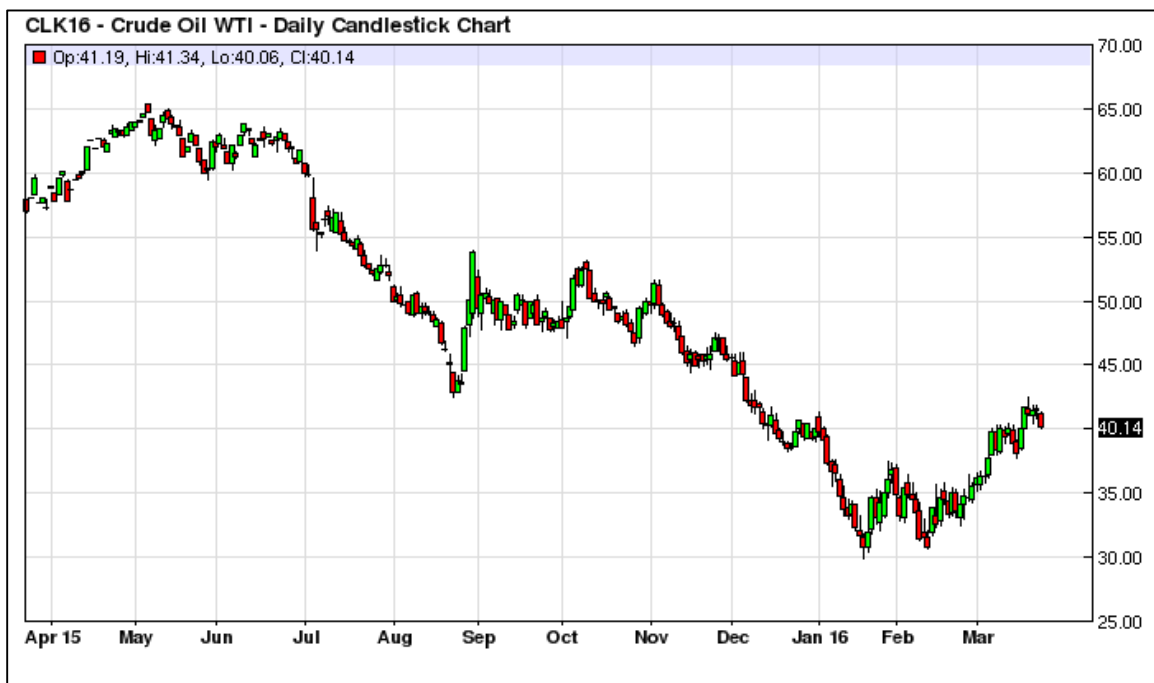


**March 24, 2016**

**The Market**

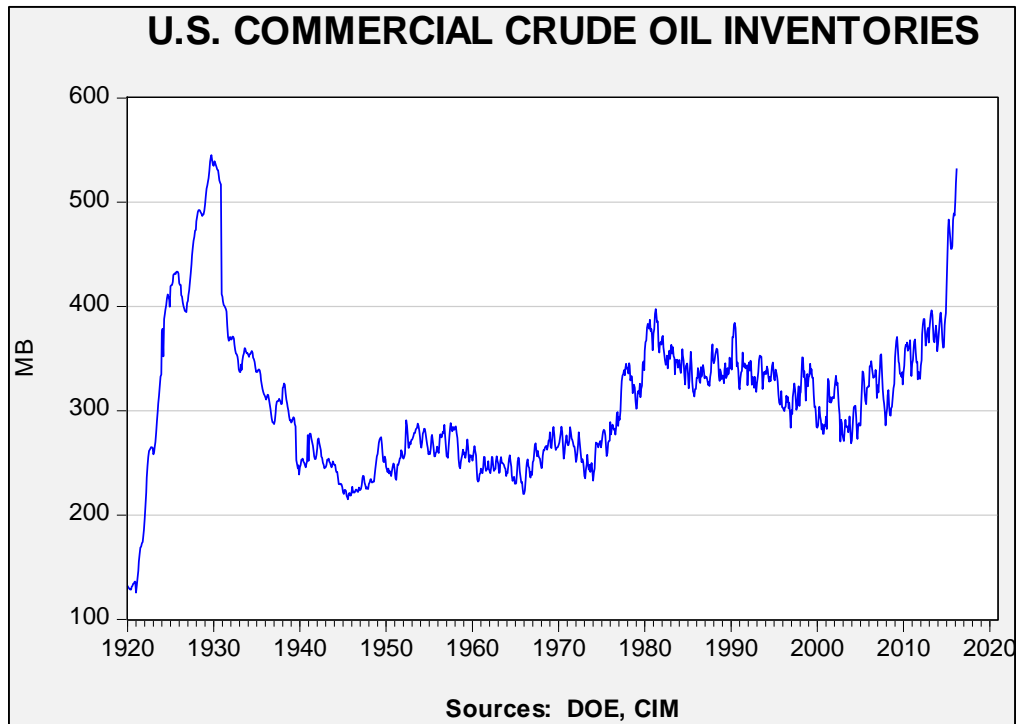
Oil prices have fallen steadily over the past year, reaching a new low early in the first quarter just below \$30 per barrel. Since mid-February, they have staged an impressive recovery.



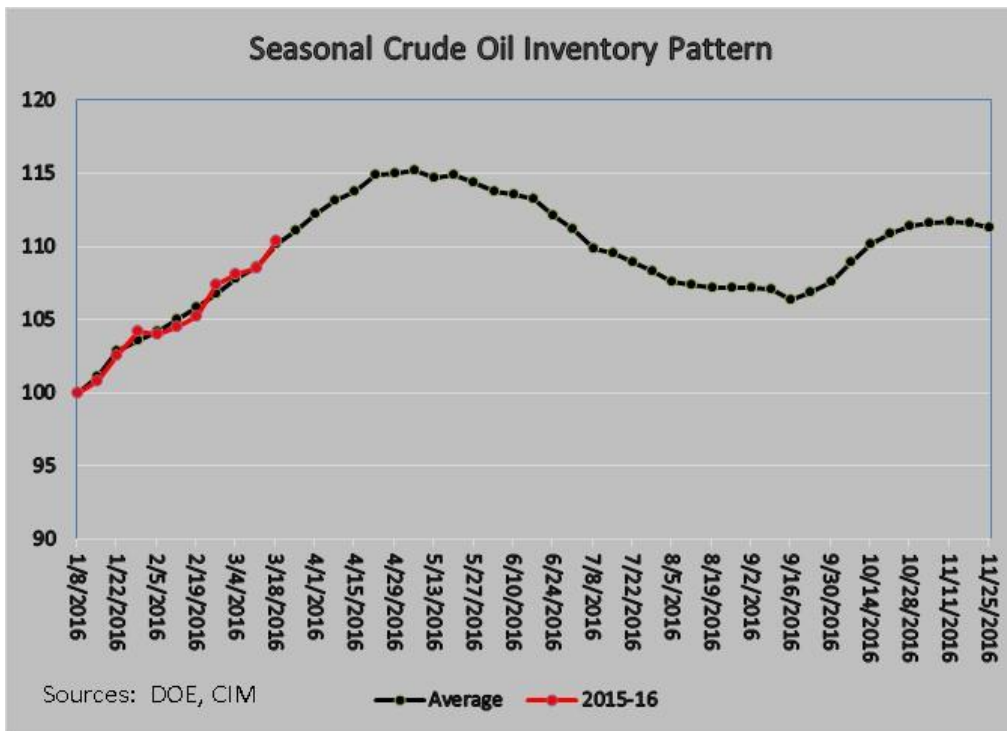
(Source: Barchart.com)

**Oil Prices and Inventories**

This rally has occurred despite historic levels of U.S. commercial crude oil inventories. The chart below shows the level of inventories dating back to 1920. The current level of stockpiles is only about 12 mb below the all-time high set in October 1929. The DOE estimates that U.S. working crude oil storage is 502 mb. With current inventory levels at 533 mb, we are well above the working storage level. Although there were some concerns over a price collapse if storage costs become excessive, thus far, the industry has been able to manage these high inventory levels without serious trouble. Additionally, with the inventory build season nearing an end, the odds of breaking the recent lows are growing less likely.



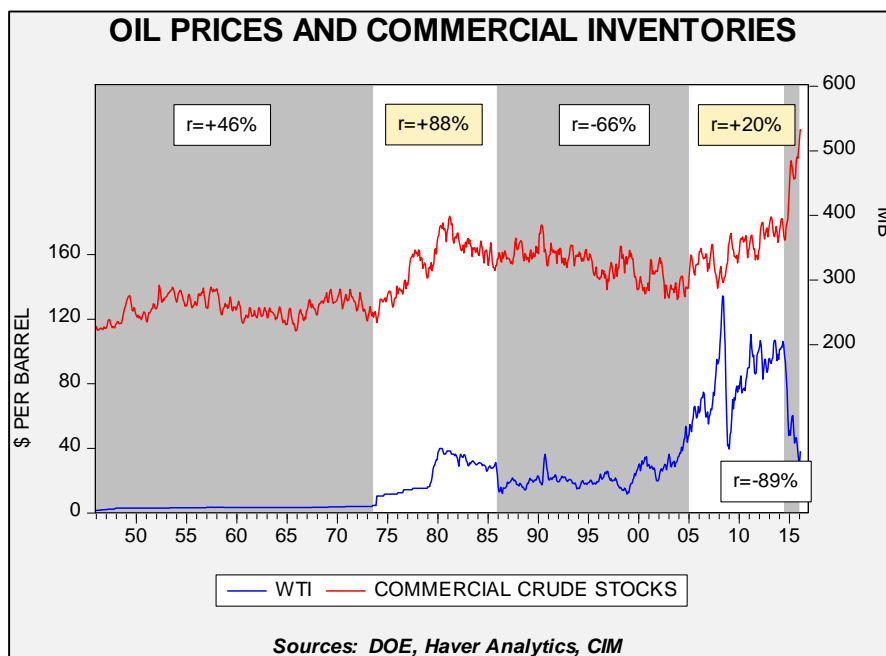
So far, crude oil inventories have been tracking their usual seasonal pattern.



Inventories usually rise about 15% from the beginning of the year into late April. As the red line shows, the current year accumulation has been typical. If we continue to adhere to the average, inventories will peak around 555 mb.

**Oil Prices**

Over the past seven decades, the relationship between crude oil inventories and prices has been unstable. Economic theory would suggest that the relationship should be negative; inventory represents the residual of supply and current consumption, and so rising stockpiles indicate oversupply. However, there are periods when consumers, fearful over the security of supply, will hoard crude oil. This situation will lead to a positive correlation between inventories and prices.

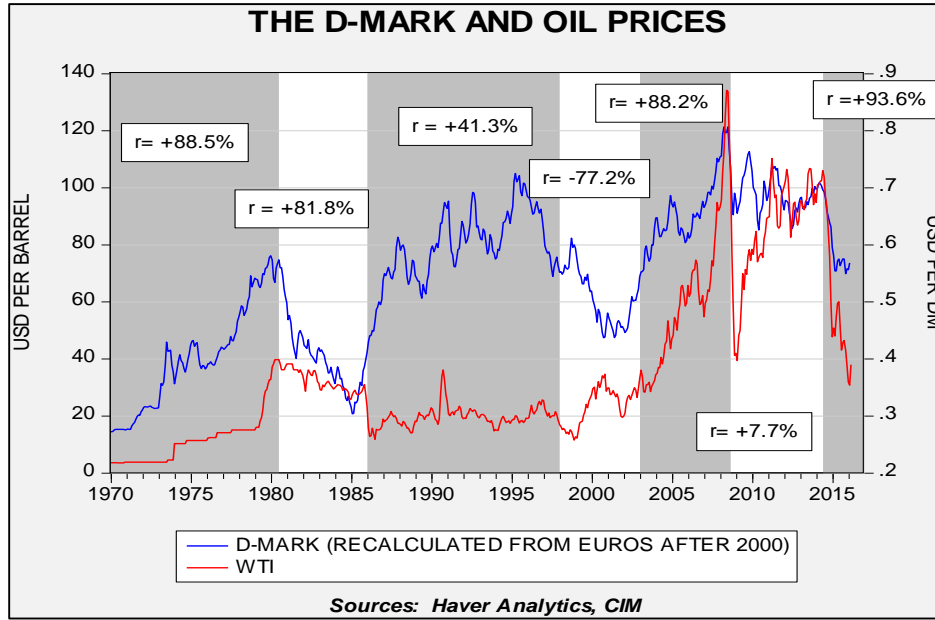


This chart shows the correlations over various periods since 1945. What is interesting is that, more times than not, the relationship is positive between oil prices and inventories. However, when supplies were perceived as ample, from 1986 to 2005, oil prices were inversely correlated to inventories. Since mid-2014, inventories and oil prices have been strongly inversely correlated.

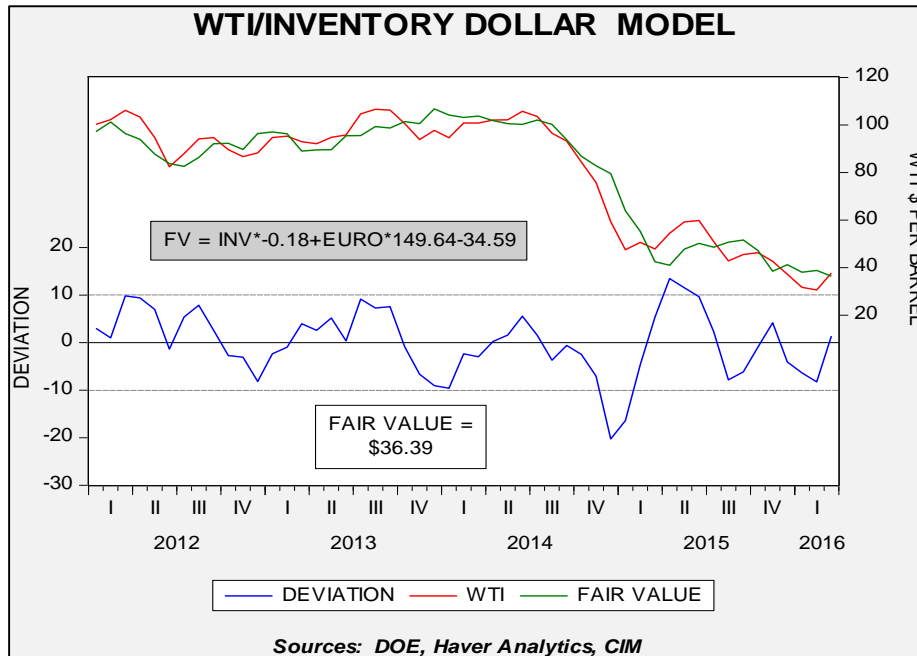
On the other hand, a weaker dollar is usually bullish for commodity prices, in general, and oil prices, in particular. The chart below shows the relationship of the D-mark/dollar exchange rate and oil prices over various periods.<sup>1</sup> Note that, with the exception of the period from 1998 to 2002, oil prices and the dollar are directly correlated; in other words, when the D-mark is strengthening, shown by a rising blue line, oil prices tend to rise. The only instance when this relationship didn't hold was during the aforementioned

<sup>1</sup> We recalculated the D-mark value from the euro/dollar exchange rate after 2000. The D-mark is used for illustration only. Since 2000, the euro is a better representation of developed market exchange rates.

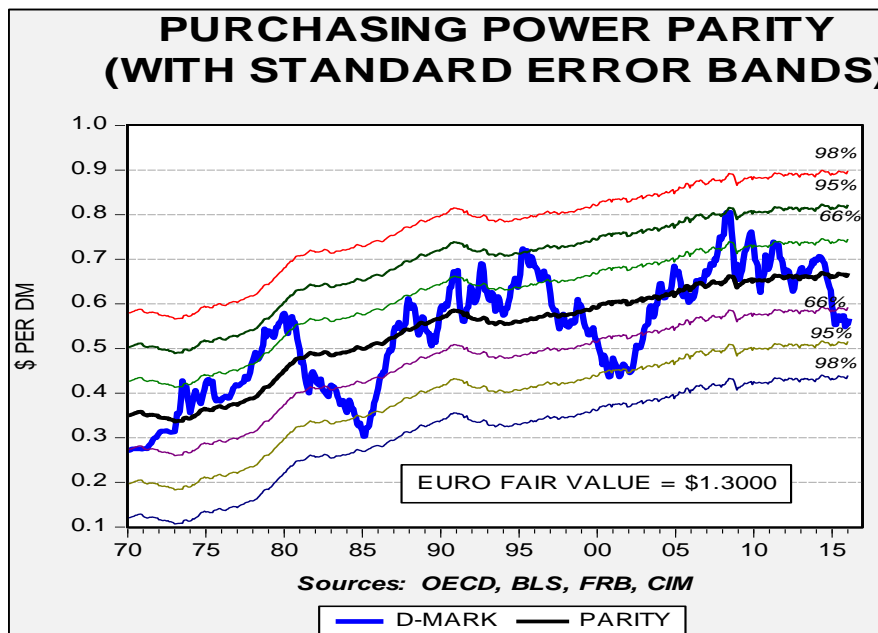
1998-2002 period when a production curtailment agreement between Mexico, Russia, Saudi Arabia and Venezuela lifted oil prices, offsetting dollar strength. As the above chart shows, this was also a period of falling inventory levels.



Since mid-2014, the relationship between oil prices, the dollar and inventories has been very strong. We use this situation to create a price model for crude oil that uses the euro and U.S. commercial crude oil inventories.



Using this model, if inventories peak at 555 mb and the EUR/USD exchange rate remains around \$1.11, fair value for crude oil will be \$32.35. By the end of summer, assuming the usual seasonal decline in inventories and a stable exchange rate, fair value will climb to \$39.86. Of course, the path of the dollar’s exchange rate is difficult to forecast. As long as there is a divergence between U.S. and European monetary policy, the dollar will tend to remain richly valued.

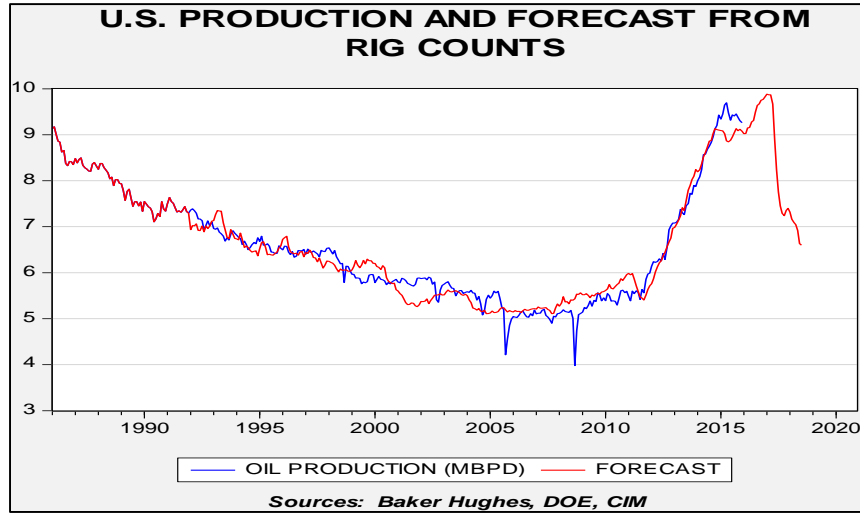


Based on purchasing power parity, which values exchange rates based on their relative inflation rates, the dollar is expensive. On the other hand, as the model shows, persistent deviations from fair value are not uncommon. Still, the dollar may weaken if Federal Reserve policy turns out to be easier than expected, which could be quite bullish for crude oil.

**Slowing U.S. Production**

The bigger problem is that inventory levels are historically elevated and that overhang must be reduced in order to foster a durable recovery in oil prices. There are typically two ways to accomplish that goal; reduce supply, increase demand or both. Demand is mostly a function of global economic growth, which isn’t expected to be all that robust. Cutting supply is the fastest way to address this overhang. In the past, OPEC has taken on this role, reducing supply during periods of weak prices. However, the current Saudi policy of supporting market share is mostly to blame for recent price weakness and there is little evidence to support a change in that policy. Thus, the likelihood of a cartel supply cut is low. Another option would be for non-OPEC production to decline. Since this production tends to be higher cost, low prices should eventually force non-OPEC production to fall, which should help balance the market.

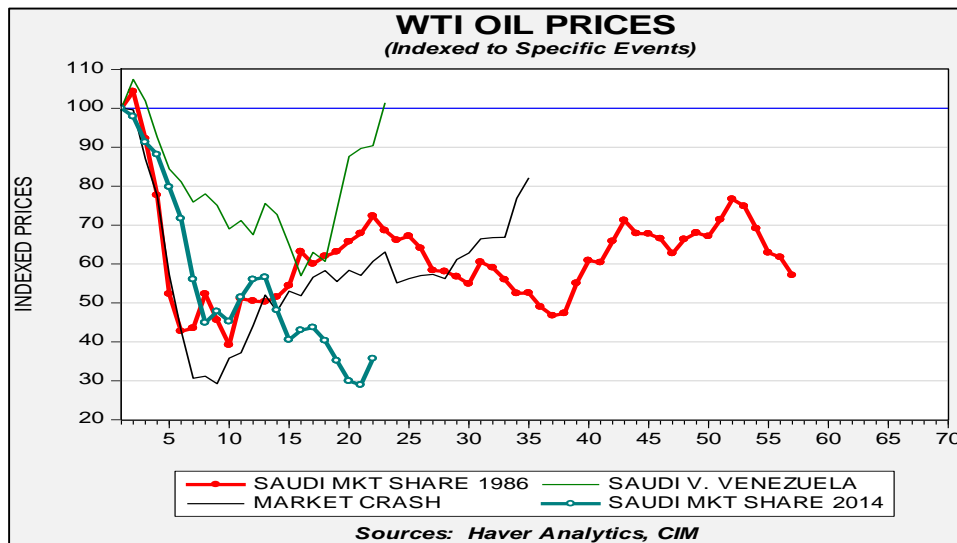
We forecast U.S. production using crude oil rig counts and employment in oil exploration and drilling. Both variables work with significant lags. The following chart shows our most updated version.



This simple model suggests that production growth will remain high into 2017. Will this model get it perfectly right? No. All models are prone to error simply because there are a number of uncountable variables that will affect production. In this case, high decline rates for fracked wells may lead to a shorter lag. Tighter financing could have a similar impact, although recent reports suggest that financing remains available. However, this model makes the case that a major drop in output may simply take time.

**OPEC**

In terms of bear markets in oil, the current one is developing into the worst since OPEC became the controlling cartel.



This chart shows four market events during which oil prices fell significantly. Three were periods when Saudi Arabia was engaged in market share conflicts within the cartel, and the fourth was tied to the 2008 financial crisis. As the chart shows, the current market is the weakest of this time frame compared to the previous three events.

Note that after the low was made in 1986, prices traced out a broad trading range and maintained it for about four years. We would expect something similar this time around, probably with a range of 40% to 60% of the price at the onset of the event. At nearly \$106 per barrel, our estimate would yield a price range of \$42 to \$64 dollars per barrel. If U.S. production falls as expected next year, that trading range will likely develop.

**Oil Summary**

To a great extent, our outlook on oil prices remains mostly the same. We are probably in a \$35 to \$55 per barrel range until either (a) OPEC cuts production, (b) U.S. production falls significantly, (c) oil-producing regions become geopolitically unstable, or (d) a major bear market develops in the dollar. Despite talk of a production freeze, we don't expect the first option to occur anytime soon, and the second option probably will not occur until next year at the earliest. The third option could happen at any time. Lastly, for now, we expect the dollar to remain mostly stable, although it is richly valued. If there is a bullish surprise, it may be that the dollar weakens. Our base case is the aforementioned trading range, meaning that oil is attractive in the low \$30s and unattractive near \$50 per barrel. We do believe the worst is over for oil prices but the inventory overhang needs to be eliminated before a sustainable rally is possible.

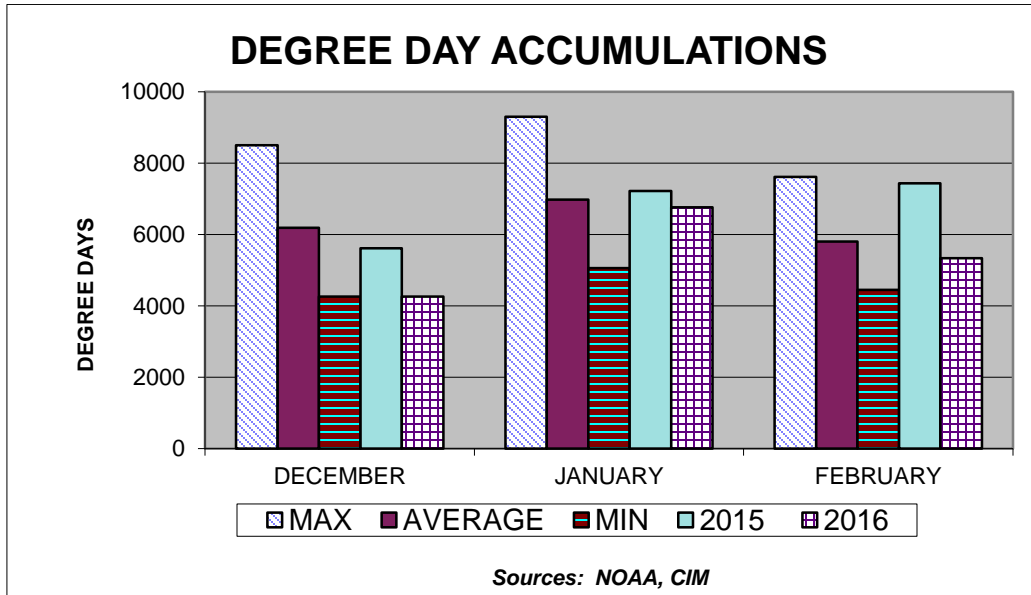
**Natural Gas**

Natural gas prices had a difficult winter.



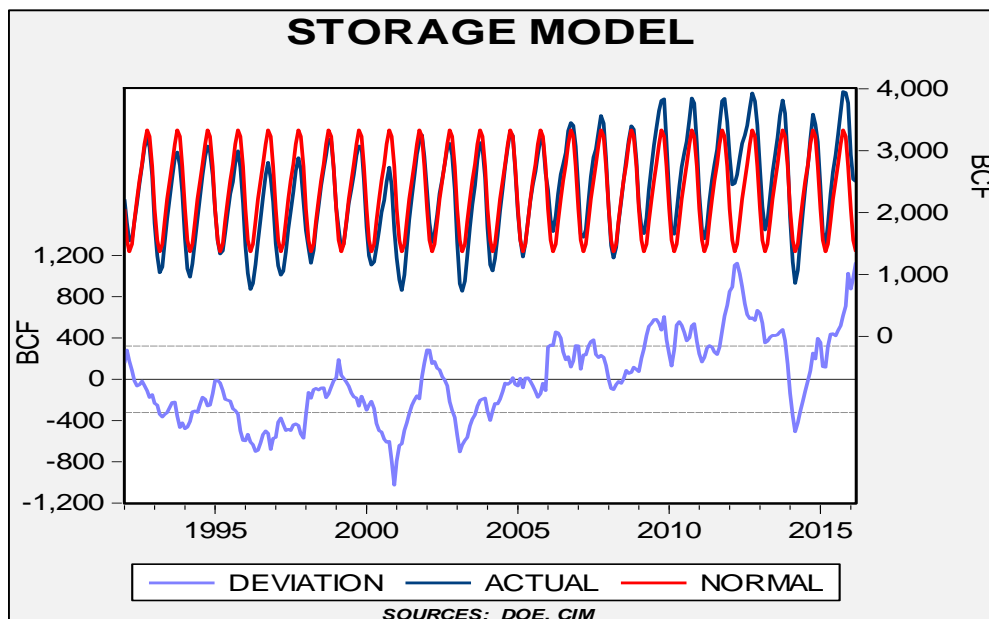
(Source: Barchart.com)

Inventory levels remain very elevated. It should be noted that weak prices were mostly due to a mild winter.

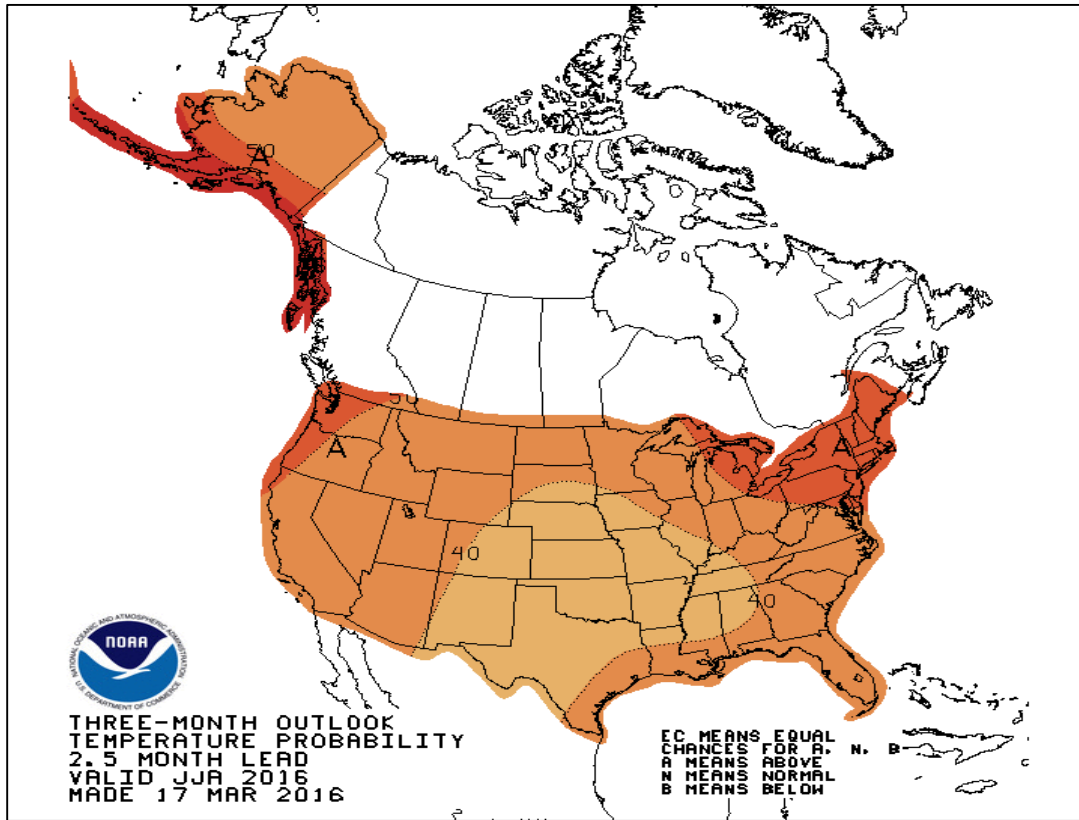


This chart shows population-weighted degree day accumulations for the region east of the Rockies. The higher the accumulation, the greater the demand for energy. December was one of the warmest on record (our data goes back to 1932). January and February were fairly close to normal, but withdrawals that were also near normal levels were not great enough to eliminate the inventory overhang.

The chart below shows seasonally adjusted working natural gas storage. This is the highest level of natural gas inventories since 2012.







It should be noted that mild winters are sometimes followed by hot summers. The National Weather Service’s official forecast for this summer calls for hot weather. If this forecast is accurate, it will likely reduce the inventory overhang. Thus, natural gas may be an attractive purchase at these levels.

Bill O’Grady  
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Confluence Investment Management

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