Understanding the Oil & Gas Price Correlation

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There is a limited positive correlation between crude oil and natural gas prices. It seems there would be a positive correlation between the commodities, especially since natural gas is often a byproduct of drilling for crude oil. While at times crude oil and natural gas have positive correlation, the markets for each commodity are substantially different and subject to differing fundamental forces. Statistical analysis shows there are periods of positive correlation but generally the two have limited correlation.

CORRELATION COEFFICIENT

The correlation coefficient is a statistical measure of the extent to which the price of natural gas and crude oil move together. It is also a measure of the degree to which the prices move proportionally all of the time. A measure of -1 indicates a perfect negative correlation. This means the asset prices move in the opposite direction of each other in the same proportion all of the time. If the correlation coefficient is zero, it means there is no relationship between the two prices. The correlation coefficient is often used in the construction of portfolios by providing a statistical measure of the diversification of the assets in the portfolio.

QUARTERLY CORRELATIONS

The Energy Information Administration (EIA) provides historical data for the daily correlation between commodities on a quarterly basis. This information indicates the correlation between crude oil and natural gas is falling. For example, in 2004, the average quarterly correlation between the two prices was around 0.45. This is a moderate positive correlation. In 2010, this correlation average fell to -0.006, showing there was very little relationship between the prices. In 2014, the average correlation was 0.075. This also indicates very little correlation. However, the first two quarters of 2015 show an average correlation of 0.195 which is slightly positive. Prices for both commodities generally fell during this period.

The highest correlation was in the third quarter of 2005 with a measure of 0.699. The lowest correlation was in the third quarter of 2010 with a negative correlation of -0.21. In general, the correlation is falling. The EIA notes this is due to the increase in shale oil natural gas production.

NATURAL GAS PRODUCTION

Natural gas oil production has increased dramatically with the discovery of new shale drilling technologies. Between 2007 and 2012, natural gas production from shale drilling rose by a whopping 417%. Overall production increased by around 20% during the same period. Natural gas prices have shown greater volatility historically than crude oil prices. Low natural gas prices have also influenced some to convert to more usage of the commodity versus crude oil. Natural gas usage in the transportation sector grew by 22% from 2007 to 2012.

CRUDE OIL PRODUCTION

The same shale drilling technologies have also led to expanded crude oil production. Daily crude oil production increased from 5.35 million barrels per day in 2009 to 6.5 million barrels in 2012. Production in 2014 grew even more to 8.7 million barrels a day. Estimates for 2015 indicate this number will likely grow even larger.

This increased production is one of the reasons for the dramatic drop in oil prices from 2014 to 2015. Oil was trading at over $105 a barrel in 2014. By late January of 2015, this price cratered to around $45 a barrel. Supply was outstripping demand. Increased production combined with lower demand has hurt prices. Further, economic uncertainty across the globe has called into question the strength for future demand.