

## Capturing Aluminum's Embedded Call Option

Famous last words and epitaphs are an endless source of amusement and the sort of inspirational quotes various newsletter writers think you need before you are jolted awake by your morning coffee. While futures traders as a whole have been deficient in this department, may we suggest inscribing, "If you can store it profitably, do so" across the gates to the Tomb of the Unknown Trader.

The reason is very simple and goes right back to the very basis of cash-and-carry arbitrage. If you can take a physical commodity, place it in storage and hedge it with a short futures position at a price sufficient to cover all of the physical and financial costs of storage, the worst that can happen to you is you will make a profit equivalent to the amount at which you sold the future over full carrying costs.

You can determine this return in advance by calculating the convenience yield implied in the forward curve of a futures market. This payment often is referred to as the convenience yield of a market, 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. The "convenience" is the premium buyers in physical process industries are willing to pay to keep available inventories on-hand; alternatively, it is the discount at which risk-averse sellers are willing to accept when they sell futures to hedge their production.

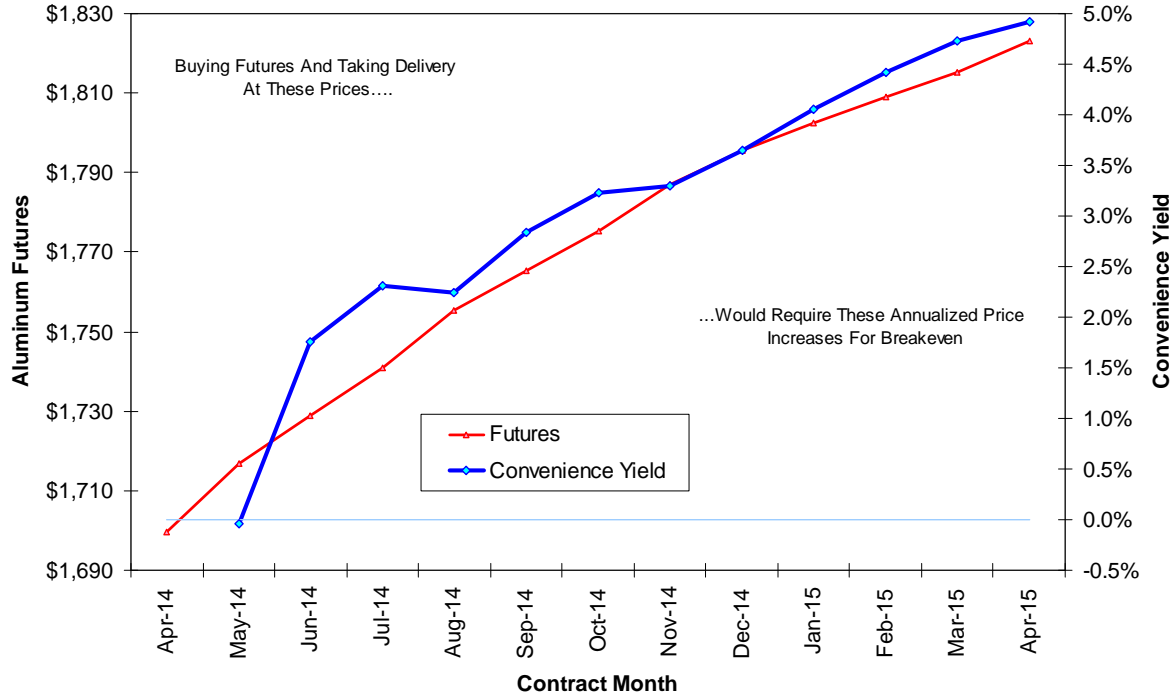
$$CY = \left[ 1 + \frac{Month_1 * e^{rt} + Storage - Month_2}{Month_1} \right]^{365/d} - 1$$

A market in backwardation, also known as an inverse depending on the industry, always has a positive convenience yield; a market in a true contango has a negative convenience yield, and a market at full carry has a convenience yield of zero. We should expect inventories to decline in backwardated markets and to rise in contango markets as storage is unprofitable in the former and profitable in the latter.

If the worst that can happen to you in a storage situation is a return equivalent to the convenience yield, the best is an opportunity to deliver the commodity in storage to a buyer at a premium to the futures price prevailing at the time of sale. As the commodity was placed in storage at a discount to the future, a sale at a price greater than the future can represent a gain, one whose bounds are defined by an anxious buyer of the spot commodity who may need it to prevent a shutdown of a processing unit. This realization of the premium is the embedded call option referred to in the title and will be illustrated below in the case of the aluminum market.

A snapshot of the London Metals Exchange's aluminum futures market from March 24, 2014 indicates the upward-sloping forward curve was not in contango as convenience yields were not negative. This was to be expected as markets abhor free arbitrage opportunities. However, the spot price gains required for the trade to break even are quite low and might invite a speculative trader to take the gamble on a spot market premium for aluminum materializing.

**LME Aluminum Forward Curve And Convenience Yield**  
**March 24, 2014**

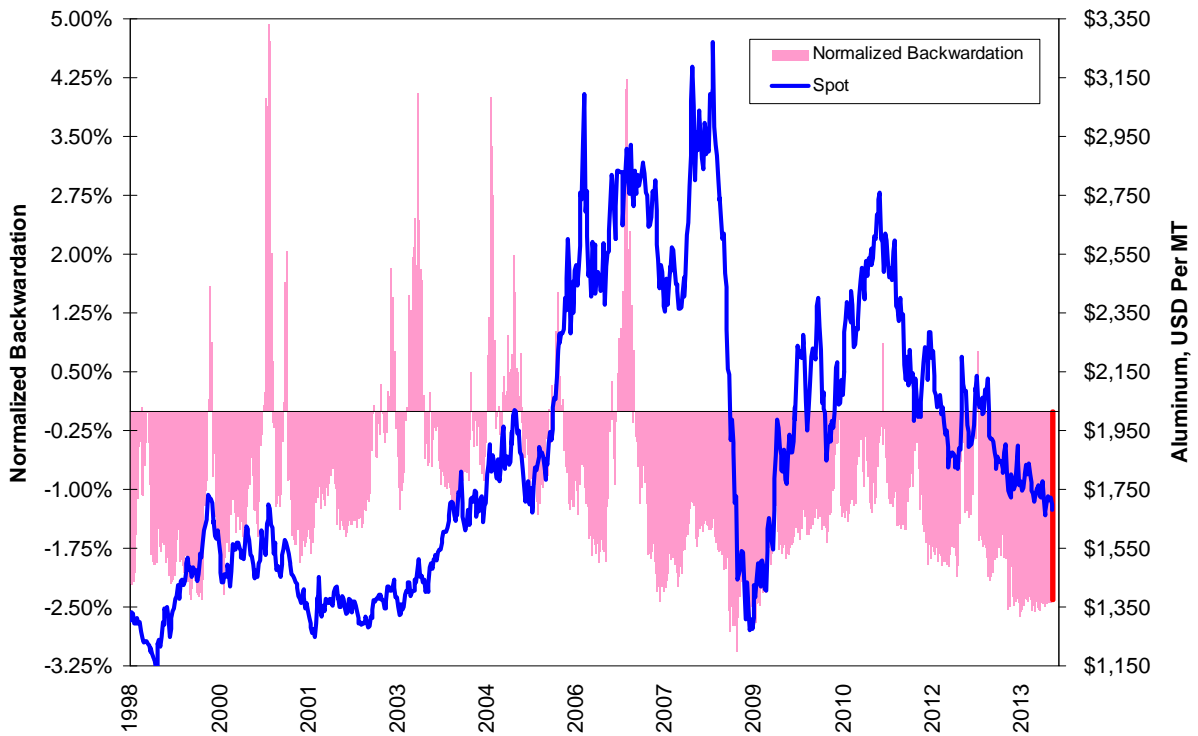


**Aluminum Market**

Just as every long-term physical commodity chart subsuming the inflationary 1970s has a few enormous increases, every chart involving the 2003-2008 period reflects China’s construction boom. That boom took a hiatus during the financial crisis and then resumed in early 2009 as China began a short-lived strategic stockpiling campaign for copper, aluminum and other industrial materials. Chinese imports of aluminum rose from an average of 77,670 metric tons per month in the second quarter of 2008 to 375,020 metric tons per month in the second quarter of 2009 and then retreated to 87,470 metric tons per month in the second quarter of 2010. Monthly imports in the fourth quarter of 2013 averaged 103,843 metric tons and were at 102,550 metric tons per month in January-February 2014.

While the normalized backwardation between LME spot prices and three-month forwards ebbed and flowed with price, the relationship has not been a very strong indicator. Backwardation is the expected pattern in physical markets where the cheapest places of storage are with the producer rather than with the buyer. This was the case only for short-lived periods prior to the financial crisis and very rarely afterwards. The implication has been the aluminum market was well-supplied even during the large price rally between March 2009 and April 2011. China was stockpiling metal and driving the price higher during a period of slack demand; whether this is a good money-making strategy will be left for you to decide.

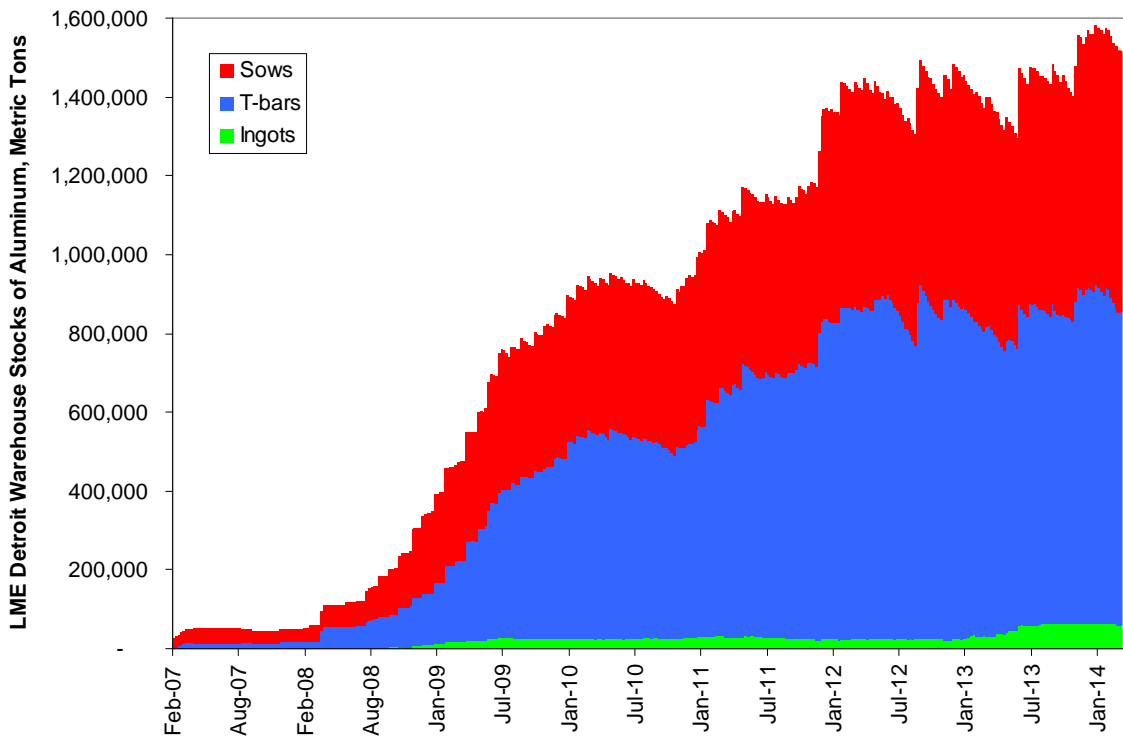
## Normalized Backwardation Not A Strong Indicator For Spot Aluminum Prices



### Scarcity Is Where You Find It

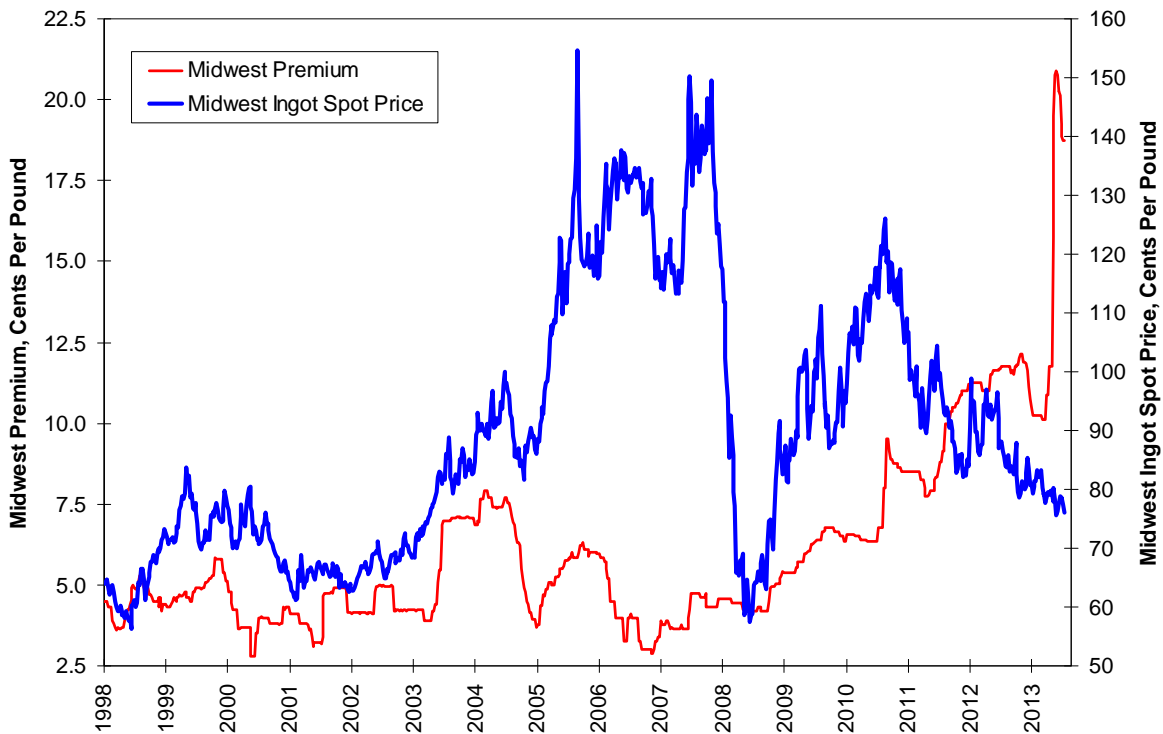
Just as all politics is local, so, too, are all warehouse delivery markets. Take Detroit, please. The city may be in a messy Chapter 9 bankruptcy and living proof bad governance can destroy property just as surely as an invading army, but it is still a center for automobile manufacturing and the home of three LME-certified warehouses for aluminum. The stocks of aluminum in those warehouses have been rising over the past seven years whether in the form of ingots, T-bars or everyone's favorite, sows (basically a large block of metal for re-melting and casting).

### Aluminum Stocks In Detroit Warehouses



You might think a market with a generally rising supply of metal in warehouses would be pedestrian, one where you could drive your truck up to the dock, load it to your heart's content with ingots and sows and tell them to send you the bill. This has not been the case at all. The so-called Midwest Premium for P1020 aluminum ingots as reported by *Metals Bulletin* has been jumping since November 2013 while the Midwest spot price has been declining, a sure sign someone, somewhere has been realizing the embedded call option for aluminum.

## Midwest Premium Surging In Falling Market



### Realizing The Embedded Call Option

While it might not suit those with a regulatory mindset, traders need to keep in mind W.C. Fields' response to a sucker card-player's inquiry in *My Little Chickadee*: "Is this a game of chance?" To which Fields responded, "No, not the way I play it."

Let's illustrate broadly and using data from November 15, 2013 and March 24, 2014. The *Metals Bulletin* Midwest spot and premium prices are converted from dollars per pound to dollars per metric ton. A long position in the Midwest spot can be matched against a short April futures contract. Four months later, after paying the LME warehouse and capital charges, the trade would be approximately \$109 per metric ton underwater (\$117.25-64.15-162.10). The call could be realized by first repurchasing the futures contract and then selling the spot aluminum at a Midwest premium \$190 greater than it was in November. Now the gross and indicative gain would be \$81 per metric ton.

### Midwest Aluminum Premium As A Call Option

	Midwest Spot	April Future	Storage	Midwest Premium
Nov. 15, 2013	\$ 1,741.66	\$ 1,817.00		\$ 223.22
March 24, 2014	\$ 1,677.50	\$ 1,699.75		\$ 413.37
Component Gain/Loss:	\$ (64.15)	\$ 117.25	\$ (162.10)	\$ 190.15
Net:	\$ 81.14			

The trick to realizing this call option of course is not delivering the aluminum in a timely fashion. Otherwise, the premium could not materialize. It would be easy to assign blame, but those who live in aluminum houses should not throw stones. Moreover, just as the mid-continent discount in crude oil led to expansion of inventories held at Cushing, Oklahoma, a form of insurance against supply disruption, the Midwest premium led to the growth in aluminum inventories seen above. The U.S. automobile manufacturing industry can rest easy at night knowing this,

and aluminum smelters did not have to cut production runs in the face of growing supply overhangs; instead of selling to fabricators, they could sell to warehouses. Social utility is such an abstract concept, is it not?

The introduction of a new aluminum futures contract by the CME Group based on the all-in delivered price of aluminum should end the odd cycle of rising spot market premiums in a market with excess supplies. The repurchase price of the short futures contract in the illustration above will incorporate the increase in the Midwest premium and thus will negate the gains on the spot market side of the trade.