AN OVERVIEW OF THE OIL AND GAS PRODUCTION AND PRICES IN LOUISIANA

by
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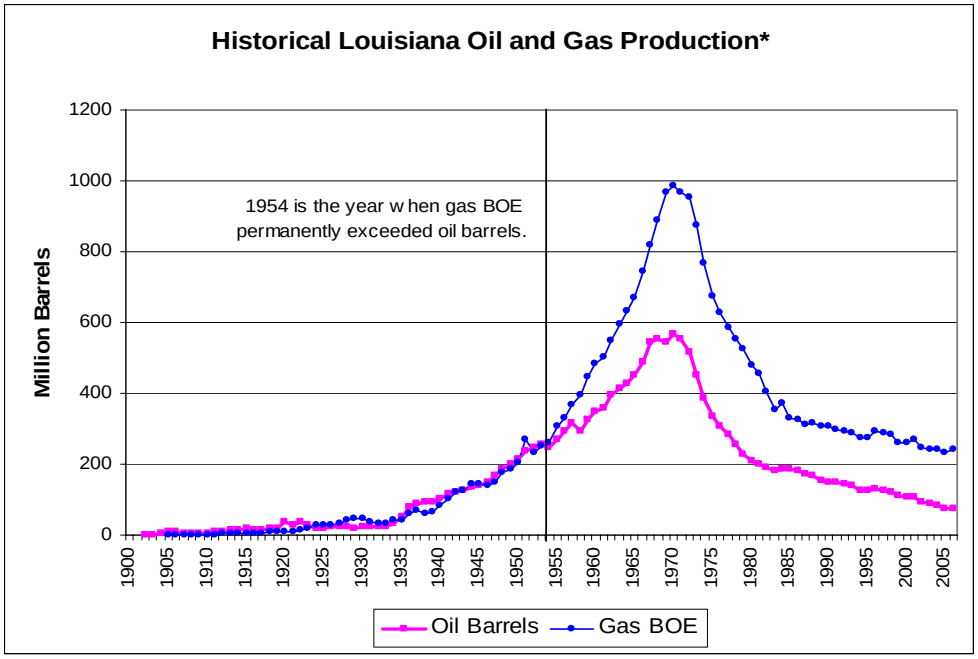
Production

In this short review, we revisit the evolution of the production of oil and gas in Louisiana and the development of their prices. Oil and gas production is intimately linked to the economy of our state. Presently, Louisiana is the fourth ranked producer of crude oil and fifth ranked producer of natural gas in the US[1]. More than 210,000 wells have been drilled searching for oil and gas in Louisiana, since the first commercial oil well was drilled in 1901 at Jennings. The Louisiana OCS oil and gas production is greater than any other federally regulated offshore areas in the US.

Figure 1



Louisiana's reservoir of crude oil was known to its native Indians for centuries before commercial oil was produced, and natural gas bubbles were reported rising to the surface at Bayou Bouillon in St. Martin Parish as early as 1833. Commercial oil was first discovered in Louisiana near the town of Jennings, in Jefferson Davis Parish, in the year 1901. As the story goes, a landowner, Jules Clement, had noticed bubbles rising from a spot on a rice field. Word spread about this discovery, and soon enough, one of the first developers of the Spindletop oil wells (in Texas), Scott Heywood, was brought in for exploration. After dramatic and unsuccessful attempts that almost made the project not worth the while, oil was found on September 21, 1901. From this date onward, our state would no longer be the same; the oil and gas industry became absolutely central to the state's economic and social development. Natural gas also started to be produced in commercial quantities. In the first few years, crude oil

[1] This is, *not including* the federal Outer Continental Shelf (OCS) productions in the ranking.

dominated production. There was no widespread use of natural gas; gas pipelines had not been installed, and homes were not "wired" for this form of energy. And, of course, natural gas was very difficult to store. However, as time passed and technology of transporting and storing natural gas improved, the production of this fossil fuel became more important. And, in fact, as Figure 1 above shows, production of natural gas nowadays is more important than the production of crude oil. The diagram shows annual production of crude oil and natural gas, measured in comparable units (barrels of oil equivalent), since 1905, which is the first year for which we have reliable data on the production of both fuels.

In the beginning, oil production exceeded gas production by a big multiple. Around the mid-1910s, natural gas began to catch up, and between 1920 and the mid-1930s, natural gas production was higher in terms of barrels of oil equivalents. By the mid-1930s, the war effort probably caused an increased production of crude, which finished when World War II was over by 1945. A period of more or less equal production followed; but since 1954, natural gas production definitely dominates. Furthermore, the trend seems to be, at least judging from the last fifty years or so and the recent discovery of the Haynesville formation, that such domination is not reversible.

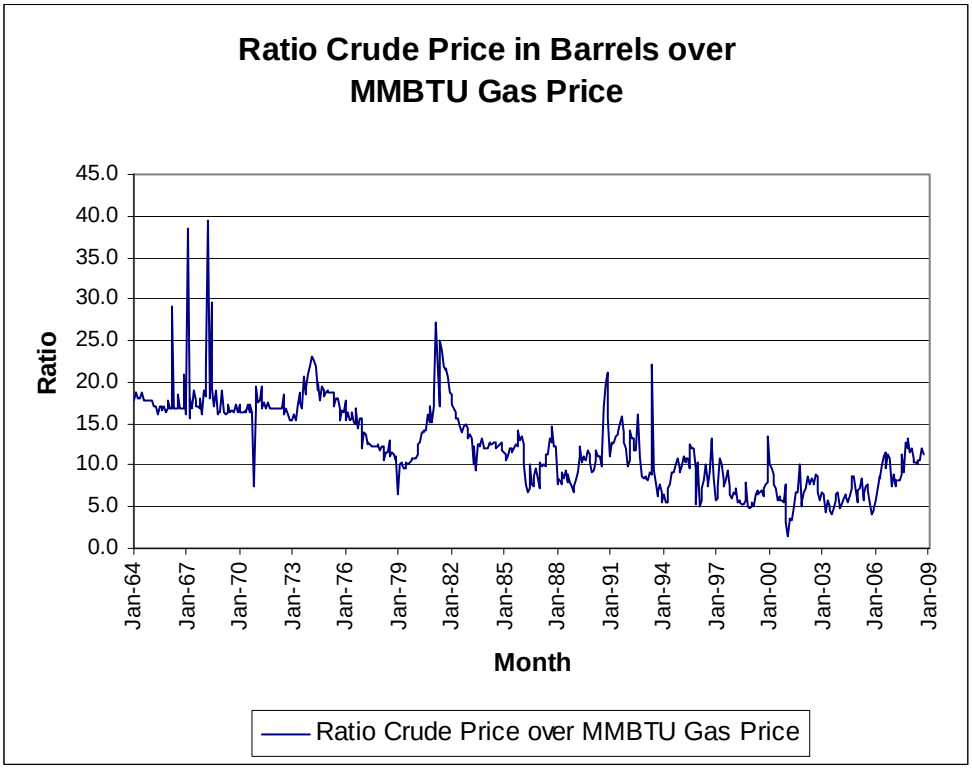
The Haynesville formation is a layer of sedimentary rock more than 10,000 feet below the ground in the area of northwestern Louisiana, southwestern Arkansas and eastern Texas, with some of the formation stretching well across the northern central portion of Louisiana. Several energy companies have begun work in the area to explore the shale formation and drill for natural gas based on findings indicating a potentially large supply of gas trapped within some portions of the shale. This type of formation was once considered too costly to explore, but rising energy costs and newer, less expensive technology and processes have changed that.

Some other interesting benchmarks in the Louisiana oil and gas production history are that, in 1910, the first freestanding above-water platform was used in Caddo Lake, near Shreveport; in 1938, the first well over water was completed in the Gulf of Mexico near Creole, offshore Cameron Parish; in 1947, the first oil well was completed out of the sight of land in Ship Shoal Block 32, south of Morgan City, offshore St. Mary Parish; and in 1951, the first concrete-coated pipeline was laid in the Gulf of Mexico.

Prices

Prices are not privy to Louisiana, since crude oil and natural gas are traded, basically, in the world market. There are differences in the types of crude and, to a lesser extent, natural gas sold, but the different types usually move in tandem. What can we say about the relationship between the price of crude oil and the price of natural gas? A few rules of thumb have been proposed over time regarding such relationships. One of the most common is the so-called "6-to-1" rule, where the price of one barrel of crude oil should be (approximately) six times the price of natural gas per million BTUs (MMBTUs). The reason is that the BTU content of a barrel of oil amounts to, roughly speaking, six times the quantity of a million BTUs of natural gas. Does such a relationship hold up? In Figure 2 below, we use the longest series for which DNR-Technology Assessment has monthly data (from January 1964 onward to September 2008), which is the royalty price paid for Louisiana crude oil and the royalty price of Louisiana natural gas. The diagram plots the ratio of the average monthly price of a barrel of crude oil divided by the average monthly price of a million BTUs of natural gas.

Figure 2

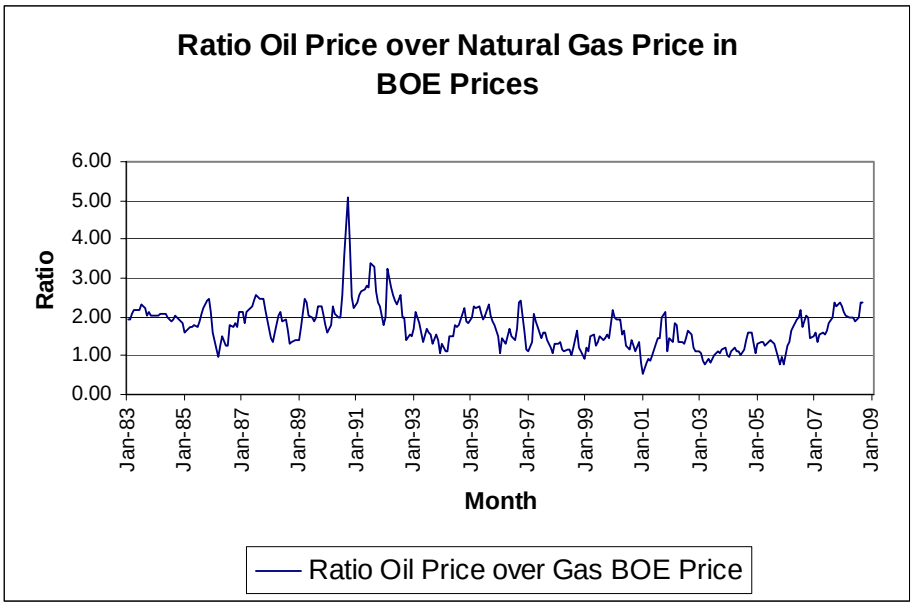


From the beginning of the series until around January 1994, the ratio does not seem to be anywhere near 6. Between January 1994 and January 2006 (with several exceptions), it seems to fluctuate within the band of 5 and 10. But, after January 2006, the ratio seems to increase and move beyond 10.

One problem with this ratio is that it uses different units for both energy sources. To make a useful comparison, the price must be stated in the same measurement of energy. Only then, can we draw conclusions on whether one fuel is "more expensive" than the other, and by what kind of magnitude. Figure 3 below plots such a diagram, which looks very similar to the previous one, but now we have both fuels in the same unit of measurement.

In Figure 3 below, a ratio of 1 means that crude oil and natural gas were priced equally. A ratio higher than 1 indicates that for the same amount of fuel content, crude oil was relatively more expensive, and a ratio less than 1, natural gas was more expensive. The diagram shows that by and large the ratio stayed above 1 during the period considered, except for brief periods after the turn of the millennium.

Figure 3



With these price series, we can ask some interesting questions. For starters, we would like to find out if the prices for crude oil and natural gas conserve the same statistical features over time; in other words, do the price series for crude oil and natural gas preserve (more or less) the same average, the same variability over time, or do such properties diverge as time passes by? Economic science gives us statistical tests that we can perform to study such issues. Preliminary investigations carried out with our data at hand suggest that we should reject the fact that the properties of prices series of crude oil and natural gas remain constant. This is important, because this means that, when utilizing the series for further study, we need to be very careful with its usage. For example, one well known technique in economics to make a price series "useable" is to take the first difference of the prices; such series very often gives us a "constant property" series as time goes by.

Another question that economists like to ask is the following: is there a "long-run relationship" between the price of crude oil and the price of natural gas? As both crude oil and natural gas are important sources of energy for the United States and the rest of the world, one might think that their prices could have a long-term association. In economic techno-speak, we say that, if such a far-reaching relationship does exist, then the two price series are "co-integrated." Economic science, again, gives us some statistical tests to examine such long-term relationships; some first round checks performed by the Technology Assessment Division indicate that such long-term associations may not exist. In other words, the price of crude oil and the price of natural gas do not seem to "move together" in an economically meaningful way over the long-run (evidence of this can be seen already in the figures above). The prices, and their ratio, seem to be determined by other factors that need further study.