

## Natural Gas And Contango Limits

The simple statement, “bugs are your enemy,” probably would elicit one of two responses, either a nodding agreement that, yes, we should try to keep insects out of our immediate personal space as much as possible or some sort of sanctimonious lecture about all parts of an ecosystem working together, blah, blah, blah.

That was the bait; here is the trap: You could then explain you were referring to the price boxes commonly displayed on business-oriented daytime television, an oxymoron if there ever was one. Referred to as “the bug,” these boxes are pitched to the limited attention spans of their audience and never contain more than one month’s price at a time for commodity futures. They typically use the front-month contract right into the delivery window even though any trader with an ounce of sense long ago rolled their position forward by that time. As a result, amateurs might believe the price of a commodity with a forward curve strongly deviated from full carry, as has been typical for both crude oil and natural gas in recent years, either jumped or fell depending on whether the market was in contango or in backwardation, just after expiration.

### Time-Dependent Price Expectations

The large-scale movement of financial traders into physical commodity markets over the past decade has produced the inevitable culture clashes. Financial traders are used to nearly instantaneous fulfillment of their orders and freedom from logistical costs such as transportation, storage, losses and death (yes, they send you death notices in the livestock markets. It is all quite sad, really). While certain seasonal factors, real and imagined, apply to financial markets, physical markets are chock full of them on both the supply and the demand sides.

The real difference, however, lies in the cost of carry and its role in the development of a forward curve. Let’s take the case of a stock index future where fair value will be the index plus the short-term interest rate cost of carry minus the future value of expected dividends. At any given point in time, the interest rate forward curve is both well-known and hedgeable. Stochastic dividend expectations are the only variable, and these are sufficiently unknown and unhedgeable to make traders back away from futures longer than the next quarter’s expirations. You are better off holding a cash market position in the index rather than a futures position.

A similar exercise can be offered for bond futures. Here the uncertainty comes primarily from changes in which bonds will rotate into and out of cheapest-to-deliver status. As a result, only one month of a stock or bond future ever is active at any point in time other than during contract rolls.

Where do price expectations come into play for these contracts? In the case of stock derivatives all the way from single stock futures through sector contracts through the familiar broad-based futures such as the S&P 500, expectations are embedded in the price of the stock itself. Expectations in the bond world are reflected in the shape of the yield curve, in inflation-linked instruments and in the ordinal level of rates themselves.

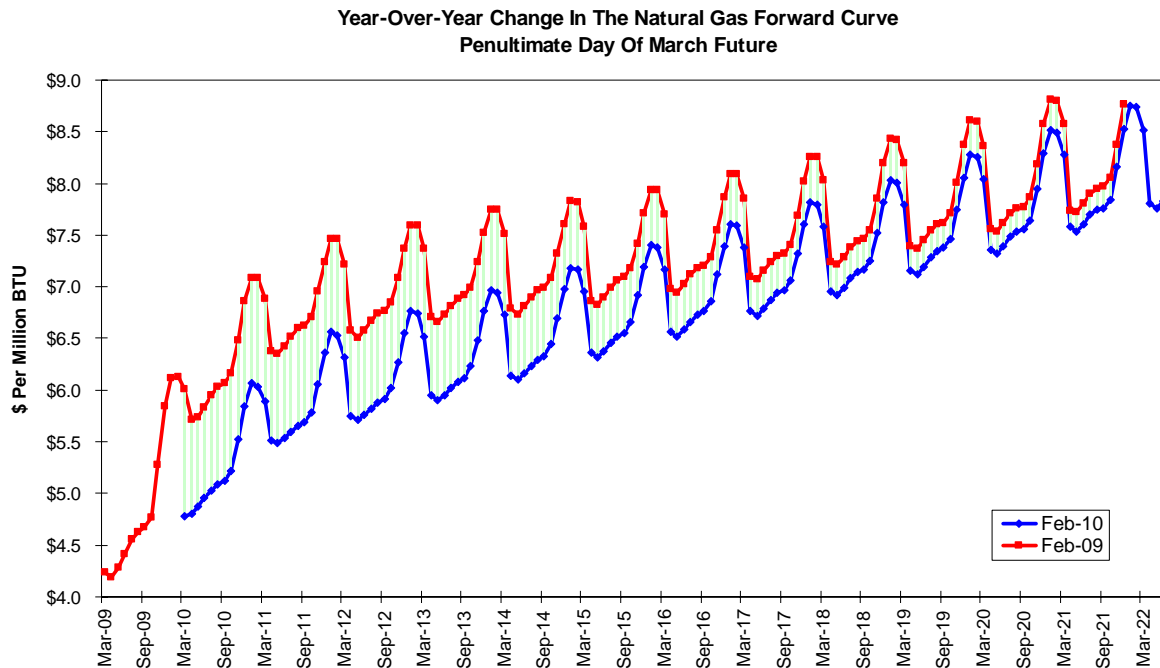
Physical commodities such as natural gas are very different. Instead of simply having a single spot price such as the current value of the stock index serve as the basis for any subsequent futures price, the markets have a forward series of what are referred to as “expected future spot prices.” These reflect seasonal factors, expected changes in the supply-demand balance, the demand for insurance by both buyer and seller, logistical constraints surrounding storage and delivery and other factors. As a result, multiple contract months are active at any time. The resulting forward curve is information-rich and as both producers and consumers can use the forward curve both to hedge and to interpret market expectations, the forward curve itself influences current behavior.

### The 2009 Natural Gas Case

Backwardation reaches a limit when the insurance cost of a producer selling forward exceeds the expected price loss or, conversely, when holders of inventories see they can make more by selling them into the market than they can by processing them. Contango reaches a succession of limits at each incrementally more expensive level of storage and then finally disconnects when no more storage is available.

Such a situation applied in August 2009 as a cool summer reduced electric utility demand for natural gas and as new supplies from onshore shale formations came into the market. The gas utilities and others who have the physical facilities to store natural gas reached their limits, and the price collapsed for the front-month contracts. Interestingly, while the price for the more distant months fell with respect to 2008 levels, the drop was modest and reflected a belief the 2009 supply glut was temporary. By early March 2010, a cold winter and recovery in

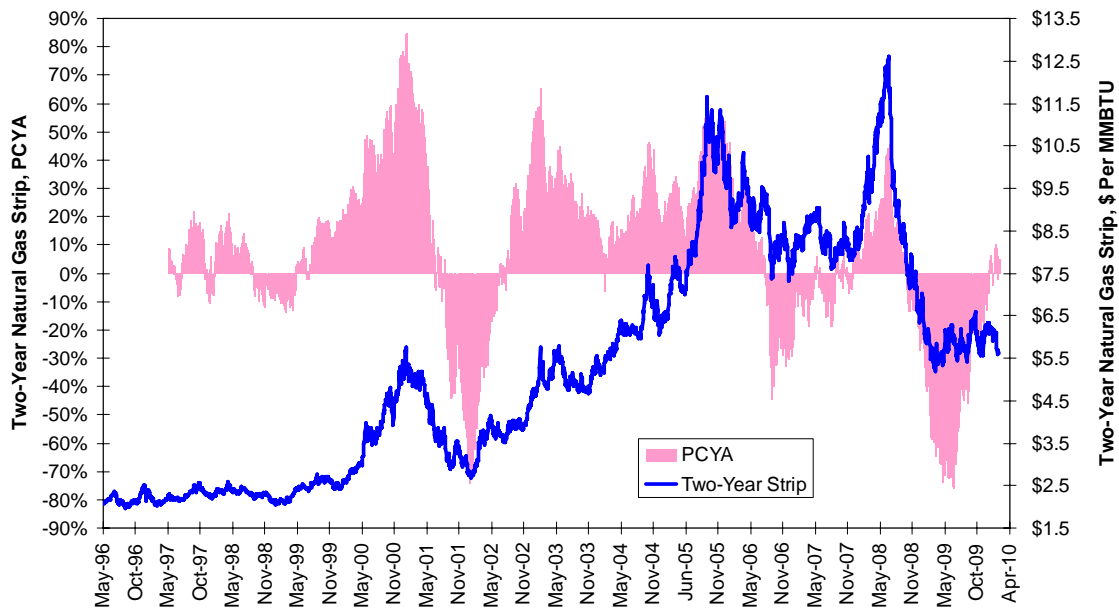
industrial natural gas demand led to the closure of the front-month contango and created a steadily rising forward curve.



### Strips And Swaps

Nearly all of the price action had occurred in the front months. The back months remained resilient, and that is instructive. Commercial traders of natural gas are in a continuous business for an indefinite period of time. Any business planner wants to be able to floor or cap their natural gas prices and costs, respectively. They do not focus on the “bug” price but rather on a longer-term strip of prices. The two-year natural gas strip price fell between 2008 and 2009 and then stabilized into 2010, but this strip price hardly moved in comparison to front-month prices.

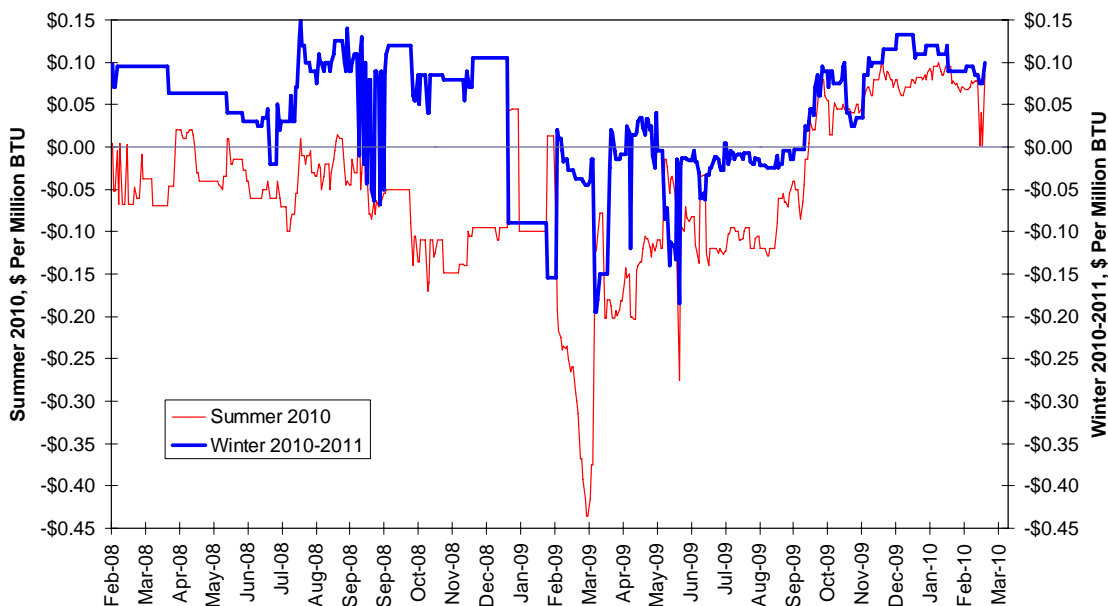
### Two-Year Natural Gas Strip Moderates Front-Month Swings



We must remember as well futures prices are for delivery at Henry Hub in Louisiana. While many regional prices are linked to Henry Hub, the basis can fluctuate significantly, especially in those markets served by multiple pipelines. Over-the-counter swaps for local markets exist for both seasonal markets and for the switch between fixed and floating price exposures. By the beginning of March 2010, the fixed-for-floating swaps for the summer 2010 and winter 2010-2011 Chicago city gate markets had stabilized in a range. The buyer of a fixed-for-floating

swap pays a fixed price for natural gas and receives the floating price. This is a bullish position as it benefits when prices move higher in the future. A stable range at low positive levels, therefore, reflects expectations for modest price weakness over the delivery period.

**Chicago City Gate Fixed-For Floating Swap**

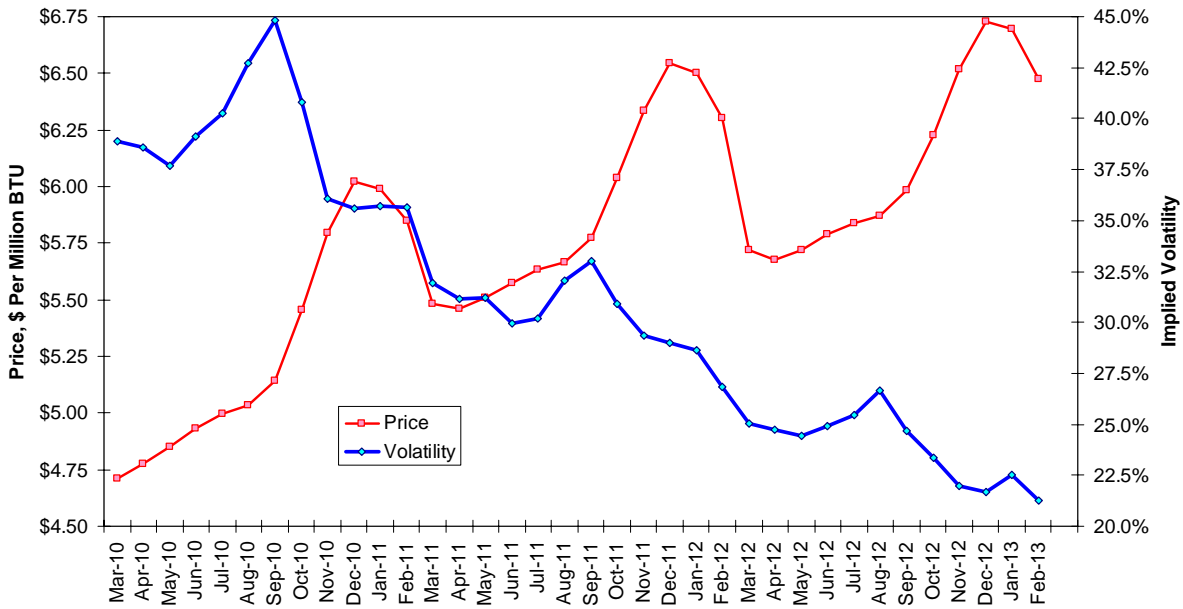


### Option Costs

Capping costs involves the purchase of a call option structure in one form or another, which means higher volatility will push the cost of hedging higher, all else held equal. The implied volatility of physical commodity futures tends to fall over time for reasons including increase actual volatility increases as expiration approaches (the Samuelson hypothesis) and the interest rate dynamics of calendar spreads.

The implied volatility of natural gas tends to rise within a given contract month as buyers are the more anxious party and tend to panic during price spikes. The picture can change with time-dependent price expectations, however. At the start of March 2010, volatility remained lower in the near months and then peaked for September 2010 futures. This indicates an expectation for oversupply in the markets to disappear after the summer months of peak electricity generation demand. Ironically, the complacency for near months sets the stage for price surges as the uninsured have no alternative but to buy natural gas when its price is rising.

### Implied Volatility Typically Declines Over Time



### Equity Market Impact

As a concluding aside – the topic justifies a much larger and more detailed treatment – equity prices do not reflect the short-term “bug” prices inasmuch as they do long-term strip prices. This explains the modest relationships between energy commodity prices and related equities (see “Energy Stock Movers And Shakers,” June 2008). Those who wish to express their short-term price opinions on energy commodities with energy equities will get exactly what they deserve and no more.

The deformations in the front months of futures distorted by limit conditions on either backwardation or contango are short-term in nature. Many dollars were lost during the summer of 2009 by those who thought natural gas prices could not go any lower. They were wrong. Perhaps a little more homework and a little less daytime television would have helped.