



How to (Potentially) Weather the Storm in Risk Premia Strategies in the Commodity Markets

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A 2018 *Financial Times* article described how commodity risk premia strategies had caused a “boom in trading volumes on exchanges” with estimates of \$60 to \$80 billion eventually going into these types of strategies (Meyer, 2018). With “risk premia strategies[,] investors systematically place bets based on so-called factors such as momentum, volatility and the pattern of prices for future delivery,” explained Meyer (2018).

In this article, we describe risk premia strategies more broadly and note how commodity risk premia strategies are an extension of ideas that originated in the equity markets. We then cover various techniques which attempt to minimize the inevitable losses that can arise from such strategies. Lastly, we conclude with several hypotheses on why commodity risk premia strategies have historically earned high average returns; we do so by identifying the risk exposures that investors are taking on and for which they need to be compensated.



Introduction to Risk Premia Strategies and Factor Investing

In risk premia strategies, an investor or speculator takes on an exposure that other market participants would prefer to lay off and from which an investor earns a return not conditioned on manager skill. These strategies involve the risk of loss and/or underperformance. The underlying idea is that some investors can achieve extra returns by in effect selling insurance to other investors (Cochrane, 1999). One does not classify these strategies as being due to market inefficiencies.

Risk premia strategies can also be referred to as factor investing. As noted by Hixon *et al.* (2018), this type of investing “has become mainstream, but most approaches still focus on equities.” Further, “these strategies are all derived from the same idea: go long (or overweight) assets with high values in a particular metric and short (or underweight) assets with low values in the same metric,” explain Hixon *et al.* (2018). Researchers also attempt to identify what particular risk is being taken on which allows structural returns for these strategies. So for example, an investor who systematically buys stocks based on value considerations and sells stocks based on growth considerations would be taking on business cycle risk that most investors would desire to avoid since their jobs would also be at risk then (Cochrane, 1999).

There is now a burgeoning body of academic and practitioner research on applying factor investing to commodities, along with attempting to identify the specific risk factor that may give rise to a strategy’s backtested returns.

We will now consider how to weather the storm during the inevitable losses that occur in commodity risk premia strategies.

Fundamental Analysis

A modicum of fundamental knowledge on commodity markets is advisable when employing commodity risk premia strategies. In all commodity markets, the key fundamental variable is the storage or inventory situation. The existence of storage can act as a dampener on price volatility since it provides an additional lever with which to balance supply and demand. If there is too much of a commodity relative to demand, it can be stored. In that case, one does not need to rely solely on the adjustment of price to encourage the placement of the commodity. If too little of a commodity is produced, one can draw on storage; price does not need to ration demand.

But when inventories for a commodity become quite tight, the price can become “non-linear” since in the absence of adequate inventories only price can balance supply and demand. After all, one cannot draw from inventories that do not exist. In treatments of the economics of price volatility, one typically sees that at low levels of inventories, a commodity’s price can become exponentially large at ever lower levels of inventory.

Arguably, incorporating fundamental knowledge of the commodity markets can help in mitigating potential losses in commodity risk premia strategies. [Till \(2019b\)](#) advocated this position in noting that



an examination of the prevailing natural gas inventory situation could have helped OptionSellers.com avoid its catastrophic blow-up in November 2018.

In crude oil, a further fundamental variable besides above-ground inventory is the level of excess spare capacity. Spare capacity is the volume of production that can be brought on within 30 days and sustained for at least 90 days. OPEC spare capacity has historically provided an indicator of the world oil market's ability to respond to potential crises that reduce oil supplies.

There are times when OPEC spare capacity is the most important factor for driving oil prices. When above-ground inventory levels are sufficient, the cushion provided by OPEC spare capacity does not become material. But at sufficiently low levels of inventory, an examination of data over the last 20 years shows that the amount of OPEC spare capacity becomes crucial ([Till, 2016](#)). In the absence of being able to draw on inventories *or* exploit surplus capacity, price is the only lever that can balance supply-and-demand in such a scenario.

With both natural gas and corn, being aware of the timing of potential adverse weather events is also crucial, as noted in [Till \(2019a\)](#). Natural gas positions can be strongly impacted by potential heat waves, hurricanes, and cold shocks, especially if the cold shocks occur during the end of winter when inventories are drawn down. The advantage of being a commodity trader, unlike a commercial market participant, is that one does not have to always have a position on. One can decide which pitches to swing at. For certain structural trades in the natural gas markets, one can choose to not include these trades during times of potentially extreme weather.

The advantage of trading corn over natural gas is that one has a much longer dataset with corn over which to run risk-management studies as compared to natural gas, which only started trading in 1990. July is a key time during corn's growing season that determines corn yields. Adverse weather then can have a large impact on corn prices. But over many decades of trading, one can see what the potential impact is and what trade constructions are robust to weather-related price spikes.

In summary, a grasp of key commodity market fundamentals should be included in the design of commodity risk premia strategies in order to mitigate potential losses.

Active Management of Risk Premia Strategies

There are a number of other decisions to incorporate in the design of commodity risk premia strategies. One must decide how much to leverage the strategy, how many reserves to set aside in the event of a catastrophic event, and whether to give up any returns by hedging out some of the strategy's extreme risks. These decisions all impact the ability of an investor to withstand a potential storm in returns in commodity risk premia strategies.



Tactical Allocation Based on Risk-Cheapness Metrics

As is done in tactical asset allocation, one can also use statistical rich-cheapness analyses in deciding which commodities to incorporate in a risk premia strategy.

In an International Monetary Fund working paper, Nozaki (2010) advised such an approach in order to avoid crash risk when carrying out a currency carry strategy. In a currency carry strategy, an investor takes “a short position in a currency with a low interest rate and a long position in a currency with a high interest rate,” as explained by Nozaki (2010). The IMF researcher created a *fundamental valuation metric* for foreign currencies (relative to the U.S. dollar) based on (1) each country’s “commodity-based terms of trade” and (2) each country’s “relative GDP per capita relative to its trading partners.” The author advocated a trading strategy of investing in the carry strategy unless the undervaluation or overvaluation of a foreign currency was beyond a threshold level. At that point, one would toggle into owning a currency based on the fundamental metric. Nozaki (2010) found that this strategy offered “some insurance against crash risk without sacrificing a high risk-adjusted average return achieved by the carry ... strategy.”

How might this idea apply to a commodity strategy?

In commodities, inventories matter and with crude oil, spare capacity matters. Specifically with crude oil, when spare capacity has been quite low, the market can be at risk to oil prices spiking higher, creating demand destruction, followed by the price of oil subsequently crashing. By toggling out of crude oil during pinch-point levels in spare capacity, the distribution of crude oil returns has historically been positively skewed rather than negatively skewed (Till, 2015).

Long-Only Programs: Diversification with Financial Assets

For an investor who is solely in long-only commodity strategies, that investor is taking on the risk of debt-deflationary spirals. And if the commodity strategy is heavily weighted to crude oil, then the investor is also at risk to the possibility of oil-market price-share wars. In both of these scenarios, only financial assets can diversify and dampen these risks.

In examining data since 1876, HSBC found that “[t]umblin’ oil prices ... [have been] a bonanza for global stock markets, provided the chief cause has been a surge in crude supply rather than a collapse in economic demand,” wrote Evans-Pritchard (2014). But if oil prices are undergoing a dramatic decline because of “the forces of global recession,” this can overwhelm “the stimulus or ‘tax cut’ effect for consumers and non-oil companies of lower energy costs,” summarized Evans-Pritchard (2014). Under that scenario, a Treasury hedge has been the most effective hedge for petroleum complex holdings.

Long-Short Strategies Can Potentially Hedge Out the Commodity Beta

Where long-short strategies are permissible, one can hedge out the commodity beta and therefore not need to diversify with financial assets. And one can potentially further limit drawdowns by diversifying across commodity factors that are implemented as long/short strategies.



Fernandez-Perez *et al.* (2017) discuss harvesting commodity styles by equally weighting them in a portfolio. The chosen styles had previously been found to be associated with high average returns when one formed portfolios based on high and low values of each style's metric. The authors' commodity styles included roll-yield, hedgers' net short positions, speculators' net long positions, momentum, value, and skewness, amongst others.

Their study was from 1992 to 2016. The annualized excess returns were about 8% with a drawdown of -17%. This drawdown figure is strikingly low, showing the potential of diversifying across commodity styles.

Tolerance for Fluctuations in Returns

In weathering the storm in commodity strategies, an investor may find it a challenge to be able to tolerate fluctuations in returns. Taleb (2001) explained why it is such a challenge for traders and investors to follow a disciplined investment process. He provides an example of a return-generating process that has annual returns in excess of T-bills of 15% with an annualized volatility of 10%. At first glance, one would think it should be trivial to stay with a strategy with such superior risk and return characteristics.

But Taleb (2001) also notes that with such a return-generating process, there would only be a 54% chance of making money on any given day. If the investor felt the pain of loss say 2.5 times more acutely than the joy of a gain, then it could be potentially exhausting to carry out this superior investment strategy.

Behavioral Challenges for Quantitative Funds

Risk premia strategies are betas (specifically, alternative betas and definitely not alphas.) In practice, the standalone strategies have experienced at best mid -20% drawdowns.

According to Wiggins (2019), "owning quant funds is not easy," which apparently was particularly the case in 2018. The author noted that there are specific behavioral challenges in holding a quant strategy, particularly when performance is poor. For example, one can never have complete certainty "why a particular factor has delivered a premium ... [and one] can never be sure as to whether it will continue to work. ... [V]alid factors can struggle for long spells and it is difficult ... to decipher whether these are the result of a structural shift extinguishing the factor premium or a 'temporary' phenomenon."

In addition, "[e]ven a strategy with a high Sharpe ratio [that invests] ... in proven factors is prone to experience drawdowns that can be multiples of long-term expected volatility," explained Wiggins (2019). The author therefore recommended that "investors ... need to be aware of the distinct behavioral challenges that arise from owning systematic strategies and be prepared to manage them if they are to successfully invest in such strategies."



Economic Rationale for Returns

Given the behavioral challenges that arise from investing in quantitative strategies, investors need to be reasonably secure that a strategy has an economic rationale and therefore is not just an artifact of a lot of backtesting. The more confidence that an investor has that a factor is economically grounded, the more likely that investor should be able to stay with that investment during adverse times.

Some of the commodity factors that have been found to have high average returns and have a plausible economic story include momentum, basis or carry, negative skewness, and basis-momentum (Sakkas and Tessaromatis, 2018).

Momentum

Over many decades, momentum has worked across asset classes, including commodities. Hurst *et al.* (2012) noted that momentum's long-term profitability may be due to "long-standing behavioral biases exhibited by investors, such as anchoring and herding, as well as due to the trading activity of non-profit seeking participants such as central banks and corporate hedging programs."

Carry

With the basis or carry factor, one invests in portfolios of commodities based on the commodity futures curve shape. Gorton *et al.* (2013) showed that when the front-month price of a futures contract is at a premium to the deferred contract (which is known as backwardation), this is correlated to when the commodity has relatively low inventories. When the front-month price is at a discount to the deferred contract (which is known as contango), this is correlated to when the commodity has relatively high inventories. In the commodity carry strategy, one overweights backwardated commodity futures contracts and underweights commodity futures contracts that are in contango. According to Bakshi *et al.* (2019), this factor delivers low returns in periods when global equity volatility increases.

Negative Skewness

Regarding another commodity factor, portfolios sorted on overweighting negatively (or lowly skewed) commodities and underweighting positively (or more highly) skewed commodities have also done well, indicating that one should include skewness as an alternative risk factor, as shown by Fernandez-Perez *et al.* (2015). One possible explanation for this effect is that there is a preference for "lottery-like payoffs" (which depresses the returns of positively skewed commodities relative to commodities that have the opposite feature.)

Basis-Momentum

Recently Boons and Prado (2019) proposed a "basis-momentum" factor. Basis-momentum is measured as the difference between momentum in first- and second-nearby futures contracts. The authors found that returns to portfolios sorted on high values of this factor increased with aggregate commodity volatility. The authors inferred that times of heightened volatility would be when the market-clearing



ability of speculators would become impaired and so speculators would have to at least partly resort to spread positions to manage risk taken on from commercial hedgers. During these times, speculators would have to be well-compensated to take on spread positions with the compensation needing to be even greater for taking on riskier outright positions.

The Drawdowns

A key reason for bringing up the explanations for why various commodity strategies may be earning risk premia is that when these strategies have drawdowns in the order of -20% to -30%, it may be easier for investors to remain with these strategies if they understand their return rationale along with the risks that they are assuming.

Conclusion

Meyer (2018) noted that inflows into commodity risk premia strategies have been even greater than those into commodity hedge funds. It remains to be seen how various newly discovered commodity risk factors will perform once documented, understood, and invested in. One advantage for commodity futures traders and researchers alike is that one can monitor the relative participation of commercials versus non-commercials through the U.S. Commodity Futures Trading Commission's (CFTC's) Commitments of Traders Reports. Why would these CFTC reports be useful? One can potentially use these reports to detect whether an imbalance of speculative capital emerges relative to commercial hedging needs, which could thereby have a dampening impact on returns of commodity risk premia strategies over time.

Endnotes

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