

Commodities: what's changed?

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Preface

Investors have many options for gaining exposure to commodities, and may invest in the asset class for a variety of reasons. This research piece is tailored specifically to those who invest in futures-based commodities strategies with the goal of protecting the portfolio from inflation risk. We believe actively managed commodity futures strategies can add value, but for simplicity we focus here on characteristics of benchmark/passive exposure. Additional color on the inflation hedging properties of commodity futures can be found in our July 2015 Topic of Interest research paper, titled *Commodities in a Low Inflation Environment*. This research piece details the inflation-protecting qualities of commodities and the important role they play in portfolios. (www.verusinvestments.com/commodities-in-a-low-inflation-environment/)

Introduction

Futures-based commodity strategies have recently performed poorly, delivering a negative total return over the past 10 years. In this research piece, we take an objective look at futures-based commodity strategies in the current environment and focus on three key questions. First, what has been the cause of such poor performance? Second, might this performance be the result of a permanent change in the commodity markets (i.e., is something broken)? Third, why do we invest in commodities and what are the tradeoffs involved? In conclusion, a better understanding of commodity returns allows

us to see that recent poor performance is perhaps not surprising, given the market environment. Evidence does not suggest that the commodity markets have structurally changed. Investors should keep in mind the benefits commodities provide to the portfolio, and evaluate their exposure accordingly. Furthermore, the shifting market environment may warrant a more positive outlook for futures-based commodity returns over the intermediate term future.

Understanding the last 10 years

The past 10 years have been unfortunate for commodities, covering two significant crises – the global financial crisis of 2008-2009 and the oil crisis of 2014. Commodity prices fell by as much as 50% year-over-year in February of 2009 (S&P GSCI) along with equities and other risk assets. Five years later, commodities plunged again - most notably oil, which fell from \$110 per barrel to a low of less than \$30 per barrel. The more recent crash may be associated with the tail end of the commodities supercycle, as increased commodity productive capacity, creating increased supply, contributed to sharp price declines which then coincided with a slowing of China’s infrastructure investment and growth trends. U.S. dollar strength has also been a contributing factor to price weakness, as commodity prices tend to correlate negatively with U.S. dollar movement.

EXHIBIT A – 1 YR PERFORMANCE



EXHIBIT B – 10 YR PERFORMANCE



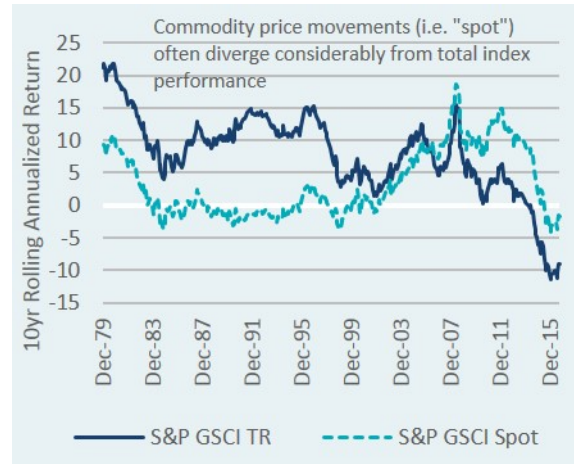
Source: Standard & Poor’s, Bloomberg, as of 10/31/16

The past 10 years of performance clearly shows that movement of commodity prices does not represent the returns which investors receive when invested in commodity futures-based strategies.

EXHIBIT C – 1 YR PERFORMANCE

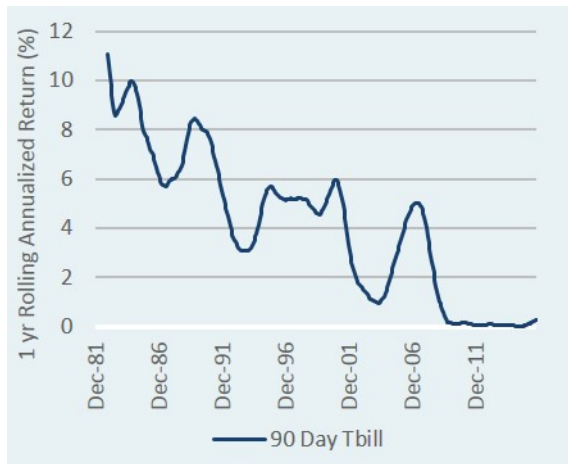


EXHIBIT D – 10 YR PERFORMANCE



Discrepancies occur because commodity exposure is gained through collateralized exposure to futures contracts. Interest paid on collateral varies based on the level of U.S. interest rates, and interest rates have fallen considerably. Also, the shape of individual commodity future curves determines roll return, which can be negative or positive. Roll return is the gain or loss created due to the price difference between shorter-term futures contracts and longer-term futures contracts. Selling and buying futures contracts is necessary to maintain continuous exposure to commodities, since individual futures contracts eventually expire. Negative roll return occurs when the futures curve is upsloping, which means the price of longer-term futures contracts are higher than the price of shorter-term futures contracts (investors are *paying* a premium). Positive roll return occurs when the futures curve is downsloping, meaning the futures price is lower than the current price (investors are *receiving* a premium). As shown in Exhibit F, roll return is a significant driver of performance and can contribute +/- 20% to annual experienced returns, or perhaps much more in extreme times such as in 2008-2009.

EXHIBIT E – COLLATERAL RETURN (CASH)



Source: MPI, as of 11/30/16

EXHIBIT F – ROLL RETURN



Source: Standard & Poor's, as of 10/31/16 – 1yr rolling return of S&P GSCI Excess Return minus S&P GSCI Spot

Roll returns tend to be the largest single component of the return from futures-based commodities as an asset class, and of individual commodity future markets through time.

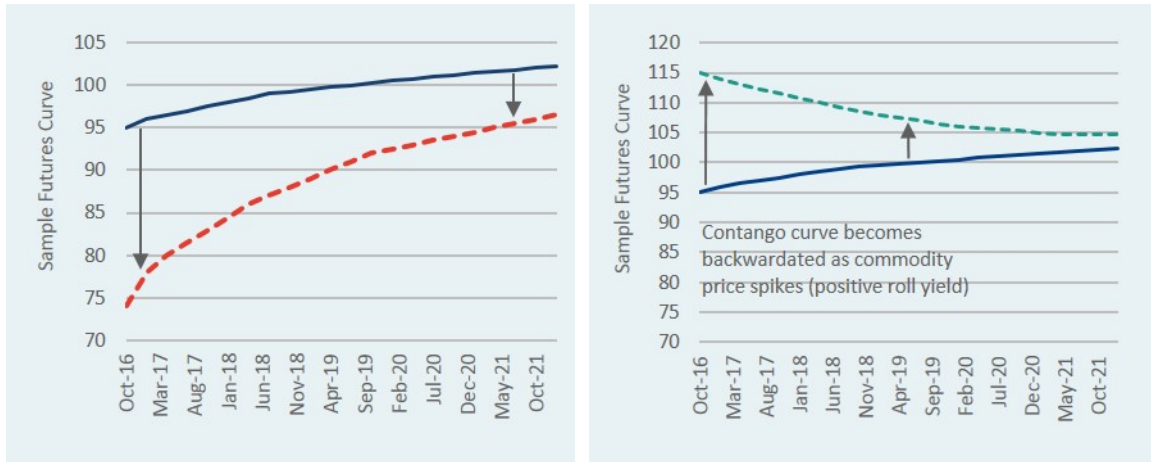
EXHIBIT G – ROLL RETURN & EXCESS RETURN



Source: Invesco analysis, Bloomberg, excess return relative to cash - 9/30/90 to 12/31/15

Furthermore, it is important to understand that commodity price movements and futures curve shape are interconnected. Commodity price shocks tend to have a large impact on the front end of the futures curve, which means big downward/upward moves in commodity prices can cause extended periods of negative/positive roll returns (bad times can be really bad, and good times can be really good). This effect helps to explain why commodities have delivered negative returns over the recent 10-year period, as investors were double hit by two commodity crises and by the ensuing negative roll returns.

EXHIBIT H – POSSIBLE COMMODITY CURVE ENVIRONMENTS



Source: Verus, for illustrative purposes only – spot price increases/decreases can also be associated with a steepening/flattening curve

EXHIBIT I – RELATIONSHIP BETWEEN PRICE MOVEMENT & ROLL RETURN



Source: Standard & Poor's, as of 10/31/16

Understanding these effects suggests that recent commodity performance may not be surprising.

Is something broken in the commodity markets?

When an asset class produces very positive or very negative performance for an extended period of time, there are strong behavioral biases that make us expect the trend to continue, and we tend to justify those biases to ourselves based on stories. Some believe that the story behind recent poor commodity performance is that this market has been negatively affected by the “institutionalization” of commodities as an asset class leading to an imbalance across market participants, and that investors might now expect:

- Contango markets: negative roll returns and therefore continuing performance drag
- Less attractive *broad* diversification benefits: higher correlation between commodities and traditional asset classes
- Less attractive *cross* diversification benefits: higher correlation between individual commodities which may result in deterioration of overall risk-adjusted performance

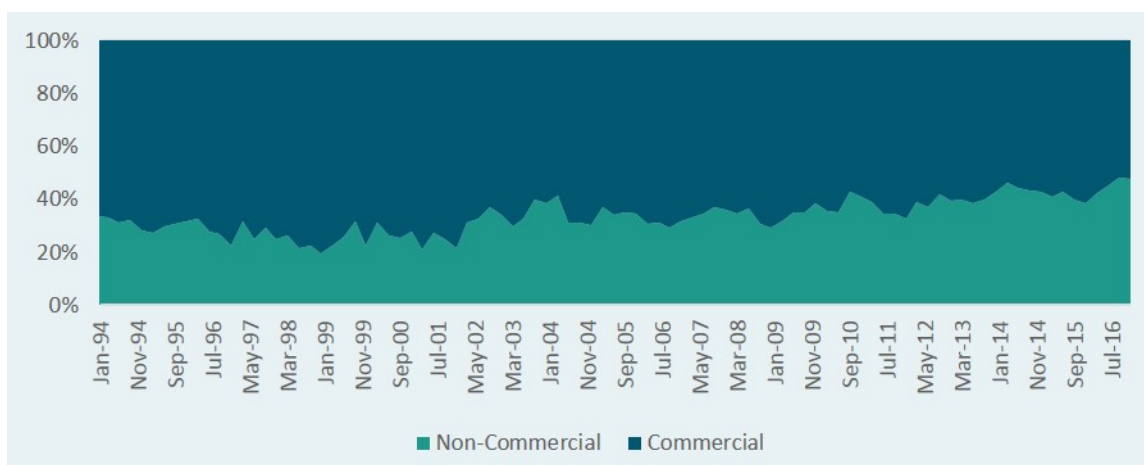
If true, it seems these effects should be identifiable in market data.

CONTANGO MARKETS THEORY

Two types of participant trade in the commodity markets: those that trade for business reasons to hedge risks (commercial users) and those that trade for investment (non-commercial users). The former are referred to as “hedgers” and the latter as “investors”. In theory, hedgers should be willing to contract to sell their commodities at a future date for some slight discount in order to protect themselves against adverse price movement¹. Investors should be willing to take the other side of these trades as long as futures contract prices provide compensation for the risk that commodity prices move against them. The contango markets theory states that as more investors have entered the market, this has created a supply/demand imbalance, reducing how much investors are being paid to take the other side of futures contracts.

Commodity market participants report the nature of their trading with the U.S. Commodity Futures Trading Commission (CFTC), which means market participant composition can be measured through time. Examining the balance of non-commercial (investor) and commercial (hedger) market participants in Exhibit J below suggests perhaps a mild increase in investor activity over recent decades.

EXHIBIT J - MARKET PARTICIPANT BALANCE



Source: CFTC, Bloomberg, as of 12/27/16

Non-commercial long contracts percentage of all non-commercial and commercial long contracts for 18 actively traded commodities markets. Summary above takes the simple average of the percentage balance of these 18 markets each quarter since 1994.

On a basic level, the contango markets theory attempts to explain why commodity markets have switched to contango. But this seems to imply that negative roll return is abnormal, and that it requires explaining. *Negative roll return is not abnormal*. While recent negative roll may be unusual according to the short track records of modern-day commodity indices, over the long-term we know that extended periods of negative roll return have often persisted. In fact, research suggests that roll return may have delivered near-zero cumulative performance over the past 130+ years, which means negative and positive roll returns balanced out. Therefore, negative roll return of the past 10 years is not in itself evidence of a broken market.

EXHIBIT K – CUMULATIVE COMMODITIES RETURN DRIVERS (VERY LONG-TERM)



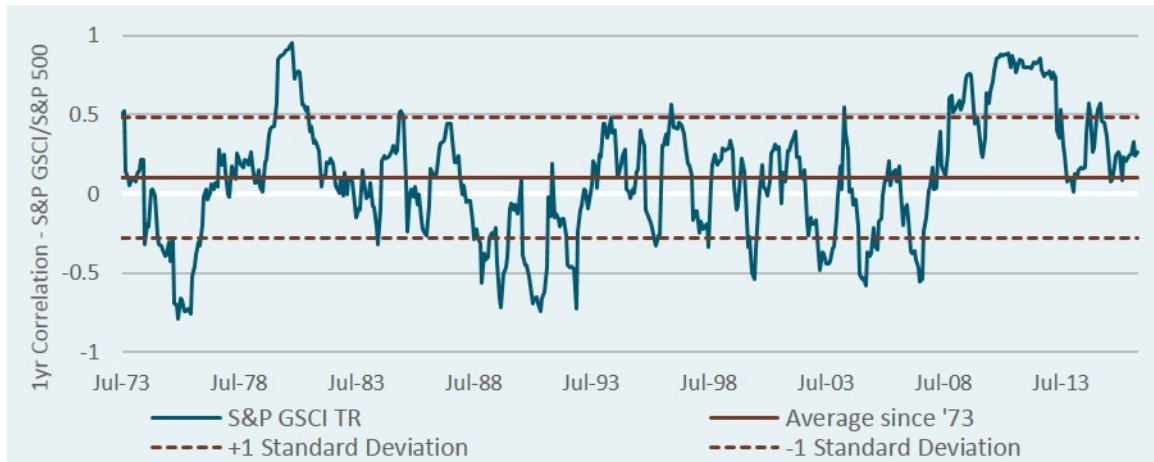
Source: AQR, as of 12/31/15

HIGHER CORRELATION THEORY

If a market is truly being “institutionalized” then we would expect this market to noticeably ebb and flow more closely with the broader markets. Additionally, since investors will likely be moving money into and out of strategies rather than into and out of *individual commodity futures*, we would expect individual commodity futures to have become more highly correlated with one another. We take a look at both of these effects – the correlation of commodities with *broader* markets and the correlation between *individual* commodities.

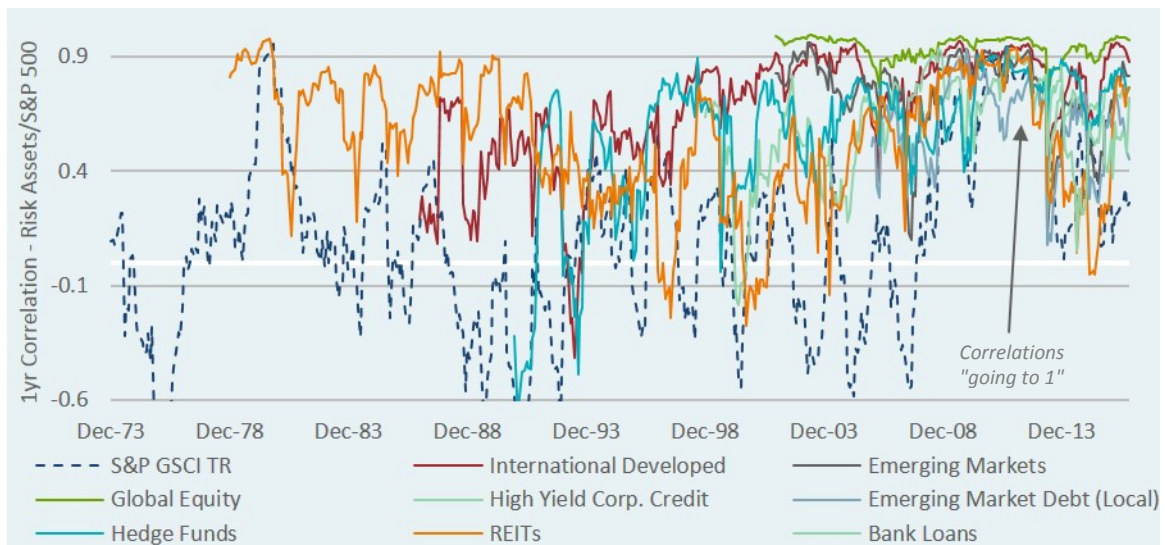
With regard to the correlation of commodities with broader markets, we chose the S&P 500 as a proxy, since an asset’s correlation to equities is typically a primary concern for investors. As shown in Exhibit L, commodities have exhibited a correlation to equities of around 0.1, on average. This means that commodity exposure has acted as a significant diversifier through history. Commodities exhibited unusually high correlation with U.S. equities during the global financial crisis market selloff and subsequent rebound. However, most other risk assets also exhibited heightened correlation to U.S. equities during this time.

EXHIBIT L – COMMODITY CORRELATION WITH U.S. EQUITIES



Source: Standard & Poor's, MPI, as of 10/31/16

EXHIBIT M – RISK ASSET CORRELATION WITH U.S. EQUITIES



Source: Standard & Poor's, MPI, as of 10/31/16

Increased correlation between assets during stressed markets is a commonly acknowledged market phenomenon. Correlations have since moved toward a more normal range.

With regard to the correlation between individual commodity futures, investable commodity strategies typically invest in those commodities which are part of major commodity benchmarks. Not all commodities are a part of these benchmarks. This allows for a great comparison between correlation trends of *benchmark-included* and *benchmark-excluded* commodities.

EXHIBIT N – CROSS CORRELATIONS

Average Index Commodity Correlation (5yr)*	Average Index Commodity Correlation (Dec. 1990 to Oct. 2016)*	Average Non-Index Correlation (5yr)**	Average Non-Index Correlation (Dec. 1990 to Oct. 2016)**	Average Non-Index Correlation w/ Index (5yr)	Average Non-Index Correlation w/ Index (Dec. 1990 to Oct. 2016)
0.198	0.197	0.141	0.129	0.158	0.182

Source: Invesco, as of 10/31/16.

*Average correlation of all commodities included in Bloomberg Commodity index, using monthly returns

**Average correlation of a sample set of commodities not included in Bloomberg Commodity Index – gas oil, platinum, tin, lead, cocoa, orange juice, and feeder cattle

Once again, there appears to be no obvious change. Commodity market movements have not been unduly affected by investor flows, according to these data.

In summary, the “institutionalization” story is not particularly apparent in the data examined. Of course, the complexity of commodity futures pricing and other market dynamics will always make it difficult to determine true effects of investment flows.

Why do we invest in commodities?

As mentioned, this research piece is tailored specifically to those who invest in commodities with the goal of protecting their portfolio from inflation risk. Inflation protection can mean different things to different people – long-term returns that beat inflation, or returns that exhibit high correlation to inflation, or returns that are very high during inflation shocks. Different assets meet different goals, but no single asset meets all definitions. Commodities have delivered on one definition - very high returns during inflation shocks.

While risk/return is the typical tradeoff for traditional asset classes, commodities should be thought of differently. Commodities provide inflation shock protection, and investors should expect to sacrifice some return in order to gain this protection.

Our current long-term (10-year) return expectation for commodities is 4%, which assumes 2% collateral return, 2% commodity price appreciation, and 0% roll return. Active management could be expected to bolster this 4% figure, but investors should be mindful regarding how the active strategy might affect inflation protecting qualities of their exposure. Annual volatility is assumed to be 18%.

Period of rising inflation	Annualized inflation	Annualized GSCI returns
12/1/1975 to 12/1/1980	9.2%	14.9%
5/1/1986 to 5/1/1991	4.5%	24.9%
7/1/2003 to 7/1/2008	3.7%	21.3%

Largest inflation increases, examining all 5-year periods since inception of S&P GSCI Index. Top three periods shown above are identified using the largest difference between end-of-period inflation and beginning-of-period inflation.

The counterbalance to this lower return expectation is the significant inflation protection which commodities tend to provide. Commodities have delivered significantly high “inflation beta” – a very unique quality. The two axes in Exhibit O (left axis & right axis) demonstrate that during a 1% up/down move in inflation, commodities have delivered returns in the same direction, but many multiples of the move – delivering roughly 10x during this time (1% jump in inflation accompanied by 10% jump in commodity returns, on average). A relatively small portfolio allocation to commodities can therefore help bolster portfolio returns in an inflation shock scenario. But this inflation beta unfortunately also works in reverse, as seen during the 2014 oil crisis, with commodities falling sharply as inflation declined.

EXHIBIT O – COMMODITY INFLATION BETA (3YR ROLLING)



Source: Standard & Poor’s, Bloomberg, MPI, as of 10/31/16

Investors may be well served by thinking about their commodity exposure in terms of high inflation shock protection but with a tradeoff of low or moderate returns. If it is decided to divest from commodities, an investor can either: a) seek inflation shock protection through some other means, b) replace commodity exposure with some other type of inflation protection while acknowledging that the inflation protecting qualities will be different, c) choose not to protect the portfolio from inflation shocks.

Concluding thoughts

In this research piece, we answered three questions to better understand commodity exposure in the current environment. First, what has been the cause of recent poor performance? Two commodity crises and the “commodities supercycle” contributed to negative commodity returns. Second, has anything changed structurally within the commodity markets? The data suggests not. Balance of market participants has not changed significantly, and correlation characteristics have not materially shifted. Third, why do we invest in commodities? Investors receive inflation shock protection from commodities, and in return should expect lower or moderate returns. If a decision

is made to divest, it must be decided how this inflation shock protection will be replaced in the portfolio.

Forecasting commodity returns is extremely difficult. However, looking forward we see the current environment shifting in a more favorable direction. Inflation is rising moderately both domestically and around the globe, U.S. fiscal policy is on the table which tends to be supportive of inflation, many commodity markets have moved or are moving through a major supply correction, and supply in these markets often overcorrects after sustained price pain. In addition to delivering inflation protection, we believe shorter-term commodity fundamentals will be supportive of improving performance.

Notes & Disclosures

1. This is a simplistic example. Storage costs, interest rates, convenience yield and other factors have an impact on futures pricing. “Disadvantaged” simply means an incentive discount exists on top of these factors.

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