

Commodity Alpha Strategies

By

Alex Gioulekas¹ and Russ Newton²

Why Commodity Alpha?

Investors are drawn to commodities because historically commodity futures have offered a risk premium similar to that of equities, and have been a great source of portfolio diversification both in normal and in bad times.

However, history also shows that returns from investing passively in commodities over short to medium time frames are unreliable, and occasionally expose the investor to substantial drawdowns as shown in Figure 1.

Furthermore, some investors are unwilling to initiate passive investment in commodities at the present time, because the rapid increase in passive commodity investment over the past decade has contributed to large price increases, especially in industrial metals and hydrocarbons.

How does one reconcile the wish to reap the benefits offered by this asset class, while improving risk-adjusted returns?

To those already invested passively in commodities, we would recommend protection via a commodity alpha overlay. The overlay offers the overall portfolio large incremental returns with small incremental volatility. Furthermore, it protects against drawdowns. As it is uncorrelated to the passive portfolio, it provides profit in some of the instances when the core portfolio suffers losses.

To those seeking to diversify their active portfolio as well as those unwilling to invest passively in the commodity space at the present juncture, we would advocate adopting alpha commodity strategies. Below we explain why commodity alpha is a winning proposition and outline our approach to generating alpha.

Trailing 3-year GSCI Total Return



¹ Head of Research and Trading, IPM Informed Portfolio Management

² Principal Partner, Risk Management and Research, Global Advisors

The Opportunity

Why do commodities offer opportunities to the speculator (investor?) who uses a systematic approach to generate alpha?

The model-builder benefits from a wealth of information related to price expectations, which is contained in forward curves extending far into the future, and in a mature options market.

Commodity markets are underpinned by real assets and therefore respond to fundamental supply/demand changes. Financial assets respond in a different fashion to economic changes and tend to lead the economic cycle and commodities. This shows that experience gained in other markets cannot be readily transferred to commodities: commodities require commodity expertise.

It is important to recognise the feedback mechanism between prices and changes in supply and demand. For example, term structure tends to be self-perpetuating. In backwardation, forward prices are cheaper than spot prices; consequently producers do not invest in increasing long-term supply capacity and consumers buy only what they need and do not store because there is no financial incentive to do so.

The correlations between individual commodities are low³ and this benefits the performance of any skilled alpha generator. To see why, consider first a market where prices move in unison. In this situation a model is likely to put on similar trades in different instruments. If the model is correct, the profit is high; but conversely if the model is incorrect, the loss is substantial. The speculator prefers that markets head in different directions. Then his bets are not all in the same direction and his skill should provide a more consistent percentage of winning trades, creating reliable profits.

Commodities exhibit cyclical behaviour. The underlying cause may be seasonal or the fact that producers use current prices in production decisions. In the first case the period of the cycle is one calendar year, in the second case the period can be several years. Models developed in the last half of the twentieth century to explain phenomena such as the 'hog-cycle', and have led to big advances in the theory of dynamic systems⁴.

Inefficiencies in commodities over the past decade have increased because commodities gradually are acquiring a double personality: in addition to being real assets they are also becoming financial assets. This fact has changed the type of agents that determine prices and consequently has affected price behaviour. We think it is important for a model to be able to identify the influence of trend followers in price formation. Several of our strategies use a variety of tools to do just that.

³ See Erb and Harvey (2006) and Gorton and Rouwenhorst (2006).

⁴ See for example Luenberger, 1979.

Our Way of Generating Alpha

To exploit the opportunities for alpha in the commodity space, we have jointly developed a multi-strategy programme that models and trades 35 commodity futures and spread markets. We trade spreads between different commodities as well as calendar spreads in a given commodity. We have eight strategies at our disposal, several of which target a distinct market inefficiency. Each strategy uses information from a specific source: price data, term structure, the options market, and the fundamentals. As a result, the correlations between strategies are low. Added programme breadth derives from the fact that some of the strategies are based on technical and some on fundamental analysis.

Each strategy is applied consistently to all the candidate commodities. Most strategies have been back tested for at least twenty years. When researching new strategies we cross-validate results by hiding away some of the available commodities during the research stage and introducing them again in out-of-sample testing. We withhold four years of data (two at the beginning and two at the end of every time series) during model development and then use this data in out-of-sample testing. We then paper-trade the strategy for some time before introducing it to the live portfolio.

The strategies have been developed by a broad team of individuals with different backgrounds and training, reducing conceptual biases and hopefully providing better model diversity.

To make sure that the profit we deliver is pure alpha, all of our strategies are long-short and many of them are delta neutral (in the sense that they have low net exposure to commodities in aggregate). We found that the latter feature helps to keep the overall strategy beta close to zero. Furthermore it makes the strategy much less sensitive to the influence of other factors, i.e. helps the strategy focus on the targeted inefficiency.

We have put emphasis on using unique strategies. In speculation there is no safety in numbers. When speculators put on similar bets and the market turns against them, they all head for the same exit. The result is the boom-bust performance signature that has become prevalent as of late. The IPM - Global Advisors Commodity Programme has very low correlation to the hedge fund universe and has benign drawdowns. Because of its low negative tail dependence to leading hedge fund strategies as well as to indices of hedge fund strategies⁵, the programme is a good diversifier in the context of fund-of-funds portfolios.

The following graph shows the correlation between monthly returns net of fees for Global Commodity Systematic and the Goldman Sachs Commodity Index since July 2005, when the programme started trading live. It demonstrates that GCS has yielded approximately 1.33% per month of pure alpha at a target volatility 10%, with just 26% beta to GSCI.

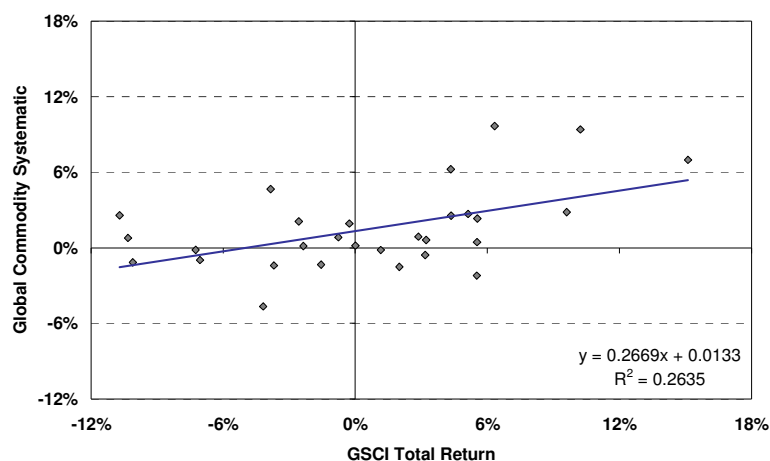


Figure 2. Monthly returns of Global Commodity Systematic (net of fees, target volatility 10%) versus the Goldman Sachs Commodity Index.

⁵ Results available upon request.

Technical Strategies

1. The agent-based strategy

Prices are determined by the actions of different traders (agents) that follow different trading approaches: some of them follow trends, some use breakout models, some believe in mean reversion, some use fundamental data to support their decisions and so forth. This technical strategy models the behaviour of many different agents, aggregates their actions, anticipates what their next moves may be, and places bets that will profit from these expected future moves.

2. The breakout strategy

In this strategy, we take the stance that break-out moves are often initially very difficult for human traders to adopt - and yet, in our experience in commodities, "doing the difficult thing" has more often than not proved to be correct. This may be because commodity markets typically exhibit quite high degrees of kurtosis - so called 'fat tails'. It could also be that the sort of self-perpetuating circumstances mentioned earlier will serve to reinforce short- or medium-term price trends (i.e., those that are shorter than the time taken for the long-term supply curve to shift).

3. The signal filtering strategy

This strategy uses statistical signal processing techniques to identify the signal within noisy time-series of prices and takes positions in only those markets that it considers to have high risk/reward characteristics.

The key point is that signal processing algorithms are used to allow the model to adapt to changing conditions in each commodity market traded. However, we firmly believe that commodities as an asset class differ in very material ways from other investable assets: for example, liquidity in commodities is generally lower than in mainstream financial assets. Recent total trading volume in NYMEX WTI, one of the most liquid commodity futures contracts, has averaged around 550 million barrels per day, with a total value of approximately \$50 billion. That is dwarfed by turnover in equity, bond or foreign exchange markets. Supply/demand fundamentals in the underlying physical markets create markets that are different from financial assets. As a result, we believe that technical models built for financial markets may not enjoy the same degree of success when applied to commodities.

Fundamental Strategies

4. The volatility strategy

Option prices reflect the market's fears and expectations about the future path of prices. Our volatility strategy uses information from the option market to decipher whether the market is driven by liquidity or by new information. Having identified the market regime, this strategy proceeds to exploit it.

5. The roll yield strategy

There is evidence in academic literature⁶ that even a naïve roll yield strategy is profitable. To render our roll yield strategy robust, we quantify the risk associated with capturing the roll return, rank the opportunities, and then construct the portfolio.

6. The term dynamics strategy

In developing our term dynamics strategy we studied how the term structure responds to changes in its boundary conditions. The front end is driven by near-term demand changes and event-driven supply shocks, whereas the back end is driven by the marginal cost of production and changes slowly. When substantial price moves unfold, the term structure of commodities changes in a consistent fashion. The term dynamics strategy identifies high probability moves by tracking certain changes in the term structure.

7. The fundamental strategy

Our fundamental strategy forecasts the impact on prices of changes in supply and demand in the short and the long run. On the supply side, it focuses on changes in the production capacity of the major producers. On the demand side, it focuses on the industries that use these commodities and applies proprietary leading indicators to forecast how activity will change in these industries. We try to replicate the thought process of an analyst issuing forecasts.

8. The seasonality strategy

Our seasonality strategy captures the risk premium embedded in certain maturities, for example when the commodity is in short supply. We have developed a systematic process for identifying these maturities. The strategy trades time spreads that differ from commodity to commodity and vary during the year. This strategy applied to a single commodity does not turn the seasonal risk premium into profit year in and year out (note that the seasonality component in the price is not statistically significant), but when the strategy is applied to a number of commodities, it results in a stable return stream.

To maintain our competitive edge, we are continuously working on developing new strategies. We are currently researching three strategies of fundamental nature.

Our gamma balance strategy uses the open interest per strike of listed options to identify the levels that will attract prices and the levels that will repel prices. This price behaviour stems from the actions of option traders.

We are working on developing a macro strategy based on the observation that commodities lag bonds and equities. We have described a simple version of such a strategy in an earlier article in this magazine⁷. This type of strategy is particularly useful in the context of a Global Tactical Asset Allocation programme, as it can be configured to trade commodities versus stocks and bonds.

Finally we are working on a type of a cobweb model⁸, that helps us determine whether the perturbation in supply and demand conditions will cause the price to return to equilibrium, or whether it would destabilise it.

⁶ Erb and Harvey, 2006

⁷ Gioulekas and Newton, 2007.

⁸ For an introduction to this type of dynamic models, see Luenberger 1979.

Risk Design and Control

The main objective is to limit drawdowns and to use the risk budget effectively. In order to limit drawdowns,

- we define a stop loss level whenever we enter a new trade and
- we divide the commodities into six sectors (precious metals, base metals, energy, grains, meats, softs / tropicals) and limit the net sector exposure. Because returns of commodities belonging to the same sector are closely correlated, we want to avoid taking too many bets in the same direction within a sector.

An investor allocating risk to a commodity programme, as opposed to capital, wishes that at all times the realised volatility of the returns does not deviate significantly from the target. The risk of a strategy with zero delta normally varies less than the risk of a strategy that has a net delta. Many of the strategies in our programme have low delta and this makes the realised volatility of the programme quite stable.

We weigh the strategies within the programme equally. This reflects the fact that the strategies have similar information ratios and low correlation with each other.

To determine the bet size in different commodities by a given strategy, the programme uses one of two different approaches.

In the first approach we divide the risk equally amongst the commodities traded by the strategy. The definition of risk in this case is the Value at Risk or VaR (at the desired percentile) realised in a rolling window. The bet size is inversely proportional to the historical VaR generated by the commodity strategy in question. Thus the sizing of bets responds to the tail risk in each market.

In the second approach we take equal dollar bets in every commodity traded by the strategy. The size of this bet is determined by simulation, so that the risk taken by the strategy is equal to the desired risk.

The first approach has the advantage of dividing the risk equally to strategies and commodities. But it has one weakness: when market volatility subsides, the strategy takes ever increasing debts. Periods of decaying volatility are always followed by abrupt volatility increases, and the portfolio is caught holding large bets in a highly volatile environment.

The second approach uses the dollar value of the bet as a simplistic measure of risk. This approach may not divide the risk equally, but in the long run benefits the portfolio: for example, if the price of copper doubles, the size of the bet is halved. This protects the portfolio in the event that this increase is a bubble that will burst.

Conclusions

We firmly believe that commodities present excellent opportunities to generate alpha since they offer a diverse set of inefficiencies and a broad and uncorrelated set of assets. They require special market expertise, since they are a different animal when compared to other assets. But they reward the investor, as is the case with our multi-strategy programme, with high quality risk-adjusted returns and low negative tail dependence to other passive and active strategies.

References

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