

STUDY TITLE: Economic Effects of Changes in Oil and Gas Prices and Petroleum Resource Development in Onshore Louisiana and State Offshore Waters

REPORT TITLE: Effects of Changes in Oil and Gas Prices and State Offshore Petroleum Production on the Louisiana Economy, 1969-1999

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BACKGROUND: This study was motivated by the MMS' desire to undertake more socio-economic analyses of communities that are affected by the activities of the oil and gas industry under its jurisdictional mandate. The focus on Louisiana is motivated by the role of the state in meeting U.S. oil and gas consumption needs. Louisiana is the third leading producer of natural gas and fourth in crude oil production in the U.S. If offshore production activities are included, then the state is the second and third leading producer, respectively.

OBJECTIVES: This study examines the inter-relationships between petroleum price changes and economic activities in Louisiana subject to the state of oil and gas production in the state offshore waters. The goal is to provide some baseline information that will be useful to policy makers and resource managers, such as MMS, to enhance their decision-making capability.

DESCRIPTION: In this study, a time series econometric model has been developed to examine the impact of changes in crude oil prices on both the oil industries and relevant

Louisiana macroeconomic aggregates. The research uses recent econometric tools to provide quantitative estimates of the responsiveness and correlation between past and current activities of the oil industries in Louisiana. The analysis is restricted to the interaction between oil and gas production from Louisiana offshore waters and Louisiana state employment, personal income, and revenue growths.

SIGNIFICANT CONCLUSIONS: The results seem to follow the pattern predicted by economic theory where oil and gas producers want to maximize their returns on investment in the long run. We would expect that as oil and gas prices increase (assumed positive shock), more oil and gas is produced, as the results show. To produce more, more workers are hired. Because such price shocks often occur in boom periods in the oil and gas industry, competition in the labor market forces the wage rate to increase. Given that the oil and gas industry usually pays higher than average wage, the overall effect is to raise the take-home pay of workers, and hence, the average personal income of Louisiana residents. At the given severance tax rates, but with increases in production and price, revenue derived by the government should also rise.

The scenario above probably also extends to other non-oil sectors of the Louisiana economy in the short run. However, in the oil and gas-dependent sectors the situation may be mixed, even in the short run. For example, refineries and other chemical and allied industries may experience increases in input costs as a result of price increases, if the price shock is high enough. Thus, in these oil-using sectors, job losses may occur. This may reduce personal income and tax-base of the government as well. In the long run, this shock may lead to a decline or even recession in the U.S. economy, which implies a reduced demand for goods and services, including oil and gas. The result of such a development is the reverse of the previous scenario—job losses, reduced income, and less government revenue. In other words, all economic activities in Louisiana may eventually return to their equilibrium levels, as this study finds.

Thus, the analyses above imply that what is finally observed following a positive price shock are overall net-effects. Our study shows that these net-effects in the short run are clearly positive for employment and personal income but mixed for revenue. The long-term prospects for a positive price shock in oil and gas indicate a net-effect that is significant only for employment and personal income. This long run result is understandable because, while industries may be forced to reduce output, in practice, it is not often easy to reduce wages and employment. Economic theory suggests stickiness in wages and rigidity in job markets characterized by contracts, as is often the case in the oil and gas industry.

STUDY RESULTS: Our empirical results indicate some salient findings that will be of interest to policy makers and oil and gas resource managers. These findings point to differences and similarities as well as general conclusions, which are conditional on the interactions between state offshore oil and gas production and Louisiana economic activity. The salient features are highlighted as follows:

- Changes in oil prices are more important in forecasting changes in employment and personal income than changes in natural gas prices in the short run.
- Both oil and gas price movements are equally important in explaining changes in Louisiana revenue, although the overall revenue impact is minimal.
- The indirect effects of oil and gas price changes are more important than the direct, autonomous, changes that occur in oil and gas production in state waters themselves. In other words, in the absence of price shocks, autonomous changes in oil and gas production (e.g. technology-induced) have ceased to be very important to Louisiana economic activities.
- In general, the effects of a gas price shock on the economy are more persistent than oil price shocks. That is, price volatility in the gas market has a potential to be more destabilizing to the economy than an equivalent change in the oil market.
- Irrespective of the market, oil or gas, the employment effects of a price shock last longer than the personal income or revenue effects.
- The fiscal exposure or vulnerability of the Louisiana budget to oil and gas price changes in the context of offshore production in state waters has declined over time.
- The responsiveness of the macroeconomic variables to price changes indicate that when considering state offshore production, a considerably high and sustained change in prices is required to have an appreciable effect on Louisiana economic performance.

STUDY PRODUCTS: Iledare, O.O. and W.O. Olatubi. 2004. Effects of Changes in Oil and Gas Prices and State Offshore Petroleum Production on the Louisiana Economy, 1969-1999. U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region, New Orleans, La. OCS Study MMS 2004-052. 45 pp.