



Mean Reversion, Markets, and the McRib: *The Observations and Lessons from Seasoned Commodity Traders*

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Introduction

This article chronologically discusses the lessons learned from our diverse experiences in the commodity markets. Typically, one can only gain expertise in commodity trading if one has worked in niche commodity-processor companies, in banks that specialize in hedging project risk for natural-resource companies, or at highly successful proprietary trading companies. In contrast, this article provides the reader with practical lessons regarding the commodity markets without having to undertake these professional experiences.

Commodity-Index Exchange-Traded Fund

In 2008, our firm was involved in launching a long-only commodity-index Exchange-Traded Fund (ETF). This ETF index fund followed the strategy of the original Commodity Research Bureau (CRB) equally-weighted commodity index. This ETF was early-to-market in 2008 to meet the demand of what at the time was a Wall Street wide allocation of investor and institutional capital to long-only commodity indices for inflation hedging. This effort led to our appreciation of the potential returns from a “rebalancing bonus” in a diverse portfolio of commodity futures contracts.

Agricultural Business Ventures

But since 2008 our team has evolved: we ventured into the production of agricultural products, i.e., farming, as well as the risk management of livestock, feed inputs, and energy inputs. We have also actively traded our own accounts to take advantage of opportunistic, seasonally-oriented trades.

Our team learned further lessons from our agricultural business ventures: regardless of whether one is building a long-only commodity index fund, managing a hedge on physical commodities, managing a “tail



hedge” on the interest cost of a physical hedge, taking a speculative spread, option or directional position, or simply working within the sector of a commodity space, a keen understanding of seasonal and calendar events is as important as understanding supply and demand.

Without this understanding, a price move in a commodity may be mistaken as a counter-seasonal move when in actuality it may be the result of index funds rolling from front months to back months as they do every roll period. Or observing a futures contract converging with cash in the delivery period may send the wrong signal to someone not informed on these seasonal or calendar events.

This paper will provide three examples of the effect that seasonal events can have on the price action of commodity futures and cash commodities. Each commodity is different, but all are affected by the calendar constraints of the traders in the commodities. Month end, quarter end, holiday schedules, delivery schedules, spring, summer, winter, and fall all have profound impacts on price.

Trading System Design

This paper concludes with a brief discussion of how a trading system based on mean reversion can potentially be improved upon by incorporating seasonal and calendar events in its algorithm. The principles underlying such a system are based on our experiences noted above, namely managing a daily-rebalanced commodity index and running a physical commodity hedging business.

Mean Reversion

As touched upon in the introduction, our commodity team launched a commodity-index fund, which was based on the original CRB and whose methodology is based on the daily rebalancing of futures positions in order to maintain equal weights across commodities. Because of this unique index methodology, we became students of William Bernstein’s (and Robert Arnott’s) research, as it relates to their work on mean reversion and rebalancing returns. Our index fund’s commodity basket, which is comprised of 17 commodities from all sectors, became an interesting data set which our team of traders also have examined to see if one could potentially isolate and optimize a long-short mean-reversion strategy.

Our team at GreenHaven sold the ETF business in 2016, and to be clear, the absolute performance of all long-only commodity indexes and funds that track those indexes, including the fund we managed, has not been good in terms of absolute returns since 2013. This seven-year period can be described as a deep deflationary commodity bear market. Nevertheless, the data we observed showed a strong relative outperformance of a daily rebalanced fund versus its peers that had quarterly or annual rebalancing.

Bernstein (1996) provides insights into the potential benefits of rebalancing. He instructs that the “expected return of a rebalanced portfolio is not accurately represented by a simple arithmetic weighting of individual asset returns.” Bernstein also states that “[i]t may be possible to sort assets for a rebalancing return by looking to pair assets with a high standard deviation and low or negative correlation.” Furthermore, Bernstein’s 1996 paper provides a formula to predict the rebalancing benefit and contemplates using such a formula to predict optimal rebalancing frequency.



Based on Bernstein’s work and our own projections and observations, we believe that the historical return profile of several long-only commodity-index ETF’s have displayed the following performance characteristics. For the period from 2008 through the present, a fund that bought the commodity futures that have declined in price while selling the commodity futures that have increased in price, rebalancing daily to maintain an equal-weight portfolio, provided an annualized outperformance or “rebalancing bonus” of approximately 0.8% to 1% net of fees, slippage, and commissions. Compounded over a decade, this has led to an outperformance of 10% to 15% versus longer rebalancing periods. We will return to the mean reversion/rebalancing theme later in the article after discussing further insights that we garnered from our physical commodity business.

Market Seasonality and the McRib Effect

As our team moved away from focusing on the commodity ETF business, we focused our attention on our core competency, which is risk management services for customers in the U.S. grains, lean hogs, live cattle, and feeder cattle sectors. This renewed focus led to learning further lessons on idiosyncratic commodity characteristics, namely the importance of seasonal effects, which will be discussed in this section of the paper.

One aspect of our risk-management business is managing the “crush” margins for hog and cattle producers. A “crush” in U.S. livestock business vernacular is a cash-flow hedge of the inputs and outputs of the business. We hedged corn and soybean meal as feed inputs and sold forward lean hog futures and live cattle and/or feeder cattle futures against forward purchases and sales. This allowed customers to lock in a margin of the cost of production and expected revenue per unit of commodity sold.

Based on our experience with hedging livestock margins, we learned that calendar and specific seasonal events within the agricultural industry were in many ways of equal or greater importance than the understanding of fundamental supply and demand. Interestingly, this observation is not referring to random events such as a cold winter or a drought-stricken summer that can affect supply and demand beyond expectations. More specifically, we found if one researches each commodity and its sector, there are repetitive seasonal events impacting supply and demand of the commodity or the commodity futures contract that the market may not necessarily price efficiently in the forward market, but which the experienced commodity expert is well aware of. It may be a subtle fact such as a key holiday falling on a weekday or weekend, which if it falls on a Friday or Monday may materially change the number of manufacturing or processing days in a month by 10 to 15%. Short-term supply is certainly impacted by holiday schedules. What if the Easter holiday is in early March versus early April? What happens if Christmas and New Year’s Day are on a Friday and processing plants cancel Saturday processing for two consecutive weeks?

The data-driven quantitative analyst and the physical commodity trader alike observe that specific markets tend to trend and mean revert strongly within one-year periods, which is correlated with specific calendar dates that can create extreme tops and bottoms. For the casual or uninformed professional, the market may seem irrational and out of touch with supply and demand numbers. For the informed professional it becomes an expected seasonal move.



If we have any advice for a student or new professional to the world of commodities or a specific commodity sector, it would be to understand the direct and indirect seasonal factors that impact prices and/or the demand for futures. We provide specific examples in the next section of this article.

The McRib

In 1981, McDonald's released the McRib Sandwich, a processed pork barbecue sandwich trademarked and sold by McDonald's. Since the late 1990s the McRib is only offered seasonally, becoming a cult classic, whereas food bloggers and connoisseurs of the sandwich would speculate on whether McDonald's would bring back the McRib again. (See Kleincast (2016), ABC Channel 7 Chicago (2017), McRib Locator (2018), and McDonald's Corporation (2019).)

By paying attention to marketing campaigns, one could see that businesses would act rationally according to the seasons. The annual fall release of the McRib coincides with the lower price of pork that is due to the biological fact that pigs breed more piglets in the spring that hit the markets in the fall and have less success breeding piglets in the fall that are marketed in the summer. In addition to recognizing the McRib's annual release within weeks of the typical fall low for pork prices, one can also observe that October is National Pork month, which presumably is meant to encourage demand during this seasonal period.

The McRib Cycle

Based on data from the Moore Research Center, one can observe that from 1990 through the present, prices in the hog cash market have fallen into the fall in 27 out of 30 years with the cash price falling as much as 40%+ from the summer high. There are exceptions such as supply disruptions due to disease such as in 2014 with the PED virus and in the fall of 2020 with supply impacted by euthanized piglets due to COVID-19. Notably, the futures contracts have generally priced in relatively modest changes in cash prices as compared to the actual cash changes that have been realized.

"McCorn Cycle"

One can observe other seasonal patterns, which while not always the case, merit attention in commodity trading. Drawing again from Moore Research Center data, corn typically rallies in the cash market from the fall low, peaking on average in late June over the last 30 years. The futures curve is generally upward sloping from the fall into the summer, but the actual spot move can be several standard deviations greater than the implied seasonal move calculated from the futures curve during the fall.

"McBeef Cycle"

An additional example can be found in the Boxed Beef market, again based on Moore Research Center data. This market has rallied in 32 of the last 33 years from the fall low to the spring high, peaking on average in late March. The price of Choice Steers has been closely correlated to this typical seasonal rally. Analogous to the previous two examples, the futures contracts for live cattle have historically priced in only a fraction of this move, as of the fall contracts.



Caveats on Seasonal Cycles

The reader should not take our position that the same trade or hedge or procurement decision works every year. But what we have observed is that the senior managers at the top of their respective commodity fields have risen to the top because they have maximized the probability of beating the market and are thus recognized for their above average achievements. To beat the market, one has to take the opposite position of the market and be correct in one's position, even if only for brief timeframes. These relative outperformers know to push their positions and risk in the seasonal periods which have the highest odds of success, long or short, and they understand how to read the calendar as much as the supply and demand or the technical analysis charts.

“McMean Reversion Cycle”

This section will briefly discuss how one can *potentially* combine insights from managing an equally-weighted, daily rebalanced commodity fund with the seasonal lessons garnered from managing physical commodity hedging programs, resulting in a hybrid trading system. That said, we fully understand that one must be cautious about how much one can extrapolate historical results into the future.

In considering the design of a new trading system, we drew from our knowledge that rebalancing asset pairs with high standard deviations and low correlations could provide a “rebalancing bonus.” Our particular data set used the following futures contracts: corn, wheat, soybeans, bean oil, crude oil, natural gas, heating oil, gold, platinum, silver, copper, coffee, sugar, cocoa, cotton, live cattle, lean hogs, and since 2018, bitcoin. As a next step, we modeled the optimization of a rebalancing or mean-reverting trade strategy by examining the change in standard deviations and correlations amongst our study's asset pairs, followed by sorting the asset pairs with the highest standard deviations and low correlations. Utilizing this simple sorting methodology for mean-reversion long-short trades, we found that such a system would have provided respectable gross annual returns from January 2014 through June 2020, but with extreme volatility.

Interestingly, when we used a version of the optimization formula to pick the perfect rebalancing period, including weekly or monthly, we did not find any significant improvement to risk-adjusted returns. But once we integrated the seasonal lessons learned in the physical commodity world, the results notably improved.

Instead of trying to optimize mean-reversion trades in a linear fashion (i.e., rebalance every day, every week, every month, or say every second Friday), we adjusted the formulas to do the opposite of mean reversion in seasonal periods of extreme volatility. Arguably, like McDonald's we were attempting to gain an edge based on typically repeatable calendar events. Adding this fundamental insight to a trading system based on mean reversion produced promising risk-adjusted returns, which aligned with our experiences in the two business ventures that we discussed in this article.



Conclusion

By trading, modeling, and hedging commodities, we learned that commodities are materially impacted by calendar events and seasonality that may not be fully priced into the commodity futures markets until these events approach the maturity of a commodity's futures contract. As a result, the seasoned commodity expert in a specific sector or commodity must consider these events as catalysts for short and intermediate commodity price moves, which allow for an increased probability of mean reversion in certain time periods and an increased probability of counter-seasonal price trends in other periods. In addition, based on our historical research, we believe that these observations are useful in improving upon the design of a systematic futures trading system based on mean reversion.

Endnote

For more information on GreenHaven's perspective on seasonal commodities and mean reversion, please visit: <http://www.greenhavengroup.com/public.html>.

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Mr. Thomas Fernandes is responsible for the strategy and daily operations of the farmland and livestock businesses at GreenHaven. In addition, he serves on the Product Development, Land Acquisition and Hedging Committee and has been an employee since April 2020 at GreenHaven Cattle Company, LLC. Previously Mr. Fernandes co-founded and served as Chief Operating Officer of GreenHaven, LLC, holding that position since October of 2006. From May 2005 to October 2006, Mr. Fernandes worked as a commodity derivatives expert at Grain Service Corporation. Prior to joining Grain Service Corporation, Mr. Fernandes worked as an analyst at West Broadway Partners, an investment partnership from March 2002 to April 2005. From March 2000 to March 2002, Mr. Fernandes was employed as a trader at Fleet Bank of Boston and from 1996 to 2000 he



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In addition to serving as the Vice President of Trading and Futures Operations for GreenHaven Group, LLC, Mr. Glasing also serves as the Head Trader for GreenHaven Advisors LLC, the trading advisor of a public commodity ETF and is a developer of commodity trading algorithms. His responsibilities include daily portfolio management, cash flow management, treasury portfolio management, and quantitative analysis of commodities. Additional responsibilities include his membership on the Product Development Committee as well as carrying out futures and financial product research. Mr. Glasing also serves as the Director of Operations for Grain Service Corporation where he helps clients with their hedge accounts. He has over 34 years of futures industry experience, holds a Series 3 license and was first registered with the National Futures Association in 1988. Previously, Mr. Glasing worked with both speculative and hedging clients at several Chicago firms. He studied finance and economics at the University of Illinois at Chicago.

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Mr. Doug Wilson started as a commodity broker in the meat trade in 1992. He traded his own commodity account as member of the Chicago Mercantile Exchange from 1992 to 2004. In 1994 he founded and was head trader for a commodity fund until 1996 when he decided to focus on trading his own capital. Since 2004, Mr. Wilson has invested in the electronic trading of meat and grain commodity futures as well as various farmland development projects. Mr. Wilson studied Administration in Higher Education at Southern Illinois University.

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Mr. Pringle serves as President of GreenHaven Group, LLC. He is responsible for the overall firm strategy and serves on the Product Development Committee. Mr. Pringle co-founded GreenHaven, LLC and has served as its President since October 2006. In 1984 Mr. Pringle founded Grain Service Corporation, a commodity research and trading company where he still serves as President. He has conducted hundreds of seminars on hedging, risk management, and basis trading in energy and agriculture, and is a recognized expert in commodity risk management. He has been quoted in the *Wall Street Journal* and appeared on CNBC. Mr. Pringle holds a B.S. in Mechanical Engineering from Duke University and an M.B.A. from Harvard Business School. In addition, he co-authored a chapter with Thomas Fernandes in *Intelligent Commodity Investing* (Risk Books, 2007).

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Mr. David Cary has been an executive in the departments of pork procurement and risk management solutions for over 35 years within global corporations such as Cargill and Seaboard Triumph Foods. Mr. Cary has developed relationships with the decision makers at the large protein companies as well as having daily direct relationships with pork producers in Nebraska, Minnesota, Iowa, Indiana, Illinois, Ohio, and North Carolina. Since 2018, Mr. Cary has been working as a commodity risk management advisor for swine and grain producers at C&C Ag Consulting, a company that he founded.

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