

**THE ECONOMIC IMPACT OF THE HAYNESVILLE SHALE  
ON THE LOUISIANA ECONOMY IN 2008**

**PREPARED BY**

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## EXECUTIVE SUMMARY

Much excitement has been created in Louisiana's oil and gas extraction sector by the discovery of the Haynesville Shale deposit in the northwestern part of the state. In Louisiana, it is located primarily in four parishes---Caddo, Bossier, DeSoto, and Red River. What has especially bolstered excitement about this play is the first estimate of its size. Some of the initial wells have produced prodigious amounts of natural gas. Chesapeake Energy has estimated the Haynesville Shale holds an estimated 245 tcf of natural gas, which would make it the largest onshore natural gas find in the U.S.

The purpose of this report is to capture and measure the direct and indirect effects on the Louisiana economy from the activities of the extraction firms operating in the Haynesville Shale in 2008. In the present case, expenditures provided by the seven of the seventeen firms (72 percent of the acreage) operating in the shale were plugged into the RIMS II model to estimate the annual impacts on: (1) *new sales* for firms in the state, (2) *new household earnings* for residents in the state, (3) *new jobs* in the state, and (4) *tax collections* by the state and local governments.

We can summarize the impacts on the Louisiana economy in the following way:

- We estimate that during the year 2008, the extraction activity of these seven firms generated approximately **\$2.4 billion in new business sales within the state of Louisiana.**
- New business sales in turn created new household earnings for residents of the state. **As a result of these activities, nearly \$3.9 billion in household earnings was created in 2008.** This estimate includes both direct and indirect earnings and includes almost \$3.2 billion in lease and royalty payments to private landowners.

- Including the direct employment of approximately 431 employees and contract workers reported by these seven firms, **there was an increase of 32,742 new jobs within the state in 2008. As a reference point**, this is slightly larger than total employment in all of Louisiana's banks and credit unions. The job multiplier is remarkably large in this case due to the fact that \$3.2 billion in lease and royalty payments were injected into the state's economy by the extraction firms.
- Finally, we estimate the increase in state and local tax collections that were generated by these seven firms due to their extraction activities in the Haynesville Shale. These new taxes came from two sources: taxes paid directly by the seven firms and additional taxes paid by households who experienced an increase in their household earnings via the multiplier effects. Our conservative estimate is that collectively, **state and local tax revenues increased by at least \$153.3 million in 2008** due to the extraction activities in the Haynesville Shale. In one parish sales tax collections alone are up over 300 percent in the first quarter of 2009.

While these multiplier impacts appear large at first blush, it is important to note that most of the multiplier impacts estimated above do not arise from the extraction or drilling activity *per se*. Approximately \$3.2 billion (or 70%) of the total expenditures associated with the extraction activity in the Haynesville Shale for these seven firms were in the form of mineral lease payments and royalty payments. Thus, the impacts on business sales, household earnings and jobs arise in large measure from the expenditures made by these lease owners.

On a final note, it is important to point out that we have data from only seven of the seventeen companies involved with extraction activity in the Hayneville Shale. Obviously, our impact estimates understate the total infusion of new money in the state's economy and in turn, understate the true impacts on business sales, household earnings and employment in the state. Also, we are using a very conservative estimate of the percentage of newly created wealth (e.g. lease payments and royalties) that households will spend on goods and services. Based on existing studies, economists estimate that households spend about 5 percent of their wealth each

year. But, these estimates are based on traditional measures of household wealth (value of homes, pension values, etc.). The studies do not contemplate massive increases in a household's wealth due to royalties and lease payments (equivalent in this case to winning the lottery). Unfortunately, we are not aware of any studies that measure the amount of money that households spend from lottery winnings, so we use the 5 percent value to calculate the impacts on sales, earnings and jobs. Thus, the multiplier impacts reported here may be viewed as lower bound estimates. The actual impacts are likely to be substantially larger.

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## I. Introduction

Much excitement has been created in Louisiana's oil and gas extraction sector by the discovery of the Haynesville Shale deposit in the northwestern part of the state. As pointed out by engineer David McGee of Louisiana's Department of Natural Resources, shale is formed where rivers deposit muddy waters over many years. When the water stops flowing a marsh is formed, plants grow and become the source of carbon that is later consumed by bacteria (methanogens), releasing methane. Buried under many feet of other material it is compacted to form a layer of shale with the methane and some water trapped in tiny spaces between the grains.<sup>1</sup>

### **Depth, Location & Size**

This shale is found at depths of 10,000 to 14,000 feet and requires horizontal drilling and fracturing of large areas of the formation to release the gas in economical quantities.<sup>2</sup> This makes the Haynesville Shale gas relatively expensive to produce at \$5 to \$6 million per well. In Louisiana, it is located primarily in four parishes---Caddo, Bossier, DeSoto, and Red River.

What has especially bolstered excitement about this play is the first estimate of its size. Some of the initial wells have produced prodigious amounts of natural gas. For example, a typical well in the Fayetteville Shale may produce 5 mmcf/d and in the Marcellus Shale wells typically yield 3 to 4 mmcf/d.<sup>3</sup> Conventional gas wells yield about 2-3 mmcf/d.<sup>4</sup> The **Oil and Gas Journal** reported on a Petrohawk well in Red River Parish

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<sup>1</sup> David McGee, "Haynesville Shale Gas Play and Louisiana Coal Seam Natural Gas", Louisiana Department of Natural Resources/Technology Assessment Division, August 2008.

<sup>2</sup> Ibid.

<sup>3</sup> Jefferies & Company, Resource Chronicles – US Equity Research, January 2009.

<sup>4</sup> "Companies Gush Over LA Wells", Morning Advocate, March 24, 2009, p. 1D.

producing 28.2 mmcf/d---a rate more than five times that of the Fayetteville Shale. Petrohawk had another well in Bossier Parish clocking in at 23.4 mmcf/d.<sup>5</sup> EXCO Resources has completed two wells in DeSoto Parish yielding initial flow rates of 22.9 mmcf/d and 24.2 mmcf/d, respectively.<sup>6</sup> It is because of these prodigious flow rates that exploration and production in the Haynesville Shale has continued in early 2009 despite the fact that natural gas prices frequently dipped below \$4 per mmbtu at the wellhead.

Chesapeake Energy has estimated the Haynesville Shale holds an estimated 245 tcf of natural gas, which would make it the largest onshore natural gas find in the U.S.

### **Rig Count Data**

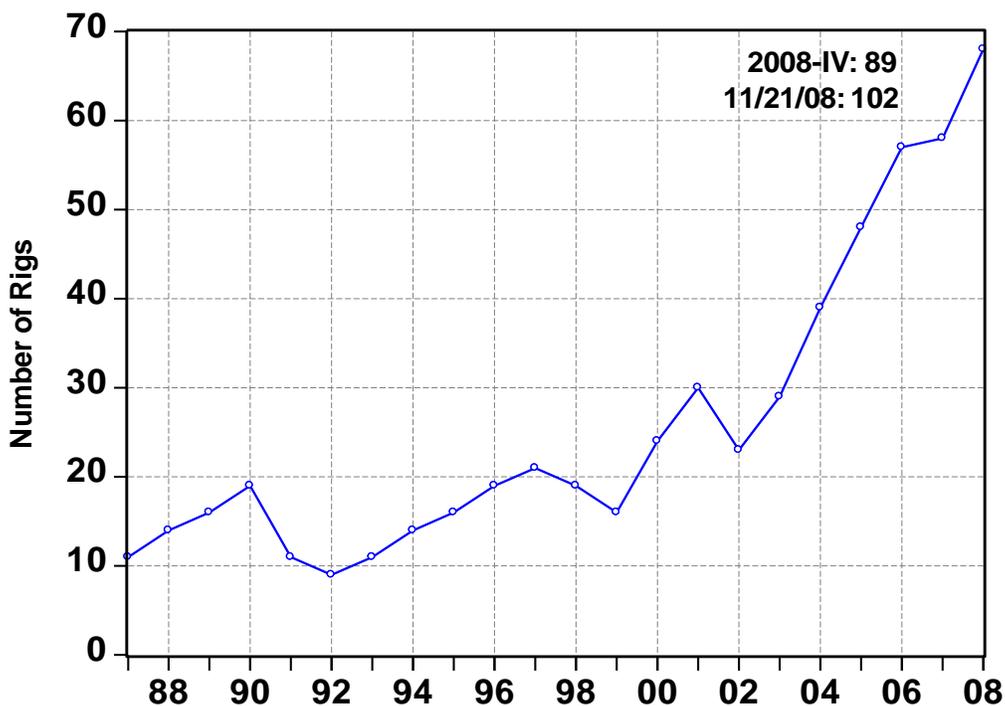
Rig count data for the northern part of the state reveal the intensity of interest in the Haynesville Shale (see Figure 1). Between 2004 and 2006 there was an increase in the number of operating rigs from about 39 to approximately 58 due to the overall increase in commodity prices. However, there was another step increase that occurred in 2008 as word about the Haynesville Shale spread.

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<sup>5</sup> Oil and Gas Journal, website release, December 9, 2008.

<sup>6</sup> Oil and Gas Journal, March 9, 2009, p. 40.

**Fig. 1: North Louisiana Rig Count**



The magnitude of the rig count response is somewhat hidden in the annual average numbers in Figure 1. **Actually, the rig count had declined to only 47 in February 2008. By November 21, 2008 the count had jumped suddenly to 102 rigs before settling down at 90 in December 2008.** This number declined somewhat in early 2009 to 71 rigs in March in response to the U.S. recession, tightening credit markets, and lower natural gas prices. Despite this small dip, this latest rig count is more than 50 percent higher than February 2008, just before the Haynesville Shale play began in earnest.

### **Outline of Report**

The purpose of this report is to estimate the impact on the Louisiana economy of activities in the Haynesville Shale in 2008. Section II describes the methodology that we

use to estimate these impacts. Section III provides the impact estimates on business sales, household earnings, jobs, and tax collections in the state. Section IV provides a summary and conclusions.

## **II. Methodology**

It is a well established principle that business operating decisions have both direct and indirect (multiplier) impacts on the economy.

### **The Direct Effects**

The **direct** impact can be measured by how much new money is injected into the state's economy by activities of firms operating in the shale. In the case of exploration firms, they inject money via lease payments to landowners, monies spent on drilling activities, monies spent on administrative costs associated with operating a firm in the area, and direct taxes paid to governmental entities.

**The Questionnaire.** To measure these direct impacts we conducted a questionnaire survey of firms that were operating in the Haynesville Shale in 2008. A copy of this questionnaire can be found in Appendix A. This questionnaire was first tested with a few on the participating firms to make sure that questions were clearly stated and that we were asking questions that would capture all the new spending that these firms would be injecting into the Louisiana economy. Several useful suggestions were incorporated into the questionnaire before it was finally emailed to contact persons in each firm. These contact persons were provided by the staff of the Louisiana Oil and Gas Association.

**Responses to Questionnaire.** Table 1 illustrates the acreage position of the firms that were operating in the Haynesville Shale in 2008.

**Table 1**  
**Net Acreage Position in the Haynesville Shale: 2008**

<b>Operator</b>	<b>Net Acreage Position</b>
Devon Energy	483,000
Chesapeake	480,000
Encana	370,000
Petrohawk	300,000
Shell	175,000
EOG Resources	150,000
Cabot Oil And Gas	135,000
EXCO	119,800
Plains Exploration	110,000
Forest Oil	106,000
XTO Energy	100,000
Comstock	67,918
Penn Virginia	61,000
Goodrich	60,500
St. Mary	50,000
El Paso	42,500
GMX Resources	38,455
<b>TOTAL</b>	<b>2,849,173</b>

Source: Jefferies & Company

**Of the total net acreage position of 2,849,173 acres, we received completed questionnaires from seven firms holding 72 percent of this acreage.** We use these data to estimate the impacts of shale activity on the state's economy. Clearly, because we are leaving out data on 28 percent of the firms operating in the shale, our estimates will be very conservative.

### **The Multiplier Effect**

However, just estimating these direct impacts alone would significantly understate the role of these firms in the economy. The reason is that the firms also buy from, and sell to, many other firms in the economy. The interactions caused by these purchases and

expenditures are magnified by the spending of employees of the extraction firms who earn income from the firm and the affected businesses.

Thus, any change in the activity of a particular firm **indirectly** affects these other buyers and sellers, which in turn affects firms that buy from and sell to these buyers and sellers, etc. For example, when a decision is made by a firm that creates a new job, a chain-reaction is started which works its way throughout the economy. This chain-reaction (**multiplier effect**) causes even more jobs to be created. The analogy is of a rock being tossed into a pond. Not only is there an initial splash (the direct effect), but ripples are created that spread throughout the pond. The purpose of this report is to capture and measure these direct and indirect effects on the Louisiana economy from the activities of the extraction firms operating in the Haynesville Shale.

### **The Input-Output Table**

A major difficulty lies in attempting to quantify these indirect impacts. Fortunately, a technique has been developed for precisely this purpose---an **input-output (I/O) table**. An I/O table is a matrix of coefficients describing the interactions between all industries in a geographical area. The I/O table provides a complete picture of the flows of products and services in an economy for a given year, illustrating the relationship between producers and consumers and the interdependencies of industries in a region.

An I/O table for state has been constructed by the Bureau of Economic Analysis (BEA), U.S. Department of Commerce. The BEA is the government agency responsible for measuring the nation's gross domestic product each quarter. This model is referred to as the RIMS II model, and is similar to the IMPLAN or REMI models. To find the direct

and indirect (spillover) operational effects of particular firm or industry on other firms and workers within a given geographical area, we insert the firm's expenditures into the matrix. In the present case, expenditures provided by the firms operating in the shale are plugged into the RIMS II model to estimate the annual impacts on: (1) *new sales* for firms in the state, (2) *new household earnings* for residents in the state, (3) *new jobs* in the state, and (4) *tax collections* by state and local governments.

### **III. Impact of Seven Firms' Extraction Activities on the Louisiana Economy**

In this section we estimate the direct and indirect impacts on the state's economy resulting from the extraction activities of the seven firms operating in Haynesville Shale. The estimates reported below represent the impacts for one year---2008. We estimate the impact on business sales, household earnings, and jobs.

#### **The Direct Effects**

To get some idea of the magnitude money infusion into the state's economy that was associated with the extraction activity by these seven firms, Table 2 reports the expenditures on such things as lease and royalty payments, wages and salaries, direct drilling expenditures, administrative expenses, and taxes in 2008.

Note, that in just one year **these seven firms pumped an amazing \$4.5 billion into the state's economy**. As seen in Table 2, of that \$4.5 billion total, approximately \$3.2 billion (70 percent) was accounted for in mineral lease payments with another \$93.8 million in royalty payments. Using the analogy above, this sizable injection of new money into the Louisiana economy can more appropriately be characterized as tossing a "boulder" into the pond.

Further, recall that we have data from only seven of the seventeen companies involved with extraction activity in the Hayneville Shale. Obviously, these numbers understate the total infusion of new money in the state's economy and in turn, will understate the true impacts on business sales, household earnings, employment and taxes in the state.

**Table 2**  
**Annual Expenditures, Taxes and Direct Employment**  
**From Extraction Activity by Seven Firms Operating**  
**In the Haynesville Shale, 2008**

<b>Category</b>	<b>Amount</b>
Mineral Lease Payments	\$3,152,276,305
Royalty Payments	\$93,788,467
Rental & Surface Lease Payments	\$18,221,292
Wages and Salaries	\$31,879,630
Other Administrative Expenses	\$3,645,552
Direct Drilling Expenditures	\$1,081,620,980
Infrastructure Spending	\$75,350,000
Direct Taxes	\$3,962,000
State Taxes	\$13,992,034
Local Taxes	\$38,302,276
<b>Total</b>	<b>\$4,513,038,536</b>
Direct Employment	318
Contract Employment	113

Source: Survey conducted by author.

### **Handling of Lease & Royalty Payments**

Estimating the impact of the activities of these seven firms on the state's economy presents researchers with a special problem that is unique to impact analysis. The problem has to do with how one treats the very large lease and royalty payments made to private individuals.

Under normal circumstances, researchers will take all monies spent by a firm in an area and plug that number into an I/O table to generate the indirect impacts on the state economy. However, there is behind that procedure the normal assumption that a large portion (95 percent +) of the new money received by state residents will be spent. In the case of the \$3.2 billion in lease and royalty payments we are quite confident that this assumption is not true. As an example, we have heard anecdotal evidence of one landowner receiving a check for \$23 million for the right to drill in the Haynesville Shale on his land. Is it reasonable to assume that landowner will spend all \$23 million dollars in one year? The answer is clearly no.

How much will be spent? Perhaps a useful way to approach this is to consider these lease payments (from a spending standpoint) not as income but rather as a sudden increase in wealth. Based on a study by Yash Mehra, he estimates that households spend about 5 percent of their wealth each year.<sup>7</sup> That would suggest that we insert only 5 percent of the lease and royalty payments into the I/O tables as new spending in 2008.

It is important to note that such a procedure will yield very conservative estimates of lease and royalty payment impacts. This is because Mehra's estimates are based on traditional measures of household wealth (value of homes, pension values, etc.). The studies do not contemplate massive increases in a household's wealth due to royalties and lease payments, which are more equivalent in this case to winning the lottery. Unfortunately, we are not aware of any studies that measure the amount of money that households spend from lottery winnings, so we use the 5 percent value to calculate the impacts on sales, earnings and jobs. Thus, the multiplier impacts reported here may be viewed as lower bound estimates. The actual impacts are likely to be substantially larger.

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<sup>7</sup> Yash Mehra, Federal Reserve Bank of Richmond Quarterly Review, Spring 2001.

## Impact of Extraction Activity on Business Sales in Louisiana

Table 3 shows the I/O estimates of the impact of these extraction activities within the Haynesville Shale on new business sales in the state. We estimate that during the year 2008, the extraction activity of these seven firms generated approximately **\$2.4 billion in new business sales within the state of Louisiana.**

**Table 3**  
**Direct and Indirect Impacts on the Louisiana Economy from Extraction Activity**  
**Of Seven Firms Operating in the Haynesville Shale**

<i>Item</i>	<i>Impact</i>
New Sales Created	<b>\$2,402,779,223</b>
New Annual Household Earnings Created	<b>\$3,866,342,225*</b>
New Permanent Jobs Created	<b>32,742*</b>

Source: BEA RIMS II Input/Output tables and author's calculations.

\* Includes both the direct and indirect impacts. Direct impacts on household earnings includes both wages and salaries and lease and royalty payments from Table 2.

The distribution of these additional sales across industries within the state's economy is reported in Table 4. As expected, **the largest impact was experienced by the mining sector (the location of exploration firms), with about \$1.1 billion in new sales during 2008.** Wholesale and retail trade together experienced an increase of about \$177.9 million in new business sales during 2008, which is not surprising given that a non-trivial portion of lease payments going to individuals would be spent in these sectors. According to the I/O tables, other sectors benefiting in a major way from the Shale

activities included manufacturing (\$202.6 million), healthcare (\$123.4 million), and real estate (\$147 million).

**Table 4**  
**Impact of Extraction Activity by Seven Firms on**  
**New Business Sales in Louisiana by Industry**

<b>Industry Sector</b>	<b>New Business Sales</b>
Agriculture, forestry, fishing, and hunting	\$9,920,461
Mining	\$1,067,177,163
Utilities	\$36,817,395
Construction	\$84,242,917
Manufacturing	\$202,594,108
Wholesale trade	\$74,634,557
Retail trade	\$103,314,366
Transportation and warehousing	\$62,978,657
Information	\$53,775,522
Finance and insurance	\$67,629,974
Real estate and rental and leasing	\$147,355,113
Professional, scientific, and technical services	\$90,009,387
Management of companies and enterprises	\$112,918,177
Administrative and waste management services	\$31,793,545
Educational services	\$18,958,622
Health care and social assistance	\$123,370,644
Arts, entertainment, and recreation	\$14,743,159
Accommodation and food services	\$51,939,909
Other services	\$48,605,545
<b>Total</b>	<b>\$2,402,779,223</b>

Source: BEA RIMS II Input/Output tables and author's calculations.

### **Impact of Extraction Activity on Household Earnings in Louisiana**

New business sales in turn created new household earnings for residents of the state. The impact on household earnings for Louisiana residents resulting from the extraction activities of these seven firms is reported in the second row of Table 3. **As a result of these activities, nearly \$3.9 billion in household earnings was created in 2008.**

These household income estimates include both direct and indirect earnings. Table 5 documents the indirect household earnings created by Haynesville Shale activities. These indirect earnings (multiplier effect earnings) totaled \$588.4 million. As shown in Table 5, **the greatest impact on indirect household earnings was experienced by workers in the mining sector, with new household earnings of \$191.3 million in 2008.** Over \$30 million in new earnings was also created in six other sectors: (1) health care (\$56.7 million); (2) management (\$46.6 million); (3) professional, scientific, and technical services (\$38.5 million); (4) retail trade (\$35.7 million); (5) manufacturing (\$33.5 million); and (6) construction (\$31.8 million).

**Table 5**  
**Indirect Impact of Extraction Activity by Seven Firms on**  
**New Household Earnings for Louisiana Residents by Industry**

<b>Industry Sector</b>	<b>New Household Earnings</b>
Agriculture, forestry, fishing, and hunting	\$2,236,948
Mining	\$191,314,334
Utilities	\$5,469,296
Construction	\$31,815,171
Manufacturing	\$33,529,206
Wholesale trade	\$24,204,186
Retail trade	\$35,712,413
Transportation and warehousing	\$21,948,471
Information	\$9,683,058
Finance and insurance	\$19,870,854
Real estate and rental and leasing	\$12,378,124
Professional, scientific, and technical services	\$38,488,877
Management of companies and enterprises	\$46,592,529
Administrative and waste management services	\$11,828,088
Educational services	\$9,146,507
Health care and social assistance	\$56,734,553
Arts, entertainment, and recreation	\$5,436,693
Accommodation and food services	\$15,200,658
Other services	\$16,807,858
<b>Total*</b>	<b>\$588,397,823</b>

Source: BEA RIMS II Input/Output tables and author's calculations.

\* Does not include the direct earnings

### **Impact of Extraction Activity on Jobs in Louisiana**

Using the I/O tables for the region, we can also estimate the impact that the extraction activities of these seven firms had on permanent new jobs in the state. New job estimates are reported in the third row back in Table 3. Including the direct employment of approximately 431 employees and contract workers reported by these seven firms, **there was an increase of 32,742 new permanent jobs within the state in 2008.** As a reference point, in February 2009, there were 32,100 Louisianans working in banks and

credit unions throughout the state and about 31,500 working in all the real estate/rental/and leasing firms in Louisiana.<sup>8</sup>

The distribution of the indirect new jobs across industries within the state is reported in Table 6. The new jobs created by the extraction activities in the Haynesville Shale are widely dispersed across industries. Large impacts were felt in utilities (5,229 jobs), mining (3,808 jobs), health care (3,496 jobs), and retail trade (3,433 jobs).

**Table 6**  
**Indirect Impact of Extraction Activity by Seven Firms on**  
**New Permanent Jobs in Louisiana by Industry**

<b>Industry Sector</b>	<b>New Permanent Jobs</b>
Agriculture, forestry, fishing, and hunting	205
Mining	3,808
Utilities	5,229
Construction	1,506
Manufacturing	996
Wholesale trade	952
Retail trade	3,433
Transportation and warehousing	1,346
Information	359
Finance and insurance	1,058
Real estate and rental and leasing	957
Professional, scientific, and technical services	1,588
Management of companies and enterprises	928
Administrative and waste management services	1,352
Educational services	882
Health care and social assistance	3,496
Arts, entertainment, and recreation	423
Accommodation and food services	2,218
Other services	1,574
<b>Total*</b>	<b>32,311</b>

Source: BEA RIMS II Input/Output tables and author's calculations.

\* Does not include direct employment.

<sup>8</sup> Louisiana Workforce at a Glance, Louisiana Workforce Commission, March 25, 2009, p.8.

A careful reader will note that since there were only 431 people directly involved in exploration activities by these seven firms, that 32,311 indirect jobs results in a huge job multiplier figure. While this is an unusually large job multiplier, it is important to note that most of the multiplier impacts estimated above do not arise from the extraction or drilling activity *per se*. Recall that \$3.2 billion (or 70 percent) of the total expenditures associated with the extraction activity in the Haynesville Shale are in the form of mineral lease payments and royalty payments. This means that \$3.2 billion is injected directly into the hands of lease owners. Thus, the impacts on business sales, household earnings and jobs arise in large measure from the expenditures made by these lease owners.

#### **Alternative Estimates Based on Greater Spending of Lease/Royalty Payments**

The impact estimates that we reported in Tables 3-6 are all based on a very important assumption that we discussed back on page 9. That is the assumption that recipients of lease and royalty payments will treat these huge sums of money as a sudden increase in their wealth and will only spent 5 percent of these payments in 2008. We mentioned that the 5 percent figure was based on studies of how much people spend out of traditional sources of wealth, like their homes and equity holdings.

How will lease and royalty recipients think of their newly received wealth? Like a traditional increase in home prices and stock values---leading to a 5 percent withdrawal for spending---or like picking a winning lottery ticket where much more of the sudden increase in wealth is spent?

To illustrate how sensitive our impact estimates are to different assumptions about spending of lease and royalty payments we show in Table 7 what happens to the impact

estimates if we assume that lease and royalty payment recipients spent 25 percent of their increase in wealth rather than only 5 percent.

**Table 7**  
**Direct and Indirect Impacts on the Louisiana Economy from Extraction Activity**  
**Of Seven Firms Operating in the Haynesville Shale Assuming 5% v. 25% Spending**  
**by Lease and Royalty Recipients**

<i>Item</i>	<i>Impact Assuming 5%</i>	<i>Impact Assuming 25%</i>
<b>New Sales Created</b>	\$2,402,779,223	\$3,234,649,884
<b>New Annual Household Earnings Created</b>	\$3,866,342,225*	\$4,076,672,631
<b>New Permanent Jobs Created</b>	32,742*	40,310

Source: BEA RIMS II Input/Output tables and author's calculations.

\* Includes both the direct and indirect impacts. Direct impacts on household earnings include both wages and salaries and lease and royalty payments from Table 2.

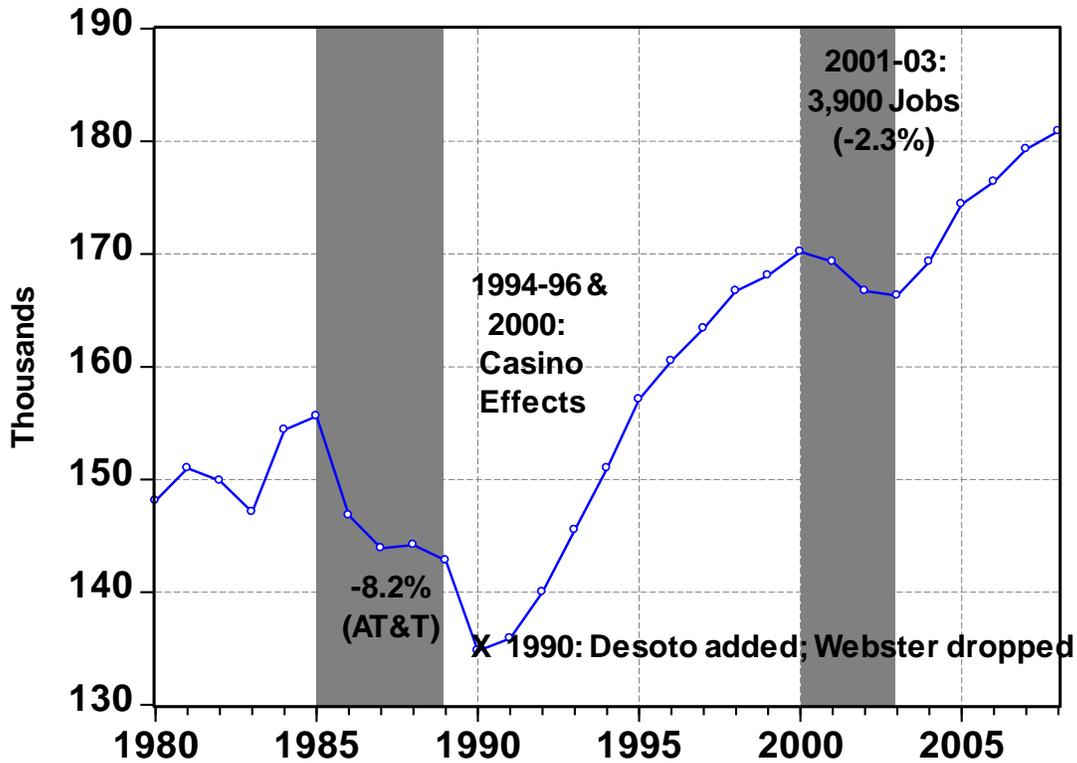
Note that the impact on our estimates of this small change in the spending assumption results in a non-trivial boost in our impact estimates. In particular, the job impact jumps from 32,742 to 40,310---a 23.1 percent increase. Table 7 confirms how sensitive the impact estimates are to our assumptions about these spending patterns and also confirms that the estimates we generated in Tables 3-6 are very conservative estimates.

### **National Recessions and Employment in Northwest Louisiana**

Seeing these job impact estimates in Table 7 helps readers understand another interesting phenomenon in the Northwestern area of the state. Figure 2 illustrates the pattern of non-farm employment in the Shreveport-Bossier MSA---defined as Caddo, Bossier, and DeSoto Parishes. **Typically this MSA is the most sensitive area of the state to declines in the national economy.** Note for example that during the post 911 national recession in the early 2000s, the very strong impact on this MSA's employment.

Non-farm employment (1) fell for three straight years and (2) by -2.3 percent. By contrast, during this same period, Louisiana's employment (1) fell in only two years and (2) by only 1.2 percent.

**Fig. 2: Shreveport-Bossier MSA Non-Farm Employment 1980-2008**



Why does this difference exist in the impact of national recessions in the state as a whole versus the Northwestern corner of the state? When the national economy enters a recession and people either lose their jobs or think they may lose their jobs, the first thing they quit buying are durable goods like autos, appliances, electronics, houses, etc. In the U.S., 6.4 percent of employment is in durable goods, while in Louisiana the comparable figure is only 4.6 percent. Thus, Louisiana firms as a whole are not hit as badly as at the national level. On the other hand, durable goods employment is 8.2 percent of total

employment in the Shreveport-Bossier MSA; thus, this MSA tends to fall harder and longer than the national economy.

It is here that we see evidence of the Haynesville Shale's powerful influence on this part of the state. The national economy has been losing jobs since January 2008. As of February 2009, its employment had dropped by almost 4.4 million jobs or 3.2 percent. Normally, the Shreveport-Bossier MSA would be tracking that pattern. However, during this national recession, the MSA's employment actually grew every month in 2008 until November 2008. As of February 2009, employment in the MSA has fallen only 0.6 percent. **Instead of falling harder than the U.S. economy, the Shreveport-Bossier MSA is performing significantly better.**

And this occurred despite the fact that some of the typical durable goods manufacturers in this northwest region are being distressed just as in a normal recession. For example, the local GM plant has completely dropped one shift (-798 jobs) and has buyout offers accepted by another 195 employees, Beaird Industries has closed its 400-worker plants, and Georgia Pacific closed a plywood plant (-280 jobs) and furloughed 400 at another plant in the region. Clearly, the huge sum of money injected into the local economy via the Haynesville Shale activity has spared this MSA from some of the worst effects of the national slowdown.

### **Impact of Extraction Activity on Government Tax Revenues**

Finally, we estimate the increase in state tax collections that were generated by these seven firms due to their extraction activities in the Haynesville Shale. These new taxes came from two sources: (1) taxes paid directly by the seven firms and (2) additional

taxes paid by workers in the Haynesville Shale and households who experienced an increase in their household earnings via the multiplier effects.

**Direct taxes paid.** Table 8 reports both direct taxes paid by these seven companies and our estimate of indirect taxes generated by new household earnings. According to the information provided by these seven firms, they paid a total of \$562.6 million in state and local taxes that related directly to their extraction activities.

**Indirect state taxes collected.** Regarding indirect taxes, we have an estimate for both (1) state tax collections and (2) local government collections. We have estimated that earning created by Haynesville Shale activities in 2008 was \$782.6 million. This number is the sum of (1) total indirect household earnings from Table 5, (2) total wages and salaries paid to extraction firm employees from Table 2, and 5 percent of total lease and royalty payments in Table 2.

Officials in the State Legislative Fiscal Office estimate that for every dollar of new earnings generated in the state, the state treasury collects about 7.0 cents in sales taxes, income taxes, and other fees. Thus, Haynesville Shale activities resulted in additional tax revenues for the state of about **\$54.8 million** (\$782.6 million x 0.07). As a reference point, in FY07 the state collected \$53.9 million from its beer and liquor taxes combined.<sup>9</sup>

**Indirect local taxes collected.** Dr. James Richardson of LSU's Public Administration Institute has estimated that local governments collect 5.4 cents on every new dollar of earnings generated in the economy. That suggests that Haynesville Shale activities generated \$42.3 million in new revenues for local government coffers in Louisiana (\$782.6 million X 0.054). It is interesting to see what is happening to sales tax

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<sup>9</sup> Louisiana Department of Revenue, 06-07 Tax Collection Report.

collections alone in some of the parishes directly impacted by the Haynesville Shale activity. For example:

- In Red River Parish, over the 6-month period from October 2008 through March 2009, sales tax collections were up by over \$5.3 million---a 101 percent increase. In the more recent part of that 6-month period---the first quarter of 2009---collections are up by over 300 percent.
- In DeSoto Parish over the 12-month period from April 2008 through March 2009, sales tax collections were up by \$12.5 million, an increase of 53.6 percent.
- In Caddo Parish, over the 7-month period from August 2008 through February 2009, sales tax collection rose by \$16.7 million or 14.5 percent. This is in a parish where at this stage of the national business cycle sales tax collections would normally be decidedly down.

**Total taxes collected. Thus, our conservative estimate is that collectively, state and local tax revenues increased by at least \$153.3 million (see Table 8) in 2008 due to the extraction activities in the Haynesville Shale.** Obviously, these estimated tax impacts understate the true impacts because there are an additional 10 firms engaged in extraction activities in the Haynesville Shale for which we do not have data, and the estimates assume lease and royalty recipients spend only 5 percent of their newly received wealth.

**Table 8**  
**Additional Taxes Generated by the Extraction Activities of Seven Firms in**  
**Haynesville Shale, 2008**

<b>Category</b>	<b>Amount</b>
Paid Directly by Seven Companies:	
Direct Taxes	\$3,962,000
State Taxes	\$13,992,034
Local Taxes	\$38,302,276
Indirect Taxes:	
State Taxes Paid by Households	\$54,780,648
Local Sales Taxes Collected	\$42,259,357
<b>Total</b>	<b>\$153,296,315</b>

Source: Survey and author's calculations.

#### IV. Summary and Conclusions

Much excitement has been created in Louisiana's oil and gas extraction sector by the discovery of the Haynesville Shale deposit in the northwestern part of the state. In Louisiana, it is located primarily in four parishes---Caddo, Bossier, DeSoto, and Red River. What has especially bolstered excitement about this play is the first estimate of its size. Some of the initial wells have produced prodigious amounts of natural gas. Chesapeake Energy has estimated the Haynesville Shale holds an estimated 245 tcf of natural gas, which would make it the largest onshore natural gas find in the U.S.

The purpose of this report is to capture and measure the direct and indirect effects on the Louisiana economy from the activities of the extraction firms operating in the Haynesville Shale in 2008. In the present case, expenditures provided by the seven of the seventeen firms (72 percent of the acreage) operating in the shale were plugged into the RIMS II model to estimate the annual impacts on: (1) *new sales* for firms in the state, (2)

*new household earnings* for residents in the state, (3) *new jobs* in the state, and (4) *tax collections* by the state and local governments.

We can summarize the impacts on the Louisiana economy in the following way:

- We estimate that during the year 2008, the extraction activity of these seven firms generated approximately **\$2.4 billion in new business sales within the state of Louisiana.**
- New business sales in turn created new household earnings for residents of the state. **As a result of these activities, nearly \$3.9 billion in household earnings was created in 2008.** This estimate includes both direct and indirect earnings and includes almost \$3.2 billion in lease and royalty payments to private landowners.
- Including the direct employment of approximately 431 employees and contract workers reported by these seven firms, **there was an increase of 32,742 new jobs within the state in 2008.** As a reference point, this is slightly larger than total employment in all of Louisiana's banks and credit unions. The job multiplier is remarkably large in this case due to the fact that \$3.2 billion in lease and royalty payments were injected into the state's economy by the extraction firms.
- Finally, we estimate the increase in state and local tax collections that were generated by these seven firms due to their extraction activities in the Haynesville Shale. These new taxes came from two sources: taxes paid directly by the seven firms and additional taxes paid by households who experienced an increase in their household earnings via the multiplier effects. Our conservative estimate is that collectively, **state and local tax revenues increased by at least \$153.3 million in 2008** due to the extraction activities in the Haynesville Shale. In one parish sales tax collections alone are up over 300 percent in the first quarter of 2009.

While these multiplier impacts appear large at first blush, it is important to note that most of the multiplier impacts estimated above do not arise from the extraction or drilling activity *per se*. Approximately \$3.2 billion (or 70%) of the total expenditures associated with the extraction activity in the Haynesville Shale for these seven firms were in the form of mineral lease payments and royalty payments. Thus, the impacts on

business sales, household earnings and jobs arise in large measure from the expenditures made by these lease owners.

On a final note, it is important to point out that we have data from only seven of the seventeen companies involved with extraction activity in the Hayneville Shale. Obviously, our impact estimates understate the total infusion of new money in the state's economy and in turn, understate the true impacts on business sales, household earnings and employment in the state. Also, we are using a very conservative estimate of the percentage of newly created wealth (e.g. lease payments and royalties) that households will spend on goods and services. Based on existing studies, economists estimate that households spend about 5 percent of their wealth each year. But, these estimates are based on traditional measures of household wealth (value of homes, pension values, etc.). The studies do not contemplate massive increases in a household's wealth due to royalties and lease payments (equivalent in this case to winning the lottery). Unfortunately, we are not aware of any studies that measure the amount of money that households spend from lottery winnings, so we use the 5 percent value to calculate the impacts on sales, earnings and jobs. Thus, the multiplier impacts reported here may be viewed as lower bound estimates. The actual impacts are likely to be substantially larger.

Appendix A

Questionnaire Sent to Exploration Firms

Louisiana Haynesville Shale Questionnaire

Note: The responses to this questionnaire will be seen only by the staff of Loren C. Scott & Associates, Inc., will not be shared with any other parties, and will be kept strictly confidential. All responses will be reported in aggregate so that confidentiality of individual responses can be maintained. All data requested are for calendar year 2008. Please return to us by February 20<sup>th</sup> so we can have the report finished for the upcoming legislative session. Thanks!

1. How much did your firm pay in mineral lease payments in the Louisiana Haynesville Shale in 2008? \$145,000,000
  
2. How much did your firm pay in royalty payments in the Louisiana Haynesville Shale in 2008? N/A
  
3. How much did your firm pay in rental or surface lease payments in the Louisiana Haynesville Shale in 2008? N/A
  
4. How much did your firm pay in direct taxes (severance, royalties, rentals, bonuses, lease) to the State of Louisiana associated with the Louisiana Haynesville Shale in 2008? N/A
  
5. How much did your firm pay in General and Administrative payments in the Louisiana Haynesville Shale in 2008?  
Wages & salaries (direct employees and contractors): \$1,115,000  
Utilities: 0  
Field Office construction and operating expenses 0  
Advertising and Public Relations 0  
Community Sponsorships and Donations \$50,000  
Other: \_\_\_\_\_  
Total \$1,165,000
  
6. How much did your firm spend on direct drilling activities associated with the Louisiana Haynesville Shale in 2008?  
Rig expenses (include new build construction expenses if built in Louisiana, contract expenses, and operating expenses) N/A

Materials (include pipe, proppant, chemicals, etc. purchased from vendors in Louisiana) \_\_\_\_\_ N/A \_\_\_\_\_

Service company expenses (include Louisiana-procured pressure trucking, water trucking, frac / completion services, road and pond construction, trailers, other provisions) \_\_\_\_\_ N/A \_\_\_\_\_

Utilities (water, electricity at operational level):  
\_\_\_\_\_ N/A \_\_\_\_\_

State taxes (other than those in question 4): \_\_\_\_\_ N/A \_\_\_\_\_

Local government taxes: \_\_\_\_\_ N/A \_\_\_\_\_

Other: \_\_\_\_\_ N/A \_\_\_\_\_

Total: \_\_\_\_\_ \$0 \_\_\_\_\_

7. How much did your firm spend on infrastructure activities associated with the Louisiana Haynesville Shale in 2008? (include gathering / pipeline / amine plant construction and operation) \_\_\_\_\_ N/A \_\_\_\_\_
7. How many people did you directly employ in Louisiana associated with the Louisiana Haynesville Shale in 2008? \_\_\_\_\_ N/A \_\_\_\_\_
8. How many contractors did you employ in Louisiana associated with the Louisiana Haynesville Shale in 2008? \_\_\_\_\_ 15 \_\_\_\_\_

**Please fax to Loren C. Scott at 225-751-2350. Thanks! If you have any questions please call me at 225-751-1707**