

When You're A Jet, Stay Hedged All The Way

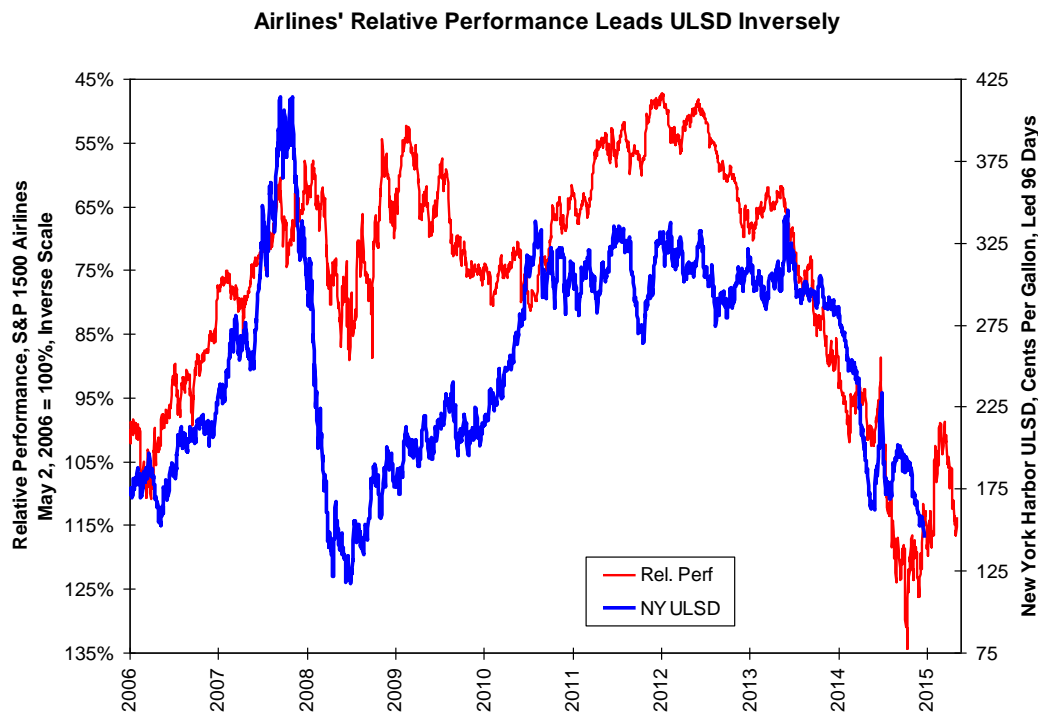
Airlines have a simple business model, summarized as “planes in the sky, [posteriors] in the seats.” There is a derived demand, a fancy way of saying passengers tolerate a really dreadful experience as the cost of arriving at their destination. As an empty seat a revenue opportunity permanently foregone, carriers are willing to sell them below their marginal cost of operations as any revenue is better than none. If you add truculent labor unions, the vagaries of weather and economic factors and the always variable cost of jet fuel, our topic here today, small wonder Warren Buffett once quipped, “Indeed, if a farsighted capitalist had been present at Kitty Hawk, he would have done his successors a huge favor by shooting Orville down.”

Jet fuel is and always has been one of the most difficult refined petroleum products to hedge. It is produced from the same cut of the barrel, called middle distillates, as diesel fuel and heating oil, but unlike those markets where the buyers are small, numerous and scattered widely, the jet fuel market is concentrated in a handful of large airports, some of which have direct dedicated pipelines running from nearby refineries.

A further layer of complexity is added by the actions of the U.S. military. When Uncle Sam decides to launch a few thousand sorties into the wild blue yonder, they pull the price of jet fuel higher relative to that of other middle distillates. What can a self-respecting airline do to manage its fuel price risks and avoid another encounter with Chapter 11 bankruptcy? Part of the answer lies in hedging the cost of jet fuel with ultra-low sulfur diesel fuel futures (ULSD). This contract succeeded the old heating oil futures contract starting in May 2013.

Risk Management Matters

In homage to Samuel Johnson's maxim, “When a man knows he is to be hanged in a fortnight, it concentrates his mind wonderfully,” we might add the prospect of stock market underperformance focuses option-compensated executives' minds wonderfully as well. The relative performance of the S&P 1500 Airline group vis-à-vis the S&P 1500 Supercomposite has led the price of ULSD in New York Harbor by 96 days on average since the ULSD market began in May 2006. Investors understand jet fuel price risk management matters and they buy and sell airline stocks in anticipation of price changes for ULSD.



Long Hedges

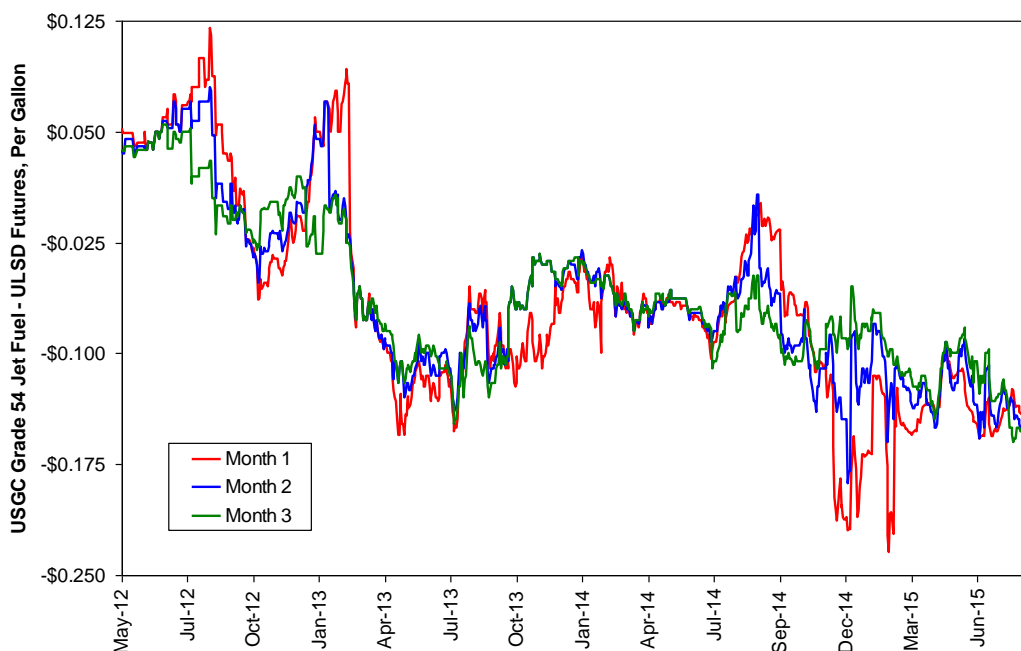
Any buyer of any commodity, not just jet fuel, is exposed to the risk of higher prices at all times. Incredibly, this statement is not accepted universally, and many organizations try to trade around the market with a variety of timing and partial exposure methodologies. They often fail spectacularly when the price shoots higher and over a level they

feel has to mark the start of a reversion to the mean. Worse, many commodity buyers enter into cash market swaps where they receive the difference between higher prices and the swap price but have to pay the difference between the swap price and the market price when the price collapses.

Jet fuel buyers can take long positions in ULSD futures with the credit counterparty risk of the CME Clearinghouse, they can try to trade the relatively illiquid ULSD options or they can trade jet fuel swaps customized to local jet fuel markets and accept counterparty credit risk.

Let's focus on ULSD futures as a hedge instrument and whether they have a stable enough basis against jet fuel to work. Basis is defined as the difference between a cash market price and a futures market price. If a hedge is perfect, basis should move to zero by the delivery date for the standard delivery date at the exchange's delivery point, ideally with a smooth convergence path. We live in the real world, of course, where grade differentials and with local market variations lead to basis fluctuations. This can be illustrated by basis spread swap futures for Grade 54 jet fuel at the U.S. Gulf Coast (USGC) and each of the first three months of ULSD futures.

USGC Jet Fuel Vs. NYH ULSD Spread Swap Futures



Local Market Hedges

Per the Financial Accounting Standards Board's Statement 133, the beta or relative variance between a cash market and a futures contract must lie between 0.80 and 1.25 to qualify as a bona fide hedge. ULSD futures meet these requirements as a hedge for jet fuel in four regional markets, Chicago, New York, Los Angeles and the U.S. Gulf Coast (USGC) easily. Their betas between the May 2012 start of ULSD futures trading and late-August 2015 were 1.023, 1.027, 0.991 and 1.047, respectively.

This quality of fit was similarly high for these four regional jet fuel markets when No. 2 heating oil underlay the middle distillate futures contract. Betas for the combined period extending back to May 2006 for the four markets were 1.009, 1.021, 0.989 and 1.002, respectively. The r^2 , or percentage of variance explained, over the post-May 2006 period for the four markets have been 0.929, 0.983, 0.962 and 0.978, respectively.

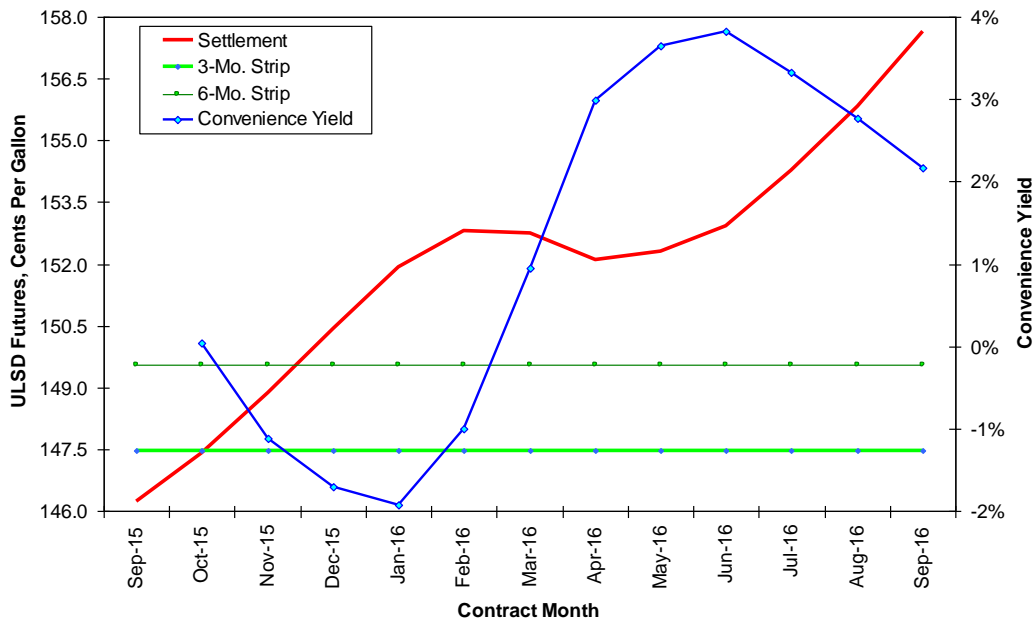
Forward Curve Considerations

Those numbers were generated from front-month contracts. While the ULSD market is not quite as seasonal as the heating oil market, both increased wintertime demand for heating fuels and shifts in refinery output configurations give the ULSD forward curve a seasonal shape. An airline buying a three- or six-month strip of ULSD futures to hedge its price risk often will be buying into a carry curve where the strip price will be greater than the spot price of ULSD and will converge downwards, as illustrated below. Of course, the opposite phenomenon, buying forward into a backwarddated forward curve, often occurs during the winter and spring and will give the airline upward price convergence of futures to the spot price.

While the old heating oil contract often traded in a deep carry or contango during the late spring and summer months so that heating oil buyers could build and hedge inventories by taking delivery and selling back-month futures contracts, ULSD does not follow this storage schedule. As a result, an airline buying a strip of ULSD futures will face a storage charge called the convenience yield. This represents the cost of insurance against prices risk. It is described below in equation form where $Month_1$ and $Month_2$ are the first and second futures contracts, $Storage$ is the physical cost of holding a commodity and e^{rt} is the capital cost of money tied up in inventory.

$$CY = \left[1 + \frac{Month_1 * e^{rt} + Storage - Month_2}{Month_1} \right]^{365/d} - 1$$

NYMEX Forward Curve And Convenience Yield
August 21, 2015

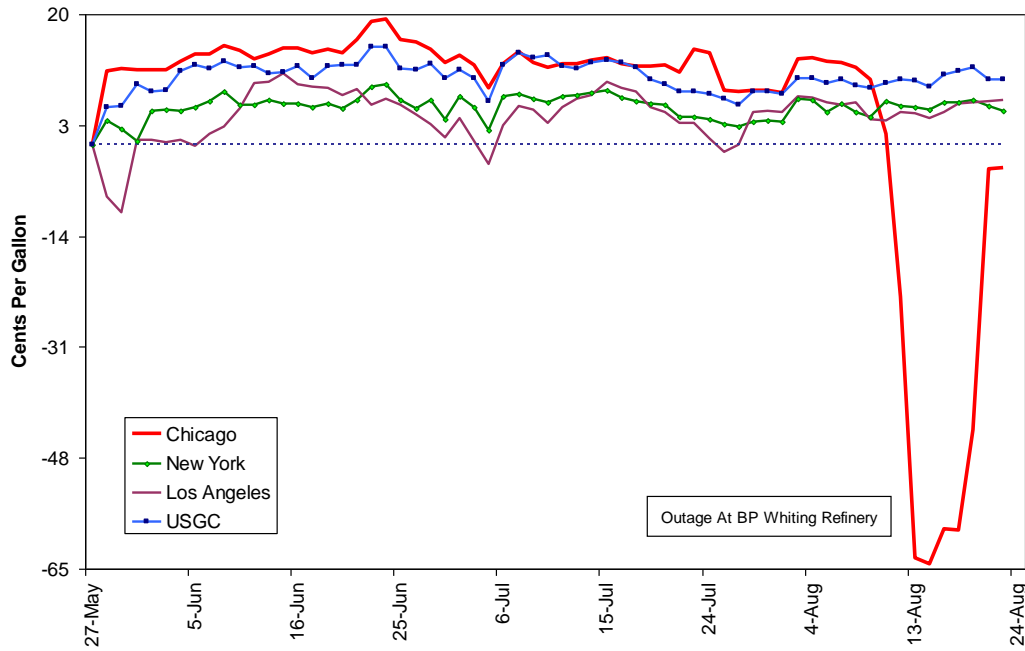


Case Study

While jet fuel price risk management must be a continuous process of maintaining a long ULSD futures position against a naturally short jet fuel position, it is still instructive to map a three-month case study of how a three-month ULSD strip would have hedged Grade 54 jet fuel positions beginning on May 27, 2015.

The ideal combined hedge position should oscillate around zero and have very low variance, but the real world with its refinery outages and other supply disruptions does not always allow this. What we do see in the chart below is how a short-term dislocation in the Chicago market in mid-August associated with an outage at BP's Whiting refinery affected the market violently but closed rapidly. The ability of local jet fuel markets to return to a normal basis relationship vis-à-vis a three-month strip of ULSD futures illustrates just how effective and efficient they are as a hedge instrument.

Gross Hedge Gain/Loss Using Three-Month ULSD Strip



Airlines can and indeed should manage their jet fuel costs by any and all means available, including ULSD futures. To not hedge in that business is to bet the company every day, a parallel to the reliance of late and unlamented Wall Street firms such as Bear Stearns and Lehman Brothers that relied on overnight repo to finance their operations. Now if they could just do something about baggage fees, the middle seat and on-time arrival, maybe Warren Buffett could apologize to Orville Wright's descendants.