or by 89 people from 2007 to 2010, though it remains a small industry subsector with a total of 133 payroll employees.

Figure 55: Change in Pope County Payroll Employment, 2001-2010



From September 2010 to September 2011, Pope County had a 0.1 percent decline in payroll employment, smaller than the 0.4 percent increase in the state. Payroll employment in the natural resources and mining industry declined by 17.7 percent or by 107 employees. Detailed data by industry subsector are not available to describe the trend in the oil and gas extraction subsector during that time period.

Figure 56: Change in Pope County Payroll Employment, September 2010 –September 2011

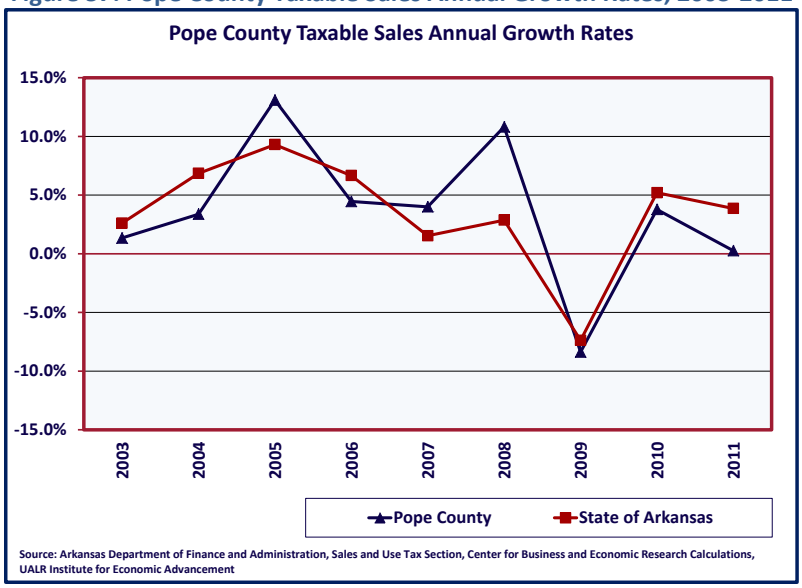


Average annual pay in Pope County was $32,797 or 90.5 percent of the state average annual pay in 2010. Average pay in the county increased by 27.1 percent from 2001 through 2010, or more slowly than the state average growth rate of 33.0 percent. Average pay in the mining, quarrying, and oil and gas extraction subsector in Pope County was $67,788 in 2010, more than twice the average pay across all industries in the county.

From 2001 to 2010, Pope County netted a gain of 227 business establishments. The level of establishments in 2010 (1,800) was the second highest level in the past ten years, while the peak level of 1,818 establishments was in 2008. The number of establishments in the mining, quarrying, and oil and gas extraction subsector in the county increased from 4 in 2004 to 8 in 2010.

Almost $930 million of local taxable sales occurred in Pope County in 2011. From 2006 to 2011, local sales increased by 9.9 percent, while taxable state sales increased by only 5.7 percent. From 2010 to 2011, Pope County sales increased by 0.3 percent, while, total Arkansas sales increased by 3.9 percent during that time period.

Figure 57: Pope County Taxable Sales Annual Growth Rates, 2003-2011



Van Buren County

According to U.S. Census Bureau intercensal population estimates, 17,083 people resided in Van Buren County as of July 1, 2011. The county population increased at a slower rate than the state from 2000 to 2011. Van Buren County population increased by 5.3 percent or by 862 people, while the Arkansas population increased on average by 9.7 percent and the average growth rate in all Fayetteville Shale counties was 16.0 percent during that time period.

Figure 58: Van Buren County Population, 1990-2011

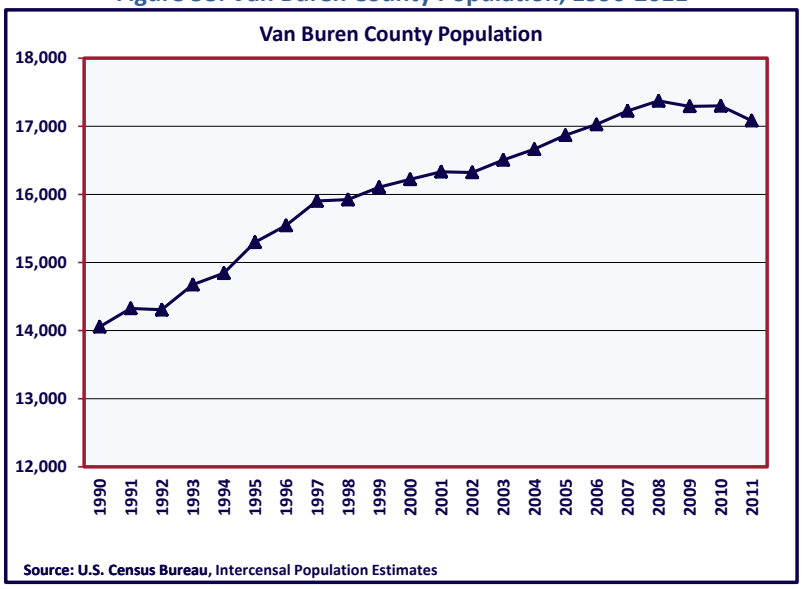
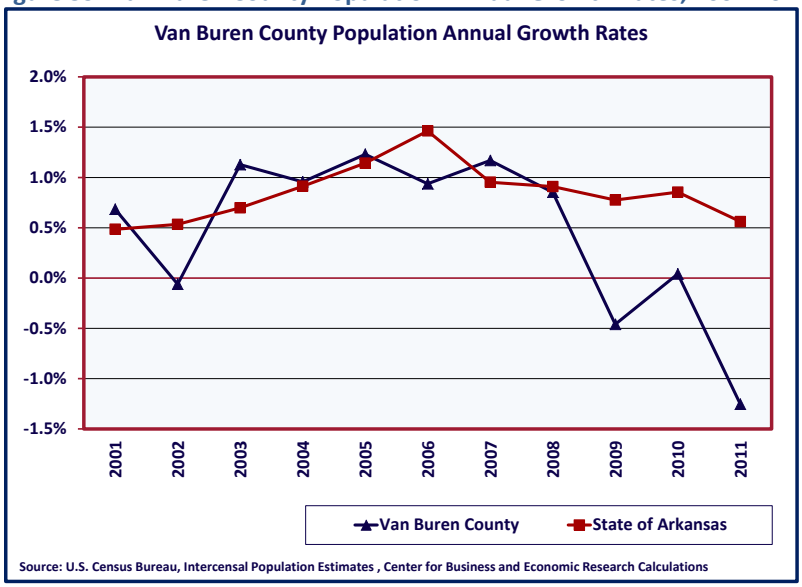


Figure 59: Van Buren County Population Annual Growth Rates, 2001-2011



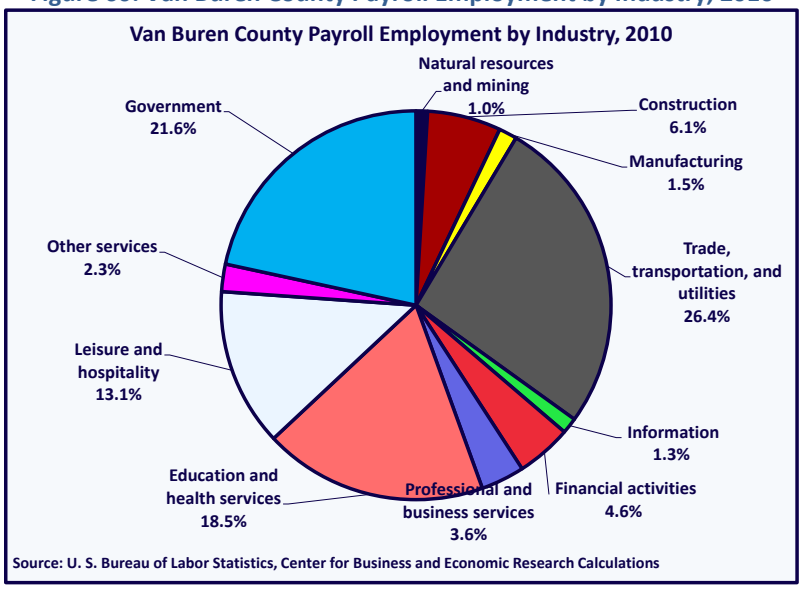
Van Buren County had the lowest per capita personal income among Fayetteville Shale counties in 2010: $27,377, 83.5 percent of the state per capita personal income (or $5,428 lower). This was despite the fact that from 2002 to 2010, the county per capita personal income increased

at a much faster rate than the state per capita personal income growth rate: 43.4 percent as compared with the state growth rate of 35.2 percent.

The unemployment rate in Van Buren County was 9.9 percent in February 2012, or 1.6 percentage points higher than the state average unemployment rate that month (which was 8.3 percent), according to preliminary not seasonally adjusted estimates from the BLS.

Total payroll employment in Van Buren County was 3,573 in 2010. The largest number of payroll employees in Van Buren County worked in the trade, transportation, and utilities sector in 2010. This sector accounted for 26.4 percent of total employment in the county, as compared with the state average of 20.4 percent. The second largest employment sector was government (21.6 percent), followed by education and health services (18.5 percent). Due to several manufacturing facilities that closed, only 1.5 percent of county payroll employees worked in the manufacturing sector in 2010 (in 2001, this number was 16.5 percent). The share of payroll employment in the natural resources and mining industry was smaller in Van Buren County than on average in the state: 1.0 percent as compared with the state average of 1.9 percent.

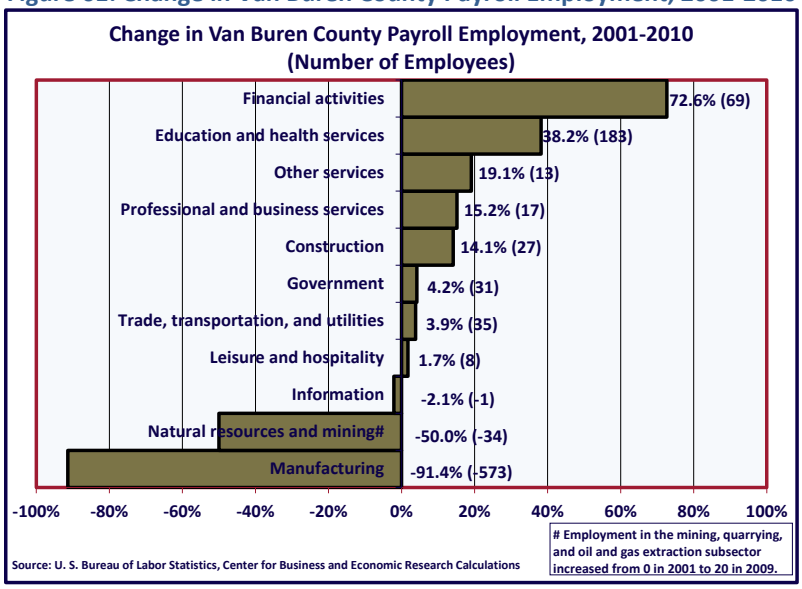
Figure 60: Van Buren County Payroll Employment by Industry, 2010



Van Buren County had a decline in payroll employment of 5.9 percent from 2001 to 2010, while state employment increased by 0.6 percent. Most of these lost payroll jobs were in the manufacturing sector, which experienced a decline of 91.4 percent or a loss of 573 payroll jobs. The industry sector with the highest growth rate was the financial activities sector (72.6 percent or 69 employees), followed by education and health services (38.2 percent or 183 employees), and the other services sector (19.1 percent or 13 employees). Payroll employment in the mining, quarrying, and oil and gas extraction subsector increased from 0 employees in 2001 to 20 employees in 2009 and comprised two thirds of the employment in the natural resources

and mining industry sector in 2009.[14] Meanwhile, the agriculture, forestry, fishing, and hunting subsector declined significantly during that time period (by 85.3 percent) and its share of employment in the natural resources and mining industry sector declined from 100.0 percent to about one third in 2009.

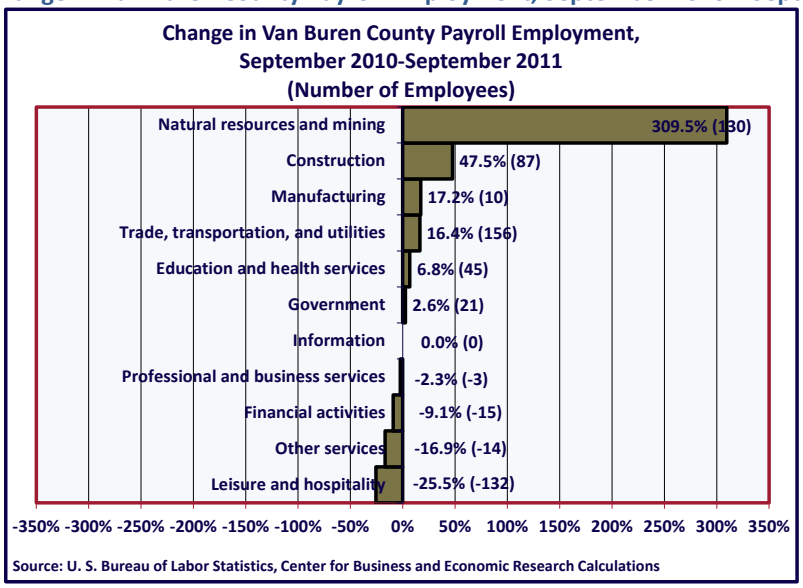
Figure 61: Change in Van Buren County Payroll Employment, 2001-2010



From September 2010 to September 2011, Van Buren County had a 7.8 percent increase in payroll employment, while state payroll employment increased by 0.4 percent. Payroll employment in the natural resources and mining industry increased by 309.5 percent or by 130 employees.

[14] According to the industry survey conducted by the Center for Business and Economic Research, the employment numbers published by the Bureau of Labor Statistics fail to capture the total employment in the oil and gas extraction industry in Van Buren County. In 2011, exploration and production companies had employment of at least 99 in that subsector.

Figure 62: Change in Van Buren County Payroll Employment, September 2010 – September 2011

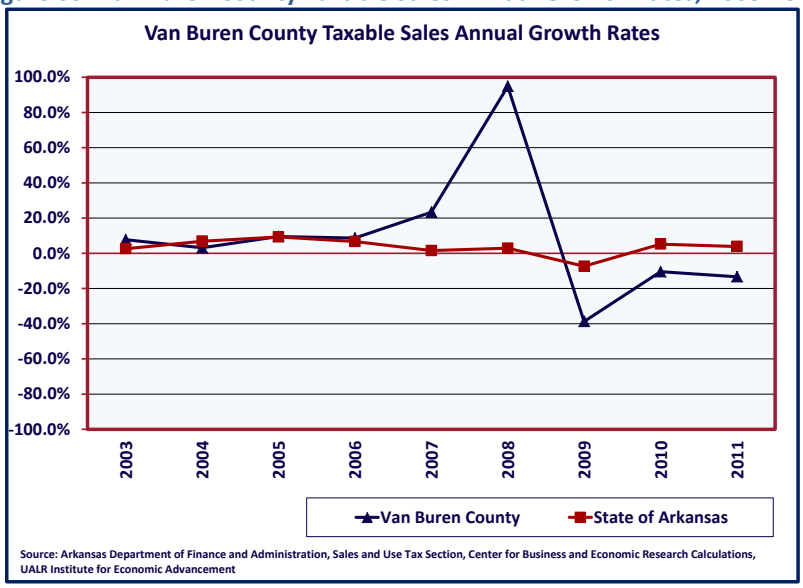


Average annual pay in Van Buren County was the smallest among Fayetteville Shale counties: $27,036 or 74.6 percent of the state average annual pay in 2010. Average pay in the county remained low despite an increase of 48.4 percent from 2001 through 2010, which was a much higher increase than in the state (33.0 percent). Average pay in the mining, quarrying, and oil and gas extraction subsector in Van Buren County was $46,572 in 2009 (the latest data available), almost twice the average pay across all industries in the county that year.

From 2001 to 2010, Van Buren County netted a gain of 40 business establishments. The level of establishments in 2010 (381) was the second highest level during that time period, with the highest level being in 2009 at 383 establishments. The number of establishments in the mining, quarrying, and oil and gas extraction subsector in the county increased from 1 in 2006 to 4 in 2010.

More than $182 million of local taxable sales occurred in Van Buren County in 2011. From 2006 to 2011, local sales increased by 14.2 percent, in spite of a significant decline in 2009 and a further decline in 2010. Meanwhile, total state taxable sales increased by 5.7 percent during that time period. From 2010 to 2011, Van Buren County taxable sales declined by 13.3 percent, while total Arkansas taxable sales increased by 5.7 percent during that time period.

Figure 63: Van Buren County Taxable Sales Annual Growth Rates, 2003-2011



White County

According to U.S. Census Bureau intercensal population estimates, 78,167 people resided in White County as of July 1, 2011. White County was the second largest county among Fayetteville Shale counties and its population had the second highest growth rate in the region from 2000 to 2011. During this time period, the county population increased by 10,785 people or by 16.0 percent (while the Arkansas average population growth rate was 9.7 percent). The figure below shows how the growth rate of White County's population accelerated after the beginning of activity in the Fayetteville Shale.

Figure 64: White County Population, 1990-2011

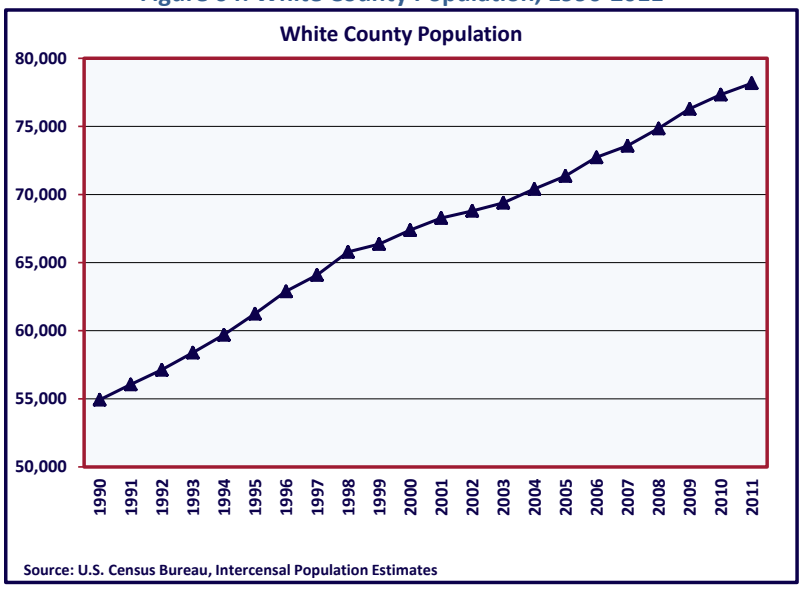
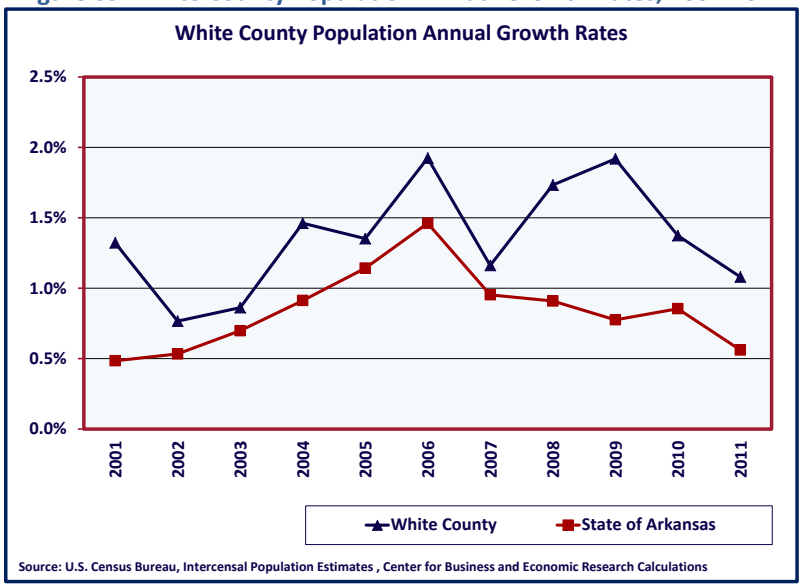


Figure 65: White County Population Annual Growth Rates, 2001-2011

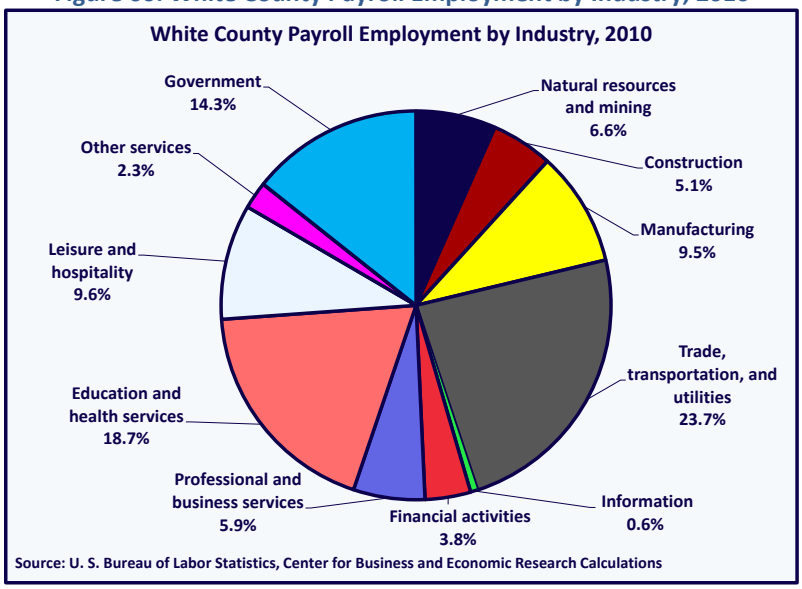


Per capita personal income in White County was $28,798 or $4,007 lower than the state average in 2010. The growth rate of per capita personal income was somewhat higher than the growth rate of Arkansas per capita personal income: 36.2 percent as compared with the state growth rate of 35.2 percent from 2000 to 2009.

The unemployment rate in White County was 9.0 percent in February 2012, higher than the Arkansas unemployment rate of 8.3 percent that month, according to preliminary not seasonally adjusted estimates from the BLS.

In White County, total payroll employment was 25,279 in 2010. The largest number of payroll employees in White County worked in the trade, transportation, and utilities sector in 2010. This sector accounted for 23.7 percent of total payroll employment in the county, as compared with the state average of 20.4 percent. The second largest employment sector was education and health services (18.7 percent), followed by government (14.3 percent). The share of payroll employment in the manufacturing sector declined to 9.5 percent in 2010 and was lower than the state average of 14.1 percent that year. Meanwhile, the natural resources and mining industry sector share in White County was the largest among Fayetteville Shale counties. About 6.6 percent of payroll employees worked in this industry in 2010, as compared with the state average of 1.9 percent.

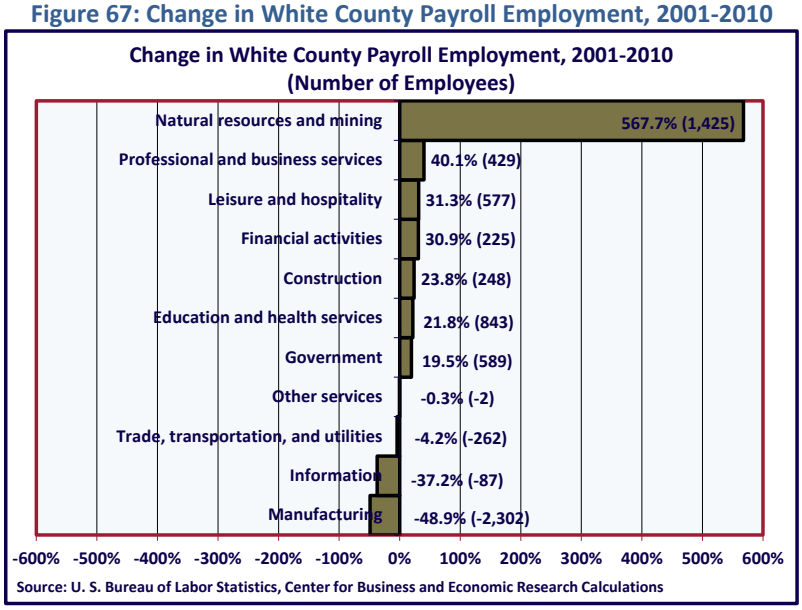
Figure 66: White County Payroll Employment by Industry, 2010



White County experienced much higher than the state average payroll employment growth from 2001 to 2010 or 7.1 percent (the Arkansas average growth rate was 0.6 percent). The industry sector with the highest growth rate was natural resources and mining (567.7 percent or an increase of 1,425 payroll employees), followed by professional and business services (40.1 percent or 429 employees) and leisure and hospitality (31.3 percent or 577 employees). The mining, quarrying, and oil and gas extraction subsector comprised 91.7 percent of the natural resources and mining industry sector and increased by 2,974.0 percent or by 1,487 payroll

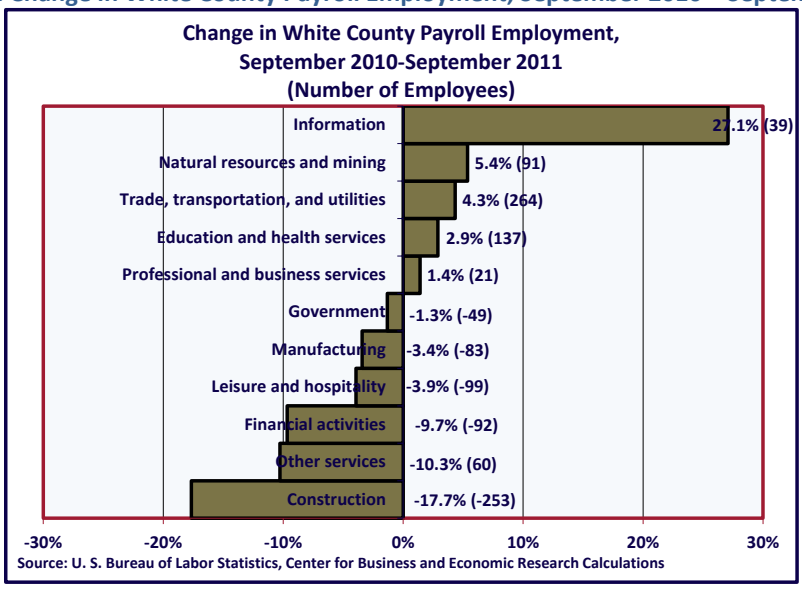
employees from 2001 to 2010. The manufacturing sector had the largest decline in White County in the past decade (by 48.9 percent or a loss of 2,302 payroll jobs). Employment in the information and trade, transportation, and utilities sectors also declined from 2001 to 2010.

Figure 67: Change in White County Payroll Employment, 2001-2010



From September 2010 to September 2011, White County had a 0.3 percent decline in payroll employment, while payroll employment in the state increased by 0.4 percent. Payroll employment in the natural resources and mining industry increased by 5.4 percent or by 91 employees.

Figure 68: Change in White County Payroll Employment, September 2010 – September 2011



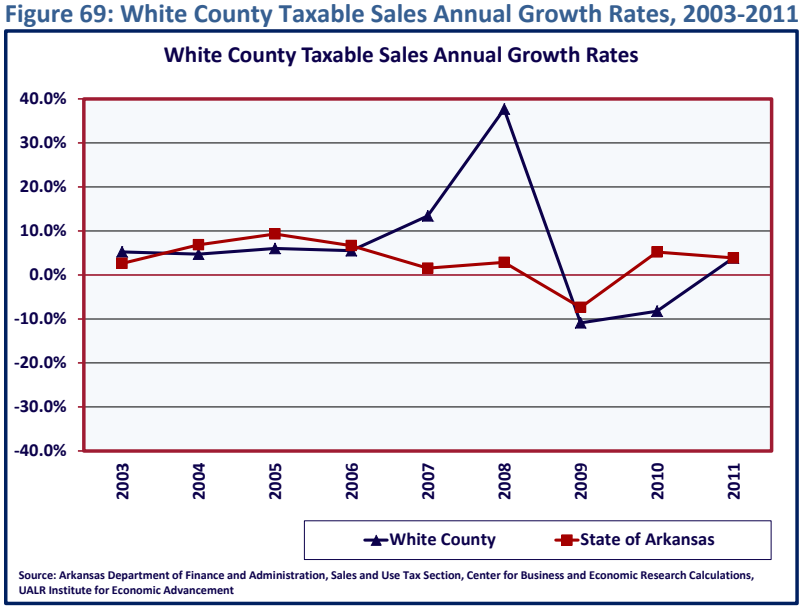
Average annual pay in White County was $33,397 or 92.1 percent of Arkansas average annual pay in 2010. Average pay in the county increased by 36.1 percent from 2001 to 2010, or more

quickly than the state average growth rate of 33.0 percent. Average pay in the mining, quarrying, and oil and gas extraction subsector in White County was $60,639 in 2010, almost twice the average pay across all industries in the county.

From 2001 to 2010, White County netted a gain of 377 business establishments. The number of establishments in 2010 (1,850) was the third highest in the past ten years, with the 2008 and 2009 levels being the highest (with 1,851 and 1,865 establishments, respectively). The number of businesses in the mining, quarrying, and oil and gas extraction subsector in the county increased from 4 in 2004 to 35 in 2010.

Almost $1.1 billion of local taxable sales occurred in White County in 2011. From 2006 to 2011, local sales increased by 32.6 percent, while the state sales increased by 5.7 percent. From 2010 to 2011, White County sales increased by 3.9 percent, the same rate as total Arkansas taxable sales increased.

Figure 69: White County Taxable Sales Annual Growth Rates, 2003-2011



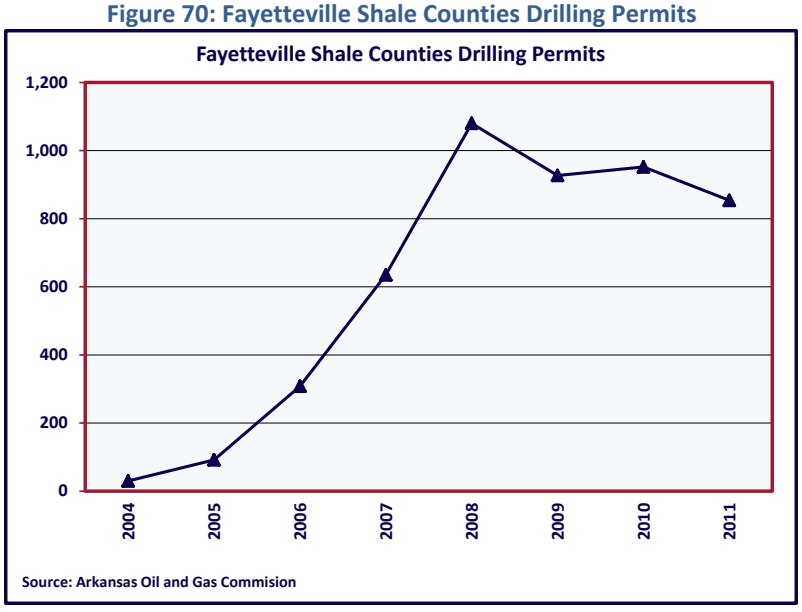
Fayetteville Shale Developments to Date

The Fayetteville Shale is an unconventional gas reservoir located on the Arkansas side of the Arkoma Basin, ranging in thickness from 50 to 325 feet and ranging in depth from 1,500 to 6,500 feet. The Fayetteville Shale is similar in character, age, and thickness to the Barnett Shale, an unconventional reservoir of natural gas in north and central Texas that thousands of wells producing hundreds of billions cubic feet of natural gas annually. In 2004, natural gas production in the Fayetteville Shale began. From 2004 to 2011, natural gas production increased from practically zero to almost 943.6 billion cubic feet (BCF). Natural gas production in the Fayetteville Shale area, in turn, caused the development of supporting economic activities and the construction of necessary infrastructure.

Drilling Permits and Natural Gas Prices

The number of drilling permits issued in Fayetteville Shale counties by the Arkansas Oil and Gas Commission increased exponentially from 2004 to 2008. There were no permits issued in the field before 2004 when 30 drilling permits were issued. In 2008, there were already 1,080 drilling permits issued. The pace of issuance of drilling permits declined from 2009 to 2011 during the time period when natural gas prices hovered between $2 and $4 per MMBTU. In 2011, there were 823 drilling permits issued in Cleburne, Conway, Faulkner, Franklin, Independence, Jackson, Pope, Van Buren, and White counties.

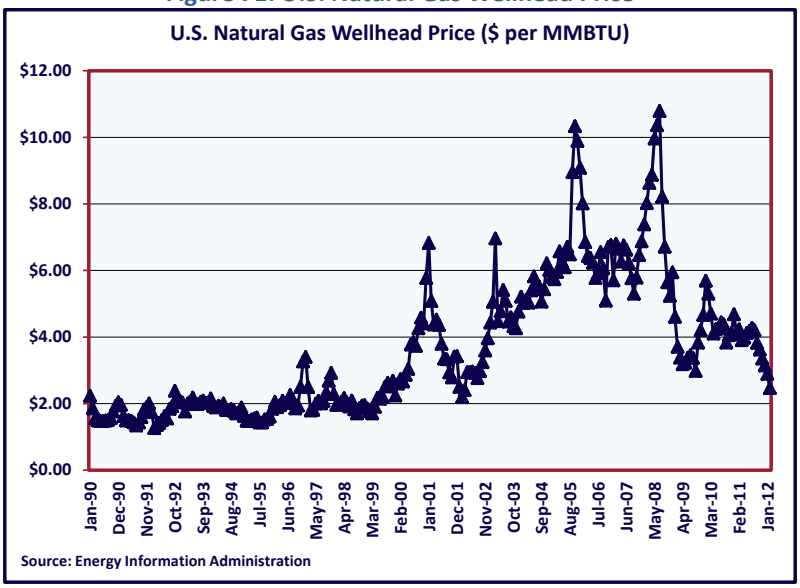
Figure 70: Fayetteville Shale Counties Drilling Permits



All natural gas exploration and production activities depend on several factors and price volatility is one of the important components. The wellhead price of natural gas is determined by a complex domestic and global energy market. Natural gas wellhead prices reached $10.79 per MMBTU (millions of BTU) in July 2008. This high price was followed by a steep decline, down to about $4.00 per MMBTU in 2009. Although the price varied from $5.82 to $3.44 per

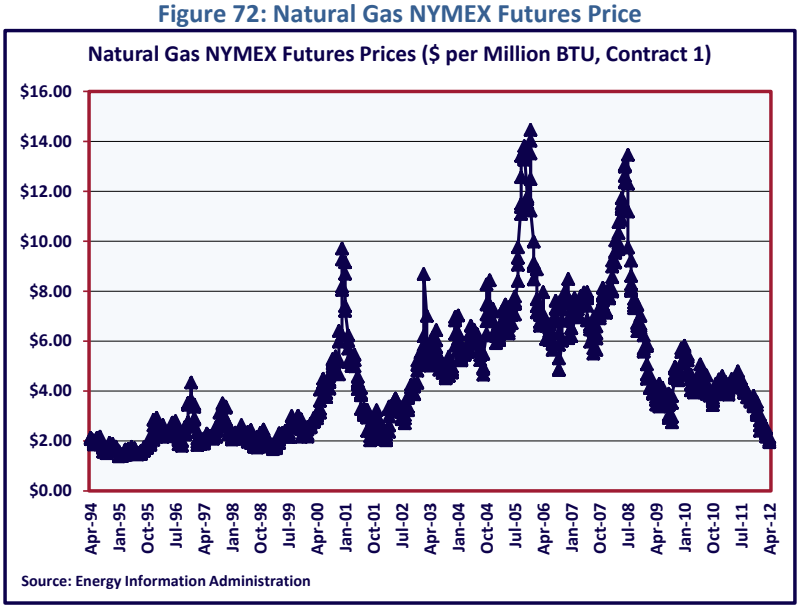
MMBTU in 2010, the price trend declined in 2011, varying from $3.14 to $4.27 per MMBTU. In February 2012, the natural gas wellhead price was $2.46, according to the Energy Information Administration. Following the dynamics of wellhead natural gas prices, the peak number of oil and gas companies operated in the Fayetteville Shale area in 2008 (16 companies with subsidiaries). The number of companies declined to 15 in 2009 and to 11 companies in 2010 and 2011.

Figure 71: U.S. Natural Gas Wellhead Price



Data are also available for natural gas futures prices, traded on the New York Mercantile Exchange (NYMEX). The natural gas NYMEX futures price continued to decline in 2012, falling to its lowest level in the past decade: $1.95 per MMBTU on April 20, 2012.

Figure 72: Natural Gas NYMEX Futures Price



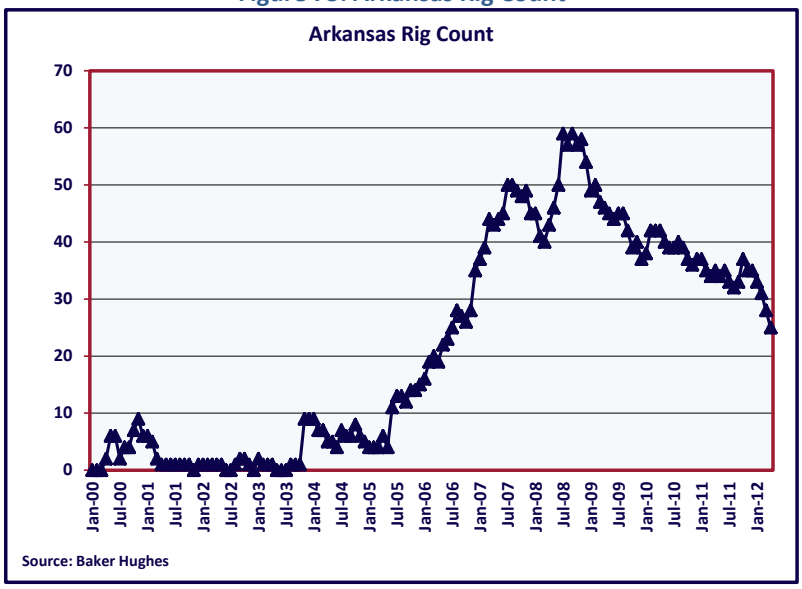
In the 2008 study, conducted by the Center for Business and Economic Research, oil and gas producers estimated the level of natural gas prices needed to continue their projected activities in Fayetteville Shale. The respondent companies reported an average price of $6.21. Although 2008 average prices were higher than this indicated level, from 2009 on the prices were significantly lower.

Natural Gas Rig Counts

Drilling rigs are used to identify geologic reservoirs and to create wellbores that allow the extraction of oil or natural gas from those reservoirs. In tandem with the increase in the number of drilling permits, the number of natural gas drilling rigs in the region varied with the pace of development in the Fayetteville Shale. When prices were high in 2007 and 2008, rig counts were high. As natural gas prices declined, the number of rigs working in the region also declined.

As of March 23, 2012, there were 25 horizontal rotary rigs located in the Fayetteville Shale. This accounted for 92.6 percent of total 27 rotary rigs operating in Arkansas, according to Baker Hughes data. The total number of drilling rigs in the state was down by 25.0 percent from 38 rigs during that time in 2011, and down from a peak of 59 in September of 2008. As of April 6, 2012, there were 6 natural gas rigs both in Cleburne and Van Buren County, 5 rigs in Conway, 4 rigs in Faulkner, and 3 gas rigs in White County.

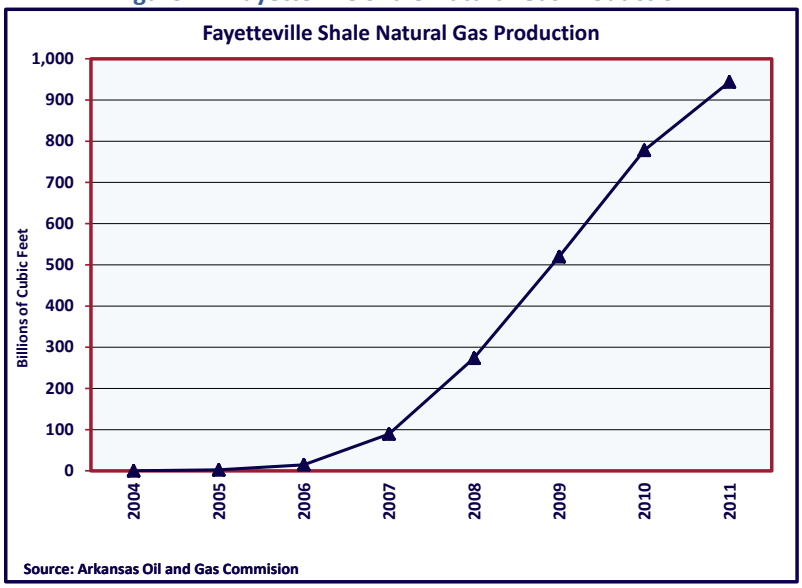
Figure 73: Arkansas Rig Count



Natural Gas Production[15]

Production of natural gas in Fayetteville Shale counties increased significantly from 2004 to 2011. During this time period, the amount of natural gas produced increased from about 100 million cubic feet to almost 943.6 billion cubic feet. The production growth rate declined in 2011 when compared with growth rates seen in 2008 to 2010, but the trend remained positive.

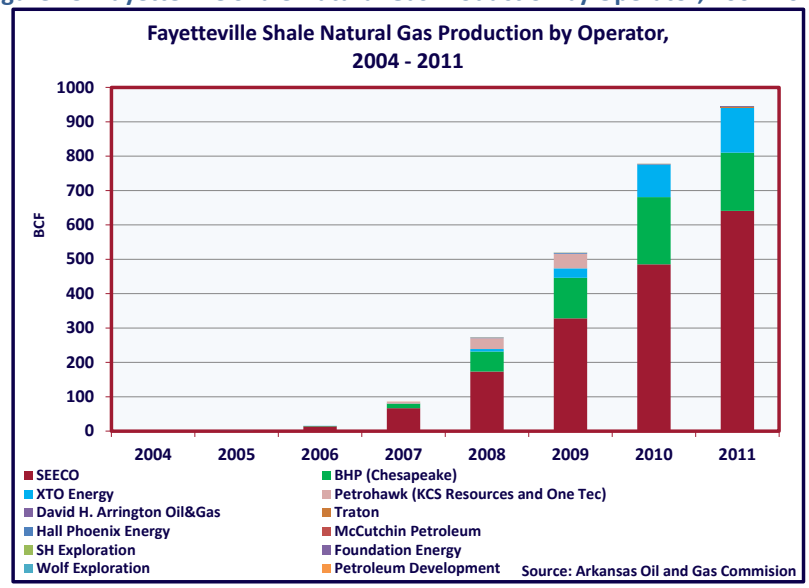
Figure 74: Fayetteville Shale Natural Gas Production



In 2011, eleven oil and gas companies were involved in natural gas production in the Fayetteville Shale area. SEECO, Inc. remained the largest operator since 2004. Three major companies accounted for 99.7 percent of total production in 2011: SEECO, Inc.; BHP Billiton Petroleum, LLC (BHP acquired Chesapeake Energy Corporation Fayetteville Shale assets in early 2011); and XTO Energy, Inc. (XTO acquired Petrohawk Operating Company Fayetteville Shale assets in 2010).

[15] All gas production within Fayetteville Shale counties refers to the B-43 field.

Figure 75: Fayetteville Shale Natural Gas Production by Operator, 2004-2011



The county with the highest level of natural gas production in 2011 was Van Buren County. About one fourth of the natural gas from the Fayetteville Shale was produced in White County and about one fifth in Conway County. Cleburne County accounted for 14.8 percent of natural gas production in the Fayetteville Shale area. Overall, these four counties accounted for 90.6 percent of natural gas production in the Fayetteville Shale in 2011.

Figure 76: Fayetteville Shale Natural Gas Production Shares by County, 2011

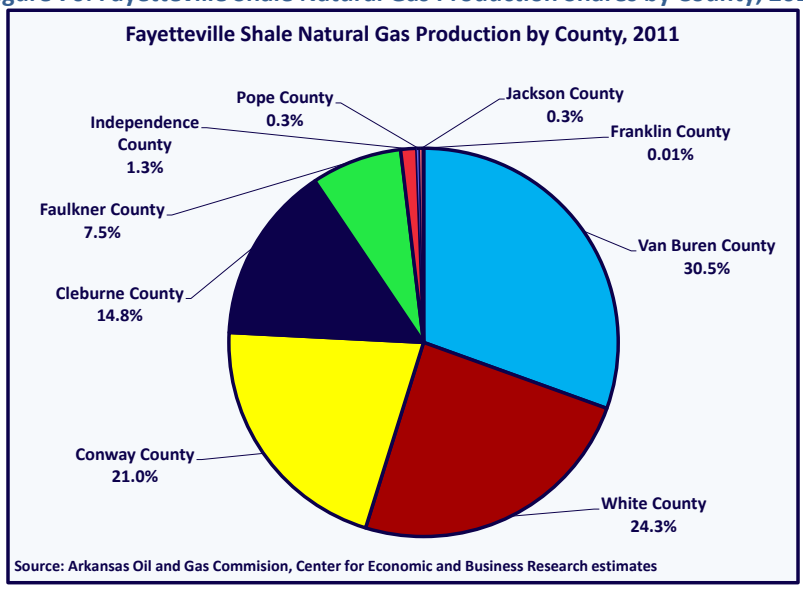
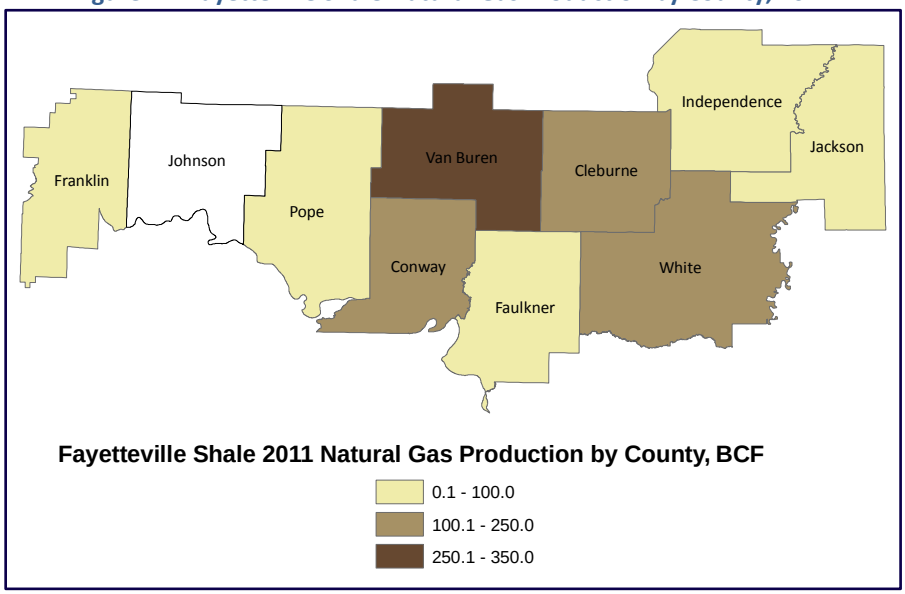


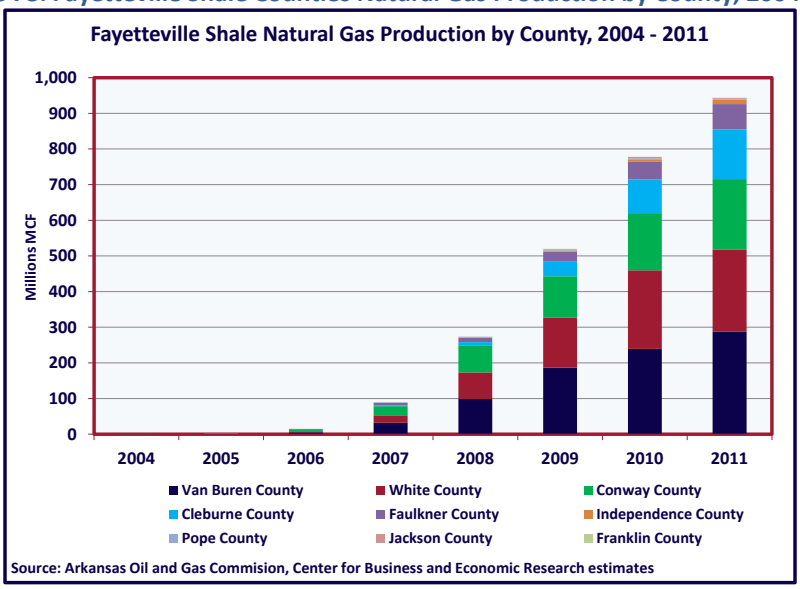
Figure 77: Fayetteville Shale Natural Gas Production by County, 2011



Source: Arkansas Oil and Gas Commission, Center for Business and Economic Research estimates

Production of natural gas in Van Buren County has been the highest among Fayetteville Shale counties since 2007. Conway, Van Buren, and White counties were also among the top producing counties from 2007 to 2011.

Figure 78: Fayetteville Shale Counties Natural Gas Production by County, 2004-2011



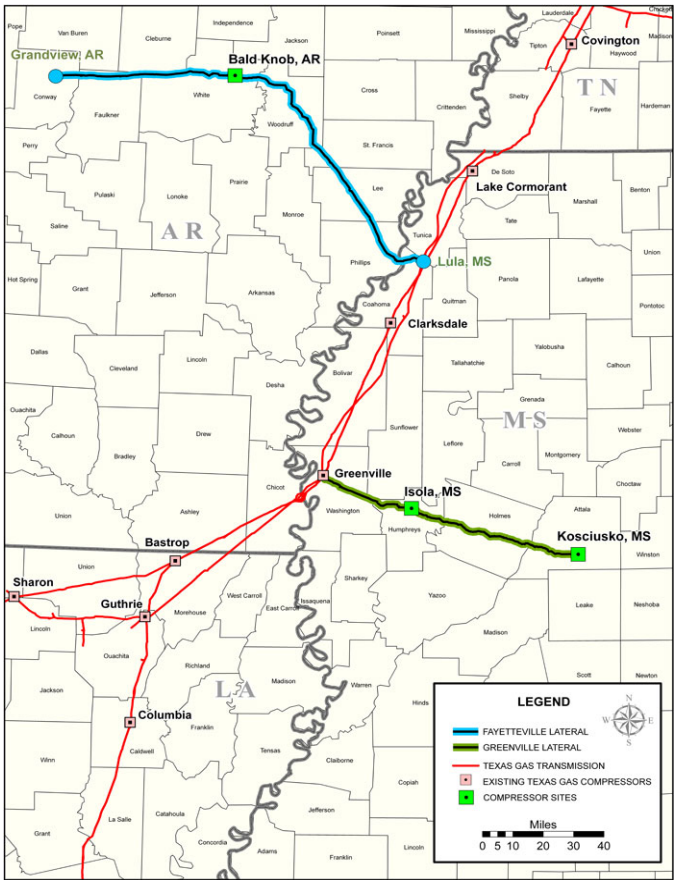
Pipelines

The transportation of natural gas from production locations to consumers or pipeline systems is required to support natural gas exploration and production. The exploration and production in the Fayetteville Shale required the development of such infrastructure. The transmission

pipelines in the Fayetteville Shale area are provided by several companies: CenterPoint Energy Gas Transmission; Ozark Gas Transmission (Spectra Energy); and Texas Gas Transmission, LLC.

At the end of 2008 and in the beginning of 2009, Boardwalk Pipeline Partners built a $500 million pipeline (the Fayetteville Lateral) to take natural gas from the Fayetteville Shale to market. The Fayetteville Lateral consists of approximately 165 miles of 36-inch pipeline. Peak-day transmission capacity for the Fayetteville Lateral is 1.3 billion cubic feet. End markets include the Henry Hub, the Midwest, the Gulf Coast, and the Northeast.

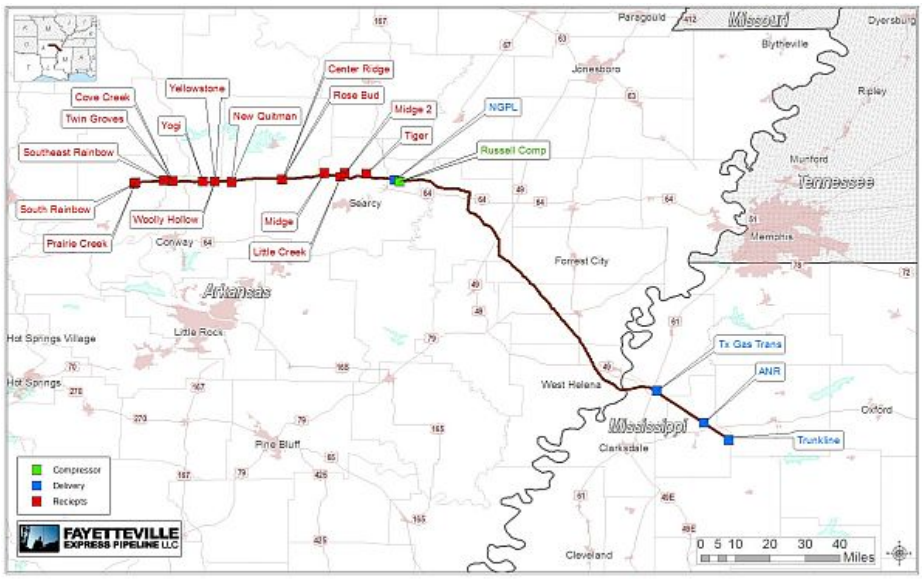
Figure 79: Boardwalk Pipeline Partners Fayetteville Lateral Pipeline



Source: Boardwalk Pipeline Partners LP

Additionally, the Fayetteville Express Pipeline (FEP), a natural gas pipeline system, was designed to connect the Fayetteville Shale area with pipelines serving the Midwest and Northeast. The importance of this pipeline is evident since, for example, Southwestern Energy (SWN) reduced production in 2009 due to maintenance on a pipeline, used to transport natural gas. The construction of the FEP was approved by the Federal Energy Regulatory Commission in 2010. The pipeline cost $1.0 billion and had an initial capacity of up to two billion cubic feet per day of natural gas. The pipeline starts in Conway County, Arkansas, and is 185 miles in length, ending in Panola County, Mississippi. Construction work began in early 2010, and full service began January 1, 2011.

Figure 80: Fayetteville Express Pipeline



Source: Fayetteville Express Pipeline LLC

Economic Impacts from 2008 to 2011

In order to quantify the economic impacts of the Fayetteville Shale, a survey was administered to the exploration and production companies that are major producers in the area. This survey included questions about expenditures and employment, mineral leases and royalty payments made by companies to Arkansas residents, severance taxes, and other payments made to the state and local governments. The numerical responses were used as inputs to the customized IMPLAN input/output model, which was used to estimate the indirect and induced effects associated with direct industry spending.

IMPLAN is a regional impact model that enables the evaluation of the economic impact of specific activities such as construction or operation of public works projects, as well as retail, wholesale, manufacturing, and service sales within an economy. IMPLAN was originally developed by the U.S. Department of Agriculture, the Forest Service in cooperation with the Federal Emergency Management Agency (FEMA), the U.S. Department of Interior Bureau of Land Management, and the University of Minnesota to assist the Forest Service in land and resource management planning.

The basic data sources for the current edition of the IMPLAN database and the models used in this study are the Input-Output Accounts of the United States, developed by the U.S. Department of Commerce, Bureau of Economic Analysis (BEA), and county income and employment data published by BEA and the Bureau of Labor Statistics (BLS). The model reflects 2010 industrial structure and technology, and 2010 prices. Center researchers customized model using average annual pay data from the BLS and employment structure developed for

the 2008 study on economic impact of Fayetteville Shale. Trade flows and the results of this analysis were adjusted to reflect prices of the respective years from 2008 to 2012.

IMPLAN uses a 525-sector input-output model to measure the effects of three types of impacts: direct, indirect, and induced. Direct impacts consist of employment and purchases of goods and services in the region resulting from the activity being evaluated, in this case, natural gas exploration and production activities. Indirect (inter-industry) impacts consist of goods and services purchased by the firms, which supply inputs consumed in the direct activity. Induced impacts consist of increased household purchases of goods and services in the region by employees of direct and indirect employers. The model generates multipliers, which summarize the magnitude of the indirect and induced effects generated by a given direct change, to estimate changes in output, income, and employment. In other words, the multiplier is the ratio of total impact to direct impact.

In the IMPLAN model, inter-industry relationships (use and make coefficients) are quantified based on data on the production functions of the different industries in the region. The IMPLAN model was used to estimate multipliers based on those coefficients in specific counties. Direct spending, total economic activity, total labor income, total employment, and total property income were generated by this model.

For this study, the geographic area considered was the entire state of Arkansas. Economic output, value added, and employment effects were generated by the customized IMPLAN model. The results were then used together with the survey responses and production data to calculate estimates of total state and local taxes, resulting from economic activity in the Fayetteville Shale.

Survey Results

According to the 2008 Center for Business and Economic Research survey, exploration and production companies planned to invest almost $9.9 billion in Fayetteville Shale activities from 2008 to 2011. In 2012, major producers in the area reported that they spent 29.0 percent more during these four years than was planned in 2008. Overall, almost $12.8 billion were invested in the Fayetteville Shale area during that time by E&P companies. Despite unexpectedly low natural gas prices, natural gas production in the Fayetteville Shale area increased more than projected in 2008.

Table 5: Projected and Actual Expenditures of E&P Companies, 2008-2011

Year	Expenditures Projected in 2008	Actual Expenditures	Increase/Decrease in Actual Expenditures
2008	$2,403,100,000	$2,826,305,746	17.6%
2009	$2,312,800,000	$3,132,245,509	35.4%
2010	$2,548,020,000	$3,228,336,598	26.7%
2011	$2,634,312,000	$3,583,976,111	36.0%
Total	**$9,898,232,000**	**$12,770,863,965**	**29.0%**

Source: 2008 and 2012 Center for Business and Economic Research surveys and estimates

Using responses from the major producers in the Fayetteville Shale area and extrapolating these results to all E&P companies in the area, Center for Business and Economic Research researchers estimated total mineral leases and royalty payments made by companies to recipients in Fayetteville Shale counties from 2008 to 2011. During that time, payments increased by 41.8 percent: from almost $244.3 million in 2008 to $346.4 million in 2011. The two important factors influencing the amount of royalty payments paid are the level of natural gas production and the level of natural gas prices. Although natural gas production increased from 2010 to 2011, prices declined, resulting in a decline in payments of 7.3 percent from 2010 to 2011. Overall, from 2008 to 2011, more than $1.2 billion of total mineral leases and royalty payments were made by E&P companies to Arkansas residents.

Table 6: Mineral Leases and Royalty Payments by County, 2008-2011

County	2008	2009	2010	2011	Total 2008-2011
Cleburne	$11,871,860	$23,747,086	$49,844,012	$57,942,394	$143,405,351
Conway	$74,655,556	$61,702,722	$87,170,123	$83,722,805	$307,251,206
Faulkner	$14,290,415	$15,006,069	$26,651,402	$25,360,649	$81,308,535
Franklin	$99,512	$1,899,010	$1,986,102	$1,389,262	$5,373,885
Independence	$35,042	$445,656	$762,043	$1,047,508	$2,290,249
Jackson	$35,076	$435,387	$1,314,162	$448,937	$2,233,563
Pope	$3,228,033	$7,518,840	$6,627,503	$2,298,515	$19,672,891
Van Buren	$67,621,648	$70,498,714	$99,839,427	$110,730,601	$348,690,391
White	$72,427,415	$66,410,909	$99,341,679	$63,502,501	$301,682,504
All Fayetteville Shale Counties	**$244,264,556**	**$247,664,393**	**$373,536,452**	**$346,443,172**	**$1,211,908,574**

Source: 2012 Center for Business and Economic Research survey and estimates

Major producers in the Fayetteville Shale area directly employed about 1,427 local residents in Arkansas in 2011[16]. Among these, about 76.5 percent or 1,092 full-time local employees worked in Fayetteville Shale counties. The largest number of local employees or 30.4 percent

[16] Employees in subsidiaries are not included in these employment totals.

worked in Faulkner County. This is due to the fact that Southwestern Energy Company has its regional headquarters office in the city of Conway in Faulkner County.

Table 7: Local Employment by County, 2011

County	*Number of Full-Time Employees*	*Share of Total Employees*
Cleburne	135	9.5%
Conway	115	8.1%
Faulkner	434	30.4%
Franklin	37	2.6%
Independence	5	0.4%
Jackson	0	0.0%
Pope	110	7.7%
Van Buren	99	6.9%
White	157	11.0%
Total Fayetteville Shale Counties	**1,092**	**76.5%**
Other Counties	335	23.5%
Total Arkansas	**1,427**	**100.0%**

Source: 2012 Center for Business and Economic Research survey and estimates

Output, Value Added, and Employment Impacts

Using the survey responses of E&P companies and a customized IMPLAN input/output model, Fayetteville Shale economic output, value added, and employment impacts were estimated from 2008 to 2011. To avoid any potential double counting problems, only direct expenditures of E&P companies were used as inputs to IMPLAN.

From 2008 to 2011, direct expenditures of almost $12.8 billion resulted in a total economic impact of more than $18.5 billion as a result of Fayetteville Shale activities in the state. This implies an average economic multiplier or the ratio of total to direct impact of 1.45.

In the 2008 economic impact study produced by the Center for Business and Economic Research, the total economic output impact was projected to be about $14.2 billion from 2008 to 2011. The total impacts estimated in 2012 are consistently higher than the impacts projected in 2008, in accord with higher than projected expenditures by the E&P companies. The multiplier estimated by using the retrospective data is also slightly larger than the average multiplier estimated for the 2008 study, which was equal to 1.44 for 2008 through 2011.

Table 8: Output Impacts of Fayetteville Shale Activities, 2008-2011

Year	Direct Impact	Indirect Impact	Induced Impact	Total Impact	Average Multiplier
2008	$2,826,305,639	$276,217,212	$662,650,133	$3,765,172,984	1.33
2009	$3,132,245,416	$499,040,374	$1,067,517,206	$4,698,802,996	1.50
2010	$3,228,336,640	$494,614,363	$1,076,406,937	$4,799,357,940	1.49
2011	$3,583,975,967	$528,293,873	$1,159,086,862	$5,271,356,703	1.47
Total	**$12,770,863,662**	**$1,798,165,822**	**$3,965,661,138**	**$18,534,690,623**	**1.45**

Source: 2012 Center for Business and Economic Research survey and estimates, IMPLAN

E&P company expenditures in the Fayetteville Shale area resulted in more than $12.4 billion of value added in the state[17]. This implied an average economic multiplier of 1.36 for value added.

Table 9: Value Added Impacts of Fayetteville Shale Activities, 2008-2011

Year	Direct Impact	Indirect Impact	Induced Impact	Total Impact	Average Multiplier
2008	$1,499,092,806	$140,907,743	$393,800,483	$2,033,801,031	1.36
2009	$2,478,709,392	$268,881,297	$640,642,475	$3,388,233,164	1.37
2010	$2,470,791,675	$262,281,682	$644,969,414	$3,378,042,771	1.37
2011	$2,661,345,036	$278,003,865	$698,949,732	$3,638,298,633	1.37
Total	**$9,109,938,909**	**$950,074,587**	**$2,378,362,104**	**$12,438,375,599**	**1.36**

Source: 2012 Center for Business and Economic Research survey and estimates, IMPLAN

Using the same methodology, direct employment impacts were estimated. Employment impacts increased from 2008 to 2011, following increased direct expenditures. Direct employment peaked in 2011 at 7,544 full-time jobs. Similarly, total employment impacts peaked that year at 22,499 jobs. This implied 2.98 as an average employment multiplier for 2011.

Total employment impacts for 2008 through 2011 were consistently higher than the employment impacts projected in 2008, again following the higher actual expenditures made in the Fayetteville Shale. For comparison, in the 2008 study, total employment impacts were projected to be in the 11,000 to 12,000 range during this time period. In fact the total impact ranged from 14,511 to 22,499.

[17] Value added is defined as the difference between an industry's total output and the cost of its intermediate inputs.

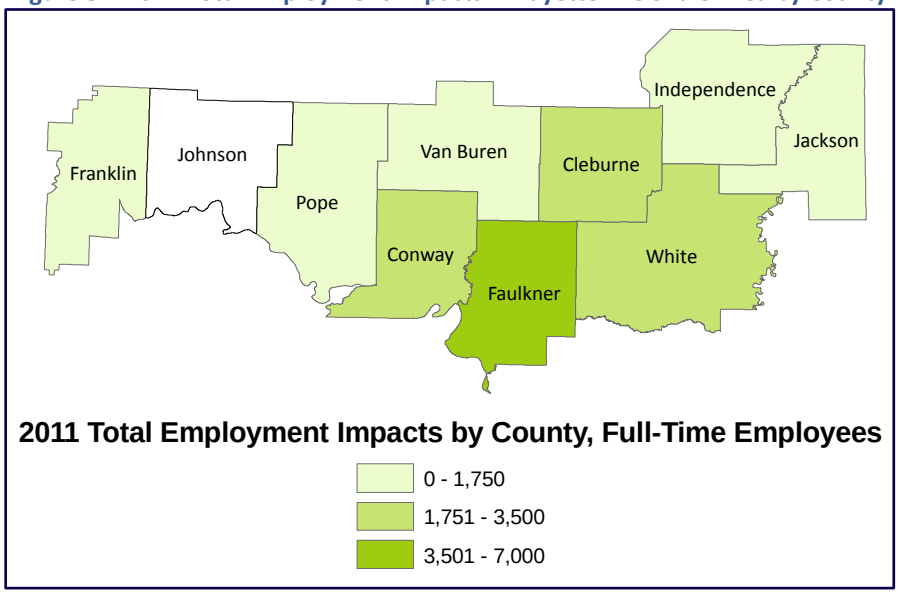
Table 10: Employment Impacts of Fayetteville Shale Activities, 2008-2011

Year	Direct Impact	Indirect Impact	Induced Impact	Total Impact	Average Multiplier
2008	5,948	1,934	6,629	14,511	2.44
2009	6,592	3,669	10,673	20,933[18]	3.18
2010	6,794	3,537	10,622	20,953	3.08
2011	7,544	3,674	11,282	22,499	2.98

Source: Center for Business and Economic Research survey and estimates IMPLAN

Detailed employment impacts by county for 2011 were estimated using the aggregated survey responses of E&P companies. When considering total employment impacts by county, Faulkner County had the largest impacts, followed by White, Cleburne, and Conway County.

Figure 81: 2011 Total Employment Impacts in Fayetteville Shale Area by County



Source: Center for Business and Economic Research survey and estimates, IMPLAN

Fees and Tax Impacts

Fayetteville Shale activities generate revenues for state and local governments through direct, indirect, and induced impacts. Fees associated with drilling permits and other fees, severance, property, income, and sales taxes, and other payments were estimated using survey responses, customized IMPLAN results, natural gas production data, and information about the existing tax structures for this report.

Enumerating each of the many revenue streams that resulted from the Fayetteville Shale activities is not feasible. For example, increased residential and commercial property values

[18] Due to rounding, sum of rounded direct, indirect, and induced impacts is 20,934. Total employment impact for 2011 is, however, 20,933.

resulted in increased assessment values and, thus, in increased property taxes. Other payments such as overweight permit fees and restricted road fees, motor fuel taxes, and increased hotel, motel, and restaurant taxes were also received by governmental organizations as a result of the Fayetteville Shale development.

Drilling Permits

The Arkansas Oil and Gas Commission requires an application for intent to drill to be accompanied by a $300 fee. From 2004 to 2011, a total of 4,878 drilling permits were issued for the Fayetteville Shale area, resulting in almost $1.5 million of fees collected. The share of drilling permits issued in the Fayetteville Shale area among total state permits increased during this time period from 8.3 percent in 2004 to 82.8 percent in 2009 and in 2011.

Table 11: Fayetteville Shale Drilling Permits

Year	*Number of Permits*	*Cost of Permits*	*Fayetteville Shale Permits as Percentage of All State Permits*
2004	30	$9,000	8.3%
2005	92	$27,600	19.2%
2006	308	$92,400	42.7%
2007	635	$190,500	60.7%
2008	1080	$324,000	70.1%
2009	927	$278,100	82.8%
2010	952	$285,600	80.9%
2011	854	$256,200	82.8%
Total	**4,878**	**$1,463,400**	--

Source: Arkansas Oil & Gas Commission, Center for Business and Economic Research estimates

Severance Taxes

The state of Arkansas collects taxes from the producers or purchasers of natural resources at the time of their severance. Producers of natural gas paid the tax rate of $0.003 per MCF (thousand cubic feet) produced until 2009. In 2008, in the severance tax structure was changed in Arkansas. As a result, since January 1, 2009, taxes were collected based on the market value of the natural gas produced and a tiered set of tax rates depending on well characteristics and age. The following table presents the severance taxes paid by Fayetteville Shale exploration and production companies. Taxes collected from 2004 to 2008 were estimated using natural gas production data and taxes collected from 2009 to 2011 were estimated using the 2012 survey responses of exploration and production companies and natural gas production data. Following the rapid growth of gas extraction, tax collections from production in Fayetteville Shale counties increased more than 129,700 times from 2004 to 2011, reaching almost $39.2 million that year. Overall, from 2004 to 2011, Arkansas received more than $90.8 million in severance tax revenues from Fayetteville Shale activities.

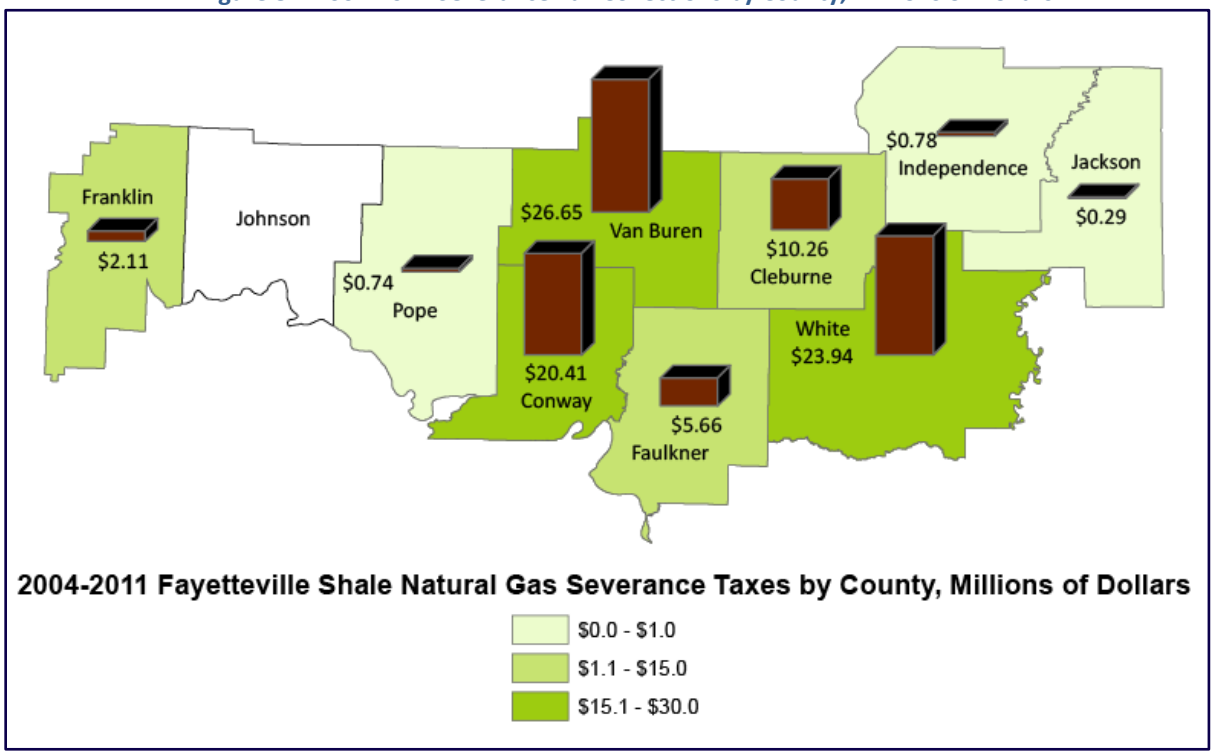
Table 12: Severance Tax Collections by County, 2004-2011

County	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*Total*
Cleburne	$0	$97	$473	$7,066	$27,191	$1,159,339	$3,912,084	$5,149,650	$10,255,900
Conway	$154	$3,806	$16,748	$76,349	$228,656	$3,673,179	$7,372,779	$9,040,923	$20,412,594
Faulkner	$0	$876	$7,494	$23,085	$37,239	$839,483	$2,283,325	$2,471,297	$5,662,799
Franklin	$94	$534	$603	$567	$507	$756,842	$794,383	$555,665	$2,109,195
Independence	$0	$0	$0	$0	$875	$134,361	$253,558	$393,425	$782,219
Jackson	$0	$0	$0	$0	$876	$38,863	$180,616	$66,404	$286,760
Pope	$0	$40	$25	$1,208	$5,468	$217,491	$290,855	$224,399	$739,486
Van Buren	$54	$1,839	$15,489	$95,598	$296,382	$4,798,028	$9,443,687	$12,003,316	$26,654,392
White	$0	$0	$3,603	$63,567	$222,805	$4,428,001	$9,951,655	$9,266,761	$23,936,392
Fayetteville Shale Counties	**$302**	**$7,193***	**$44,434**	**$267,520***	**$820,064***	**$16,045,588**	**$34,482,942**	**$39,171,840**	**$90,839,884***

Source: Arkansas Oil & Gas Commission, Center for Business and Economic Research estimates

*Totals include severance tax collected from natural gas production in Johnson County (a total of $146 collected from 2004 to 2011: $1 in 2005, $80 in 2007, and $65 collected in 2008).

Figure 82: 2004-2011 Severance Tax Collections by County, Millions of Dollars



Source: Arkansas Oil & Gas Commission, Center for Business and Economic Research estimates

In addition to using the 2012 survey responses for severance taxes collected from 2009 to 2011, data from the Arkansas Department of Finance and Administration were used as an alternative source.

As a result of the new tax structure, severance taxes were collected based on the market value of natural gas produced since January 1, 2009. Four categories of natural gas were defined by this regulation (high-cost gas, marginal gas, new discovery gas, and other gas) and different tax rates were applied based on these categories and depending on the life cycle of each completed well. Natural gas produced in the Fayetteville Shale is defined as high-cost gas, but so is the gas produced in the Woodford Shale, Moorefield Shale, Chattanooga Shale or their stratigraphic equivalents and other shale formations. From 2009 to 2011, the amount of severance taxes collected from high cost wells almost doubled: from $28.0 million to $53.1 million.

Table 13: Severance Taxes Collected from High Cost Natural Gas Wells, 2009-2011

Category	*2009*	*2010*	*2011*
State of Arkansas	$27,993,625	$47,470,578	$53,133,401

Source: Arkansas Department of Finance and Administration

The natural gas severance taxes are collected and then distributed[19] among the Arkansas State Highway and Transportation Department (70.0 percent of taxes collected), counties (15.0 percent), and cities (15.0 percent). The distribution of severance taxes to the counties and cities is not connected with the amount of natural gas produced in these counties. In fiscal year (FY) 2009, $183,524 were distributed to Fayetteville Shale counties. In FY 2010 the distribution increased to $821,040 and in FY 2011, the distribution increased to $1,013,724.

Table 14: Severance Tax Distribution by County, FY 2009 – FY 2011[20]

County	*FY 2009*	*FY 2010*	*FY 2011*
Cleburne	$16,404	$73,307	$90,084
Conway	$15,052	$67,053	$81,652
Faulkner	$31,956	$143,519	$183,203
Franklin	$14,112	$62,981	$76,594
Independence	$20,829	$93,199	$114,310
Jackson	$13,220	$59,138	$71,544
Pope	$25,066	$111,947	$137,459
Van Buren	$15,289	$68,397	$83,495
White	$31,597	$141,498	$175,384
Fayetteville Shale Counties	**$183,524**	**$821,040**	**$1,013,724**

Source: Arkansas State Treasury

Property Taxes

Additional property taxes were generated as a result of the production of natural gas in the Fayetteville Shale, with much of the increased amount received by public schools. These taxes were paid by exploration and production companies as well as by mineral right owners.

For the property tax estimation, information from the Arkansas Assessment Coordination Department (ACD) on assessing working and royalty interests was used. ACD sends assessment formulas as well as suggested gas prices to county assessors annually. Since the county assessors use the prices indicated by ACD for most of their calculations, the same prices were used for this evaluation ($6.60, $6.44, $5.48, and $4.85 for the years 2008, 2009, 2010, and 2011, respectively). For each year, working and royalty interests were calculated using the following formulas:

Working Interest = (Production, MCF x Price per MCF) x Working Interest Percent (87.5%) x (1 – Production Expenses (13%)) x 0.2 Assessment Rate

Royalty Interest = (Production, MCF x Price per MCF) x Royalty Interest Percent (12.5%) x 0.2 Assessment Rate

[19] Additionally, the State Treasury charges service fee from the total amount of taxes collected.
[20] Fiscal Year (FY): July 1 through June 30.

Once the working interests of companies and royalty interests of mineral rights owners were calculated, property taxes were estimated, using the average millage rates for school districts and counties from Arkansas Coordination Department for 2008 through 2010 and estimated millage rates for 2011. It should be noted that the evaluation was made based on the production of the specific year, thus the results for assessment years, rather than calendar years, are presented. The collection years are the years following the assessment years (for example, if the natural gas was produced in 2008, it was assessed using 2008 millage rates, yielding a total of $11.5 million in 2008 for school districts, but the property taxes were collected in 2009).

The calculations show that as a result of assessed valuation in Fayetteville Shale counties, school districts received more than $89.7 million in property taxes from 2008 to 2011. The collection of these taxes occurred from 2009 to 2011 and will occur in 2012 for assessment year 2011.

Table 15: School District Property Taxes from Fayetteville Shale Production, 2008-2011 Assessment Years

County	*2008*	*2009*	*2010*	*2011*	*2008-2011 Total*
Cleburne	$377,472	$1,657,384	$3,248,072	$4,247,617	$9,530,545
Conway	$3,288,382	$4,800,634	$5,620,949	$6,142,629	$19,852,594
Faulkner	$559,797	$1,294,498	$1,920,942	$2,383,728	$6,158,965
Franklin	$6,990	$7,867	$5,155	$3,894	$23,906
Independence	$13,084	$136,392	$210,555	$408,002	$768,033
Jackson	$12,006	$44,608	$131,535	$80,479	$268,629
Pope	$83,739	$134,725	$113,387	$87,328	$419,179
Van Buren	$3,939,920	$7,255,981	$7,909,602	$8,426,514	$27,532,017
White	$3,256,368	$6,155,947	$8,192,411	$7,540,551	$25,145,277
Fayetteville Shale Counties	**$11,538,661***	**$21,488,037**	**$27,352,609**	**$29,320,741**	**$89,700,048***

*Totals include school district property taxes that occurred from natural gas production in Johnson County in 2008 ($903).

Source: Arkansas Oil & Gas Commission, Arkansas Assessment Coordination Department, Center for Business and Economic Research estimates

In addition to property taxes received by school districts, almost $19.5 million in property taxes were partly collected by Fayetteville Shale area city, county, and other entities from 2009 to 2011 and will be collected in 2012. Overall, almost $109.2 million in total property tax revenues were estimated to be received as a result of natural gas production in the Fayetteville Shale from 2008 to 2011.

Table 16: Total Property Taxes from Fayetteville Shale Production, 2008-2011 Assessment Years

County	*2008*	*2009*	*2010*	*2011*	*2008-2011 Total*
Cleburne	$431,867	$1,896,618	$3,720,202	$4,865,038	$10,913,725
Conway	$4,163,084	$6,090,120	$7,166,982	$7,832,150	$25,252,338
Faulkner	$702,541	$1,585,080	$2,414,941	$2,996,739	$7,699,301
Franklin	$9,252	$10,453	$6,850	$5,174	$31,728
Independence	$16,413	$174,651	$271,170	$525,459	$987,692
Jackson	$15,650	$57,262	$168,848	$103,308	$345,068
Pope	$95,958	$154,417	$130,219	$100,291	$480,885
Van Buren	$5,032,095	$9,270,938	$10,108,393	$10,769,000	$35,180,426
White	$3,702,077	$6,911,997	$9,204,427	$8,472,042	$28,290,543
Fayetteville Shale Counties	**$14,170,126***	**$26,151,537**	**$33,192,032**	**$35,669,202**	**$109,182,898***

*Totals include property taxes that occurred from natural gas production in Johnson County in 2008 ($1,109).
Source: Arkansas Oil & Gas Commission, Arkansas Assessment Coordination Department, Center for Business and Economic Research estimates

Additionally, counties such as Faulkner and Pope tax minerals. County assessors evaluate natural gas reservoirs from the deeds which became possible due to the activities in the Fayetteville Shale Play. As a result, property taxes are received from the assessed values of natural gas as well in those counties. Also, property values in the area increase as a result of Fayetteville Shale activities and that, in turn, generates additional property taxes.

Total State and Local Taxes Impacts

In addition to drilling permit fees, severance and property taxes, Center for Business and Economic Research researchers estimated personal income and state and local sales taxes from estimated employment and from mineral leases and property payments made by companies to recipients in Fayetteville Shale area. For the estimations, total employment impacts from a customized IMPLAN model and survey responses from E&P companies were used together with data from Arkansas Department of Finance and Administration (ADFA), BEA, BLS, and U.S. Census.[21] Also, other indirect business taxes and fees and other taxes collected from households; employee compensation; as well as corporation profit taxes and dividends were used from the customized IMPLAN model for estimating total state and local tax impacts.

Fayetteville Shale activities generated almost $2.0 billion in state and local taxes from drilling permit fees, severance, property, income, sales, and other taxes from 2008 to 2011. This amount is higher than the projected state and local taxes for this time period in 2008 (equal to

[21] Weighted average state sales tax rate of 6% and county local sales tax rates were used from ADFA; share of personal expenditures out of personal income of 82.8% was used from the BEA; average annual pays by industry were used from the BLS; median household income by county and share of online sales from total retail sales for taxable personal expenditures were used from the U.S. Census for 2008-2011.

more than $1.2 billion), following higher than projected investments and higher total economic output and employment impacts of the Fayetteville Shale.

Table 17: Total State and Local Taxes, 2008-2011

Category	*2008*	*2009*	*2010*	*2011*	*2008-2011 Total*
Employee Compensation	$1,690,344	$2,305,688	$2,395,751	$2,653,867	$9,045,650
Indirect Business Taxes and Fees	$183,726,187	$368,667,117	$386,055,978	$412,720,807	$1,351,170,089
Households Taxes	$100,732,153	$132,720,679	$150,276,443	$159,410,819	$543,140,094
Corporation Taxes	$8,939,369	$14,852,317	$14,663,124	$15,703,921	$54,158,731
Total	**$295,088,053**	**$518,545,801**	**$553,391,296**	**$590,489,414**	**$1,957,514,564**

Source: 2012 Center for Business and Economic Research survey and estimates, IMPLAN, Arkansas Oil and Gas Commission

Projected Economic Impact for 2012

In the 2012 survey, the Center for Business and Economic Research asked E&P companies about their projected expenditures for 2012. Aggregating the received responses and using the economic impact methodology described above, the economic impacts of Fayetteville Shale were projected for 2012.

Survey Results

According to the 2012 survey, E&P companies are projecting total expenditures in the Fayetteville Shale to be lower in 2012 than in 2011 by 23.8 percent. However, these projected expenditures remain 5.8 percent higher than the amounts that the companies projected for 2012 when surveyed in 2008.

Table 18: Projected Expenditures of E&P Companies, 2012

Year	*Expenditures Projected in 2008*	*Expenditures Projected in 2012*	*Increase/Decrease in Expenditures Projected in 2012*
2012	$2,582,333,200	$2,731,667,478	5.8%

Source: 2008 and 2012 Center for Business and Economic Research survey and estimates

Projected Output, Value Added, and Employment Impacts

2012 survey responses of E&P companies were utilized together with a customized IMPLAN input/output model to estimate projected economic output, value added, and employment impacts for 2012. The geographic area considered was the entire state of Arkansas and the results are reported in 2012 dollars.

In 2012, direct expenditures of more than $2.7 billion are projected to result in a total economic activity of almost $4.0 billion and value added of more than $2.7 billion as a result of Fayetteville Shale activities. This implies an average economic multiplier of 1.46 for output impact and of 1.37 for value added impact. In addition, the total annual state employment impact is projected to be about 16,600 people during 2012.

Similarly to the re-estimated 2008 to 2011 impacts, impacts projected for 2012 in this report are higher than the impacts projected in 2008 (which were equal to $3.6 billion and about 11,300 people in total output and employment impacts, respectively). This is likely due to the fact that expenditures projected in 2012 are higher than the expenditures for 2012 projected in 2008.

Table 19: Projected Output, Value Added, and Employment Impacts of Fayetteville Shale Activities, 2012

Impact Category	*Direct Impact*	*Indirect Impact*	*Induced Impact*	*Total Impact*	*Average Multiplier*
Output	$2,731,667,460	$387,583,098	$858,611,745	$3,977,862,303	1.46
Value Added	$1,969,864,942	$202,328,325	$520,679,847	$2,692,873,115	1.37
Employment	5,750	2,620	8,237	16,607	2.89

Source: 2012 Center for Business and Economic Research survey and estimates, IMPLAN

Projected economic output, value added, and employment impacts for 2012 depend upon the industry environment remaining consistent with expectations. The investment and hiring plans of E&P companies are subject to several risk factors. Changes in the market-based price of natural gas are among the major risk factors to the projections. Price volatility and unanticipated operational cost increases could have significant impacts on overall economic product and employment effects statewide.

Conclusions

Production of natural gas in Fayetteville Shale activities counties increased dramatically during the initial years of activity in the region: from below 100 million cubic feet in 2004 to almost 943.6 billion cubic feet in 2011. From 2008 to 2011, natural gas production occurred in the following nine Fayetteville Shale counties: Cleburne, Conway, Faulkner, Franklin, Independence, Jackson, Pope, Van Buren, and White County.

The development of the natural gas industry in the area caused increases in employment, the number of establishments, personal income, taxable sales, assessed property values, and, in turn, tax revenues collected in Fayetteville Shale counties and in the state. Employment in the oil and gas extraction industry increased by 142.6 percent, while overall employment in the state increased only by 0.6 percent from 2001 to 2010. The number of business establishments in Fayetteville Shale counties increased at a higher rate than in the state overall for the past ten years: by 19.8 percent as compared with 17.0 percent in the state from 2001 to 2010. Average annual pay in the oil and gas extraction industry was $74,555 in 2010, twice the average pay of all industries in the state. From 2008 to 2011, more than $1.2 billion of mineral leases and royalty payments were made by exploration and production companies. Taxable sales in Fayetteville Shale counties increased by 20.0 percent from 2006 to 2011, while taxable sales in the state increased by 5.7 percent. Moreover, all Fayetteville Shale counties except Franklin County experienced a higher than the state average increase in their total assessment values in 2010.

From 2008 to 2011, direct expenditures of almost $12.8 billion resulted in a total economic impact of more than $18.5 billion and annual employment impacts ranging between 14,500 and 22,000 people as a result of Fayetteville Shale activities in Arkansas. Total economic output and employment impacts for 2008 to 2011 were consistently higher than the impacts projected in 2008, following higher actual expenditures in the Fayetteville Shale.

An economic output impact of almost $4.0 billion and annual state employment impact of more than 16,000 people are projected for 2012 in Arkansas. The projected impacts are subject to several risk factors. The biggest risk factor to the 2012 projections continues to be the sustained low natural gas prices environment. Price volatility could have significant impacts on overall economic product and employment effects statewide.

Data Sources and References

Arkansas Assessment Coordination Department, www.arkansas.gov/acd/index.html

Arkansas Department of Finance and Administration, www.dfa.arkansas.gov

Arkansas Oil and Gas Commission, www.aogc.state.ar.us

"Arkansas Shale Activity Continues Decline," The City Wire, http://www.thecitywire.com/node/21258

Arkansas State Treasury, www.artreasury.gov/

Arkansas State Highway & Transportation Department, www.arkansashighways.com/

Baker Hughes, http://gis.bakerhughesdirect.com/RigCounts/default2.aspx

Conway Advertising & Promotion Commission

Energy Information Administration, http://tonto.eia.gov

Institute for Economic Advancement, University of Arkansas at Little Rock, http://www.aiea.ualr.edu/

IMPLAN, http://implan.com

Market Watch, http://www.marketwatch.com

Ozark Advertising & Promotion Commission

"Pennsylvania Marcellus Shale Economic Impact Study," Marcellus Shale Education & Training Center, Summer 2011.

Rigzone, Oil & Gas Industry Information Provider, www.rigzone.com

Texas Gas Transmission LLC, www.txgt.com

"The Economic Consequences of Marcellus Shale Gas Extraction: Key Issues," Cornell University's Community & Regional Development Institute, September 2011.

"The Economic Impacts of Pennsylvania Marcellus Shale Natural Gas Play: an Update," the Pennsylvania State University, College of Earth and Mineral Sciences, Department of Energy and Mineral Engineering, May 2010.

The Economic Times, http://economictimes.indiatimes.com/newshome.cms

“The Impact of the Barnett Shale on Business Activity in the Surrounding Region and Texas: An Assessment of the First Decade of Extensive Development,” The Perryman Group, August 2011.

U.S. Bureau of Economic Analysis, www.bea.gov

U.S. Bureau of Labor Statistics, www.bls.gov

U.S. Census Bureau, www.census.gov

U.S. Energy Information Administration, www.eia.doe.gov

Appendix: Detailed Economic Impacts

Table 20: 2008 Economic Output Impacts

Industry	Direct	Indirect	Induced	Total
Oil and gas extraction	$2,258,076,944	$2,958,508	$318,307	$2,261,353,759
Drilling oil and gas wells	$568,228,695	$0	$0	$568,228,695
Rental activity for owner-occupied dwellings	$0	$0	$103,564,977	$103,564,977
Maintenance and repair construction of nonresidential structures	$0	$44,522,361	$3,522,079	$48,044,440
Support activities for oil and gas operations	$0	$44,005,117	$7,488	$44,012,606
Monetary authorities and depository credit intermediation activities	$0	$10,455,512	$32,006,897	$42,462,408
Offices of physicians, dentists, and other health practitioners	$0	$23	$41,887,892	$41,887,915
Wholesale trade businesses	$0	$10,244,440	$30,278,491	$40,522,932
Private hospitals	$0	$30	$35,899,250	$35,899,280
Food services and drinking places	$0	$1,447,064	$33,842,664	$35,289,728
Real estate establishments	$0	$4,357,273	$25,376,487	$29,733,760
Management of companies and enterprises	$0	$23,561,249	$4,631,582	$28,192,831
Telecommunications	$0	$5,767,266	$16,497,100	$22,264,366
Securities, commodity contracts, investments	$0	$3,836,412	$17,241,132	$21,077,544
Electric power generation, transmission, and distribution	$0	$8,844,804	$12,135,548	$20,980,352
Non-depository credit intermediation	$0	$3,401,710	$17,225,442	$20,627,152
Lessors of nonfinancial intangible assets	$0	$15,769,099	$385,655	$16,154,754
Other state and local government enterprises	$0	$1,629,228	$13,551,829	$15,181,056
Retail stores - motor vehicle and parts	$0	$744,493	$13,590,808	$14,335,301
Retail stores - general merchandise	$0	$423,219	$13,056,086	$13,479,305
Nursing and residential care facilities	$0	$0	$13,292,820	$13,292,820
Transport by truck	$0	$6,069,890	$6,429,994	$12,499,884
Insurance carriers	$0	$746,635	$10,070,918	$10,817,553
Civic, social, professional, and similar organizations	$0	$1,502,869	$9,213,745	$10,716,614
Retail stores - food and beverage	$0	$329,243	$10,088,040	$10,417,283

Industry	Direct	Indirect	Induced	Total
Architectural, engineering, and related services	$0	$9,263,541	$1,091,776	$10,355,317
Legal services	$0	$5,130,614	$4,928,861	$10,059,475
Natural gas distribution	$0	$5,799,931	$4,086,413	$9,886,344
Medical and diagnostic labs and outpatient and other ambulatory care services	$0	$636	$8,934,677	$8,935,313
Custom computer programming services	$0	$8,392,852	$113,829	$8,506,681
Commercial and industrial machinery and equipment rental and leasing	$0	$7,882,624	$599,742	$8,482,366
Retail stores - health and personal care	$0	$216,342	$6,506,041	$6,722,382
Services to buildings and dwellings	$0	$2,294,756	$4,100,421	$6,395,177
Iron and steel mills and ferroalloy manufacturing	$0	$6,112,249	$144,057	$6,256,306
Grantmaking, giving, and social advocacy organizations	$0	$1,510	$6,117,698	$6,119,208
Insurance agencies, brokerages, and related activities	$0	$721,165	$5,392,143	$6,113,309
Automotive repair and maintenance, except car washes	$0	$887,748	$4,929,487	$5,817,236
Retail stores - building material and garden supply	$0	$409,908	$5,253,418	$5,663,327
Retail stores - miscellaneous	$0	$162,679	$5,204,489	$5,367,167
Individual and family services	$0	$0	$5,236,654	$5,236,654
Retail stores - clothing and clothing accessories	$0	$143,688	$4,803,948	$4,947,635
Retail stores - gasoline stations	$0	$188,865	$4,519,818	$4,708,682
All other industries	**$0**	**$37,991,659**	**$126,571,429**	**$164,563,088**
Total	**$2,826,305,639**	**$276,217,212**	**$662,650,133**	**$3,765,172,984**

Source: 2012 Center for Business and Economic Research survey, IMPLAN, Center for Business and Economic Research estimates

Table 21: 2008 Employment Impacts

Industry	Direct	Indirect	Induced	Total
Oil and gas extraction	5,040	16	2	5,058
Drilling oil and gas wells	908	0	0	908
Food services and drinking places	0	33	766	799
Maintenance and repair construction of nonresidential structures	0	472	37	510
Offices of physicians, dentists, and other health practitioners	0	0	396	396
Private hospitals	0	0	348	348
Real estate establishments	0	50	290	340
Nursing and residential care facilities	0	0	293	293
Retail stores - general merchandise	0	9	266	275
Wholesale trade businesses	0	65	191	256
Support activities for oil and gas operations	0	225	0	225
Retail stores - food and beverage	0	7	205	212
Nondepository credit intermediation	0	32	162	194
Individual and family services	0	0	172	172
Retail stores - motor vehicle and parts	0	9	160	168
Private household operations	0	0	165	165
Civic, social, professional, and similar organizations	0	22	134	155
Management of companies and enterprises	0	129	25	155
Monetary authorities and depository credit intermediation activities	0	38	116	154
Employment services	0	40	109	149
Retail stores - miscellaneous	0	4	130	134
Services to buildings and dwellings	0	46	82	127
Securities, commodity contracts, investments, and related activities	0	23	104	127
Architectural, engineering, and related services	0	100	12	112
Transport by truck	0	54	57	111
Legal services	0	56	53	109
Retail stores - clothing and clothing accessories	0	3	105	109
Child day care services	0	0	103	103
Retail nonstores - direct and electronic sales	0	3	100	102
Retail stores - health and personal care	0	3	91	94
Custom computer programming services	0	92	1	93
Automotive repair and maintenance, except car washes	0	14	76	89
Retail stores - gasoline stations	0	3	82	85
Retail stores - building material and garden supply	0	6	78	84
Medical and diagnostic labs and outpatient and other ambulatory care services	0	0	82	82

Industry	Direct	Indirect	Induced	Total
Grantmaking, giving, and social advocacy organizations	0	0	75	75
Accounting, tax preparation, bookkeeping, and payroll services	0	33	35	68
Private elementary and secondary schools	0	0	68	68
Other state and local government enterprises	0	7	57	64
Retail stores - sporting goods, hobby, book and music	0	2	61	63
Other private educational services	0	0	58	59
Insurance agencies, brokerages, and related activities	0	7	51	58
Insurance carriers	0	4	52	56
Business support services	0	17	38	55
Personal care services	0	0	54	54
Home health care services	0	0	52	52
Telecommunications	0	13	38	51
Community food, housing, and other relief services, including rehabilitation services	0	0	50	50
All other industries	**0**	**298**	**948**	**1,246**
Total	**5,948**	**1,934**	**6,629**	**14,511**

Source: 2012 Center for Business and Economic Research survey, IMPLAN, Center for Business and Economic Research estimates

Table 22: 2009 Economic Output Impacts

Industry	Direct	Indirect	Induced	Total
Oil and gas extraction	$2,502,507,554	$3,249,269	$275,705	$2,506,032,528
Drilling oil and gas wells	$629,737,862	$0	$0	$629,737,862
Imputed rental activity for owner-occupied dwellings	$0	$0	$171,257,924	$171,257,924
Maintenance and repair construction of nonresidential structures	$0	$89,292,244	$5,562,481	$94,854,726
Support activities for oil and gas operations	$0	$80,547,054	$10,733	$80,557,787
Monetary authorities and depository credit intermediation activities	$0	$19,115,611	$51,011,027	$70,126,638
Offices of physicians, dentists, and other health practitioners	$0	$43	$68,636,932	$68,636,975
Wholesale trade businesses	$0	$15,980,571	$45,138,390	$61,118,961
Food services and drinking places	$0	$2,769,390	$56,432,970	$59,202,361
Private hospitals	$0	$57	$58,520,819	$58,520,876
Management of companies and enterprises	$0	$43,051,276	$7,235,270	$50,286,546
Real estate establishments	$0	$7,866,232	$39,746,182	$47,612,414
Telecommunications	$0	$10,724,981	$26,171,585	$36,896,566

Industry	Direct	Indirect	Induced	Total
Electric power generation, transmission, and distribution	$0	$16,747,675	$18,685,990	$35,433,665
Nondepository credit intermediation	$0	$5,968,373	$26,977,134	$32,945,507
Securities, commodity contracts, investments, and related activities	$0	$6,539,277	$26,288,544	$32,827,822
Lessors of nonfinancial intangible assets	$0	$31,015,167	$601,241	$31,616,407
Other state and local government enterprises	$0	$2,862,260	$21,786,649	$24,648,909
Retail stores - motor vehicle and parts	$0	$1,461,798	$21,840,224	$23,302,023
Nursing and residential care facilities	$0	$0	$21,880,670	$21,880,670
Retail stores - general merchandise	$0	$830,982	$20,981,985	$21,812,967
Transport by truck	$0	$8,885,420	$9,918,114	$18,803,534
Architectural, engineering, and related services	$0	$16,290,914	$1,768,034	$18,058,948
Insurance carriers	$0	$1,326,410	$16,695,751	$18,022,161
Civic, social, professional, and similar organizations	$0	$2,846,460	$15,071,417	$17,917,877
Custom computer programming services	$0	$16,925,216	$180,951	$17,106,167
Retail stores - food and beverage	$0	$646,463	$16,212,126	$16,858,589
Legal services	$0	$8,743,553	$8,111,116	$16,854,668
Commercial and industrial machinery and equipment rental and leasing	$0	$14,180,348	$965,969	$15,146,318
Natural gas distribution	$0	$9,075,526	$5,526,537	$14,602,064
Medical and diagnostic labs and outpatient and other ambulatory care services	$0	$1,177	$14,556,617	$14,557,794
Retail stores - health and personal care	$0	$424,783	$10,455,614	$10,880,397
Services to buildings and dwellings	$0	$4,219,305	$6,620,578	$10,839,883
Insurance agencies, brokerages, and related activities	$0	$1,327,513	$8,955,003	$10,282,516
Grantmaking, giving, and social advocacy organizations	$0	$2,626	$10,010,755	$10,013,382
Automotive repair and maintenance, except car washes	$0	$1,689,610	$8,285,638	$9,975,247
Retail stores - building material and garden supply	$0	$804,847	$8,441,724	$9,246,571
Retail stores - miscellaneous	$0	$319,416	$8,363,974	$8,683,390

Industry	Direct	Indirect	Induced	Total
Individual and family services	$0	$0	$8,573,210	$8,573,210
Retail stores - clothing and clothing accessories	$0	$282,128	$7,720,301	$8,002,429
Accounting, tax preparation, bookkeeping, and payroll services	$0	$4,207,205	$3,761,070	$7,968,275
Retail stores - gasoline stations	$0	$370,832	$7,263,492	$7,634,324
All other industries	**$0**	**$68,448,361**	**$201,016,760**	**$269,465,121**
Total	**$3,132,245,416**	**$499,040,374**	**$1,067,517,206**	**$4,698,802,996**

Source: 2012 Center for Business and Economic Research survey, IMPLAN, Center for Business and Economic Research estimates

Table 23: 2009 Employment Impacts

Industry	Direct	Indirect	Induced	Total
Oil and gas extraction	5,586	32	3	5,621
Food services and drinking places	0	60	1,232	1,292
Maintenance and repair construction of nonresidential structures	0	961	60	1,021
Drilling oil and gas wells	1,006	0	0	1,006
Offices of physicians, dentists, and other health practitioners	0	0	634	634
Private hospitals	0	0	555	555
Real estate establishments	0	91	459	549
Nursing and residential care facilities	0	0	470	470
Support activities for oil and gas operations	0	459	0	459
Retail stores - general merchandise	0	17	432	449
Wholesale trade businesses	0	108	305	413
Retail stores - food and beverage	0	13	333	346
Non-depository credit intermediation	0	58	260	318
Management of companies and enterprises	0	243	41	284
Individual and family services	0	0	279	279
Retail stores - motor vehicle and parts	0	17	259	276
Private household operations	0	0	271	271
Civic, social, professional, and similar organizations	0	41	216	257
Monetary authorities and depository credit intermediation activities	0	69	185	254
Employment services	0	74	175	249
Retail stores - miscellaneous	0	8	210	218
Services to buildings and dwellings	0	84	132	216
Securities, commodity contracts, investments, and related activities	0	41	166	207
Architectural, engineering, and related services	0	174	19	193
Custom computer programming services	0	187	2	189
Legal services	0	92	85	178

Industry	Direct	Indirect	Induced	Total
Retail stores - clothing and clothing accessories	0	6	171	177
Transport by truck	0	83	93	176
Child day care services	0	0	167	167
Retail nonstores - direct and electronic sales	0	5	161	167
Retail stores - health and personal care	0	6	147	153
Automotive repair and maintenance, except car washes	0	25	122	147
Retail stores - gasoline stations	0	7	133	140
Retail stores - building material and garden supply	0	12	127	139
Medical and diagnostic labs and outpatient and other ambulatory care services	0	0	132	132
Grantmaking, giving, and social advocacy organizations	0	0	121	121
Accounting, tax preparation, bookkeeping, and payroll services	0	62	55	117
Private elementary and secondary schools	0	0	113	113
Retail stores - sporting goods, hobby, book and music	0	4	100	103
Other state and local government enterprises	0	12	91	103
Other private educational services	0	1	94	95
Insurance agencies, brokerages, and related activities	0	12	82	94
Business support services	0	31	61	92
Insurance carriers	0	7	84	91
Personal care services	0	0	86	86
Telecommunications	0	25	60	85
Home health care services	0	0	83	83
Community food, housing, and other relief services, including rehabilitation services	0	0	80	80
All other industries	**0**	**542**	**1,527**	**2,069**
Total	**6,592**	**3,669**	**10,673**	**20,933**

Source: 2012 Center for Business and Economic Research survey, IMPLAN, Center for Business and Economic Research estimates

Table 24: 2010 Economic Output Impacts

Industry	Direct	Indirect	Induced	Total
Oil and gas extraction	$2,579,279,616	$3,350,272	$294,890	$2,582,924,778
Drilling oil and gas wells	$649,057,024	$0	$0	$649,057,024
Imputed rental activity for owner-occupied dwellings	$0	$0	$166,652,320	$166,652,320
Maintenance and repair construction of nonresidential structures	$0	$89,472,304	$5,778,697	$95,251,001
Support activities for oil and gas operations	$0	$80,502,776	$11,129	$80,513,905

Industry	Direct	Indirect	Induced	Total
Monetary authorities and depository credit intermediation activities	$0	$18,894,628	$52,024,496	$70,919,124
Offices of physicians, dentists, and other health practitioners	$0	$43	$70,876,832	$70,876,875
Private hospitals	$0	$56	$60,235,440	$60,235,496
Food services and drinking places	$0	$2,735,978	$57,481,556	$60,217,534
Wholesale trade businesses	$0	$15,271,366	$44,293,228	$59,564,594
Management of companies and enterprises	$0	$42,985,984	$7,458,770	$50,444,754
Real estate establishments	$0	$7,851,329	$40,994,896	$48,846,225
Telecommunications	$0	$10,404,248	$26,228,926	$36,633,174
Electric power generation, transmission, and distribution	$0	$16,182,206	$18,707,280	$34,889,486
Nondepository credit intermediation	$0	$5,904,783	$27,482,406	$33,387,189
Lessors of nonfinancial intangible assets	$0	$30,473,880	$611,975	$31,085,855
Securities, commodity contracts, investments, and related activities	$0	$5,733,797	$23,757,228	$29,491,025
Other state and local government enterprises	$0	$2,862,188	$22,414,980	$25,277,168
Retail stores - motor vehicle and parts	$0	$1,417,962	$21,892,114	$23,310,076
Nursing and residential care facilities	$0	$0	$22,709,198	$22,709,198
Retail stores - general merchandise	$0	$806,062	$21,031,664	$21,837,726
Transport by truck	$0	$8,879,167	$10,101,653	$18,980,820
Insurance carriers	$0	$1,358,532	$17,549,068	$18,907,600
Civic, social, professional, and similar organizations	$0	$2,843,516	$15,521,932	$18,365,448
Architectural, engineering, and related services	$0	$16,332,464	$1,822,627	$18,155,091
Legal services	$0	$8,898,618	$8,467,100	$17,365,718
Custom computer programming services	$0	$16,771,568	$185,842	$16,957,410
Retail stores - food and beverage	$0	$627,077	$16,250,514	$16,877,591
Commercial and industrial machinery and equipment rental and leasing	$0	$14,170,632	$994,003	$15,164,635
Medical and diagnostic labs and outpatient and other ambulatory care services	$0	$1,169	$14,903,194	$14,904,363
Natural gas distribution	$0	$9,070,544	$5,703,469	$14,774,013

Industry	Direct	Indirect	Induced	Total
Services to buildings and dwellings	$0	$4,212,245	$6,808,953	$11,021,197
Retail stores - health and personal care	$0	$412,044	$10,480,371	$10,892,415
Grantmaking, giving, and social advocacy organizations	$0	$2,618	$10,236,420	$10,239,038
Automotive repair and maintenance, except car washes	$0	$1,674,494	$8,456,827	$10,131,321
Insurance agencies, brokerages, and related activities	$0	$1,266,334	$8,787,193	$10,053,527
Retail stores - building material and garden supply	$0	$780,711	$8,461,853	$9,242,564
Individual and family services	$0	$0	$8,766,799	$8,766,799
Retail stores - miscellaneous	$0	$309,838	$8,383,774	$8,693,612
Accounting, tax preparation, bookkeeping, and payroll services	$0	$4,322,067	$3,987,670	$8,309,737
Retail stores - clothing and clothing accessories	$0	$273,668	$7,738,573	$8,012,241
Retail stores - gasoline stations	$0	$359,711	$7,280,715	$7,640,426
All other industries	**$0**	**$67,197,486**	**$204,580,364**	**$271,777,850**
Total	**$3,228,336,640**	**$494,614,363**	**$1,076,406,937**	**$4,799,357,940**

Source: 2012 Center for Business and Economic Research survey, IMPLAN, Center for Business and Economic Research estimates

Table 25: 2010 Employment Impacts

Industry	Direct	Indirect	Induced	Total
Oil and gas extraction	5,757	31	3	5,790
Food services and drinking places	0	58	1,226	1,284
Drilling oil and gas wells	1,037	0	0	1,037
Maintenance and repair construction of nonresidential structures	0	923	60	983
Offices of physicians, dentists, and other health practitioners	0	0	631	631
Private hospitals	0	0	553	553
Real estate establishments	0	88	458	545
Nursing and residential care facilities	0	0	468	468
Retail stores - general merchandise	0	16	429	446
Support activities for oil and gas operations	0	441	0	441
Wholesale trade businesses	0	105	304	409
Retail stores - food and beverage	0	13	331	344
Nondepository credit intermediation	0	56	259	315
Individual and family services	0	0	277	277
Management of companies and enterprises	0	234	41	275
Retail stores - motor vehicle and parts	0	17	257	274
Private household operations	0	0	269	269
Civic, social, professional, and similar organizations	0	39	215	254

Industry	Direct	Indirect	Induced	Total
Monetary authorities and depository credit intermediation activities	0	67	184	251
Employment services	0	72	174	246
Retail stores - miscellaneous	0	8	209	217
Services to buildings and dwellings	0	81	131	212
Securities, commodity contracts, investments, and related activities	0	40	165	205
Architectural, engineering, and related services	0	169	19	188
Custom computer programming services	0	180	2	182
Retail stores - clothing and clothing accessories	0	6	170	176
Legal services	0	90	85	175
Transport by truck	0	81	92	173
Child day care services	0	0	166	166
Retail nonstores - direct and electronic sales	0	5	161	165
Retail stores - health and personal care	0	6	146	152
Automotive repair and maintenance, except car washes	0	24	122	146
Retail stores - gasoline stations	0	7	132	139
Retail stores - building material and garden supply	0	12	126	138
Medical and diagnostic labs and outpatient and other ambulatory care services	0	0	131	131
Grantmaking, giving, and social advocacy organizations	0	0	121	121
Accounting, tax preparation, bookkeeping, and payroll services	0	60	55	115
Private elementary and secondary schools	0	0	112	112
Retail stores - sporting goods, hobby, book and music	0	4	99	103
Other state and local government enterprises	0	12	91	103
Other private educational services	0	1	93	94
Insurance agencies, brokerages, and related activities	0	12	82	94
Business support services	0	30	61	90
Insurance carriers	0	6	84	90
Personal care services	0	0	86	86
Telecommunications	0	24	60	84
Home health care services	0	0	83	83
Community food, housing, and other relief services, including rehabilitation services	0	0	80	80
All other industries	**0**	**523**	**1,520**	**2,043**
Total	**6,794**	**3,537**	**10,622**	**20,953**

Source: 2012 Center for Business and Economic Research survey, IMPLAN, Center for Business and Economic Research estimates

Table 26: 2011 Economic Output Impacts

Industry	Direct	Indirect	Induced	Total
Oil and gas extraction	$2,863,417,665	$3,721,199	$336,428	$2,867,475,291
Drilling oil and gas wells	$720,558,303	$0	$0	$720,558,303
Imputed rental activity for owner-occupied dwellings	$0	$0	$173,149,481	$173,149,481
Maintenance and repair construction of nonresidential structures	$0	$96,566,950	$6,404,849	$102,971,799
Support activities for oil and gas operations	$0	$86,663,321	$12,309	$86,675,629
Offices of physicians, dentists, and other health practitioners	$0	$47	$78,080,939	$78,080,986
Monetary authorities and depository credit intermediation activities	$0	$20,119,275	$56,598,741	$76,718,016
Private hospitals	$0	$61	$66,134,731	$66,134,792
Food services and drinking places	$0	$2,911,799	$62,477,187	$65,388,986
Wholesale trade businesses	$0	$15,722,463	$46,357,709	$62,080,172
Management of companies and enterprises	$0	$46,236,020	$8,203,617	$54,439,637
Real estate establishments	$0	$8,442,018	$45,080,055	$53,522,073
Telecommunications	$0	$10,872,732	$28,039,254	$38,911,986
Electric power generation, transmission, and distribution	$0	$16,842,664	$19,973,517	$36,816,180
Nondepository credit intermediation	$0	$6,293,371	$29,875,022	$36,168,392
Lessors of nonfinancial intangible assets	$0	$32,251,350	$664,698	$32,916,048
Securities, commodity contracts, investments, and related activities	$0	$5,416,152	$22,899,433	$28,315,585
Other state and local government enterprises	$0	$3,083,402	$24,602,367	$27,685,770
Nursing and residential care facilities	$0	$0	$25,145,624	$25,145,624
Retail stores - motor vehicle and parts	$0	$1,481,573	$23,425,264	$24,906,837
Retail stores - general merchandise	$0	$842,223	$22,504,417	$23,346,640
Insurance carriers	$0	$1,499,018	$19,690,786	$21,189,803
Transport by truck	$0	$9,559,439	$10,981,117	$20,540,556
Civic, social, professional, and similar organizations	$0	$3,059,990	$17,062,023	$20,122,013
Architectural, engineering, and related services	$0	$17,640,155	$2,004,662	$19,644,817
Legal services	$0	$9,756,982	$9,429,320	$19,186,302

Industry	Direct	Indirect	Induced	Total
Custom computer programming services	$0	$17,901,000	$203,655	$18,104,654
Retail stores - food and beverage	$0	$655,208	$17,388,464	$18,043,672
Commercial and industrial machinery and equipment rental and leasing	$0	$15,255,443	$1,091,368	$16,346,811
Medical and diagnostic labs and outpatient and other ambulatory care services	$0	$1,251	$16,278,798	$16,280,049
Natural gas distribution	$0	$9,765,980	$6,278,040	$16,044,020
Services to buildings and dwellings	$0	$4,530,108	$7,473,699	$12,003,807
Retail stores - health and personal care	$0	$430,529	$11,214,268	$11,644,798
Grantmaking, giving, and social advocacy organizations	$0	$2,810	$11,172,381	$11,175,192
Automotive repair and maintenance, except car washes	$0	$1,787,747	$9,212,096	$10,999,843
Insurance agencies, brokerages, and related activities	$0	$1,301,342	$9,202,528	$10,503,870
Retail stores - building material and garden supply	$0	$815,735	$9,054,509	$9,870,244
Individual and family services	$0	$0	$9,568,689	$9,568,689
Retail stores - miscellaneous	$0	$323,737	$8,970,851	$9,294,588
Accounting, tax preparation, bookkeeping, and payroll services	$0	$4,783,044	$4,510,943	$9,293,987
Retail stores - clothing and clothing accessories	$0	$285,945	$8,280,466	$8,566,411
Retail stores - gasoline stations	$0	$375,849	$7,790,571	$8,166,419
All other industries	**$0**	**$71,095,943**	**$222,261,987**	**$293,357,930**
Total	**$3,583,975,967**	**$528,293,873**	**$1,159,086,862**	**$5,271,356,703**

Source: 2012 Center for Business and Economic Research survey, IMPLAN, Center for Business and Economic Research estimates

Table 27: 2011 Employment Impacts

Industry	Direct	Indirect	Induced	Total
Oil and gas extraction	6,392	32	3	6,427
Food services and drinking places	0	61	1,302	1,363
Drilling oil and gas wells	1,152	0	0	1,152
Maintenance and repair construction of nonresidential structures	0	955	63	1,019
Offices of physicians, dentists, and other health practitioners	0	0	671	671
Private hospitals	0	0	588	588
Real estate establishments	0	91	487	579
Nursing and residential care facilities	0	0	497	497
Retail stores - general merchandise	0	17	456	473

Industry	Direct	Indirect	Induced	Total
Support activities for oil and gas operations	0	456	0	456
Wholesale trade businesses	0	110	323	433
Retail stores - food and beverage	0	13	351	364
Nondepository credit intermediation	0	58	275	333
Individual and family services	0	0	294	294
Retail stores - motor vehicle and parts	0	17	273	290
Management of companies and enterprises	0	243	43	287
Private household operations	0	0	285	285
Civic, social, professional, and similar organizations	0	41	228	269
Monetary authorities and depository credit intermediation activities	0	70	196	266
Employment services	0	74	185	259
Retail stores - miscellaneous	0	8	222	230
Services to buildings and dwellings	0	84	139	224
Securities, commodity contracts, investments, and related activities	0	42	176	218
Architectural, engineering, and related services	0	176	20	196
Custom computer programming services	0	186	2	188
Retail stores - clothing and clothing accessories	0	6	180	187
Legal services	0	94	91	184
Transport by truck	0	85	98	183
Child day care services	0	0	176	176
Retail nonstores - direct and electronic sales	0	5	170	175
Retail stores - health and personal care	0	6	155	161
Automotive repair and maintenance, except car washes	0	25	129	154
Retail stores - gasoline stations	0	7	140	147
Retail stores - building material and garden supply	0	12	134	146
Medical and diagnostic labs and outpatient and other ambulatory care services	0	0	139	139
Grantmaking, giving, and social advocacy organizations	0	0	128	128
Accounting, tax preparation, bookkeeping, and payroll services	0	62	59	121
Private elementary and secondary schools	0	0	118	118
Retail stores - sporting goods, hobby, book and music	0	4	105	109
Other state and local government enterprises	0	12	97	109
Other private educational services	0	1	99	100
Insurance agencies, brokerages, and related activities	0	12	87	99
Insurance carriers	0	7	89	95
Business support services	0	31	64	95

Industry	Direct	Indirect	Induced	Total
Personal care services	0	0	92	92
Telecommunications	0	25	64	89
Home health care services	0	0	88	88
Community food, housing, and other relief services, including rehabilitation services	0	0	85	85
All other industries	**0**	**545**	**1,614**	**2,159**
Total	**7,544**	**3,674**	**11,282**	**22,499**

Source: 2012 Center for Business and Economic Research survey, IMPLAN, Center for Business and Economic Research estimates

Table 28: 2012 Projected Economic Output Impacts

Industry	Direct	Indirect	Induced	Total
Oil and gas extraction	$2,182,465,757	$2,837,488	$263,846	$2,185,567,091
Drilling oil and gas wells	$549,201,703	$0	$0	$549,201,703
Imputed rental activity for owner-occupied dwellings	$0	$0	$123,662,050	$123,662,050
Maintenance and repair construction of nonresidential structures	$0	$71,556,128	$4,879,899	$76,436,027
Support activities for oil and gas operations	$0	$64,052,536	$9,359	$64,061,895
Offices of physicians, dentists, and other health practitioners	$0	$35	$59,130,255	$59,130,290
Monetary authorities and depository credit intermediation activities	$0	$14,710,403	$42,328,376	$57,038,779
Private hospitals	$0	$45	$49,915,308	$49,915,353
Food services and drinking places	$0	$2,127,869	$46,680,287	$48,808,156
Wholesale trade businesses	$0	$11,115,642	$33,353,011	$44,468,653
Management of companies and enterprises	$0	$34,147,673	$6,202,492	$40,350,165
Real estate establishments	$0	$6,232,905	$34,078,062	$40,310,967
Telecommunications	$0	$7,801,799	$20,605,315	$28,407,114
Nondepository credit intermediation	$0	$4,605,837	$22,324,454	$26,930,291
Electric power generation, transmission, and distribution	$0	$12,036,153	$14,659,821	$26,695,974
Lessors of nonfinancial intangible assets	$0	$23,434,084	$496,287	$23,930,372
Other state and local government enterprises	$0	$2,280,971	$18,562,638	$20,843,609
Nursing and residential care facilities	$0	$0	$19,140,171	$19,140,171
Securities, commodity contracts, investments, and related activities	$0	$3,513,096	$15,173,363	$18,686,460

Industry	Direct	Indirect	Induced	Total
Retail stores - motor vehicle and parts	$0	$1,062,863	$17,230,242	$18,293,105
Retail stores - general merchandise	$0	$604,201	$16,552,820	$17,157,022
Insurance carriers	$0	$1,135,804	$15,187,367	$16,323,171
Transport by truck	$0	$7,067,593	$8,205,684	$15,273,277
Civic, social, professional, and similar organizations	$0	$2,261,062	$12,892,267	$15,153,329
Architectural, engineering, and related services	$0	$13,083,139	$1,515,677	$14,598,816
Legal services	$0	$7,346,508	$7,218,555	$14,565,062
Custom computer programming services	$0	$13,117,723	$153,414	$13,271,137
Retail stores - food and beverage	$0	$470,039	$12,789,855	$13,259,894
Medical and diagnostic labs and outpatient and other ambulatory care services	$0	$919	$12,223,289	$12,224,208
Commercial and industrial machinery and equipment rental and leasing	$0	$11,277,381	$823,713	$12,101,094
Natural gas distribution	$0	$7,219,943	$4,750,479	$11,970,423
Services to buildings and dwellings	$0	$3,345,341	$5,639,055	$8,984,396
Retail stores - health and personal care	$0	$308,857	$8,248,507	$8,557,364
Grantmaking, giving, and social advocacy organizations	$0	$2,072	$8,382,166	$8,384,238
Automotive repair and maintenance, except car washes	$0	$1,310,593	$6,898,021	$8,208,614
Insurance agencies, brokerages, and related activities	$0	$918,298	$6,624,901	$7,543,200
Retail stores - building material and garden supply	$0	$585,199	$6,660,006	$7,245,204
Individual and family services	$0	$0	$7,179,214	$7,179,214
Accounting, tax preparation, bookkeeping, and payroll services	$0	$3,634,519	$3,507,822	$7,142,341
Retail stores - miscellaneous	$0	$232,245	$6,598,386	$6,830,632
Retail stores - clothing and clothing accessories	$0	$205,133	$6,090,581	$6,295,714
Retail stores - gasoline stations	$0	$269,629	$5,730,265	$5,999,894
All other industries	**$0**	**$51,671,374**	**$166,044,463**	**$217,715,837**
Total	**$2,731,667,460**	**$387,583,098**	**$858,611,745**	**$3,977,862,303**

Source: 2012 Center for Business and Economic Research survey, IMPLAN, Center for Business and Economic Research estimates

Table 29: 2012 Projected Employment Impacts

Industry	Direct	Indirect	Induced	Total
Oil and gas extraction	4,872	23	2	4,897
Food services and drinking places	0	43	951	994
Drilling oil and gas wells	878	0	0	878
Maintenance and repair construction of nonresidential structures	0	679	46	725
Offices of physicians, dentists, and other health practitioners	0	0	490	490
Private hospitals	0	0	430	430
Real estate establishments	0	65	357	422
Nursing and residential care facilities	0	0	363	363
Retail stores - general merchandise	0	12	332	344
Support activities for oil and gas operations	0	324	0	324
Wholesale trade businesses	0	79	236	315
Retail stores - food and beverage	0	9	256	266
Nondepository credit intermediation	0	41	201	242
Individual and family services	0	0	215	215
Retail stores - motor vehicle and parts	0	12	199	211
Private household operations	0	0	208	208
Management of companies and enterprises	0	174	32	205
Civic, social, professional, and similar organizations	0	29	166	196
Monetary authorities and depository credit intermediation activities	0	50	143	193
Employment services	0	53	135	188
Retail stores - miscellaneous	0	6	162	168
Services to buildings and dwellings	0	60	102	162
Securities, commodity contracts, investments, and related activities	0	30	129	158
Architectural, engineering, and related services	0	126	15	141
Retail stores - clothing and clothing accessories	0	4	132	136
Custom computer programming services	0	132	2	134
Legal services	0	67	66	133
Transport by truck	0	61	71	133
Child day care services	0	0	128	128
Retail nonstores - direct and electronic sales	0	4	124	128
Retail stores - health and personal care	0	4	113	117
Automotive repair and maintenance, except car washes	0	18	94	112
Retail stores - gasoline stations	0	5	102	107
Retail stores - building material and garden supply	0	9	97	106
Medical and diagnostic labs and outpatient and other ambulatory care services	0	0	102	102

Industry	Direct	Indirect	Induced	Total
Grantmaking, giving, and social advocacy organizations	0	0	93	93
Accounting, tax preparation, bookkeeping, and payroll services	0	44	43	87
Private elementary and secondary schools	0	0	86	86
Retail stores - sporting goods, hobby, book and music	0	3	77	79
Other state and local government enterprises	0	9	71	79
Other private educational services	0	0	72	73
Insurance agencies, brokerages, and related activities	0	9	63	72
Insurance carriers	0	5	65	70
Business support services	0	22	47	69
Personal care services	0	0	67	67
Telecommunications	0	18	47	65
Home health care services	0	0	64	64
Community food, housing, and other relief services, including rehabilitation services	0	0	62	62
All other industries	**0**	**390**	**1,178**	**1,568**
Total	**5,750**	**2,620**	**8,237**	**16,607**

Source: 2012 Center for Business and Economic Research survey, IMPLAN, Center for Business and Economic Research estimates