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# DESCRIBING THE ECONOMIC IMPACT OF THE OIL AND GAS INDUSTRY IN ARKANSAS

*Produced for AIPRO*

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## EXECUTIVE SUMMARY

The Arkansas oil and natural gas industries are increasingly important to the state's economic vitality. As global demand for energy increases, domestic production is put into the spotlight. This study describes the economic impact of the oil and gas industries in Arkansas, focusing on the sector's economic output, employment, and tax revenues. Some of the key statistics are:

- The 2008 population of Arkansas represented 0.9 percent of the population of the United States, but produced only 0.7 percent of the nation's gross domestic product at \$98.3 billion.
- In 2007, the oil and gas industry accounted for 1.2 percent of Arkansas gross domestic product at \$1.1 billion and generate \$380 million in employee compensation.
- Likewise, in 2008 the Arkansas population of 2.9 million people generated \$89.3 billion in personal income, which accounted for only 0.7 percent of the United States total.
- In 2007, Arkansas per capita personal income was \$30,177, which was 78.1 percent of the United States per capita income figure.
- Earnings from the oil and gas industry in 2008 represented 0.8 percent of Arkansas personal income, up from 0.5 percent in 2004.
- In 2008, there were 9,164 employees in 564 oil and gas industry establishments in Arkansas. The average annual pay for the industry was \$64,039, 183 percent of the state average annual pay of \$34,909.
- Arkansas oil and gas industry jobs accounted for 0.8 percent of all employment in the state in 2008.
- From 2004 to 2008, employment in the Arkansas oil and gas industry sector increased by 121.7 percent, while total employment increased by only 3.8 percent during the same period.
- For the calendar year 2008, the state of Arkansas collected \$23.4 million in severance tax revenues for oil production and \$1.2 million in severance tax revenues for natural gas production. For the first half of 2009, \$6.1 million for oil and \$13.6 million for natural gas have been collected in Arkansas severance taxes.

- From 2004 to 2008, taxable sales increased 5.3 percent in Arkansas. In the ten oil-producing counties, taxable sales increased by 28.8 percent. In the 13 gas-producing counties, taxable sales increased by 21.8 percent.<sup>1</sup>
- According to the Energy Information Administration, the amount of Arkansas natural gas production ranked the state 12<sup>th</sup> out of the 32 natural gas producing states in 2006 and 2007. Increased levels of natural gas production from the development of the Fayetteville Shale meant that the ranking improved from its 2004 and 2005 levels of 15<sup>th</sup> and 14<sup>th</sup> place, respectively.
- The market value of the natural gas produced in Arkansas in 2008 was \$3.6 billion. By comparison, the state's top agricultural product in 2008 was broilers, which had a market value of \$2.8 billion. Arkansas-grown rice and soybeans had market values of \$1.4 billion and \$1.0 billion in 2008.
- For 2008 oil production, Arkansas ranked 17<sup>th</sup> out of the 31 crude oil producing states, according to the Energy Information Administration. The ranking of the state has been basically unchanged since 2003.
- The market value of the crude oil produced in Arkansas in 2008 was \$413.4 million.
- In 2007, Arkansas had 3,305 billion cubic feet of proved reserves of dry natural gas and 31 million barrels of proved reserves of crude oil.

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<sup>1</sup> Oil producing counties include: Ashley, Bradley, Calhoun, Columbia, Hempstead, Lafayette, Miller, Nevada, Ouachita, and Union. Counties producing gas are based on their severance tax collections in gas category from 2008: Cleburne, Conway, Crawford, Faulkner, Franklin, Johnson, Logan, Pope, Scott, Sebastian, Van Buren, White, and Yell.

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## INTRODUCTION

The oil and gas industry plays an increasingly important role in determining the health of the Arkansas economy. The sector has received a great deal of attention in recent years as the nation focuses on developing domestic energy sources. Technological advances have made recovery of natural gas from shale formations like the Fayetteville Shale possible, and those advances have spurred the creation of a greatly enhanced industry in the state. Although the amount of natural gas being produced in the state has increased by many orders of magnitude, the industry itself is not new to the state. Indeed, natural gas was first produced in Arkansas in 1889. Likewise, the oil industry has a long history in southern Arkansas. The first oil well was drilled in 1921.

Despite the long history of oil and gas production, Arkansas is a mid-level energy producing state. Arkansas natural gas production ranked the state 12<sup>th</sup> out of 32 producing states in 2006 and 2007 by the Energy Information Administration (EIA). The state rank increased from 14<sup>th</sup> in 2005 and 15<sup>th</sup> in 2004 because of the natural gas production in the Fayetteville Shale. In 2008, Arkansas production ranked the state 17<sup>th</sup> out of the 31 crude oil producing states, according to the EIA. This ranking was basically unchanged over the preceding five years. In fact, the industry sectors most often associated with the state historically have been agriculture and manufacturing. However, the forces of globalization, combined with substantial technological advances, have meant that fewer jobs are being produced by these two sectors over time. The emergence of oil and gas production as a growth industry is occurring at precisely the right time to take up some of that economic slack.

So, how do we best describe the economic impact of this industry on the state of Arkansas? Economists traditionally use three measures to determine economic impact. First, the contribution of the industry to total economic output should be examined. Second, employment and associated income and wages are a key economic factor. Third, the revenues generated by the industry: income, sales, property, and severance tax receipts will directly impact the fiscal health of the state.

These are the ideal pieces of information to possess in order to determine economic impact. But, researchers are hampered by data constraints. Collected information is rarely as timely or as finely detailed so as to provide absolute answers. But, a great deal of information about the Arkansas oil and gas industry does exist and this study attempts to take the existing information about the oil and gas industry and to describe as fully as possible the three components of economic impact listed above.

There will always be impacts from an industry that do not show up in the formal statistics. For example, corporate giving and community leadership are not easily quantifiable, but do have substantial impacts on quality of life. So too do corporate commitments to be good stewards of

the environment where these natural resources are found. This study acknowledges these impacts, but focuses on the quantifiable.

The study is organized as follows. First, some background information about the Arkansas economy is presented. The role of the oil and gas industry and comparisons to other industry sectors are made from available gross domestic product and employment data. Information is then provided on tax revenues. In particular, severance tax collections and taxable sales in oil and gas producing counties are offered. Time series information about energy prices is then presented to describe the past and current industry environment. Next, a series of national level oil and gas industry data are described to provide context for the Arkansas contribution. Information about how oil and gas production and consumption in Arkansas have progressed during the last five years is presented in the following section. Finally, announcements of future economic activity from oil and gas producing companies and some of their social impacts on Arkansas are discussed.

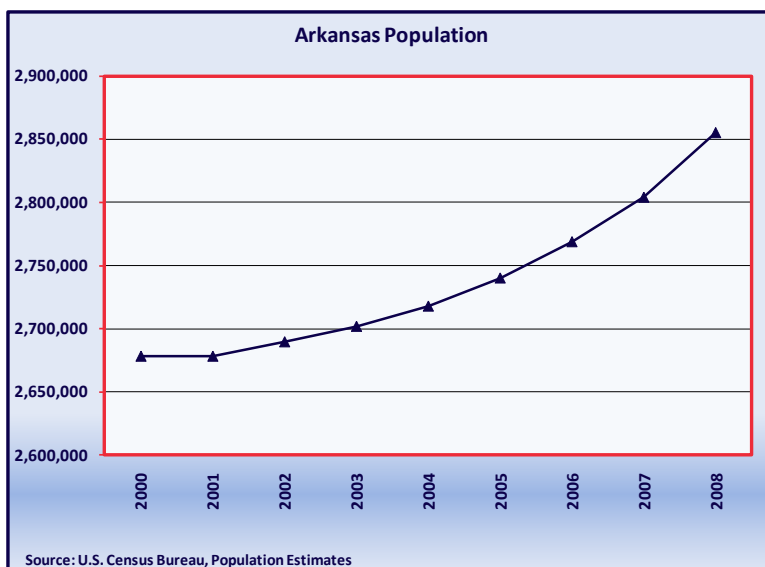
## 1. ARKANSAS ECONOMIC OVERVIEW

To understand the impact of the oil and gas industry on the Arkansas economy, a baseline economic overview of the state is necessary. In general, the oil and gas extraction industry has accounted for a relatively small share of the state economic activity, but rapid recent growth associated with the sector is increasingly important to the welfare of Arkansans.

### 1.1 POPULATION

According to United States Census Bureau intercensal population estimates, the Arkansas population was 2,855,390 in 2008 (see the recent time series in Figure 1). The state population increased by 177,173 people or 6.6 percent since 2000, while the overall U.S. population increased by 7.8 percent during the same time period. Since surpassing Kansas in 2004, Arkansas has ranked 32<sup>nd</sup> in population among the 50 states. In 2008, the population of Arkansas represented 0.9 percent of the total United States population.

Figure 1: Arkansas Population, 2000 - 2008



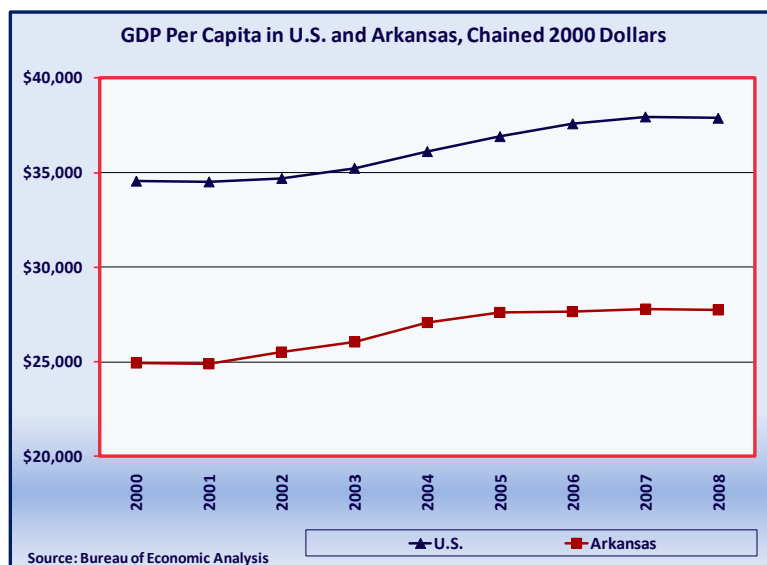
### 1.2 ARKANSAS GDP

Gross domestic product (GDP) is the measure of economic output in an economy, and as such, provides a great deal of information about overall economic vitality. In 2008, the GDP for the state of Arkansas was \$98.3 billion in current dollars, according to the United States Bureau of Economic Analysis. The state GDP of Arkansas has been approximately 0.7 percent of the total United States GDP for at least a decade. When combined with the information about

population presented above, it becomes clear that the Arkansas economy underperforms relative to the nation. That is, the 0.9 percent of the United States population located in Arkansas produces only 0.7 percent of the nation’s economic output.

Another way to look at this information is to examine the average amount of economic output created per person. Figure 2 shows how, on a per capita basis, United States and Arkansas GDP have changed during the last decade. Arkansas per capita GDP was \$27,753 in 2008 (in chained 2000 dollars) or 73.2 percent of national per capita GDP. The state ranked 49<sup>th</sup> among all states in terms of per capita GDP in 2008, with its rank slowly worsening from 48<sup>th</sup> during 2000 – 2006 and from 47<sup>th</sup> before that.

**Figure 2: GDP Per Capita in the United States and Arkansas, 2000 - 2008**



Appendix 1 at the end of this document shows the complete breakdown of Arkansas GDP by industry from 2004 to 2008 and the growth rates for each industry over that time period. Table 1 shows information about total Arkansas GDP and the portion of that GDP attributable to the oil and gas industry. Three industries make up the oil and gas sector: oil and gas extraction, support services for mining (which includes support activities for oil and gas extraction), and pipeline transportation. The Arkansas oil and gas industry was responsible for 1.2 percent of state GDP in 2007, the latest year for which data are available. Accordingly, about \$1.1 billion in current dollars were attributed to the Arkansas GDP from this industry. From 2004 to 2007, the amount of Arkansas oil and gas industry GDP grew by 89.4 percent.

Of course, other sectors of the economy besides the three listed have pieces that are attributable to the oil and gas industry. For example, petroleum refining, gas utilities, real estate leasing, waste management, legal and scientific services, and accommodations all have economic output directly attributable to the oil and gas sector as part of their totals.

Unfortunately, the publicly available data are not detailed enough to allow dependable estimation of these fractions, so only direct impacts are reported.

**Table 1: Arkansas GDP, Selected Industries, Current Dollars, in Millions**

	2004	2005	2006	2007	2008	Change from 2004-2007
<b>All Industry Total</b>	\$82,137	\$86,546	\$90,660	\$95,116	\$98,331	15.8%
<b>Oil and Gas Extraction</b>	\$191	\$247	\$243	\$321	N/A	68.1%
<b>Support Activities for Mining (Includes Support Activities for Oil and Gas Extraction)</b>	\$288	\$286	\$460	\$695	N/A	141.3%
<b>Pipeline Transportation</b>	\$117	\$103	\$112	\$113	N/A	-3.4%
<b>Oil and Gas Industry</b>	\$596	\$636	\$815	\$1,129	N/A	89.4%
<b>Oil and Gas Industry as a Percent of All Industry Total</b>	0.7%	0.7%	0.9%	1.2%	N/A	63.6%

As described in the technical notes for state GDP that the BEA produces, “Compensation of employees is the largest component of GDP by state, normally accounting for about three-fifths of U.S. GDP by state. Compensation of employees is estimated as the sum of...wage and salary accruals, employer contributions for employee pension and insurance funds, and employer contributions for government social insurance.” Table 2 presents compensation for employees information for the oil and gas industry as reported in Table 1.

In 2007, total compensation for employees in all industries in Arkansas was \$53.2 billion, up 16.8 percent from 2004. Oil and gas industry compensation represented 0.7 percent of that number, at \$380 million. Employee compensation in the oil and gas industry had increased 131.7 percent since 2004.

**Table 2: Arkansas Compensation for Employees, Selected Industries, Current Dollars, in Millions**

	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>Change from 2004-2007</b>
<b>All Industry Total</b>	\$45,538	\$48,092	\$50,469	\$53,178	N/A	16.8%
<b>Oil and Gas Extraction</b>	\$25	\$27	\$31	\$54	N/A	116.0%
<b>Support Activities for Mining (Includes Support Activities for Oil and Gas Extraction)</b>	\$77	\$98	\$161	\$264	N/A	242.9%
<b>Pipeline Transportation</b>	\$62	\$61	\$61	\$62	N/A	0.0%
<b>Oil and Gas Industry</b>	<b>\$164</b>	<b>\$186</b>	<b>\$253</b>	<b>\$380</b>	<b>N/A</b>	<b>131.7%</b>
<b>Oil and Gas Industry as a Percent of All Industry</b>	<b>0.4%</b>	<b>0.4%</b>	<b>0.5%</b>	<b>0.7%</b>	<b>N/A</b>	<b>98.4%</b>

The BEA also reports the amount of taxes on production and imports, less subsidies for each industry. Table 3 presents the amount of taxes for the oil and gas industry and for all Arkansas industries from 2004 to 2007. The total taxes (federal, state, and local) generated by all Arkansas industries in 2007 were \$6.9 billion, \$40 million of which came from oil and gas industries. It should be noted that the Arkansas severance tax was changed in 2008 (and implemented in 2009), so none of the numbers presented in the table included the increased state tax.

**Table 3: Taxes on Production and Imports, Less Subsidies, Selected Arkansas Industries, Current Dollars, in Millions**

	2004	2005	2006	2007	2008	Change from 2004-2007
<b>All Industry Total</b>	\$5,612	\$6,061	\$6,613	\$6,877	N/A	22.5%
<b>Oil and Gas Extraction</b>	\$10	\$11	\$12	\$16	N/A	60.0%
<b>Support Activities for Mining (Includes Support Activities for Oil and Gas Extraction)</b>	\$4	\$5	\$7	\$9	N/A	125.0%
<b>Pipeline Transportation</b>	\$15	\$16	\$16	\$15	N/A	0.0%
<b>Oil and Gas Industry</b>	<b>\$29</b>	<b>\$32</b>	<b>\$35</b>	<b>\$40</b>	<b>N/A</b>	<b>37.9%</b>
<b>Oil and Gas Industry as a Percent of All Industry</b>	<b>0.5%</b>	<b>0.5%</b>	<b>0.5%</b>	<b>0.6%</b>	<b>N/A</b>	<b>12.6%</b>

### 1.3 PERSONAL INCOME

The United States Bureau of Economic Analysis (BEA) defines state personal income as income that is received by, or on behalf of, persons who live in the state. It is calculated as the sum of wage and salary disbursements, supplements to wages and salaries, proprietors' income, rental income, personal dividend income, personal interest income, and personal current transfer receipts, less contributions for government social insurance. According to the BEA, Arkansas total personal income was about \$89.3 billion in 2008. This amount was about 0.7 percent of year 2008 total United States personal income. In fact, total Arkansas personal income has been about 0.7 percent of total United States personal income for the past five years (see



Table 4). From 2004 to 2007, Arkansas personal income increased by 20.8 percent.

Per capita personal income is the best measure of the average welfare of a state's population and allows easy comparison to national prosperity. The Arkansas per capita personal income was \$30,177 in 2007. The state's income per capita has gradually increased in comparison to national levels in recent years. In 2001, Arkansas per capita income was 75.3 percent of the United States measure, by 2004 it was 77.8 percent, and by 2007 it was 78.1 percent.

The BEA does not report personal income by industry, but rather reports earnings by place of work. Earnings do not include income from non-work sources such as interest, dividends, or royalty payments from gas or oil leases. Earnings attributable to the oil and gas industry increased by 92.0 percent from 2004 to 2007. These earnings came from oil and gas extraction, support activities for mining (including support activities for oil and gas extraction), and pipeline transportation. Total earnings from the oil and gas industry were \$685.9 million in 2007, accounting for 0.8 percent of all Arkansas personal income. This was a significant increase from the 0.5 percent level experienced in 2004.

Table 4: Total Personal Income and Oil and Gas Earnings in Arkansas, 2004 - 2008

Year	2004	2005	2006	2007	2008	Change from 2004-2007
<b>Total Personal Income (Thousands)</b>	\$70,700,525	\$74,858,687	\$79,845,017	\$85,418,388	\$89,276,844	20.8%
<b>Per Capita Personal Income</b>	\$25,801	\$27,035	\$28,473	\$30,177	N/A	17.0%
<b>Arkansas PCPI as a % of National PCPI</b>	77.8%	77.9%	77.4%	78.1%	N/A	0.4%
<b>Oil and Gas Extraction Earnings (Thousands)</b>	\$180,093	\$204,655	\$266,104	\$312,052	N/A	73.3%
<b>Support Activities for Mining (Including Support Activities for Oil and Gas Extraction) (Thousands)</b>	\$78,173	\$99,596	\$170,299	\$266,924	N/A	241.5%
<b>Pipeline Transportation Earnings (Thousands)</b>	\$98,989	\$95,510	\$100,234	\$106,911	N/A	8.0%
<b>Total Oil and Gas Earnings</b>	\$357,255	\$399,761	\$536,637	\$685,887	N/A	92.0%
<b>Oil and Gas Earnings as a % of Personal Income</b>	0.5%	0.5%	0.7%	0.8%	N/A	58.9%

## 1.4 EMPLOYMENT, ESTABLISHMENTS, WAGES

The United States Bureau of Labor Statistics (BLS) compiles many different data sets that describe labor conditions throughout the nation, including detailed information about Arkansas. These data sets include information about unemployment rates, employment levels, hiring establishments, and wages. As employment is one of the three key factors of economic impact, this section will describe the available information.

### 1.4.1 LOCAL AREA UNEMPLOYMENT STATISTICS

First, to provide context for the following employment numbers, it is important to look at unemployment rates in the state and compare them to national performance. According to the Local Area Unemployment Statistics (LAUS), in July 2009, the Arkansas unemployment rate was 7.7 percent, as compared with 9.7 percent in the United States (both are seasonally unadjusted rates). The Arkansas unemployment rate has been below the national rate since March 2008 (see Figure 3). However, as shown in Figure 4, the total labor force started to decline in Arkansas in March 2009, unlike the United States labor force, which continues to increase (although at a slower pace). This implies that Arkansas workers are disproportionately either becoming discouraged and are no longer actively seeking employment, or are leaving the state.

Figure 3: Unemployment Rates, Not Seasonally Adjusted

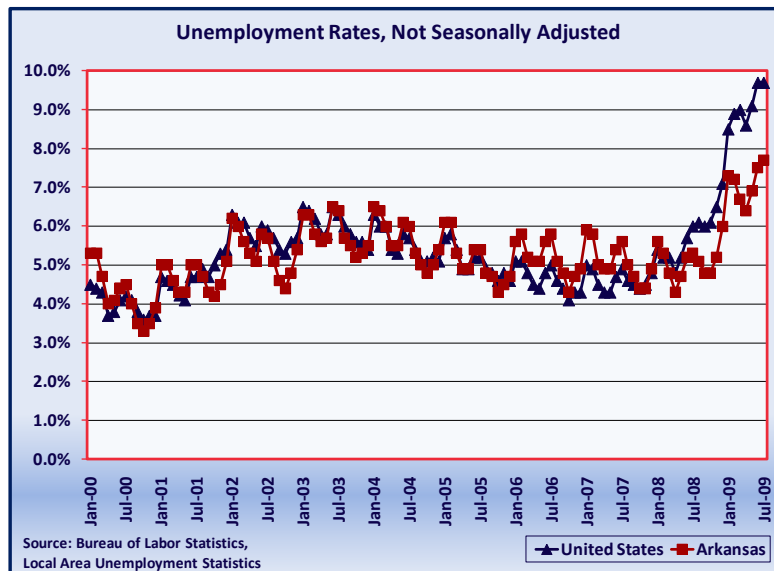
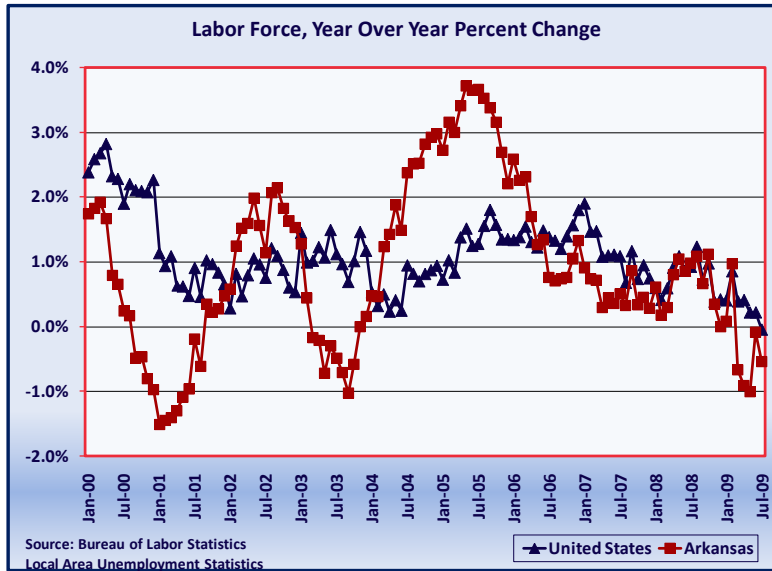


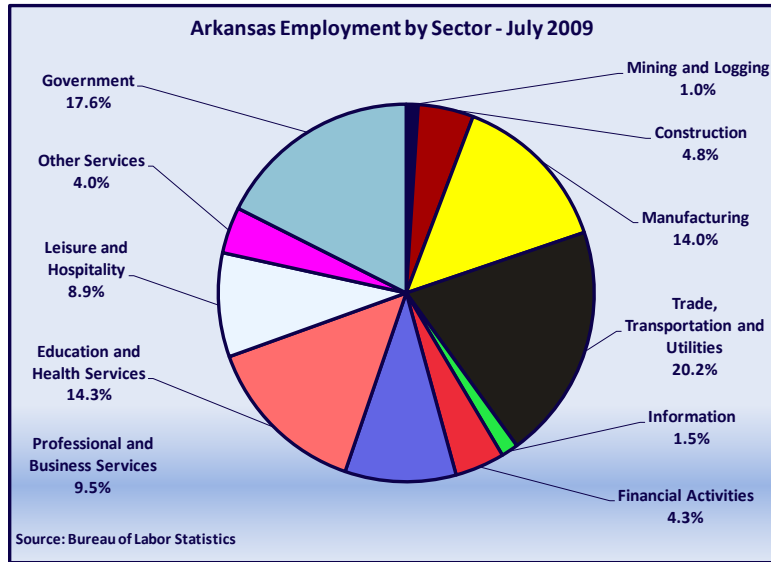
Figure 4: Labor Force, Year over Year Percent Change



#### 1.4.2 CURRENT EMPLOYMENT STATISTICS

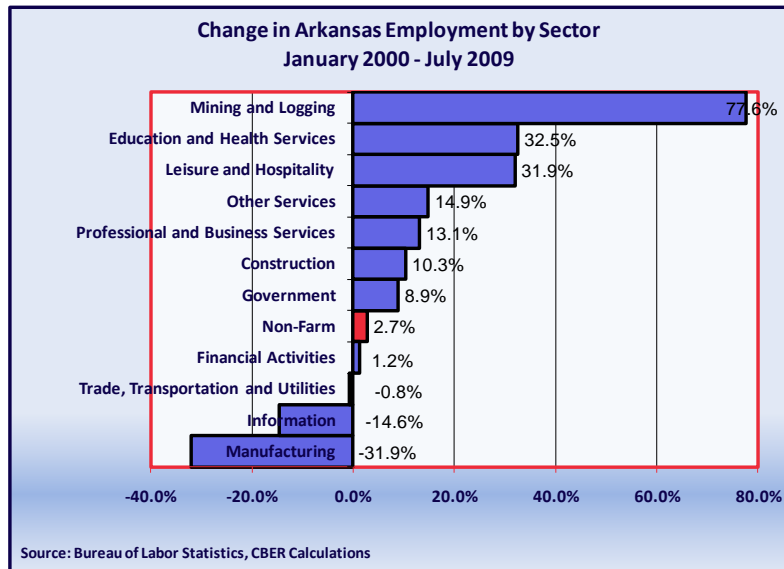
Another set of data from the BLS, the Current Employment Statistics, provides detailed information about state employment levels by sector. As the pie chart in Figure 5 shows, in July 2008, the trade, transportation, and utilities sector had the largest share of employment (20.2 percent) in Arkansas, followed by government (17.6 percent), education and health services (14.3 percent), manufacturing (14.0 percent), professional and business services (9.5 percent), and leisure and hospitality (8.9 percent). The mining and logging industry sector accounted for 1.0 percent out of total non-farm employment in July 2009. The share of this industry sector has increased gradually during the last five years from 0.6 percent in 2004 to the current level.

Figure 5: Arkansas Employment by Sector, July 2009



The distribution of labor by sector shown above provides some context for understanding employment changes over time. Figure 6 shows the total percentage change in Arkansas employment by sector from January 2000 to July 2009. Over that time period, total non-farm employment increased by only 2.7 percent. The mining and logging sector (which includes the oil and gas industry) is the clear standout in terms of positive percentage gains in employment. Since 2000, mining and logging employment has increased by an incredible 77.6 percent. This is more remarkable when seen in the context of other sectors. The part of the economy with the second largest percentage increase over the past nine years was the education and health services sector, where employment increased by 32.5 percent, while leisure and hospitality employment increased by 31.9 percent. Employment in the other services and professional and business services sectors increased by 14.9 and 13.1 percents, respectively. Construction, government, and financial activities also saw net employment gains since 2000. But, total employment growth was held back by outright declines in the manufacturing, information, and trade, transportation, and utilities sectors.

Figure 6: Change in Arkansas Employment by Sector, January 2000 - July 2009



The tremendous growth rate in mining and logging sector employment must be taken in the context of the size of the industry. In order to compare employment growth in the mining and logging sector with growth patterns in the state's other industries, the next twelve graphs are presented. Each of the figures (except Figure 7) shows employment trends for a separate industry sector in Arkansas from January 2000 to July 2009. The first graph (Figure 7) shows how overall non-farm employment has been growing, except during the 2001 recession and immediately afterwards, and during the current economic downturn. The most recent recession began affecting Arkansas employment substantially during the fall of 2008.

Figure 7: Arkansas Non-Farm Employment

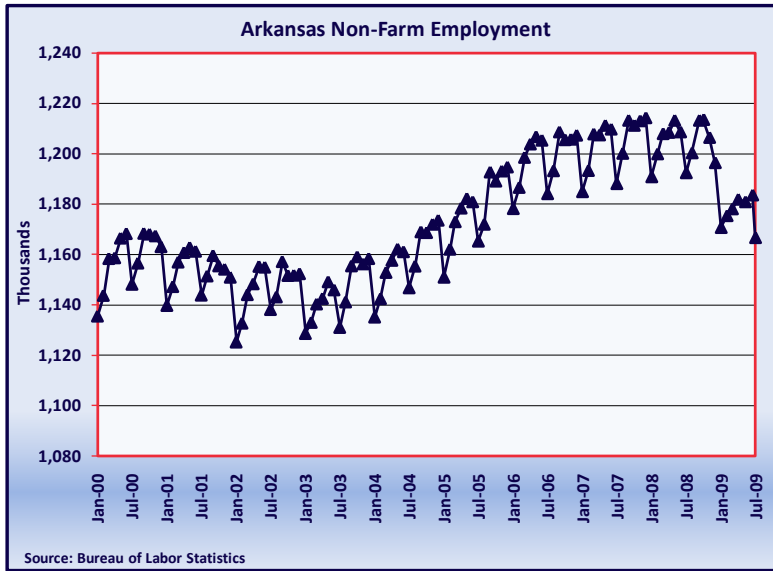
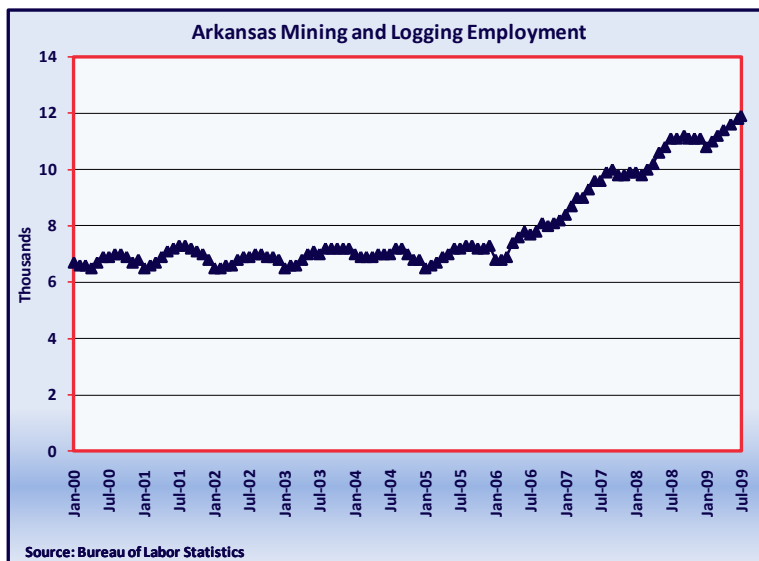


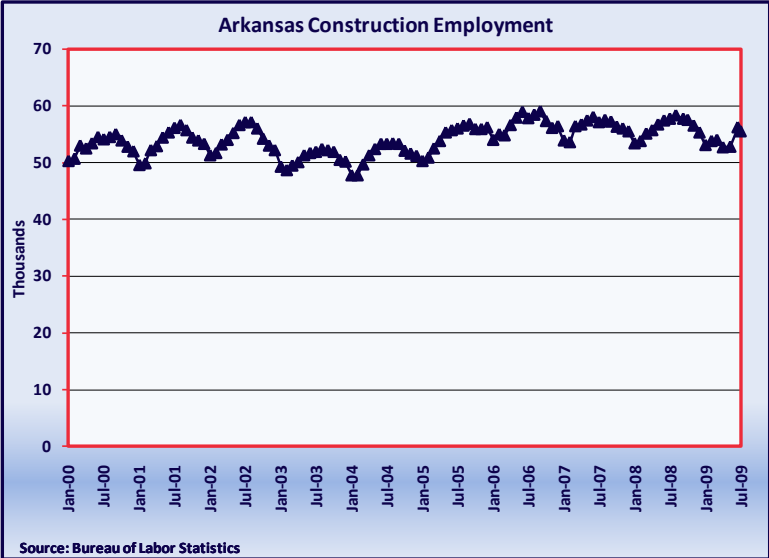
Figure 8 shows how the mining and logging sector (which includes employment in the oil and gas extraction and support services industries) fared over the same time period. Most notable is how employment began rising in 2005 with the development of the Fayetteville Shale and how the pace of new employment has endured, despite the national recession that officially began in December 2007. In July 2009, the employment level in the mining and logging sector was 11,900, up by 5,200 jobs since January 2000.

Figure 8: Arkansas Mining and Logging Employment



The construction sector is a useful basis of comparison for the mining and logging sector because both sectors showed increased employment of 5,200 from January 2000 to July 2009. However, as Figure 9 demonstrates, employment in the construction sector was more than four times larger in July 2009 than employment in the mining and logging sector, so the growth rate was much lower. The construction sector has also been significantly affected by the economic downturn. Employment in the construction sector peaked in July 2006 and had fallen by 3,400 jobs by July 2009, while employment in the mining and logging sector was at an all-time high in July 2009.

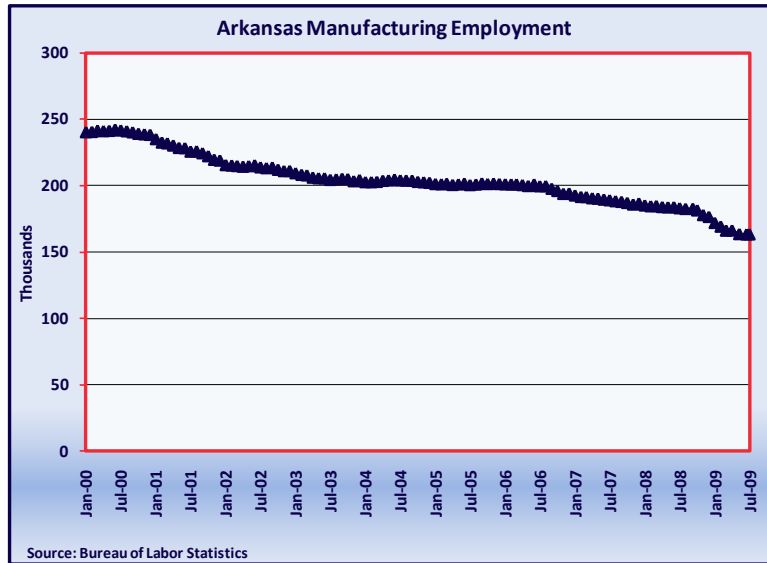
**Figure 9: Arkansas Construction Employment**



In Arkansas, no non-farm sector receives more attention than manufacturing because of the size of the industry and because of the unrelenting decline in employment due to the dual factors of globalization and technological advancement. As Figure 10 shows, employment in the manufacturing sector has declined by 76,700 jobs since January 2000. In fact, manufacturing employment peaked in June 1995 at a level of 247,300 jobs. In July 2009, manufacturing employment accounted for 163,500 jobs. The loss of employment in the manufacturing sector provides a constant headwind for the Arkansas economy.

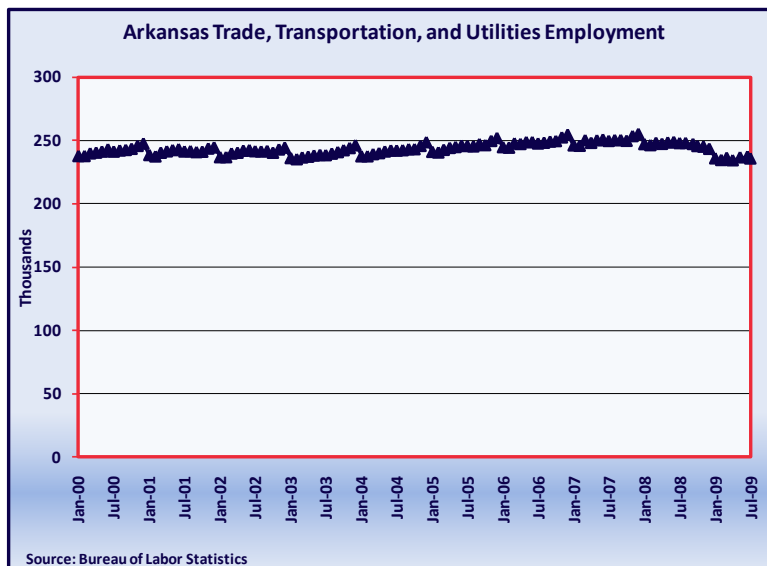


Figure 10: Arkansas Manufacturing Employment



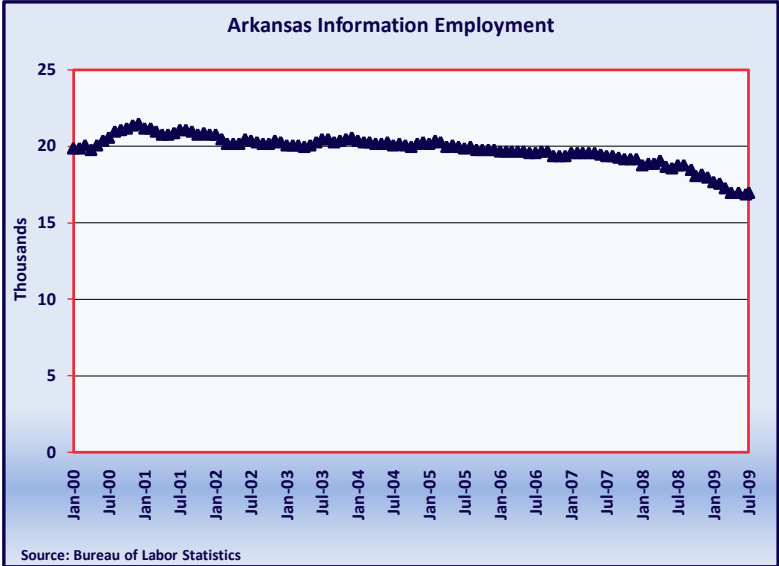
The trade, transportation, and utilities sector is the largest in terms of employment in Arkansas. The kinds of jobs that are included in the sector include those in retail and wholesale trade, trucking and logistics, pipeline transportation, and utilities. From 2000 to early 2008, the Arkansas trade, transportation, and utilities sector grew at a very modest rate, but with the onset of the latest recession and the concurrent drop off in consumer spending, employment in the sector has dropped below its 2000 levels. Indeed, from January 2000 to July 2009, 1,900 jobs were lost in the sector. Figure 11 shows the cyclical nature of the sector and how the recent numbers are a change from those in the first part of the decade.

Figure 11: Arkansas Trade, Transportation, and Utilities Employment



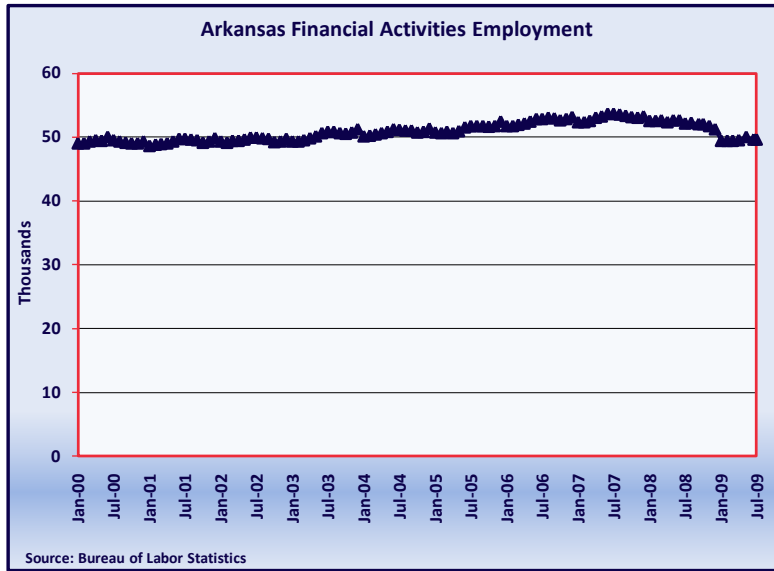
The information sector is the home of employment for companies that produce and distribute information and cultural products, transmit data and communications, and process data. The sector is not large, accounting for about 1.5 percent of Arkansas employment in July 2009. The information sector is closest in size to the mining and logging sector, but has experienced a very different trend in employment since 2000. Figure 12 shows the gradual, and then accelerating, decline in information sector employment in Arkansas from 2000 to 2009. Significant pressures on the newspaper industry, as well as changes in employment at Acxiom and the former Alltel have particularly borne on the sector. Since 2000, 2,900 jobs have been lost in information industries.

**Figure 12: Arkansas Information Employment**



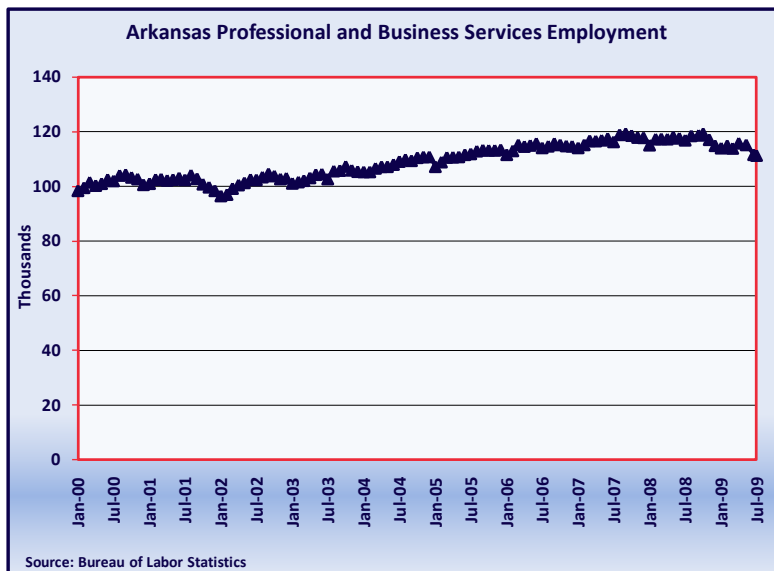
By contrast, employment in the financial activities sector, that is, the sector that includes banking and other financial firms, insurance, and real estate grew during the housing boom of 2004 to 2008 and then fell back to 2000 levels during the beginning of 2009. The financial activities sector has netted job growth of only 600 jobs from January 2000 to July 2009. Total Arkansas employment in the sector was just under 50,000 in July 2009 as seen in Figure 13.

Figure 13: Arkansas Financial Activities Employment



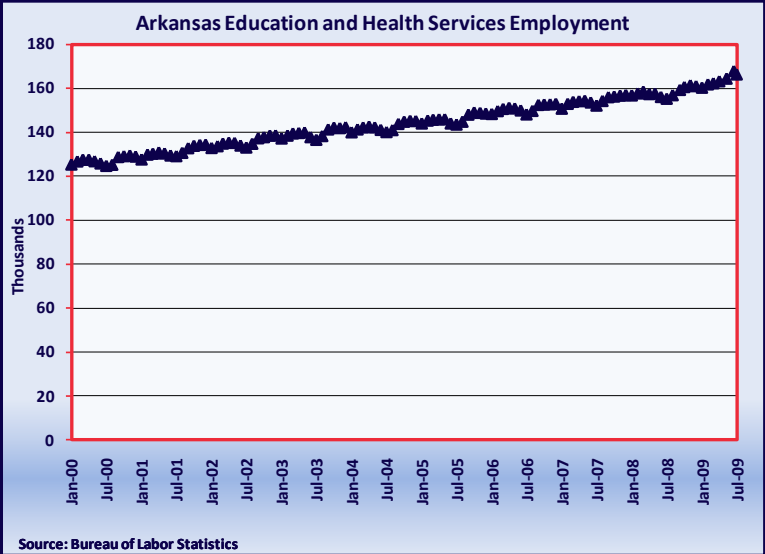
Complementing all of the other industries in the economy, the professional and business services sector includes everything from lawyers to accountants to public relations firms to administrative support. In Arkansas, employment in the professional and business services sector grew by about 20,000 jobs from the end of the 2001 recession to the beginning of the current downturn. However, as of July 2009, the sector had netted growth of 12,900 jobs since January 2000 (see Figure 14). As of June 2009, there were 111,200 Arkansans employed in the professional and business services sector, slightly more than those employed in the leisure and hospitality sector, but fewer than those employed in trade, transportation, and utilities, government manufacturing, and health and education services.

Figure 14: Arkansas Professional and Business Services Employment



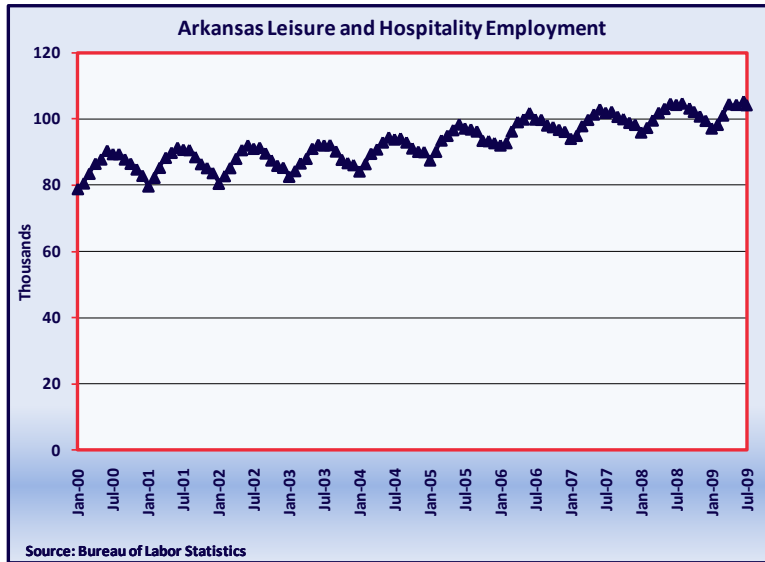
The education and health services sector benefits from demographic trends across the state. As the population grows both older and younger, additional health and education services are demanded. Across the United States, employment in the health and education services sector has continued to grow, despite the current recession. The only other sector where this trend has been true is the government sector. In Arkansas, the growth rate has been steady, as can be seen in Figure 15. Between January 2000 and July 2009, a whopping 40,800 jobs have been added to the education and health services sector. This amount is 31.2 percent higher than the total job growth for the state during the period (31,100).

**Figure 15: Arkansas Education and Health Services Employment**



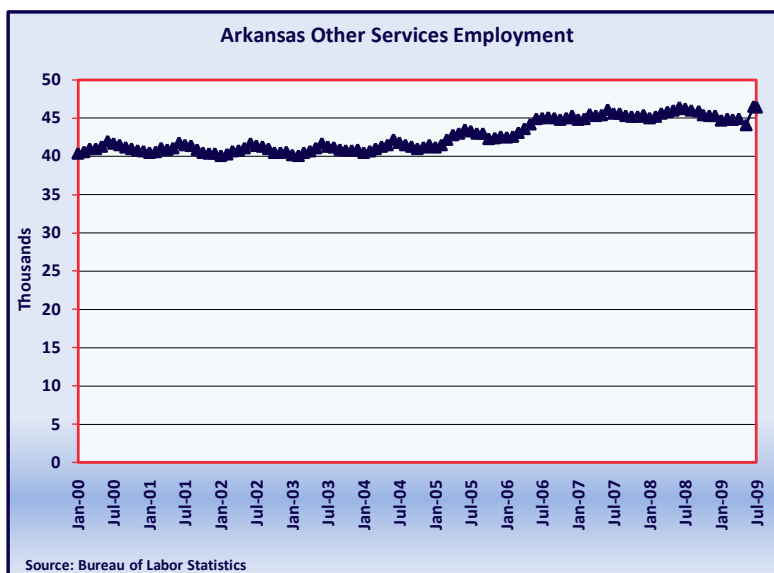
Another sector that has seen persistent employment gains, despite economic downturns is the Arkansas leisure and hospitality sector. The sector contains businesses in the arts, entertainment, and recreation industries as well as those in accommodations and food services. Employment in the sector is quite cyclical, but from January 2000 to July 2009, there were employment gains of 25,200 jobs. More than 100,000 Arkansans worked in the leisure and hospitality sector in 2009 (see Figure 16).

Figure 16: Arkansas Leisure and Hospitality Employment



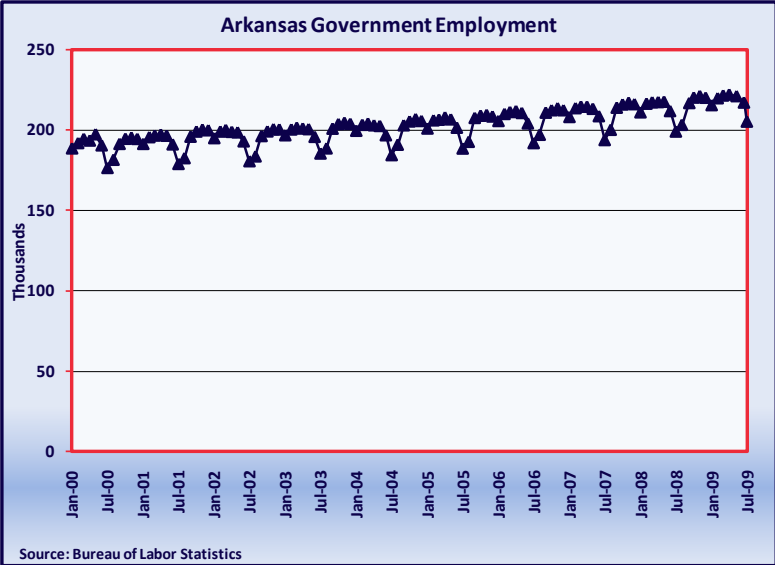
Despite the rather unhelpful title, the other services sector contains employment in some important industries in the state of Arkansas. Establishments in this sector are primarily engaged in activities such as equipment and machine repairing, administering religious activities, grant making and advocacy, and providing dry-cleaning, laundry, personal care, death care, pet care, photofinishing, parking, and dating services. As shown in Figure 17, as of July 2009, employment in the sector was at its highest level at 46,400, a gain of 6,000 jobs over the level in January 2000.

Figure 17: Arkansas Other Services Employment



The final sector of the Arkansas economy to be discussed is the public sector. Employment by local, state, and federal sources has consistently grown from January 2000 to July 2009 (see Figure 18). In fact, over the time period 16,700 jobs were added to total 205,200. The government sector includes public school employment, and as such experiences significant declines in the summer months, when teachers are not contracted employees. These cyclical declines are reversed in the early fall months.

**Figure 18: Arkansas Government Employment**



The preceding pages have supplied context for understanding the employment impact of the oil and gas sector in the state of Arkansas. Although the mining and logging sector is the smallest in terms of total employment, the number of new jobs created in the sector exceeds those created in the manufacturing, trade, transportation and utilities, information, and financial activities sectors and equals those created in construction since 2000. The service sector of the economy has been where the bulk of the jobs have been created: educational and health services, leisure and hospitality, government, professional and business services, and other services generated over 100,000 jobs since 2000.

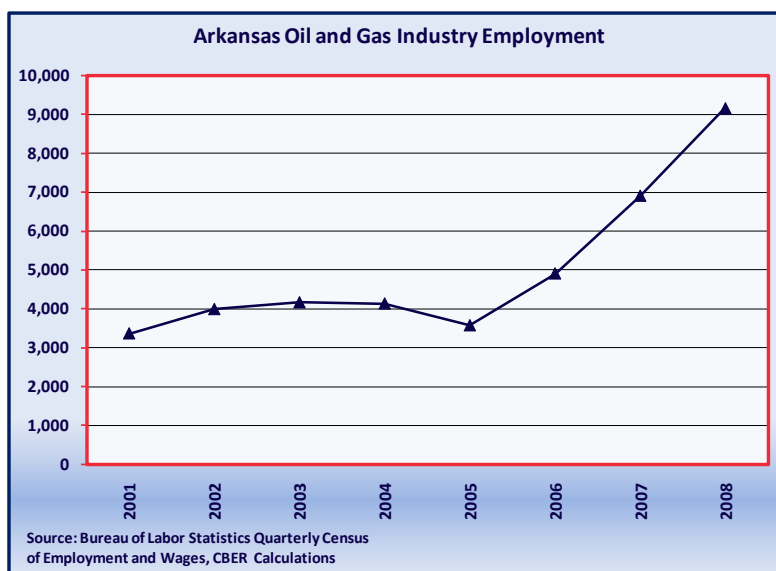
**1.4.3 QUARTERLY CENSUS OF EMPLOYMENT AND WAGES**

The statistics shown above from the Current Employment Statistics are timely and provide a good look at sector level employment. However, the release of more detailed industry level data lags. The BLS has another information series called the Quarterly Census of Employment and Wages (QCEW) that provides detailed information by industry of the number of employees,

number of establishments, and total and average wages. The latest information available for the QCEW is from December 2008 and all the 2008 numbers are considered preliminary estimates.

Figure 19 shows the rapid growth of employment in the oil and gas industry sector<sup>2</sup> in Arkansas since 2001. NAICS codes and definitions of each oil and gas industry subsector used for estimating employment are presented in Appendix 2 at the end of the document. The employment is in the oil and gas extraction, drilling oil and gas wells, support activities for oil and gas operations, oil and gas pipeline construction, and pipeline transportation industries.

**Figure 19: Arkansas Oil and Gas Industry Employment, 2001 - 2008**



A detailed comparison between oil and gas industry labor force characteristics and the overall Arkansas economy for the years 2004 and 2008 is presented in Table 5. In 2004, according to the QCEW data, Arkansas had employment of 1.1 million, 75,593 establishments, and total wages of \$34.1 billion. The average weekly wage for all employees was \$582 and the average annual pay was \$30,245. Within the oil and gas industry in Arkansas in 2004, there were employment of 4,133, 371 establishments, and total wages of \$187.3 million. The average annual pay in the industry was \$44,220. This equated to the oil and gas industry representing 0.4 percent of employment, 0.5 percent of establishments and total wages, and 146 percent of average annual pay.

By 2008, the oil and gas industry had experienced significant growth, particularly related to the development of the Fayetteville Shale as an unconventional natural gas source. In Arkansas, overall employment had grown 3.8 percent to 1.2 million. In the four years, the state had

<sup>2</sup> For the purpose of these calculations, the oil and gas sector is defined as NAICS codes 211, 213111, 213112, 23712, and 486)

10,174 additional establishments. Total wages had grown 19.8 percent to \$40.9 billion and the average annual wage was \$34,909. By comparison, within the oil and gas industry, employment had grown a huge 121.7 percent to 9,164. There were an additional 193 establishments, and total wages had grown by 213.2 percent to \$586.6 million. The average annual wage in the oil and gas industry was 183 percent of the average Arkansas wage at \$64,039. Thus, the jobs that were being created in the Arkansas oil and gas industry from 2004 to 2008 were high paying, relative to the state's average.

Table 6 provides additional information about the growth rates in employment, establishments, and wages from 2004 to 2008 for all Arkansas industries and for the Arkansas oil and gas industry. As can be seen, employment increased by 3.8 percent in the state and 121.7 percent in the oil and gas industry. The number of establishments grew by 13.5 percent for all Arkansas industries and by 52.0 percent in the oil and gas industry. Most striking is the increase in total wages, which was 19.8 percent for Arkansas and was a tremendous 213.2 percent for the oil and gas industry. The average annual pay for an Arkansan worker increased by 15.4 percent from 2004 to 2008, but for the average Arkansan oil and gas industry worker, it increased by 44.8 percent.



Table 5: Arkansas Oil and Gas Industry: Employment, Establishments, and Wages, 2004 and 2008

Category	Number of Employees	Number of Establishments	Total Wages (in Thousands)	Average Weekly Wage	Average Annual Pay
<b>2004</b>					
<b>All Industries</b>	1,129,018	75,593	\$34,146,879	\$582	\$30,245
<b>Oil and Gas Extraction Industry (NAICS 211)</b>	372	73	\$18,659	\$964	\$50,114
<b>Drilling Oil and Gas Wells (NAICS 213111)</b>	650	32	\$26,911	\$796	\$41,402
<b>Support Activities for Oil and Gas Operators (NAICS 213112)</b>	851	102	\$37,558	\$848	\$44,117
<b>Oil and Gas Pipeline Construction (NAICS 23712)</b>	486	42	\$15,336	\$607	\$31,545
<b>Pipeline Transportation (NAICS 486)</b>	984	69	\$50,297	\$983	\$51,119
<b>Total Oil and Gas Industry</b>	<b>4,133</b>	<b>371</b>	<b>\$187,301</b>	<b>\$850</b>	<b>\$44,220</b>
<b>Oil and Gas Industry as a Percentage of All Industries</b>	<b>0.4%</b>	<b>0.5%</b>	<b>0.5%</b>	<b>147%</b>	<b>146%</b>

Category	Number of Employees	Number of Establishments	Total Wages (in Thousands)	Average Weekly Wage	Average Annual Pay
<b>2008</b>					
<b>All Industries</b>	1,171,910	85,767	\$40,910,095	\$671	\$34,909
<b>Oil and Gas Extraction Industry (NAICS 211)</b>	961	103	\$66,412	\$1,329	\$69,125
<b>Drilling Oil and Gas Wells (NAICS 213111)</b>	1,910	68	\$136,357	\$1,373	\$71,404
<b>Support Activities for Oil and Gas Operators (NAICS 213112)</b>	3,224	222	\$194,018	\$1,157	\$60,181
<b>Oil and Gas Pipeline Construction (NAICS 23712)</b>	1,543	48	\$98,268	\$1,225	\$63,676
<b>Pipeline Transportation (NAICS 486)</b>	862	68	\$52,363	\$1,168	\$60,723
<b>Total Oil and Gas Industry</b>	<b>9,164</b>	<b>564</b>	<b>\$586,553</b>	<b>\$1,232</b>	<b>\$64,039</b>
<b>Oil and Gas Industry as a Percentage of All Industries</b>	<b>0.8%</b>	<b>0.7%</b>	<b>1.4%</b>	<b>185%</b>	<b>183%</b>

**Table 6: Change in Arkansas Employment, Establishments, and Wages, 2004 – 2008**

<b>Category</b>	<b>Change in Number of Employees</b>	<b>Change in Number of Establishments</b>	<b>Change in Total Wages (in thousands)</b>	<b>Change in Average Weekly Wage</b>	<b>Change in Average Annual Pay</b>
<b>All Industries</b>	3.8%	13.5%	19.8%	15.3%	15.4%
<b>Oil and Gas Industry</b>	121.7%	52.0%	213.2%	44.8%	44.8%

### 1.5 ARKANSAS STATE AND LOCAL TAX REVENUES

As a result of oil and gas extraction and production industry development, Arkansas state and local governments collect higher tax revenues. The state adjusted total revenues are presented first in this chapter. Collections of the severance tax, which are directly linked to oil and gas production, are discussed after that. Finally, taxable sales for the state as well as for oil and gas producing counties are calculated. The impact of oil and gas operating companies on taxable sales is not only direct, but also indirect through other industries and induced through household purchases.

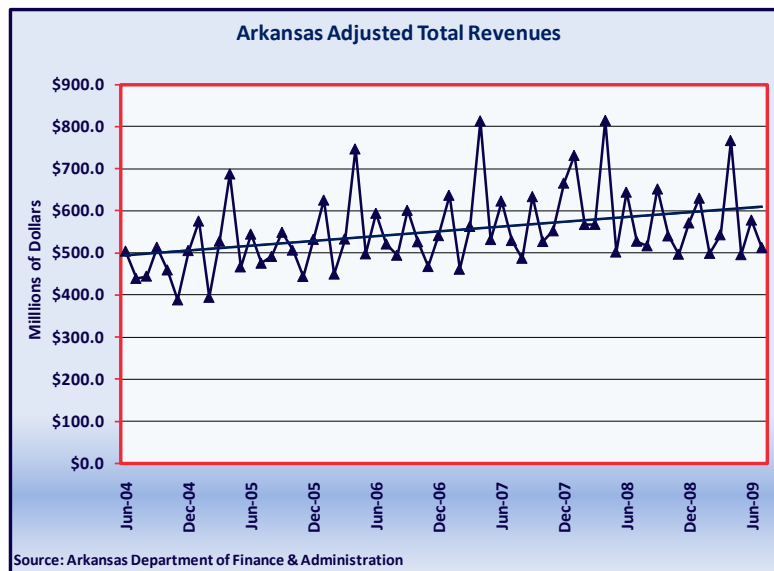
The impact of the oil and gas industry on Arkansas state and local revenues can be shown clearly with severance tax collections. The precise industry effect on other taxes such as sales, income, and other miscellaneous taxes is not easy or even possible to calculate. As a result of oil and gas industry activities, income taxes are increased. Mineral right owners receive additional streams of income from cash bonuses and royalty payments once the production of oil or natural gas begins. Royalty payments typically range between 12.5 percent and 25.0 percent of the market value of the produced oil and gas, using wellhead prices. The combination of increased production and high prices early in the year meant large royalty payments to lease holders in 2008. Prices in 2009 have been generally lower than their 2008 levels, so royalty payments will decline accordingly. Moreover, producing oil and gas yields profits for exploration and production companies, and, as a result, for service companies, which, in turn, impact corporation and partnership income taxes collections in the state of Arkansas. Additionally, employees of oil and gas companies as well as service companies' workers pay income taxes to the state and pay sales taxes when they purchase goods with their earnings.

### 1.5.1 ARKANSAS TOTAL REVENUES

From January 2004 to July 2009, adjusted total tax revenues for the state of Arkansas grew at an annual average rate of 6.3 percent. However, the annual growth rate in state revenues was significantly higher in 2004 and 2005 than in 2006 and 2007. In 2008, revenues increased by the lowest percentage in the past five years, growing by only 1.5 percent. This compares to the 13.7 percent, 10.3 percent, and 6.5 percent average growth rates in 2004, 2005, and both 2006 and 2007, respectively. Moreover, since November 2008, annual percent changes in adjusted revenues have turned negative on a monthly basis.

Arkansas total revenues have a great degree of seasonality (see Figure 20). In spite of the economic downturn, significant revenue peaks occurred in January and April of 2008. However, the revenue growth slowed down significantly since November 2008. Although there was an obvious peak in adjusted revenues in April of 2009, it was still 5.9 percent lower than April 2008 revenues.

Figure 20: Arkansas Adjusted Total Revenues, 2004 – 2009



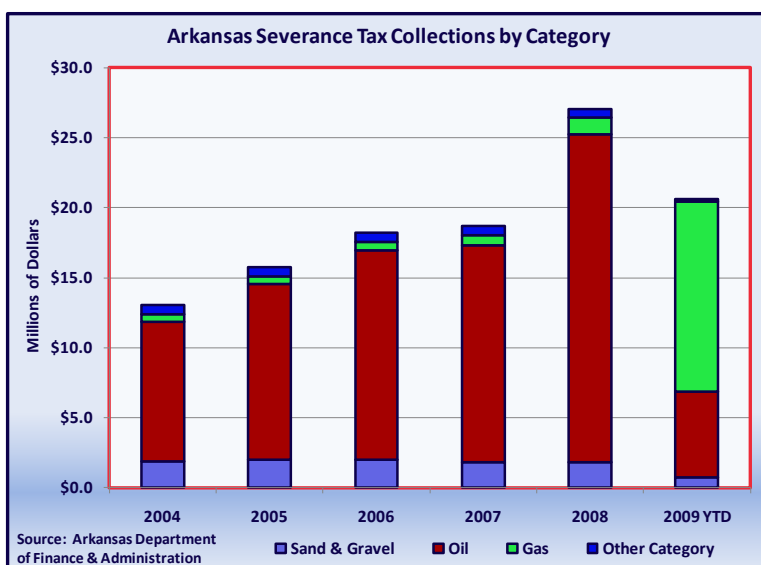
### 1.5.2 ARKANSAS SEVERANCE TAX COLLECTIONS

Severance taxes, collected by the Arkansas Department of Finance & Administration for the last five years, are presented in Figure 21. The taxes are divided into the following categories: sand and gravel, oil, gas, and other severance taxes. From 2004 to 2008, both the sand and gravel and other categories experienced negative growth of 1.7 and 5.9 percent, respectively. However, severance tax collections in the oil and gas categories increased by 134.3 and 133.9 percent during the same period, respectively. It is due to oil and gas industry activities that total severance tax revenues increased by 107.5 percent from 2004 to 2008.

From 2004 to 2009, taxes in the oil category accounted for 76.6 to 86.5 percent of total severance tax collections. In 2009 (the data covers January through June period) taxes in the gas category increased dramatically and taxes in oil category accounted for only 29.5 percent. This is a result of the changed severance tax rate for natural gas where the revenues have been earmarked to benefit the state's roads.

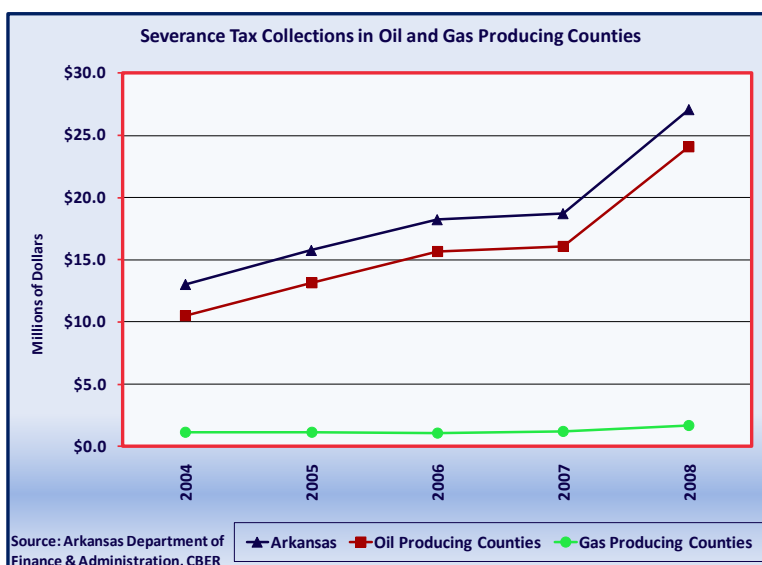
Arkansas previously collected only three-tenths of a cent per thousand cubic feet (MCF) of gas produced, a rate unchanged for more than half a century. The new tax collects up to 5.0 percent of the price of natural gas based on the first sale, but includes grace periods and lower rates for hard-to-develop wells. The new tax rates went into effect on January 1, 2009, but because the gas companies have two months to remit the tax, only four months' worth was collected at the higher rate by the time the fiscal year ended on June 30. The severance tax collected in the natural gas category for the first half of 2009 was \$13.6 million, a huge increase over the \$1.2 million collected during calendar year 2008. However, natural gas collections were well below the \$18.8 million that had been forecast by the Arkansas Department of Finance & Administration, due to the unforeseen dramatic decline in gas prices, and hence market value. Total severance tax collections for the first half of 2009 were \$20.6 million, as compared with total collections of \$27.1 million for calendar year 2008.

Figure 21: Arkansas Severance Tax Collections by Category, 2004 - 2009



Severance taxes collected in oil and gas producing counties are presented in Figure 22. Data by county are not available for 2009, so only data from 2004 to 2008 are included. Oil producing counties are defined as the ten counties in the southern region of the state: Ashley, Bradley, Calhoun, Columbia, Hempstead, Lafayette, Miller, Nevada, Ouachita, and Union. Counties producing gas are those located in Arkoma basin and Fayetteville Shale formation (based on their severance tax collections in the gas category from 2008): Cleburne, Conway, Crawford, Faulkner, Franklin, Johnson, Logan, Pope, Scott, Sebastian, Van Buren, White, and Yell.

Figure 22: Severance Tax Collections in Oil and Gas Producing Counties, 2004 - 2008<sup>3</sup>



Overall, oil and gas producing counties (defined above) were responsible for 89.4 percent of total state severance taxes collections in 2004 and for 95.0 percent of all severance tax revenues in 2008 (see Table 7).

<sup>3</sup> Oil producing counties include: Ashley, Bradley, Calhoun, Columbia, Hempstead, Lafayette, Miller, Nevada, Ouachita, and Union. Counties producing gas are based on their severance tax collections in gas category from 2008: Cleburne, Conway, Crawford, Faulkner, Franklin, Johnson, Logan, Pope, Scott, Sebastian, Van Buren, White, and Yell.

**Table 7: Arkansas Severance Tax Collections in Oil and Gas Producing Counties by Category, Share of Arkansas Total, 2004 and 2008<sup>4</sup>**

<b>Year/Counties</b>	<b>Oil Category</b>	<b>Gas Category</b>	<b>Total Severance Taxes</b>
<b>2004</b>			
<b>Oil Producing Counties</b>	97.7%	6.1%	80.6%
<b>Gas Producing Counties</b>	2.3%	93.7%	8.8%
<b>Arkansas All Counties</b>	100.0%	100.0%	100.0%
<b>2008</b>			
<b>Oil Producing Counties</b>	100.0%	1.4%	88.9%
<b>Gas Producing Counties</b>	0.0%	98.3%	6.1%
<b>Arkansas All Counties</b>	100.0%	100.0%	100.0%

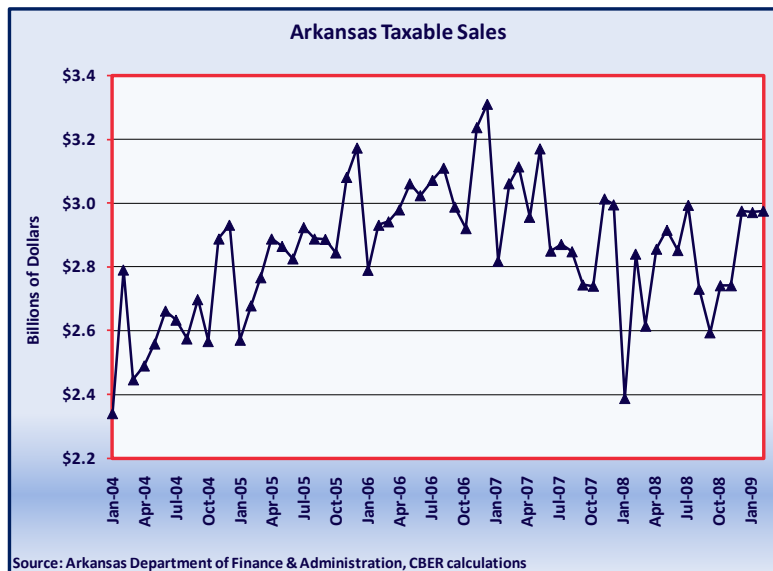
The importance of gas producing counties soared after the tax rate for produced and sold gas was increased on January 1, 2009. Although 2009 data with new tax rate are not yet available by county, the total amount of taxes collected in the gas category increased dramatically compared to previous years. Assuming that gas producing counties continued to account for 98.3 percent of total state gas revenues, almost \$13.4 million of gas taxes were generated in these counties so far in 2009. This alone accounts for 64.9 percent out of total severance taxes collected from January to June 2009 in Arkansas – a remarkable increase from the share of gas producing counties out of state severance tax collections in 2008, which was 6.1 percent.

<sup>4</sup> Oil producing counties include: Ashley, Bradley, Calhoun, Columbia, Hempstead, Lafayette, Miller, Nevada, Ouachita, and Union. Counties producing gas are based on their severance tax collections in gas category from 2008: Cleburne, Conway, Crawford, Faulkner, Franklin, Johnson, Logan, Pope, Scott, Sebastian, Van Buren, White, and Yell.

### 1.5.3 STATE AND LOCAL TAXABLE SALES

Based on sales tax data and tax rates from the Arkansas Department of Finance & Administration, taxable sales were calculated in this section. Arkansas taxable sales for the last five years are presented in Figure 23. During 2004, 2005, and 2006, taxable sales increased at annual growth rates of 5.6, 8.9, and 5.8 percent, respectively. The trend, however, changed with the onset of the national economic downturn. In 2007 and 2008, taxable sales in Arkansas declined by 3.3 and 5.5 percent, respectively.

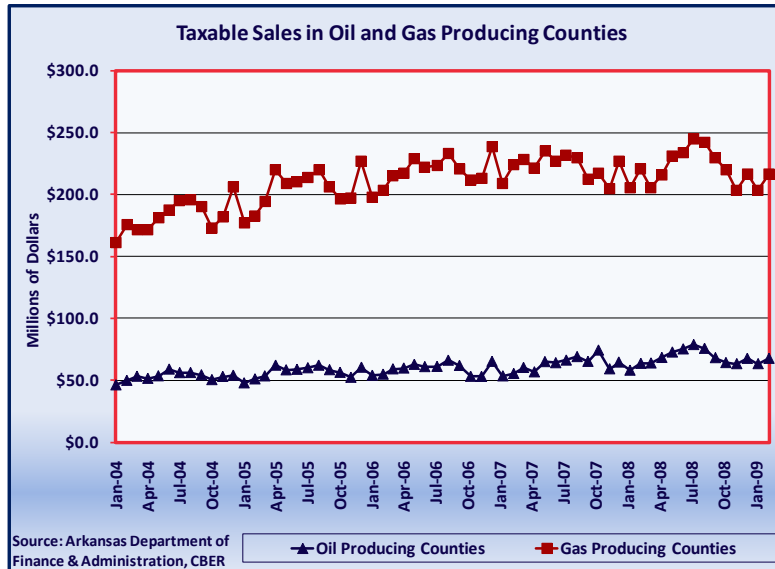
Figure 23: Arkansas Taxable Sales, 2004 - 2009



The declining trend in taxable sales was not experienced, on average, by the counties where oil and gas is produced (see Figure 24). The ten counties in Arkansas that produce oil in the southern region of the state have seen increasing taxable sales from 2005 to 2008. In fact, taxable sales in these counties increased annually by 6.9, 4.5, 5.9, and 8.8 percent. The thirteen Arkansas gas-producing counties, located in the Arkoma basin and Fayetteville Shale formation, also experienced increases from 2004 to 2007. Taxable sales in the gas-producing counties increased annually by 4.4, 12.0, 7.1, and 1.6 percent during this period. In 2008, however, taxable sales in gas-producing counties were basically flat compared to 2007 numbers. Still, even with no taxable sales growth in the gas-producing counties, the economic activity significantly outpaced the 5.5 percent decline seen at the state level.



Figure 24: Taxable Sales in Oil and Gas Producing Counties, 2004 - 2009<sup>5</sup>



## 2. ENERGY PRICES AND PRICE INDICES

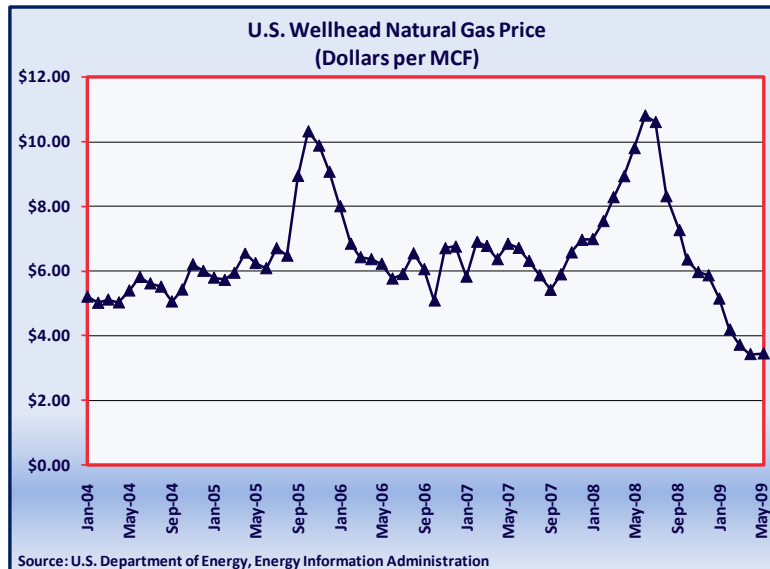
The pace and magnitude of future development of the Arkansas oil and gas industry depends considerably on prices. Therefore, the following chapter presents historical oil and gas prices in the United States and Arkansas, as well as futures prices time series. Additionally, an overview of consumer and producer price indices (including energy and oil and gas extraction industry indices) is offered at the end of the chapter.

### 2.1 OIL AND NATURAL GAS PRICES AND FUTURES

Wellhead prices for natural gas are reported by the Energy Information Administration (EIA) in its monthly publications after the final production and price data are received by the organization. Figure 25 presents wellhead natural gas prices since 2004. From 2004 to 2009, the wellhead prices of natural gas varied substantially. Prices experienced two peaks, reaching \$10.33 per MCF (thousand cubic feet) in October 2005 and increasing up to \$10.82 per MCF in June 2008. During the first half of 2009, wellhead gas prices experienced severe declines down to \$3.43 per MCF in April.

<sup>5</sup> Oil producing counties include: Ashley, Bradley, Calhoun, Columbia, Hempstead, Lafayette, Miller, Nevada, Ouachita, and Union. Counties producing gas are based on their severance tax collections in gas category from 2008: Cleburne, Conway, Crawford, Faulkner, Franklin, Johnson, Logan, Pope, Scott, Sebastian, Van Buren, White, and Yell.

Figure 25: U.S. Wellhead Natural Gas Price, 2004 - 2009

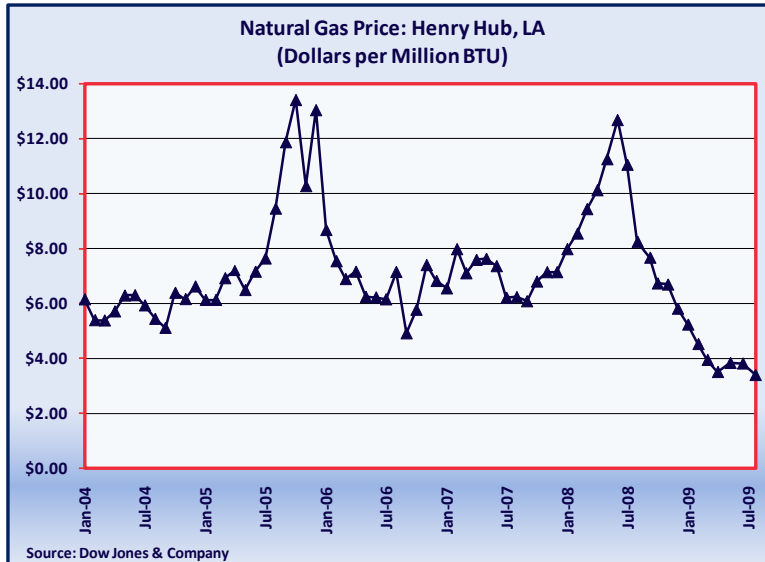


The wellhead gas prices can be compared with delivered prices, such as Henry Hub spot prices. Several publications report prices daily at Henry Hub, the largest centralized point for natural gas trading in the United States. The relationship between the Henry Hub spot prices and United States wellhead prices has been explored in several papers. The EIA analysis "U.S. Natural Gas Markets: Relationship between Henry Hub Spot Prices and United Wellhead Prices" examined the relationship between these two series and the results indicated that there is a strong linear relationship between the two price series. For the researched period from August 1996 through December 2000, the correlation coefficient for Henry Hub spot prices and United States wellhead prices was 0.975.

As of August, 24, 2009, oil prices were the following: Dated Brent Spot was \$73.95 per barrel and NYMEX Crude Future was \$74.51 per barrel. Meanwhile, natural gas prices were: Henry Hub Spot at \$2.78 per MMBTU (million British thermal units) and NYMEX Henry Hub Future at \$2.85 per MMBTU.

Looking at the Henry Hub natural gas prices shown in Figure 26, the relationship to wellhead prices is clear. Henry Hub prices also experienced two peaks: in October 2005 and June 2008. From 2004 to 2009, prices averaged around \$7.10 per million BTU. After reaching \$12.69 in the middle of 2008, Henry Hub price started to decline and continue to do so, with the recent low price being \$3.39 per million BTU in July 2009.

Figure 26: Natural Gas Price, Henry Hub, LA, 2004 - 2009



Sustained high natural gas prices encourage additional exploration and production. Indeed, below some minimum threshold of prices, the economics on existing wells do not make sense. Since 2005, prices have generally been above \$6, but declined to lower levels since December 2008 and the most severe months of the latest recession. Figure 27 presents NYMEX natural gas futures price data from January 5, 2004 to August 18, 2009. Prices have generally been above \$6 since 2005, but declined to lower levels since December 2008, reaching \$4 and even \$3 levels this year.

Figure 27: Natural Gas NYMEX Futures Prices, 2004 - 2009

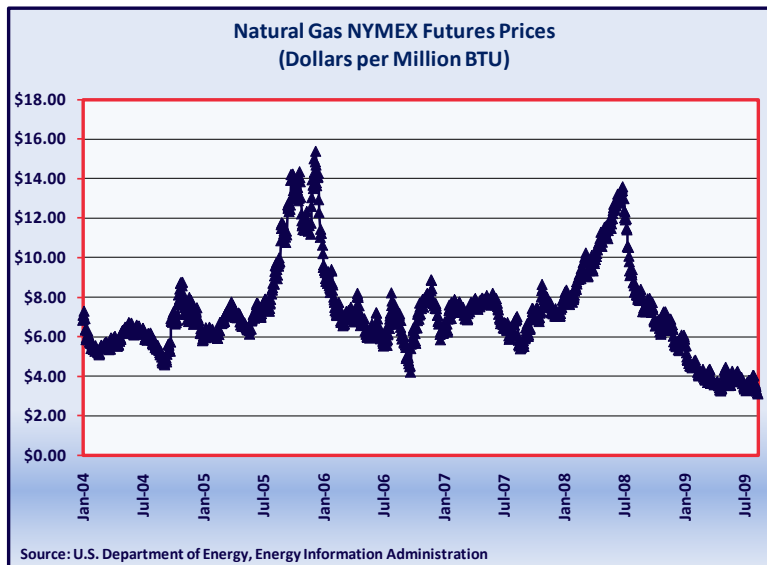
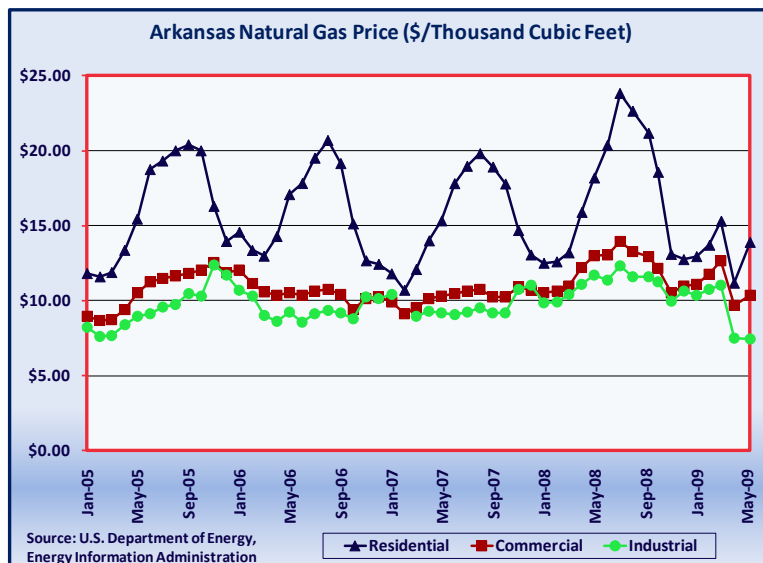


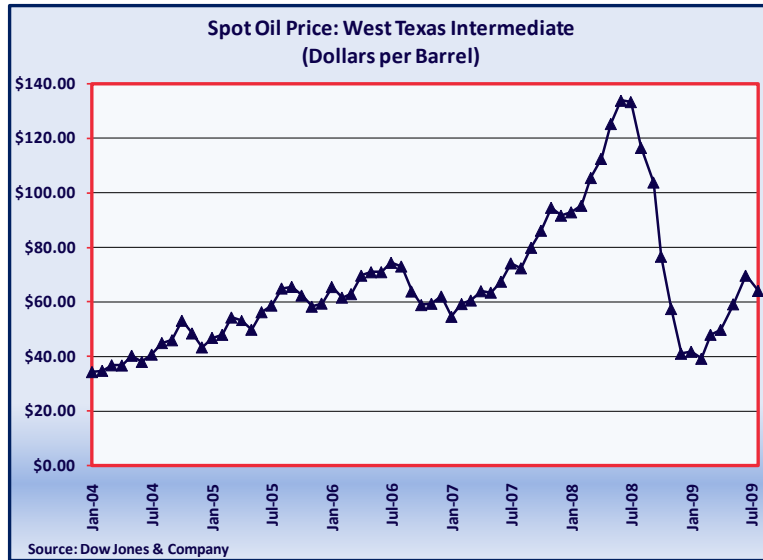
Figure 28 shows natural gas prices in Arkansas based on customer category. Prices in the residential sector have visible seasonality, averaging about \$15.84 from 2004 to 2009. Both the commercial and industrial sectors experienced less price variability, having average prices of \$10.91 and \$9.84 during the same period, respectively. In 2009, the price trend has changed, with a decline instead of the usual seasonal increase in April within all sectors. According to the May 2009 data, the latest available, natural gas prices declined compared to the last year prices substantially.

Figure 28: Arkansas Natural Gas Prices, 2005 - 2009



Oil prices and natural gas prices do not necessarily move together, as they experience different underlying supply and demand. Like natural gas prices, crude oil prices also experienced a peak in June 2008, followed by a sharp decline. Figure 29 presents West Texas Intermediate oil spot prices from 2004 to 2009. During this period, prices averaged about \$65.71 per barrel. However, unlike natural gas prices, oil prices increased in 2009, reaching the levels previously seen in the summer of 2007.

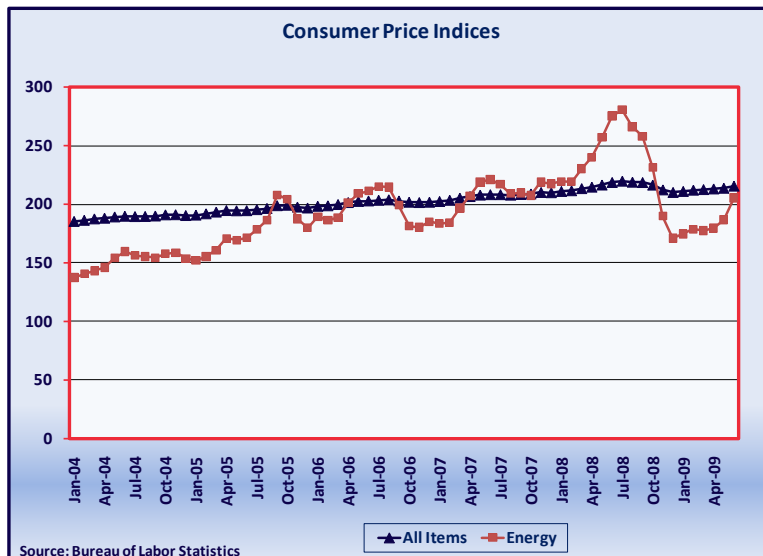
Figure 29: Oil Spot Price, West Texas Intermediate, 2004 - 2009



## 2.2 CONSUMER AND PRODUCER PRICE INDICES

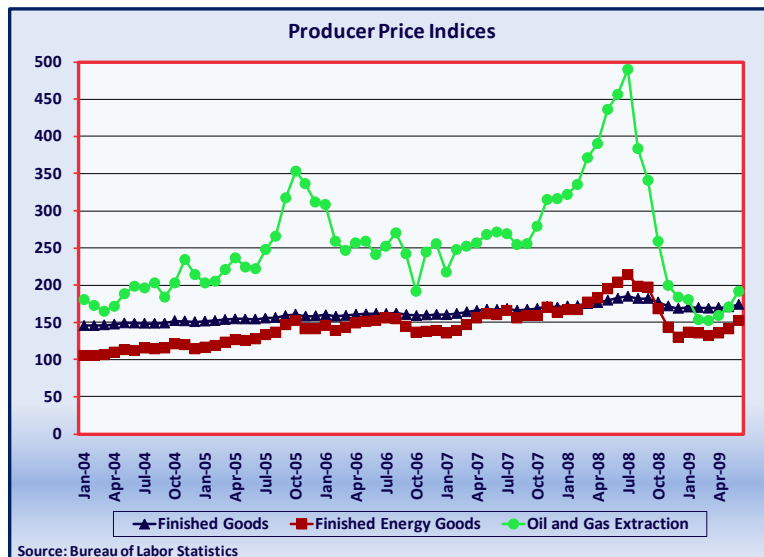
Consumer and producer price indices in the energy category reflect oil and gas price behavior. As Figure 30 shows, the consumer price index for all items increased steadily during the last five years. Meanwhile, the consumer price index for energy goods varied substantially, peaking in the middle of 2008, followed by a sharp decline. During 2009, however, the energy index has increased steadily, at a higher growth rate than for the consumer price index for all items.

Figure 30: Consumer Price Indices, 2004 - 2009



As with the consumer price index for all items, the producer price index for finished goods increased steadily during the last five years (see Figure 31). The producer price index experienced an increase in the middle of 2008, followed by a decline. The increase and the subsequent decline were proportionally larger for the finished energy goods index and much more so for the oil and gas extraction producer price index. During 2009, both the finished energy goods and oil and gas extraction indices increased again. However, the indices continued to be at significantly lower levels than those seen before the peak in the middle of 2008.

Figure 31: Producer Price Indices, 2004 - 2009



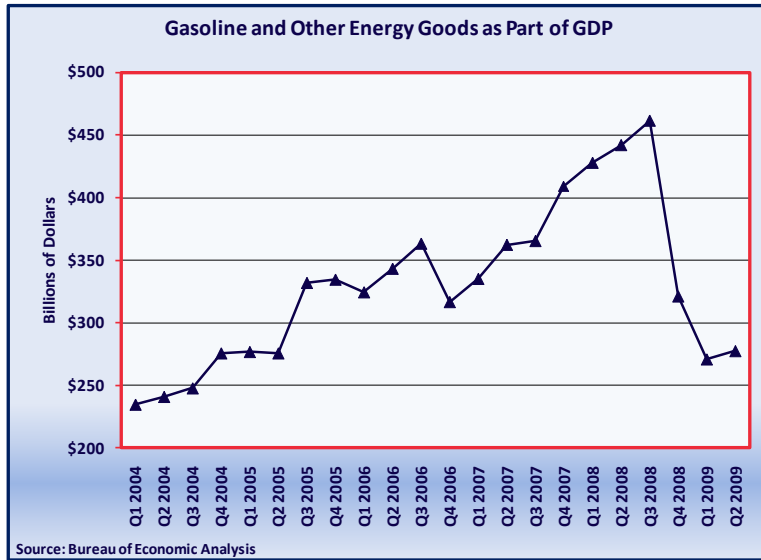
### 3. U.S. OIL AND GAS INDUSTRY OVERVIEW

To provide context for the state of the Arkansas oil and gas industry, this chapter discusses oil and gas industry development in the United States. First, the importance of this industry as part of national GDP is presented and national energy expenditures and investment are discussed. After that, data on oil and gas proved reserves and production as well as natural gas consumption are offered.

#### 3.1 OIL AND GAS EXPENDITURES AND INVESTMENT

The percentage of national GDP comprised of gasoline and other energy goods has generally followed trends in energy prices (see Figure 32). Energy goods accounted for 2.0 percent of GDP in 2004. This share increased steadily, reaching 3.2 percent in the third quarter of 2008, before declining to 2.0 percent in the second quarter of 2009.

Figure 32: Gasoline and Other Energy Goods as Part of GDP, 2004 - 2009



The BEA started to report more detailed GDP data in the fourth quarter of 2008. Table 8 shows detailed personal consumption expenditures and nonresidential fixed investments for the last three quarters. Due to the lack of extensive time series data, seasonality may account for the declines in both sectors during this time period. Decreasing energy prices are also causing the declines. Overall, \$277.6 billion were spent by United States households on energy goods during the second quarter of 2009, with \$51.3 billion on natural gas. Almost \$14.7 billion came from natural gas sales to the ultimate residential customers. About \$71.5 billion were invested in the national oil and gas well drilling and exploration industry in the second quarter of 2009, which accounted for 48.1 million feet of drilling footage. The cost of nonresidential fixed investment per foot of drilling was \$369.2 during the second quarter of 2009, a decline of 12.4 percent from the fourth quarter of 2008.

Table 8: U.S. Real GDP, Expanded Detail, Q4 2008 - Q2 2009

Category		Q4 2008	Q1 2009	Q2 2009
<b>Total GDP (Billions)</b>		<b>\$14,347.3</b>	<b>\$14,178.0</b>	<b>\$14,149.8</b>
<b>Personal Consumption Expenditures</b>	<b>Gasoline and Other Energy Goods (Billions)</b>	\$321.2	\$271.0	\$277.6
	<b>Natural Gas (Billions)</b>	\$64.0	\$57.9	\$51.3
	<b>Sales of Natural Gas to Ultimate Residential Customers (Millions)</b>	\$18,170.7	\$15,963.9	\$14,653.0
<b>Nonresidential Fixed Investment</b>	<b>Oil and Gas Well Drilling and Exploration (Billions)</b>	\$173.3	\$104.9	\$71.5
	<b>Drilling Footage (Millions of Feet)</b>	108.2	64.6	48.1
	<b>Cost Per Foot (Dollars)</b>	\$421.5	\$401.1	\$369.2

Using energy prices and adjusted energy consumption estimates, the EIA calculates expenditures on energy. Table 9 presents United States petroleum and gas expenditures data from 2003 to 2006, and represents the latest available data. Expenses on petroleum include spending on distillate fuel oil, jet fuel, liquefied petroleum gases, motor gasoline, residual fuel oil and other petroleum products. Overall, national spending increased during this time period, with larger increases seen in petroleum expenditures than in natural gas expenditures.



**Table 9: Petroleum and Natural Gas Expenditures in U.S., 2003 - 2006**

<b>Year</b>	<b>Petroleum Expenditures (Million Current Dollars)</b>	<b>Annual Change</b>	<b>Gas Expenditures (Million Current Dollars)</b>	<b>Annual Change</b>
<b>2003</b>	\$378,967	18.5%	\$143,952	29.7%
<b>2004</b>	\$468,351	23.6%	\$162,166	12.7%
<b>2005</b>	\$595,862	27.2%	\$199,605	23.1%
<b>2006</b>	\$681,443	14.4%	\$189,640	-5.0%

### 3.2 CRUDE OIL PROVED RESERVES, PRODUCTION, AND CONSUMPTION IN THE UNITED STATES

According to the “Annual Energy Outlook 2009 with Projections to 2030” by the EIA, no growth in oil consumption in the United States is expected between 2007 and 2030. Oil use is curbed in the projection by the combined effects of rebounding oil prices, more stringent corporate average fuel economy standards, and requirements for the increased use of renewable fuels.

Table 10 presents proved reserves and production development of crude oil from 2004 to 2009. There were 21,317 million barrels of crude oil proven to be in United States reserves in 2007, a slightly lower amount than proved reserves in 2004. While proved reserves experienced both annual declines and increases during the period, domestic production of oil has been consistently declining. There were 1,811,817 thousand barrels of oil produced in 2008, which was 8.6 percent lower than the amount of crude oil produced in 2004.

**Table 10: Proved Reserves and Production of Crude Oil in U.S., 2004 - 2008**

<b>Year</b>	<b>Proved Reserves (Million Barrels)</b>	<b>Annual Change in Reserves</b>	<b>Oil Production (Thousand Barrels)</b>	<b>Annual Change in Production</b>
<b>2004</b>	21,371	-2.4%	1,983,302	-4.3%
<b>2005</b>	21,757	1.8%	1,890,106	-4.7%
<b>2006</b>	20,972	-3.6%	1,862,259	-1.5%
<b>2007</b>	21,317	1.6%	1,848,450	-0.7%
<b>2008</b>	N/A	N/A	1,811,817	-2.0%

### 3.3 NATURAL GAS PROVED RESERVES, PRODUCTION, AND CONSUMPTION IN THE UNITED STATES

Unlike proved reserves of crude oil, proved reserves of natural gas increased consistently from 2004 to 2009 (see Table 11). Natural gas is commonly discussed as either wet or dry gas. Wet gas contains some of the heavier fluid hydrocarbons as vapor, is commonly associated with petroleum, and is valuable because of the extractable hydrocarbon liquids it contains. Dry gas differs from wet gas in that it does not carry appreciable amounts of the heavier hydrocarbons as vapor. According to the EIA, dry natural gas reserves increased to 237,726 billion cubic feet or by 23.5 percent from 2004 to 2007. Similarly, wet natural gas (after lease separation) reserves increased to 247,789 billion cubic feet or by 23.2 percent during the same period. Proved reserves of natural gas liquids increased by 15.3 percent, reaching 9,143 million barrels in 2007.

**Table 11: Proved Reserves of Natural Gas in U.S., 2004 - 2007**

<b>Year</b>	<b>Dry Natural Gas (Billion Cubic Feet)</b>	<b>Natural Gas, Wet After Lease Separation (Billion Cubic Feet)</b>	<b>Natural Gas Liquids (Million Barrels)</b>
<b>2004</b>	192,513	201,200	7,928
<b>2005</b>	204,385	213,308	8,165
<b>2006</b>	211,085	220,416	8,472
<b>2007</b>	237,726	247,789	9,143

The EIA recently raised its projection for United States production and consumption of natural gas, reflecting a larger resource base and higher demand for natural gas for electricity generation. Among the various sources of natural gas, the most rapid growth is expected in domestic production from unconventional resources, while the role played by pipeline imports and imports of liquefied natural gas declines over the long term. From 2007 to 2030, domestic production of natural gas is projected to increase by 4.3 trillion cubic feet (or 22 percent), while net imports fall by 3.1 trillion cubic feet (or 83 percent).

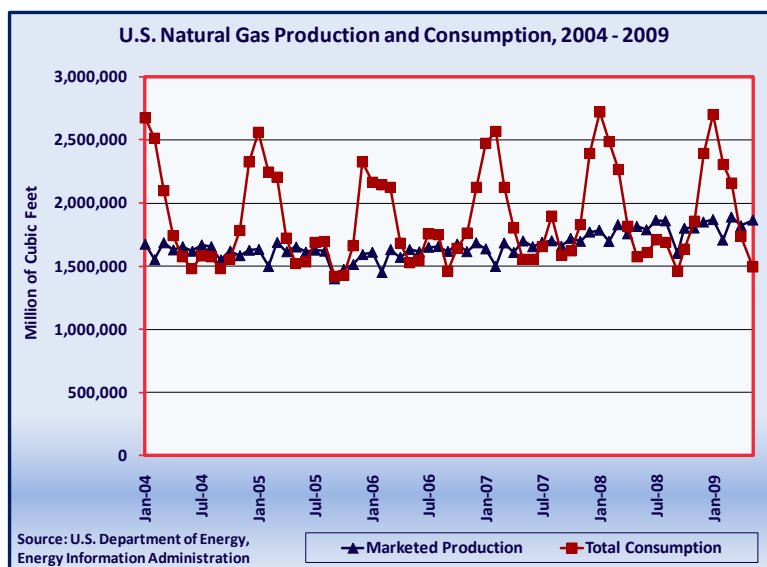
Table 12 presents United States natural gas production data from 2004 to 2008. During the period, the marketed production of gas increased by 9.9 percent, reaching 21,442.2 billion cubic feet in 2008. The number of wells producing gas increased by 11.5 percent from 2004 to 2007 and was 452,768 during the latter year. Meanwhile, average gas production per well declined by 8.0 percent from 48.1 to 44.2 million cubic feet during the same period.

Table 12: Natural Gas Production and Producing Wells in U.S., 2004 - 2008

Year	Marketed Production (Million Cubic Feet)	Number of Producing Gas Wells	Average Gas Production per Well (Million Cubic Feet)
2004	19,517,491	406,147	48.1
2005	18,927,095	425,887	44.4
2006	19,409,674	440,516	44.1
2007	20,019,321	452,768	44.2
2008	21,442,247	N/A	N/A

While natural gas production was steadily increasing, gas consumption in the United States experienced seasonal volatility from 2004 to 2009 (see Figure 33). In May 2009, marketed gas production was almost 1,864.6 billion cubic feet, while national gas consumption was 1,496.1 billion cubic feet. The EIA reported that the overall level of natural gas consumption is sensitive to many factors, including concerns and/or policies regarding greenhouse gas emissions and the pace of economic growth. As a result, EIA projections for gas consumption for 2030 vary from 22.7 trillion cubic feet to 26.0 trillion cubic feet.

Figure 33: Natural Gas Production and Consumption in U.S., 2004 - 2009



## 4. ARKANSAS OIL AND GAS INDUSTRY OVERVIEW

In 2009, Arkansas ranked 1<sup>st</sup> as a good place for oil and gas investment by petroleum executives and managers. The international survey was distributed by the Fraser Institute, an independent research organization with offices in United States and Canada. The survey responses were used to rank provinces, states, and countries by the severity of investment barriers such as high tax rates, costly regulatory schemes, and security threats, among other factors. There were 143 total jurisdictions ranked in the 2009 survey. Each of them was assigned scores for each of 16 factors that affect investment decisions.

The oil and gas industry in Arkansas includes exploration, extraction, production, transportation, refinement, and distribution of petroleum-based and gas products. State spending on energy continues to increase, as does the activity of oil and gas producing companies in the state.

Arkansas oil and gas industry development is described below. After energy expenditure and drilling permits data are discussed, oil and gas proved reserves and production, as well as natural gas consumption data are presented. Finally, some recent economic activity of oil and gas producing companies in Arkansas and their social impact are reviewed.

### 4.1 ENERGY EXPENDITURES AND DRILLING PERMITS ISSUED IN ARKANSAS

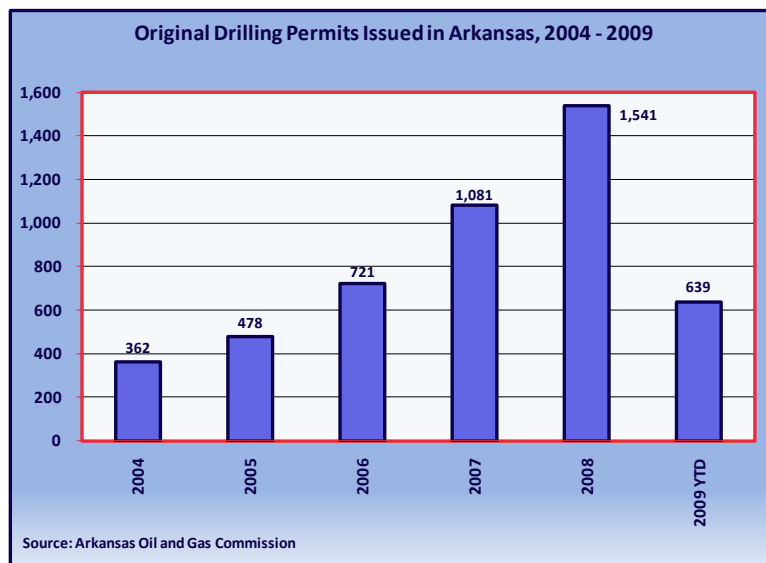
The EIA calculates state energy expenditures using the State Energy Data System prices and adjusted energy consumption estimates. Arkansas petroleum and gas expenditures data from 2003 to 2006 are presented below. In 2006, Arkansas spent \$6,984 million on petroleum and \$1,955 million on natural gas (in current dollars). This compared to \$681,443 million and \$189,640 million spent in the entire United States on oil and gas that year, respectively. As a result, the state ranked 32<sup>nd</sup> among other states on petroleum spending and ranked 30<sup>th</sup> on gas spending. Table 13 presents Arkansas petroleum and gas expenditures.

Table 13: Petroleum and Gas Expenditures in Arkansas, 2003 - 2006

Year	Petroleum Expenditures (Million Current Dollars)	Annual Change	Gas Expenditures (Million Current Dollars)	Annual Change
2003	\$3,843	13.0%	\$1,561	18.2%
2004	\$4,807	25.1%	\$1,638	5.0%
2005	\$6,186	28.7%	\$1,927	17.6%
2006	\$6,984	12.9%	\$1,955	1.5%

The increased activity in the oil and gas industry in Arkansas can be shown from the increasing number of drilling permits issued by the Arkansas Oil and Gas Commission. The number of original drilling permits issued for oil and gas producing companies from 2004 to 2009 is presented in Figure 34. The number of permits has increased substantially during the period from 362 permits in 2004 to 1,541 permits in 2008 and to 639 permits through August, 3, 2009. On average, the number of permits grew by 39.7 percent every year during those five years. The highest annual growth rate was 50.8 percent in 2006.

Figure 34: Original Drilling Permits Issued in Arkansas, 2004 - 2009



## 4.2 ARKANSAS CRUDE OIL INDUSTRY

The oil industry was introduced to Arkansas economy in the early 1920s and once-local production expanded into an international business. Currently ten counties produce oil, all in the southern region of the state in the Gulf Coastal Plain: Ashley, Bradley, Calhoun, Columbia, Hempstead, Lafayette, Miller, Nevada, Ouachita, and Union. Historically, most of the Arkansas production has been in Union, Lafayette, Columbia, and Ouachita counties. The oil industry has exerted a strong economic and cultural influence on the region. Some communities, such as Standard-Umpstead (Ouachita County), were initially founded to support the oil industry.

Arkansas extracts small amounts of crude oil mostly from stripper wells that produce less than 10 barrels per day. The state has two refineries located in the southern region. After extraction and refinement, petroleum products are delivered to consuming regions by barge via the Arkansas and Mississippi Rivers. The TEPPCO pipeline also supplies petroleum products from Texas and Louisiana to the state. Arkansas is one of the few states in United States that allow the statewide use of conventional motor gasoline, while most other states require the use of special fuel blends in non-attainment areas.

The changes in Arkansas proved oil reserves and production over the last five years are shown in Table 14. Proved reserves data come from the EIA, while production data are from the Arkansas Oil and Gas Commission. The state accounted for 0.1 percent of total United States crude oil reserves in 2007, a decrease from 0.2 percent during the previous years. Annual oil production in Arkansas declined from 2004 to 2008, but the rate of decline slowed in 2007 and 2008.

The market value of the oil produced was \$413,365,034, based on monthly West Texas Intermediate spot prices. The market value increased 34.0 percent from the 2007 value of \$308.5 million due to high oil prices during the year. By comparison, the top three agriculture commodities produced in Arkansas in 2008 by market value were broilers (\$2.8 billion), rice (\$1.4 billion), and soybeans (\$1.0 billion).

Table 14: Proved Reserves and Production of Crude Oil in Arkansas, 2004 - 2009

Year	Proved Reserves (Million Barrels)	Share of U.S. Total Reserves	Annual Change in Reserves	Oil Production (Thousand Barrels)	Annual Change in Production
2004	51	0.2%	2.0%	4,981	-9.8%
2005	40	0.2%	-21.6%	4,507	-9.5%
2006	37	0.2%	-7.5%	4,349	-3.5%
2007	31	0.1%	-16.2%	4,268	-1.9%
2008	N/A	N/A	N/A	4,149	-2.8%
2009 (through May)	N/A	N/A	N/A	2,037	N/A

#### 4.3 ARKANSAS NATURAL GAS INDUSTRY

Most of the Arkansas natural gas accumulations are present in the Arkoma Basin, an elongated basin extending from east-central Oklahoma into Arkansas, and in the southern Arkansas oil fields in the Gulf Coastal Plain. Most gas from oil fields in southern Arkansas is wet gas. The gas of the Arkoma basin in the west-central part of the state, on the other hand, is dry.

Proved reserves of natural gas located in the state and their share of total U.S. reserves are shown in Table 15. According to the EIA, from 2004 to 2007, both dry and wet gas reserves increased in Arkansas. The Arkansas shares of total dry and wet gas reserves in the United States increased as well. In particular, the share of Arkansas dry gas reserves out of total United States dry gas reserves went up from 1.0 percent or 1,835 billion cubic feet in 2004 to 1.4 percent or 3,305 billion cubic feet in 2007. Meanwhile, the share of wet gas increased from 0.9 percent or 1,837 billion cubic feet to 1.3 percent or 3,306 billion cubic feet during the same period. Proved reserves of natural gas liquids were small in Arkansas compared to the nationwide reserves, with 3 million barrels present in 2007, while there were 9,143 million barrels in the United States.



Table 15: Proved Reserves of Natural Gas in Arkansas, 2004 - 2007

Year	Dry Natural Gas (Billion Cubic Feet)	Share of U.S. Dry Natural Gas	Natural Gas, Wet After Lease Separation (Billion Cubic Feet)	Share of U.S. Wet Natural Gas	Natural Gas Liquids (Million Barrels)
2004	1,835	1.0%	1,837	0.9%	3
2005	1,964	1.0%	1,967	0.9%	3
2006	2,269	1.1%	2,271	1.0%	4
2007	3,305	1.4%	3,306	1.3%	3

Natural gas production takes place in the Arkoma Basin and in the Gulf Coastal Plain. As the share of Arkansas proved reserves of United States total reserves increased, so did the share of state production (see Table 16) in these areas. Using Arkansas Oil and Gas Commission data, gas production in Arkansas accounted for 1.0 percent of United States total gas production in 2004, with 187,089 million cubic feet of gas produced. By 2008 Arkansas marketed gas production increased to 449,864 million cubic feet and accounted for 2.1 percent of United States total gas production.

The market value of the 2008 Arkansas natural gas production was \$3,591,442,975 based on monthly United States wellhead prices. For comparison purposes, again consider the top three Arkansas agricultural commodities by market value in 2008: broilers (\$2.8 billion), rice (\$1.4 billion), and soybeans (\$1.0 billion). From January to May of 2009, 258,052 million cubic feet of gas was produced in the state. Low natural gas prices may curtail production in the second half of 2009, but production in the first half of 2009 was higher than the gas production levels seen during the same period in 2008.

**Table 16: Natural Gas Production in Arkansas, 2004 - 2009**

<b>Year</b>	<b>Gas Production (Million Cubic Feet)</b>	<b>Share of U.S. Production</b>
<b>2004</b>	187,089	1.0%
<b>2005</b>	190,956	1.0%
<b>2006</b>	201,522	1.0%
<b>2007</b>	272,082	1.4%
<b>2008</b>	449,864	2.1%
<b>2009 (through May)</b>	258,052	N/A

In addition to conventional production, companies recently began to extract natural gas from unconventional deposits in the Arkoma Basin. Unconventional gas has grown in importance as a complement to conventional fossil fuel as world energy demand continues to increase. The EIA expected United States production from unconventional gas sources to increase more rapidly than conventional gas production. In the EIA's long term forecast, unconventional gas production grows from 35 percent of total production in 2003 to 44 percent in 2025.

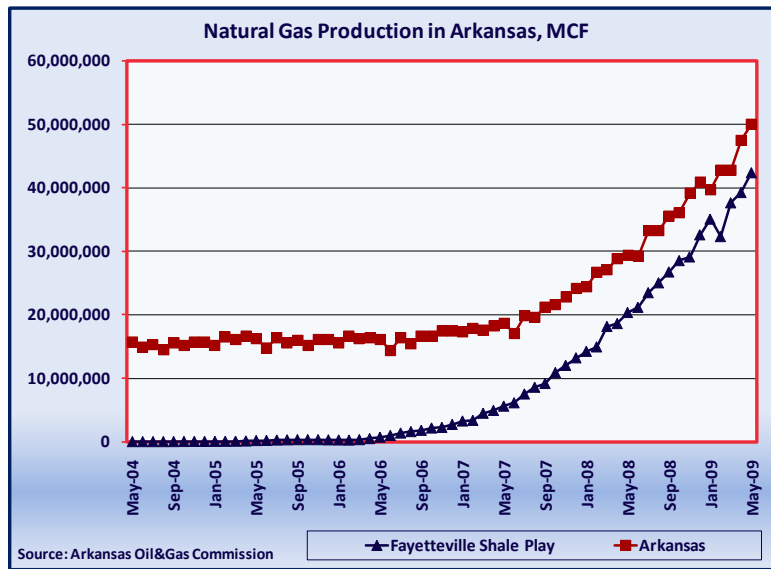
The Fayetteville Shale Formation (in the Upper Mississippi) is the current focus of the gas exploration and production industry in Arkansas. Until the early 2000's, most unconventional shale formations were not considered profitable areas for gas production, but with new technology and elevated natural gas prices, operators started to drill in the Fayetteville Shale. Since the initial test well was drilled in 2003, gas production in the Fayetteville Shale has increased dramatically. At the end of 2007, there were approximately two million acres under lease to production companies.

Figure 35 shows the overall state and Fayetteville Shale production<sup>6</sup> during 2004 – 2009, provided by the Arkansas Oil and Gas Commission. Production data shown are in MCF or thousand cubic feet. After successful exploration of the Fayetteville Shale, the number of operating wells and production in this region multiplied. There were only 2 wells operating in the area in May 2004, as compared to 1,658 operating wells five years later in May 2009.

<sup>6</sup> All gas production within the Fayetteville Shale is for the B-43 field only.

Accordingly from 2004 to 2009, production grew dramatically with annual increases from a mere 100.6 million cubic feet in 2004 to more than 273.1 billion cubic feet in 2008. Overall, the share of Fayetteville Shale natural gas production out of total Arkansas production increased from 0.1 percent in 2004 to 60.7 percent in 2008 and to 72.4 percent during the first half of 2009. As it can be seen from Figure 35, monthly production in the Fayetteville Shale continued to increase throughout 2009. As a result, the total Arkansas natural gas production increased during this period as well in accord with the increase in Fayetteville Shale Play production.

Figure 35: Natural Gas Production in Arkansas, 2004 - 2009



Another area of the Arkansas natural gas industry includes production of coal bed natural gas, which is the methane gas contained in coal seams. The development of coal bed natural gas resources in Arkansas began in 2001 and has yielded an approximate cumulative production of 10 billion cubic feet. Estimated 2007 annual production of this source of natural gas is approximately 3 billion cubic feet. CDX Gas LLC, a Texas based energy company, is currently the only producer of this resource and has drilled approximately 37 Z-pinnate horizontal wells and 15 vertical wells in Sebastian County.

Arkansas natural gas production and consumption data, provided by the Arkansas Oil and Gas Commission and the EIA, respectively, are presented in Figure 36. Unlike gas production, consumption varied significantly, with the lowest levels seen in 2005 and 2006 and higher levels in 2007 to 2009. The volatility of natural gas consumption in Arkansas was high in 2004 and increased again during 2008 and 2009. Indeed, the highest consumption since 2005 was in January 2008 at 26,433 MMCF (million cubic feet), followed by January 2009 usage of 25,701 MMCF, and the lowest consumption was in September 2008 at 12,928 MMCF.

Figure 36: Natural Gas Production and Consumption in Arkansas, 2004 – 2009

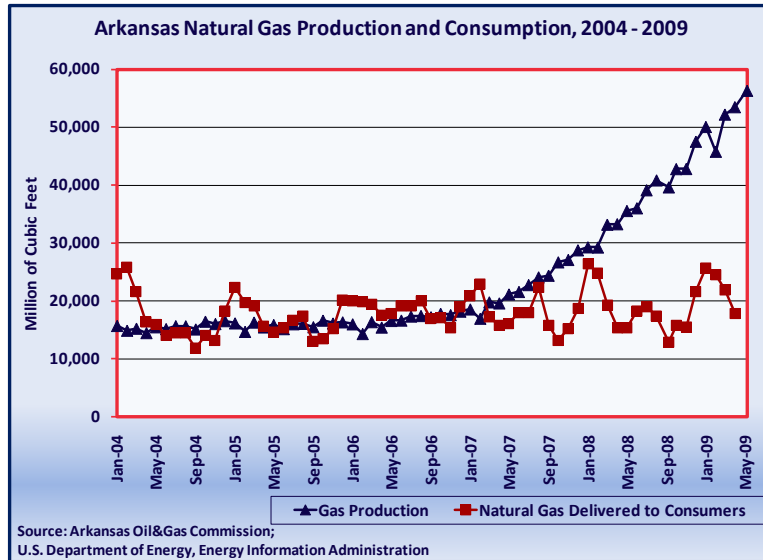
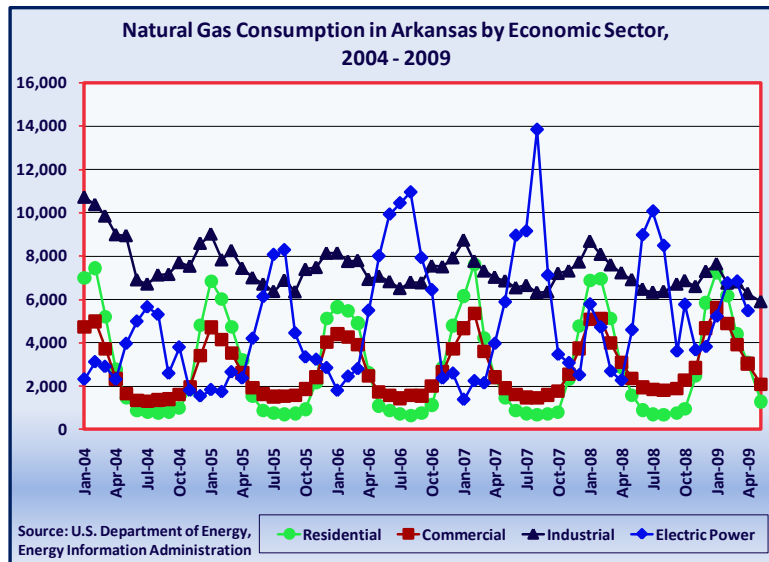


Figure 37 presents Arkansas natural gas consumption by economic sector. It is clear that industrial sector natural gas consumption in Arkansas has declined in recent years. Until 2001, the industrial sector accounted for more than half of the natural gas consumption in the state, but this share had fallen to 35.1 percent by 2009. Electric power consumption is quite volatile, and in April of 2009 it accounted for 30.6 percent of total consumption in Arkansas. Residential consumption on the other hand accounted for 17.2 percent of total consumption during that month. According to the EIA, almost one-half of Arkansas households use natural gas as their primary energy source for home heating. As for natural gas used in commercial sector, it accounted for 17.0 percent of total gas consumption in the state in April 2009.

Figure 37: Natural Gas Consumption in Arkansas by Economic Sector, 2004 - 2009



#### 4.4 OVERVIEW OF OIL AND GAS COMPANIES IN ARKANSAS

According to the Arkansas Oil and Gas Commission, there are 148 operating oil and gas companies in North Arkansas and 446 operating companies in South Arkansas. Production data from the B-43 field, which includes the Fayetteville Shale, showed 19 oil and gas companies operating in 2008 and 2009. Including companies listed as Fayetteville Shale operators in the Commission’s online contact list, there are 29 oil and gas operators in this area.

Due to the large number of oil and gas companies operating in the state, it is not feasible to review all of them in this report. Thus, selected activities of some large companies and a few small companies are discussed below.

One of the international oil companies, Murphy Oil Corporation, is headquartered in El Dorado, Arkansas in Union County. With annual revenues of \$4 billion, Murphy Oil was the third largest publicly-traded company in Arkansas in 2008. The corporation was number 134 on the Fortune 500 list last year. A subsidiary of Murphy Oil Corporation, Murphy Oil USA, Inc. is engaged in refining and marketing of petroleum products in the United States. It has an agreement with Wal-Mart and operates gasoline stations at Wal-Mart stores. During 2009, the profits of Murphy Oil Corporation plunged due to lower energy prices as compared with the previous year’s record prices. In spite of this, the company does not plan to curtail its production activity and production volumes are projected to be 169,000 barrels of oil a day in the third quarter.

Another large Arkansas company, the Stephens Group, LLC, is a private, family-owned firm that invests its capital in private and public companies. One of its partners is Stephens Production

Company, which explores for and produces natural gas and oil. Stephens Production Company is one of the largest privately owned, independent natural gas companies in the United States. The company is headquartered in Fort Smith, Arkansas, and is active not only in Arkansas, but also in six other states and the Gulf of Mexico. According to Manta.com estimates, Stephens Production Company has annual revenues of \$5 to 10 million and a staff of approximately 20 to 49 people.

The development of the oil and gas industry in Arkansas has triggered the growth of private companies. As a result, numerous oil and gas companies are located throughout the state. Some of them are small companies, employing from 1 to 4 people, according to Manta.com. Examples are Dan Reynolds and J David Reynolds companies located in Camden, Justiss Oil Company in Damascus, and Wytex Production Corp located in Fort Smith. Other companies are a little larger, employing approximately 4 to 9 employees, such as Corley Trust and Jerry Langley Oil Co, LLC both located in Smackover; Hogback Exploration Inc. located in Fort Smith; and Atlanta Exploration, Betsy Production Company, and Weiser-Brown Operating Company all located in Magnolia. Some oil and gas producing companies are even larger, with an estimated 10 to 19 employees, such as Arklatx Operating Company located in Smackover. Moreover, a few companies are much larger, such as Ocean Exploration Company located in El Dorado with estimated annual revenues of \$85.0 million and 350 employees.

Even as gas prices fell, natural gas companies in Fayetteville Shale continued to increase their production in the first half of 2009. The Fayetteville Shale is currently the second most productive shale play in the United States and one of the nation's 10-largest natural gas fields of any type. Southwestern Energy and Chesapeake Energy are major players in the area and the two companies have offices in Faulkner County and White County, respectively, facilitating their development.

Southwestern Energy Company now has 879,000 acres under lease. The company's production passed one billion cubic feet (BCF) per day in July 2009, and totaled 60.6 BCF in the second quarter of 2009. However, the company's profit fell 11.0 percent even as production soared by 65.0 percent in this quarter. Southwestern Energy plans to lower its production for the last half of 2009 because of repairs that need to be made to a portion of the Texas Gas Transmission Pipeline that it uses to move its gas production. This will affect company production guidance and its yearly production for 2009 was projected to change to a range of 278 to 288 BCF. Repairs to the pipeline are expected to begin in September and should be completed in one to five months. The company estimated that its gross well count will be approximately 575 wells and its capital investments will be approximately \$1.5 billion in the Fayetteville Shale during 2009.

Chesapeake Energy is the second-largest leasehold owner in the core area of the Fayetteville Shale play with 440,000 net acres. Chesapeake's leasehold investment in the area to date has been approximately \$525 million. By selling a 25 percent interest in the company's leasehold to BP America, one of the world's largest energy companies, for \$883 million, the company has

more than recouped its entire leasehold investment in the Fayetteville Shale. The company is not currently curtailing production, but may do so later as market conditions dictate. During the second quarter of 2009, Chesapeake's average daily net production in the Fayetteville Shale Play increased approximately 15.0 percent over the first quarter value and approximately 60.0 percent over the second quarter of 2008 value. Chesapeake is currently producing approximately 240 million cubic feet (MMCF) net per day from the Fayetteville and anticipates reaching approximately 300 MMCF net per day by year-end 2009 and approximately 375 MMCF net per day (500 MMCF gross operated) by year-end 2010. To further develop its acres of leasehold, Chesapeake anticipates operating an average of approximately 18 rigs in the second half of 2009 and 16 rigs in 2010 to drill approximately 80 and 140 net wells, respectively. During the first half of 2009, approximately \$337 million of Chesapeake's drilling costs in the Fayetteville Shale were paid for by its joint venture partner BP America. During the second half of 2009, nearly all of Chesapeake's drilling costs, or approximately \$300 million, will be paid for by BP.

In addition to Southwestern Energy and Chesapeake Energy, other gas companies are also exploring and producing natural gas in the Fayetteville Shale. XTO Energy Inc., for example, is running six rigs in the area. From the first quarter to the second quarter of 2009, the company's production went from 60 million cubic feet (MMCF) a day to 85 MMCF a day. Currently, XTO Energy has a target to exit at 120 MMCF a day. Overall, the company plans to allocate about \$500 million in capital investment to the Arkoma Basin and Mid-Continent properties during 2009. Petrohawk Energy Corporation, on the other hand, is currently operating two horizontal rigs in the Fayetteville Shale, down from 11 rigs in the fourth quarter of 2008. However, due to the increased level of activity and exceptional operational results of their non-operative partners, the company had been able to achieve steady production growth in the field. At the beginning of 2009, Petrohawk Energy net production in the field was approximately 71 MMCF a day and by the end of the second quarter it had grown to just over 80 MMCF a day or by 12.7 percent. During 2008, the company spent 36.0 percent of its capital budget or \$395 million on Fayetteville Shale activities, including drilling, completion, seismic and facility costs. Petrohawk Energy plans to have the total capital budget of \$1.0 billion in 2009, spending on two heavily weighted projects with the highest internal rates of return and highest potential for reserve growth. The Fayetteville Shale is one of these projects.

Overall, companies participating in the Fayetteville Shale experienced declines in profits during the first half of 2009 due to lower gas prices. Some of them continue to increase production, while others curtail their activities. One of the important factors that may likely influence involuntary natural gas production curtailments across the industry during the next few months is rising pipeline and gathering system pressures in the area. Currently, natural gas in the Fayetteville Shale is transported along the Fayetteville Lateral of the Texas Gas Transmission Pipeline, also called the Boardwalk Pipeline. Due to inspection and repairs on this pipeline, operators are facing capacity curtailments. The good news is that a new pipeline is on the way. Pipeline purveyors Kinder Morgan and Energy Transfer Partners have joined forces to construct a strategically situated interstate gas pipeline. A pipeline to connect the Fayetteville Shale of

Arkansas to the broader grid, however, will not be completed until early 2011. Revenue from this new pipeline, furthermore, has been locked in by multi-year contracts. Southwestern Energy and BP have already inked 10-year commitments for the upcoming Fayetteville Express.

Another company, CenterPoint Energy Inc. of Houston is also considering expanding its core pipeline system in eastern Arkansas. Its subsidiary, CenterPoint Energy Gas Transmission, has been accepting non-binding bids for use of a proposed natural gas transmission line in August, 2009. However, the company is not committing to building the pipeline and will determine the final pricing based on "facility costs, the level of firm commitments, and the amount of interest indicated in accessing interstate pipelines," according to the release.

Activities of oil and gas companies have in turn affected increased activities in the oil and gas service sector. In addition to exploration, extraction, and production, such sectors as transportation, storage, and distribution were developed in Arkansas. Moreover, it is still anticipated that many new wells will be drilled during the next several years. This activity will include construction and installation of roads and pipelines, as well as drilling fluid disposal pits and infrastructure to handle hundreds of millions of gallons of fracturing fluids. As a result, this will create employment opportunities and increased investments in the state.

#### 4.5 SOCIAL IMPACT OF OIL AND GAS COMPANIES ON ARKANSAS

In addition to their core activities, oil and gas companies also help local communities by coordinating events, participating in fundraising activities, making donations, and other activities.

Southwestern Energy, for example, has donated hundreds of thousands of dollars to improve the quality of life in local communities. These include such major gifts as \$250,000 to Junior Achievement, \$250,000 to help establish the Damascus Bobwhite Quail Habitat, and \$200,000 to the University of Arkansas Community College at Morrilton to help establish the state's only petroleum technology program.

Arkansas State University's Floorhand Training Program is another of the many benefits of the partnership that are being built around the Fayetteville Shale. Chesapeake Energy Corporation and its drilling subsidiary Nomac have donated over \$250,000 to establish a program. Coupled with a \$50,000 donation from Union Drilling, the program started accepting students in April of 2008. The Floorhand Training Program is a 40-hour week program that provides students with occupational training skills and on-the-job experience with a simulator, as well as essential classroom training. Each class includes training in both a classroom environment and on a realistic drilling rig simulator that has been erected on the Searcy campus. Many students have completed the training and over half are already working in the industry. Students are employed by companies such as Union Drilling, Premier Well, Nomac, Helmick & Paine, and Saxton, with an average hourly wage of \$14.00 to \$22.50.



As of September, 2009, Chesapeake Energy has also committed \$100,000 each to the University of Arkansas' Geosciences Department, Law School, and to Harding University's Math & Science Department as part of the Chesapeake Scholars Program.

One of the biggest social impacts is probably the El Dorado Promise. The El Dorado Promise is a unique scholarship program, providing graduates of El Dorado High School with a scholarship covering tuition and mandatory fees that can be used at any public or private educational institution in the United States. The maximum amount payable is up to the highest annual resident tuition at an Arkansas public university. El Dorado High, the sole high school in town, has about 250 graduates each year, about 65 percent of whom go to college and may benefit from the program.

Murphy Oil, (an Arkansas refiner, rather than producer) committed to fund this program in 2006 by putting up \$50.0 million. Under this commitment, the company agreed to pay \$5.0 million per year from 2007 to 2016 to cover a specified amount of college expenses for eligible graduates of El Dorado. Murphy Oil expressed that it wants to increase the number of students who attend college and perhaps attract new businesses to El Dorado, with the scholarships being a selling point. The company hopes the program will help create better jobs here for students to come back to after graduating from college. The first three payments for this program have been made through January 2009. Moreover, Murphy Oil Corporation announced in January 2009 that it is expanding the El Dorado Promise Scholarship program to allow more flexibility for students and families in El Dorado looking for ways to afford a higher education.

The importance of such programs for the community is hard to overestimate. Arkansas has the second-lowest percentage of college graduates in the nation at 16.7 percent, ahead of West Virginia's 14.4 percent. As more students can afford college, hopefully more Arkansans will be receiving higher wages and the state, in turn, will receive higher tax revenues.



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## APPENDICES

### APPENDIX 1: ARKANSAS GDP, EXPANDED DETAILS

Table 17: Arkansas GDP, All Industries, Current Dollars, in Millions

Industry	2004	2005	2006	2007	2008	Growth Rate from 2004-2008
<b>All industry total</b>	\$82,137	\$86,546	\$90,660	\$95,116	\$98,331	19.7%
<b>Private industries</b>	\$71,343	\$74,807	\$78,209	\$82,061	\$84,655	18.7%
<b>Agriculture, forestry, fishing, and hunting</b>	\$3,674	\$3,147	\$2,738	\$3,498	\$3,331	-9.3%
<b>Mining</b>	\$704	\$787	\$998	\$1,450	\$1,680	138.6%
<b>Oil and gas extraction</b>	\$191	\$247	\$243	\$321	N/A	N/A
<b>Mining, except oil and gas</b>	\$225	\$254	\$294	\$434	N/A	N/A
<b>Support activities for mining</b>	\$288	\$286	\$460	\$695	N/A	N/A
<b>Utilities</b>	\$1,783	\$1,798	\$1,969	\$2,030	\$2,232	25.2%
<b>Construction</b>	\$3,483	\$3,943	\$4,170	\$3,951	\$3,987	14.5%
<b>Manufacturing</b>	\$15,946	\$16,300	\$16,961	\$17,066	\$17,083	7.1%
<b>Durable goods</b>	\$8,557	\$8,938	\$9,612	\$9,587	\$9,386	9.7%
<b>Nondurable goods</b>	\$7,389	\$7,363	\$7,349	\$7,478	\$7,697	4.2%
<b>Petroleum and coal products manufacturing</b>	\$1,444	\$1,214	\$1,540	\$1,342	N/A	N/A
<b>Wholesale trade</b>	\$5,402	\$5,686	\$6,004	\$6,174	\$6,413	18.7%

<b>Retail trade</b>	\$5,969	\$6,478	\$6,832	\$7,059	\$7,209	20.8%
<b>Transportation and warehousing, excluding Postal Service</b>	\$4,133	\$4,410	\$4,605	\$4,732	\$4,790	15.9%
<b>Air transportation</b>	\$111	\$114	\$107	\$108	N/A	N/A
<b>Rail transportation</b>	\$512	\$546	\$615	\$639	N/A	N/A
<b>Water transportation</b>	\$14	\$15	\$17	\$14	N/A	N/A
<b>Truck transportation</b>	\$2,323	\$2,508	\$2,574	\$2,648	N/A	N/A
<b>Transit and ground passenger transportation</b>	\$31	\$31	\$33	\$40	N/A	N/A
<b>Pipeline transportation</b>	\$117	\$103	\$112	\$113	N/A	N/A
<b>Other transportation and support activities</b>	\$582	\$618	\$669	\$692	N/A	N/A
<b>Warehousing and storage</b>	\$443	\$475	\$476	\$477	N/A	N/A
<b>Information</b>	\$2,946	\$3,150	\$3,261	\$3,964	\$3,853	30.8%
<b>Finance and insurance</b>	\$3,322	\$3,437	\$3,618	\$3,637	\$3,678	10.7%
<b>Real estate and rental and leasing</b>	\$6,788	\$7,327	\$7,591	\$7,960	\$8,387	23.6%
<b>Real estate</b>	\$6,170	\$6,621	\$6,752	\$7,042	N/A	N/A
<b>Rental and leasing services and lessors of intangible assets</b>	\$618	\$706	\$839	\$918	N/A	N/A
<b>Professional and technical services</b>	\$2,975	\$3,204	\$3,393	\$3,673	\$3,940	32.4%
<b>Legal services</b>	\$590	\$610	\$621	\$648	N/A	N/A
<b>Computer systems design and related services</b>	\$643	\$670	\$714	\$730	N/A	N/A
<b>Other professional, scientific and technical services</b>	\$1,742	\$1,923	\$2,059	\$2,295	N/A	N/A
<b>Management of companies and enterprises</b>	\$1,954	\$2,023	\$2,186	\$2,240	\$2,561	31.1%
<b>Administrative and waste services</b>	\$1,623	\$1,791	\$1,872	\$1,974	\$2,137	31.7%
<b>Administrative and support services</b>	\$1,468	\$1,623	\$1,710	\$1,808	N/A	N/A

<b>Waste management and remediation services</b>	\$154	\$168	\$161	\$167	N/A	N/A
<b>Educational services</b>	\$336	\$353	\$383	\$420	\$455	35.4%
<b>Health care and social assistance</b>	\$6,153	\$6,599	\$6,945	\$7,291	\$7,707	25.3%
<b>Arts, entertainment, and recreation</b>	\$383	\$404	\$437	\$463	\$492	28.5%
<b>Accommodation and food services</b>	\$1,828	\$1,974	\$2,129	\$2,263	\$2,407	31.7%
<b>Other services, except government</b>	\$1,942	\$1,998	\$2,118	\$2,216	\$2,313	19.1%
<b>Government</b>	\$10,794	\$11,739	\$12,451	\$13,054	\$13,675	26.7%





## APPENDIX 2: DEFINITIONS OF OIL AND GAS INDUSTRY SECTORS

**NAICS 211. Oil and gas extraction.** Establishments in this subsector operate and/or develop oil and gas field properties. Such activities may include exploration for crude petroleum and natural gas; drilling, completing, and equipping wells; operating separators, emulsion breakers, desilting equipment, and field gathering lines for crude petroleum and natural gas; and all other activities in the preparation of oil and gas up to the point of shipment from the producing property. This subsector includes the production of crude petroleum, the mining and extraction of oil from oil shale and oil sands, and the production of natural gas, sulfur recovery from natural gas, and recovery of hydrocarbon liquids. Establishments in this subsector include those that operate oil and gas wells on their own account or for others on a contract or fee basis.

**NAICS 213111. Drilling oil and gas wells.** This subsector comprises establishments primarily engaged in drilling oil and gas wells for others on a contract or fee basis. This industry includes contractors that specialize in spudding in, drilling in, re-drilling, and directional drilling.

**NAICS 213112. Support activities for oil and gas operations.** This subsector comprises establishments primarily engaged in performing support activities on a contract or fee basis for oil and gas operations (except site preparation and related construction activities). Services included are exploration (except geophysical surveying and mapping); excavating slush pits and cellars, well surveying; running, cutting, and pulling casings, tubes, and rods; cementing wells, shooting wells; perforating well casings; acidizing and chemically treating wells; and cleaning out, bailing, and swabbing wells.

**NAICS 23712. Oil and gas pipeline and related structures construction.** This subsector comprises establishments primarily engaged in the construction of oil and gas lines, mains, refineries, and storage tanks. The work performed may include new work, reconstruction, rehabilitation, and repairs. Specialty trade contractors are included in this group if they are engaged in activities primarily related to oil and gas pipeline and related structures construction. All structures (including buildings) that are integral parts of oil and gas networks (e.g., storage tanks, pumping stations, and refineries) are included in this subsector.

**NAICS 486. Pipeline transportation.** Establishments in this subsector use transmission pipelines to transport products, such as crude oil, natural gas, refined petroleum products, and slurry. It also includes the storage of natural gas because the storage is usually done by the pipeline establishment and because a pipeline is inherently a network in which all the nodes are interdependent.