

Russell Research

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Active Commodity Investing

We believe that an institutional investor's decision to allocate to commodities should be considered as part of a strategic allocation. As interest in commodities continues to gain momentum across the global investment community, investors are seeking to understand the options and the rationale for including commodities exposure in their portfolios. While the diversification benefits of the asset class are well known, investors considering the asset class do not always understand the potential advantages of active management. We will take a look at various inefficiencies in the market and explore how skilled managers might take advantage of them to add value to a commodities portfolio.

INTRODUCTION

As the interest in commodities continues to gain momentum across the global investment community, investors are seeking to understand the options and the rationale for including commodities exposure in their portfolios. Investors are drawn, in particular, to portfolios of collateralized commodity futures (CCFs), due to the returns experienced, historical diversification to equities and bonds and potential for inflation protection over long periods of time. The options for investors looking to gain exposure to these markets run the spectrum from passive and enhanced indexing, active long investing and even pure-alpha long/short funds. The primary benefits of a CCF investment within an investor's portfolio relate to its historically low correlation with traditional asset classes and its relationship with inflation over time. While the diversification benefits of the asset class are well known, investors considering the asset class do not always understand the potential advantages of active management. We will take a look at various inefficiencies in the market and explore how skilled managers might take advantage of them to add value to a commodities portfolio.

A summary of key points in this paper

- The commodities market has evolved from being a trading venue inhabited by commercial hedgers and traditional speculators to become a market with a growing financial investor presence.

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- The sources of returns for CCFs are different from the sources of returns for traditional asset classes or other alternative investments, and CCFs tend to have low correlations with other asset classes.
 - By investing across a number of commodities over the long term, investors should be able to capitalize on the diversifying nature of CCF returns.
 - The investment possibilities are expanding commensurate with this market's evolution. Only a few years ago, commodities were considered a niche investment and were largely overlooked by institutional investors. The development of passive commodities indexes and a proliferation of academic studies supporting strategic exposure to commodities have helped to increase their acceptance. Most recently, we have seen heightened interest in active management of commodities.
 - We believe that an institutional investor's decision to allocate to commodities should be considered as part of a strategic allocation. This view is based on the asset class's diversification potential and risk/reward expectations. Furthermore, the opportunities for alpha generation in active management may be substantial.

A PRIMER ON COLLATERALIZED COMMODITY FUTURES¹

Commodity Futures Contracts

A commodity futures contract is an agreement between two parties to buy or sell a specified amount of a particular commodity at a specified future date and price. The price is called the futures price, in contrast with today's price for the commodity, which is known as the spot price.

Futures are traded on exchanges such as the Chicago Board of Trade or the New York Mercantile Exchange. Some commodities are traded on multiple exchanges; for example, the West Texas Intermediate Light Sweet Crude Oil contract (WTI) is traded on both the New York Mercantile Exchange (NYMEX) and the Intercontinental Exchange (ICE).

A buyer or seller must put up a cash deposit known as the margin to guarantee his or her obligation. We say a buyer has a long position, and a seller has a short position. If the futures price rises during the day, a short investor loses, and the loss is deducted from the margin account. Cash flows go in the opposite direction if the price falls.

Thus investors receive gains and must pay losses in cash every day. The obligation to pay gains or losses on the futures contract is guaranteed by the exchange by managing the margins.

At contract maturity, a buyer must take delivery of the amount of commodity covered by the futures contract at the current spot price. The futures price converges to the spot price during the term of the contract. In fact, most futures contracts are closed out before maturity, and only a small percentage of contracts result in physical delivery.

CCF investing involves buying or selling futures contracts that are always closed out before maturity. Investors effectively commit to paying cash into or receiving cash out of the margin account without physical delivery.

For a description of futures markets, see Alexander & Sharpe (1989, Chapter 25) or, for a detailed account, see Duffie (1989).

¹ This section is an updated excerpt from Ooi and Rae (2005).

Defining the CCF Asset Class

The asset class referred to in this paper comprises investable portfolios of fully collateralized commodities futures, with three important properties:

- A portfolio is constructed from a diversified basket of commodities futures
- The commodity futures position must be fully collateralized
- Investment is restricted to long-only positions. (While we will briefly look at long/short trading strategies in the active management discussion in the section “Gaining Commodities Exposure” our focus will be on long-only allocations.)

Diversified basket of commodity futures

A CCF portfolio is based on a basket of commodity futures that are diversified across broad sectors, and of individual commodities within each sector. Exhibit 1 shows the contracts currently included in the Dow Jones–UBS Commodity Index (DJ-UBS), an example of a CCF index.

Fully collateralized investment

The investor holds collateral equivalent to the notional value of the commodities exposure. This means there is no leverage.

Long-only positions

In order to capture the commodity market beta, the investment in commodity futures is often restricted to long positions—that is, there is a positive exposure to changes in the prices of commodity futures.

Exhibit 1: The Dow Jones—UBS Commodity Index Constituents— 2009 Target Weights

DJ-UBX Index Constituents – 2009 Target Weights							
Energy		Agriculture		Metals		Softs	
Natural Gas	11.89%	Live Cattle	4.29%	Aluminum	7.00%	Sugar	2.99%
Crude Oil	13.75%	Lean Hogs	2.40%	Copper	7.31%	Cotton	2.26%
Gasoline	3.71%	Wheat	4.80%	Zinc	3.14%	Coffee	2.97%
Heating Oil	3.65%	Corn	5.72%	Nickel	2.88%		
		Soybeans	7.57%	Gold	7.86%		
		Soybean Oil	2.88%	Silver	2.89%		

Source: Dow Jones Indexes. Indexes are unmanaged and cannot be invested in directly.

SOURCES OF RETURN

There are a number of ways by which investors classify the sources of returns in a CCF investment. In fact, the issue has been debated in several widely read research papers in recent years. While there is no universally accepted methodology for categorizing CCF returns, we think it is useful to review how investors may look at return sources as well as the classification used by some of today’s indexes.

Theoretical Sources of Return in CCF Investing

One of the most commonly cited pieces of research in this area (2005a—“Facts and Fantasies about Commodity Futures,” by Yale academics Gary Gorton and K. Geert Rouwenhorst) — provides evidence to support the existence of a positive risk premium in long commodity investing. The team created a proprietary CCF index in an effort to measure commodity returns going back to 1959. They concluded that “an investor in our index (from 1959–2004) of collateralized commodity futures would have earned an excess return over T-bills of about 5% per annum.” Exhibit 3 shows the five-year rolling excess returns of an

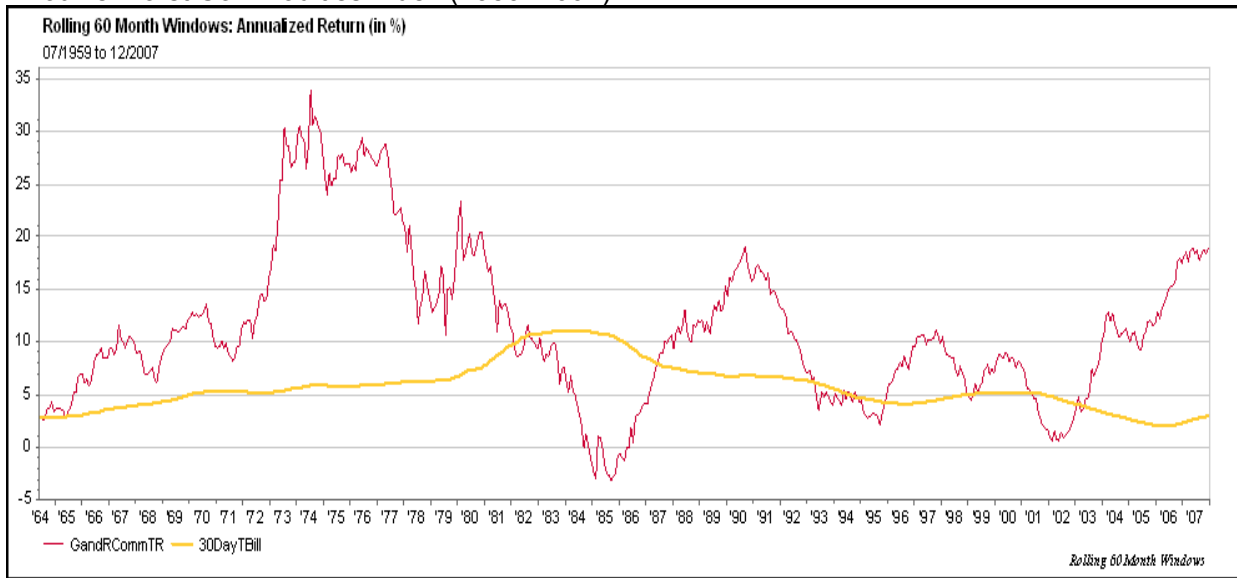
updated version of the Gorton & Rouwenhorst Index from 1959–2007². The index created by this team does show a fairly persistent risk premium, outperforming T-bill returns in 78% of five-year rolling periods from 1959–2007 (see Exhibit 2).

Exhibit 2: Gorton & Rouwenhorst Commodity Index Returns (1959–2007)

	Annualized Returns	Annualized Standard Deviation	Annualized Excess Return over T-Bills	% of 5-Year Periods with Excess Returns
G&R Commodity Index	10.95	11.91	5.45	78%
30 Day T-Bill	5.5	.78		

Source: Gorton & Rouwenhorst and the National Bureau of Economic Research. Indexes are unmanaged and cannot be invested in directly. Past performance is not indicative of future results. Returns in USD.

Exhibit 3: Rolling 5-Year Excess Returns (over T-bills) for the Gorton & Rouwenhorst Commodities Index (1959–2007)



Source: Gorton & Rouwenhorst and the National Bureau of Economic Research. Indexes are unmanaged and cannot be invested in directly. Past performance is not indicative of future results. Returns in USD.

While the persistent long-term risk premium in long CCF portfolios is a matter of continuing debate, some investors find it useful to consider returns in terms of the theoretical “insurance premium” that may exist in holding long commodity futures. In this methodology, CCF returns are generated by (i) the return on the collateral, (ii) an “insurance premium” paid by hedgers and other market participants to investors and (iii) the “expectational variance,” or, in other words, the market’s collective error in predicting future spot prices.

The simplest source of return is the interest earned on the collateral held to back the futures position. Usually, this is a cash return (bank bills, treasury notes, etc.), although it is possible to substitute other high-quality paper as collateral. (Specific recommendations on collateral management are discussed in Section 5.)

The second and third components, the insurance premium and the expectational volatility, are inextricably linked and arise from the behavior of the commodity futures market. For a

² Data from authors Gorton & Rouwenhorst and the National Bureau of Economic Research was used in order to update this return stream for the purpose of showing performance through 2007.

detailed discussion on market participants and the drivers of insurance premiums and spot prices, please see the appendix. For further discussion on the existence of risk premiums in commodity markets, please see the following bodies of work: Keynes (1930), Gorton & Rouwenhorst (2005a&b), Erb & Harvey (2005), Till (2006).

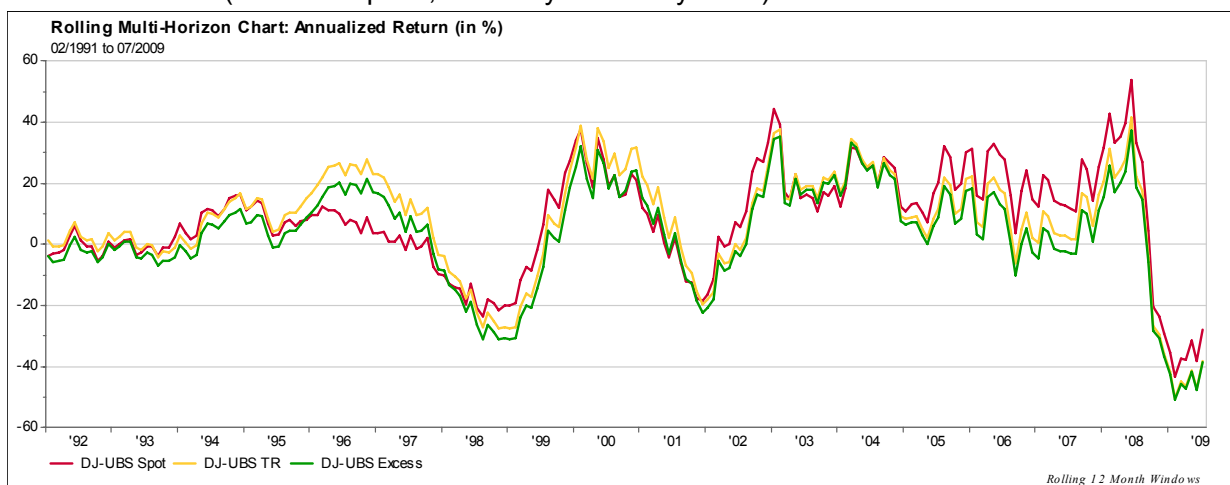
Performance Attribution in Commodity Indexes

The previous section introduced the concept of theoretical “insurance premiums” in commodity investing; we’ll come back to it again below. Well-known commodity indexes such as the DJ-UBS and the Standard and Poors – Goldman Sachs Commodity Index (S&PGSCI) use a different methodology to categorize and attribute returns. The three components of returns as measured by these indexes are spot, roll yield and collateral return. Spot is essentially the return associated with changes in current commodity price levels. Roll yield is the return from replacing futures contracts as they near expiration. When the futures curve is in backwardation (contango), the roll will be positive (negative). Collateral return is the return on the required collateral for the futures contracts.³

The “spot” sub-indexes include returns from the change in commodity price levels. The “excess return” sub-indexes include both the spot and the roll yield components, while the “total return” indexes include spot, roll yield and collateral management. The “total return” commodity indexes assume that collateral is invested in short-dated treasuries. For a detailed discussion of Russell’s views on commodity benchmarks, please see A Preferred Benchmark for Long-Only Active Commodity Manager Performance Evaluation, by Mark Paris (August 2009).

In Exhibit 4, below, we demonstrate the differences in rolling one-year returns between the three sub-indexes of the DJ-UBS as of their inception in 1991. As can be seen in the exhibit, the attribution of the different components of the index varies depending on the time period. The dynamic nature of these return sources offers significant opportunities for active managers to add value over indexes over time, as we will show in Section 5.

Exhibit 4: Rolling 1-Year Returns of the DJ-UBS Spot, Excess and Total Return Indexes (Since Inception, February 1991-July 2009)



Source: Bloomberg and FactSet. Indexes are unmanaged and cannot be invested in directly. Past performance is not indicative of future results. Returns in USD.

³ For further details on the basics of commodities returns, see Rae (2003), Howard (2005), Waheed and Oberhofer (2005) and Rae and Ooi (2005).

It is important to note that the concepts of “insurance premium” and “roll yield” are not the same. While the value of “roll yield” is directly related to the term structure of the futures price curve, “insurance premiums” are based on additional considerations.^{4, 5} It should also be noted that commodity curve structure and “roll yield” have acted as significant headwinds to commodity index returns over the last five years. While active managers are able to mitigate this headwind to some extent, market returns have been significantly impacted by the negative term structure of the futures curve. In recent years, spot returns have played a large role in the total return proposition for the asset class as prices have responded to supply and demand conditions. This phenomenon is likely to continue as commodities continue to play an ever-increasing role in current economic cycles.

Both flat (spot) prices and term structure (roll yields) are responsive to changes affecting fundamentals (physical assets) in global commodity markets. The changes are often related to increases in demand, demand destruction or fluctuations in the supply and inventories of these raw materials. While not an exhaustive list, environmental factors, geopolitical events, currency valuations and demographic and technological change can have profound short- and long-term impact on commodity performance (see Exhibit 5).

Exhibit 5: Price-Driving Factors in Commodity Markets

Price Driving Factors in the Commodity Markets	
Environmental	Environmental risk is a significant factor when it comes to commodities markets, especially for the agricultural and energy sectors. "Desertification" and increasing contamination of water tables will put pressure on agricultural commodities, while energy commodity fundamentals will always include a consideration for environmental impacts.
Geopolitical	Continued unrest in the Middle East along with past riots over rice are a constant reminder of the impact of geopolitics on commodities markets. Additionally, in the energy markets, a significant amount of world energy production is derived from national oil companies. Many of the producing countries have either policies (e.g. Venezuela, Iran) or production climates (e.g. Nigeria) that expose the world commodity markets to abrupt price changes that require ongoing risk assessment.
Currency	Many commodities are priced in U.S. dollars. In recent times, much of the run-up in crude oil prices has been attributed, by some commentators, to the declining value of USD. The precious metals sector, most notably gold, has been treated by some investors as an alternative currency. This has led to the significant negative correlation between the metal's price and the value of the dollar.
Demographic Change	Demographic changes, including population growth and increasing global wealth and nutrition levels, have had a dramatic impact on global demand for foodstuffs and building materials. Explosive demand in developing economies has led to increased prices and significant concern over current and future shortages for some commodities (including wheat, rice, and oil).
Technological Change	Technological change can have a material impact on commodity prices, particularly with respect to energy. Indeed, the information age has put price pressure on various metals and other materials. Similarly, advancing technology in the area of renewable energy will likely put pressure on materials associated with the manufacture of solar panels and wind turbines. Conversely, this sort of technological advance may also help to ease price pressure on fossil fuels. While such change will likely be slow, major shifts and disruptions are known to happen and may take investors by surprise.

⁴ Till (2007)

⁵ Keynes (1930)

THE RELATIONSHIP OF CCFs WITH TRADITIONAL ASSET

Classes and Inflation

For long investors, the beta of the asset class has provided considerable diversification relative to traditional investments. We now turn our attention to CCFs' historical correlation with those traditional assets, as well as CCFs' relationship with inflation. First up, let's address the diversification properties of CCFs.

Diversification

Exhibit 6: Correlations of the S&P GSCI Index and DJ-UBS Index Monthly Returns with Various Bond and Stock Indexes⁶ (February 1991–June 2009)

	S&P GSCI	DJ-UBS
Russell 1000 [®] Index	0.18	0.24
Russell 2000 [®] Index	0.22	0.25
Russell 3000 [®] Index	0.19	0.25
BarCap US Agg Bond TR	0.05	0.06
FTSE EPRA/NAREIT	0.25	0.35
Russell Global EM/IFC	0.28	0.38
Russell Global ex-US/MSCI EAFE	0.34	0.42
Russell Global Index/MSCI World	0.29	0.36
S&P GSCI TR		0.90

Indexes are unmanaged and cannot be invested in directly. Past performance is not indicative of future results.

To understand the low correlations of CCF indexes and other asset classes, we take a look at the fundamental drivers of global commodity spot prices. The value of commodities is largely governed by demand and supply conditions for physical assets. For example, physical commodities are delivered into—and change hands via—grain silos, storage tankers and metals warehouses. They are used to feed us, build our bridges and buildings and power our homes and cars. Price increases for grain suggest either that supply is curtailed, demand is expanded or both. Similarly, falling metals prices suggest that fabricators are experiencing less demand for their goods or that mining capacity is excessive.

Ultimately, higher commodity prices translate into higher costs for corporations, just as for households. When commodities are expensive, corporations and ultimately financial markets will likely suffer. The diversification potential of commodities is logical and likely permanent; thus, the benefits associated with adding commodities to a portfolio of financial assets should not be isolated to any particular sample period.

Because commodities form a material portion of the cost basis of production and household expenses, they are thought to have an element of inflation protection. In the next section, we will explore the theory of and evidence for inflation protection by commodities.

As noted in Exhibit 6, commodities currently exhibit modest correlations with other asset classes. The correlation of the S&P GSCI and the DJ-UBS with other asset classes increased considerably in late 2008 and early 2009 as commodities experienced a broad-based sell-off along with all other risk assets during the deleveraging of that period.

⁶Russell 1000 Index, Russell 2000 Index, Russell 3000 Index, BarCap US Aggregate Total Return Index, FTSE EPRA NAREIT Equity REIT Total Return Index, Russell Global Emerging Markets Index (Prior to 2001)/S&P/IFC Investable Composite Index (After 2001), Russell Global ex-US Index (Prior to 6/1996)/MSCI EAFE (After 6/1996), Russell Global Index (Prior to 6/1996)/MSCI World (After 6/1996), Goldman Sachs Commodities Index, Dow Jones–UBS Commodities Index.

Additionally, we are seeing industrial metals and some energy commodities benefiting from investors' move into risk assets of all types. Some commentators are noting the behavior of crude oil prices as a financial asset, and looking to its correlation with the U.S. dollar, the global equity markets and the global macro environment. While it is not unexpected to see positive correlations between commodities and other asset classes increase over short periods of time, commodities futures should continue to be useful as a long-term diversifier of portfolio risk.

Relationship with Inflation

Much ado has been made about the ability of commodities to provide a "hedge" against inflation...when inflation exists. The past decade has been one of very moderate inflation in the U.S. and much of the developed world. Moreover, in most developed economies, inflation is tightly controlled by monetary authorities. Demonstrating "high" correlations between inflation and anything else is likely to prove difficult.

The difficulty in demonstrating high correlations has several sources. First, inflation is measured *ex post* and takes time to be realized. While the price of gasoline may rise in lockstep with crude oil prices, the prices of airline tickets, cruises and taxi rides may not. As well, the price of corn, soybeans and wheat should affect the prices of groceries, but such price increases may be delayed by contract, slow realizations of cost increases due to food processor hedging practices, or simply a reluctance to alter prices on a frequent basis. Prices tend to be sticky and may take time to respond to changes in inputs. Thus, simple correlations are often fruitless in describing the relationship between commodities and inflation.

While correlations between commodities and inflation might be difficult to demonstrate, adding commodities and other real assets to a portfolio can help to provide positive real returns over the long term. In a recent study, Russell showed how various real asset mixes, including commodities, have outpaced inflation over longer periods of time. As shown in Exhibit 7, portfolios combining commodities, real estate and listed infrastructure have outperformed a benchmark of inflation + 3% in the majority of rolling 3-, 5- and 10-year periods ending June 2009. Adding a diversifying collection of real assets, including commodities, to a balanced portfolio has potential to reduce volatility and lead to positive real returns over the long term (see Exhibit 8; for a complete discussion of this study and more detail on the benefits of real assets, please see Ross [2009]).

Exhibit 7: Periods Where Real Assets Dominate Inflation +3% (February 1991–June 2009⁷)

	Dow Jones–UBS Commodity Index	Real Assets (Real Estate/Commodities/ Listed Infrastructure)	60 Equity/40 Fixed Income	60 Equity/40 Equity + Real Assets
Rolling 3 Years	68%	80%	68%	74%
Rolling 5 Years	69%	81%	62%	70%
Rolling 10 Years	87%	100%	83%	91%
Thru August 2008	100%	100%	100%	100%
Entire Sample Period	100%	100%	100%	100%

Data is based on rolling annualized returns. Indexes are unmanaged and cannot be invested in directly. Past performance is not indicative of future results.

Exhibit 8: Real Assets – Frontier Analysis. Balanced Portfolios With and Without Real Assets (February 1991–June 2009⁸)

	Dow Jones–UBS Commodity Index	Real Assets (Real Estate/Commodities/ Listed Infrastructure)	60 Equity/40 Fixed Income	60 Equity/40 Equity + Real Assets
Annualized Return	5.47	7.67	7.78	7.84
Standard Deviation	14.66	12.38	9.35	9.25
Correlation with 60/40	0.24	0.64	-	-
Sharpe Ratio	0.70	0.25	0.35	0.36

Indexes are unmanaged and cannot be invested in directly. Past performance is not indicative of future results.

GAINING COMMODITIES EXPOSURE

Options for gaining exposure to commodities are numerous. While investors often seek commodities exposure through an equity investment, this option has its limitations. Direct exposure to commodity futures can be achieved through passive CCF indexing, enhanced CCF indexing and a variety of active CCF strategies. In the paragraphs below, we lay out options for various points along the commodity investing spectrum. Ultimately, we will argue that investors may be able to enhance returns through active CCF investing. An active approach is attractive, given a variety of potential strategies, and may preserve the diversification potential the indexes offer.

Commodity-Related Equities

Many investors seek exposure to access commodities through a thematic investment in commodity-related equities. There are practical reasons for doing so. For example, government regulations may discourage or prohibit specific classes of investors from directly

⁷ Source: Russell Investments

Balanced = 60% Russell 3000 Index + 40% US BarCap Aggregate, RE/Comm/LI = 30% EPRA/NAREIT + 40% DJ UBS + 30% S&P LI/UBS GI&U

S&P Global Listed Infrastructure Index (Dec 2001–Jun 2009) linked with UBS Global Infrastructure & Utilities Index (Feb 1991–Nov 2001)

U.S. Seasonally Adjusted Consumer Price Index may be found at www.bls.gov/cpi/.

⁸ Ibid.

holding CCFs. Additionally, equities are the only way to gain exposure to some commodities. An example is uranium, which does not have a futures market but can be accessed through uranium mining stocks.

Certain equity sectors possess commodity market exposure:

- Shipping, ground transportation, and storage securities provide exposure to a variety of commodities, such as grains, steel, and energy commodities.
- Agribusiness, timber production or timberland can provide exposure to agricultural commodities as well as timber, which is not traded on any futures exchange.
- Energy infrastructure, mining, integrated oils and energy services provide exposure to crude oil and refined product commodities.

Indirect exposures are often pulled together into thematic equity products. Thematic investing involves purchasing equities on the basis of a particular theme that a manager believes will add value for some period of time. In the case of commodities, a thematic equity investor might invest in stocks of companies anywhere in the supply or demand chain of a particular commodity. The idea here is to select stocks that will benefit from price movements in commodities, even though commodity futures are not directly purchased.

In this paper we focus on direct investment through CCFs. Relative to a direct investment in futures, commodity-related equities have a host of non-commodity considerations. Suffice it to say that the influence of company-specific risk can often confound the underlying commodity exposure that the investor seeks.

Passive CCF Investing

Investment in CCFs can involve passive exposure to a diversified basket of futures, effectively earning the long beta returns of the asset class.

While passive investing in commodities has been around since the 1980s, the proliferation of commodities indexes over the last 10 years has expanded the options for investors seeking diversified commodities exposure. The Commodities Research Bureau (CRB) Index is the oldest commodities benchmark and dates back to 1957. The CRB Index has undergone a number of revisions over the years and at this time is not commonly seen as the benchmark for U.S. investment products. The DJ-UBS and S&P GSCI indexes, currently the most frequently cited benchmarks, have recently been joined by a number of other indexes, such as the Deutsche Bank Liquid Commodity Index and the UBS Bloomberg Constant Maturity Index. The increasing number of indexes is reflective of increasing sophistication and specialization on the part of providers, a more discriminating investor base and high levels of liquidity in many commodity futures markets. In addition, many of these indexes incorporate simple, mechanistic trading strategies to assist in mitigating the negative roll yield that can occur in indexes constructed solely of front-month contracts.

Index exposure may be obtained by investing directly in a basket of futures, through exchange-traded funds (ETFs) and exchange-traded notes (ETNs), or via index swaps.

Passive Investing with Enhanced Collateral

Some investors seeking to add excess returns over a passive commodity benchmark do so by investing in products with enhanced collateral. These types of funds have traditionally sought to add value through active management of the underlying collateral. However, turbulence in the credit markets in 2008 led to heavy losses in the collateral portfolios of some commodity managers, and we have observed that the move to de-emphasize risk in collateral portfolios has been widespread. Russell recommends considering managers who are not looking to add value through their collateral management and who invest in low-risk

treasuries or agency discount notes. If managers expect to add a significant amount of value via active collateral management, a thorough evaluation of their fixed income skills is paramount.

Active CCF Investing

In recent years, active long-only commodities managers have become more numerous. Active commodity management is no longer the exclusive domain of commodity trading advisors (CTAs), and the last five years have given rise to a number of sophisticated managers employing a variety of fundamental and quantitative strategies. Active investing is a natural fit with commodities, due to the participation of non-economic players—physicals buyers and sellers or hedgers—in commodity markets. Because hedgers are motivated by balance sheet goals, skillful active managers (economic players) have a rich and deep pool of alpha to exploit. The increased interest in active strategies has led to an increasing selection of fund structures and implementation options, such as:

- Active long-only products, which utilize curve strategies and under/overweights to commodity sectors and individual commodities.
- Active long-neutral products, which include the long-only strategies but will also tactically allocate to cash versus holding a benchmark-neutral position in the commodity.
- Active long-biased products, which allow limited shorting but have an overall long position.
- Active long-short products, which are benchmark-agnostic and seek absolute returns via spread trades and outright long or short directional bets.
- Specialist managers who limit their investments to specific sectors, such as energy and metals.
- Thematic investment products, which utilize long-term macro views on commodity sectors as the primary investment thesis.

Strategies and Success Factors in Active CCF Investing

Managers can employ a variety of trading strategies, be they long-only, long-neutral, or long/short, to attempt to capture the alpha available in commodities. While not a complete list, the following should give readers an appreciation of the variety of strategies available to active commodity managers.

Directional trades. In a benchmark-relative portfolio, individual commodity positions can be implemented as either over- or underweights relative to their weight in the index. In an absolute-return portfolio, these views are implemented via outright long or short positions.

Curve Positioning. Via these strategies, used in long-only mandates, managers will look at the spectrum of contracts traded along the commodity term structure to implement their benchmark commodity position. The strategies are useful in contangoed markets, as “roll” yields can often be improved by moving out on the curve.

Spread trades. These strategies look to exploit relative-value opportunities between different contract months, exchanges or commodities. Spread trades can include inter-month (e.g., April/August wheat), inter-market (e.g., Brent vs. WTI crude), and inter-commodity positioning (“crack spreads” such as crude/gasoline).⁹ Spread trades are typically

⁹ “Crack spread” is a term used to define a trade that involves the differential between the price of crude oil and the petroleum products extracted from it.

implemented by taking a long position in one commodity or contract month while shorting another. Spread trades are the basis for a large number of the strategies used in absolute-return products. They can also be used in long-only products, if the manager avoids having a net short position in an individual commodity or commodity sector.

Commodity options trades. Options on commodity futures are typically used to express managers' directional outlook for a commodity or expectations for future volatility, or to structure relative-value trades similar to those via outright spread trading.

Regardless of the trading strategy employed by a manager, the underlying alpha source is dependent—like all active investing—on the existence of price movement and pricing dislocations in the market. To that end, our research has identified several success factors that we believe give certain managers an advantage in profiting from pricing shifts in commodity markets. Examples of these factors are the following:

Informational advantages. Managers use a variety of information sources to establish their views on the supply/demand, storage outlook or valuation expectation for a particular commodity. Some portfolio managers rely on publicly available data, while others use proprietary information gathered through contacts or detailed data aggregation.

Informational advantages can lead to profitable trading strategies if strategies are implemented properly. For example, managers with proprietary knowledge of impending supply shortages for a particular commodity may be able to structure profitable directional trades before the information is disseminated to the public.

Various types of informational advantages include access to ground-level supply data for particular commodities, visibility into investor/commercial flows, visibility into demand information in foreign countries, contacts with regulators/government entities, knowledge of commercial activities, etc.

Trade idea generation. Successful managers should be able to consistently leverage their competitive advantages to maintain a pipeline of robust trade ideas. For example, managers who monitor commodity inventories generally have an outlook on how the forward curve for that commodity will change to reflect a change in stocks. This type of process can lead to a consistent source of trade ideas. Other sources of trade ideas can come from: observing transactions in physical markets, analyzing publicly available or proprietary supply and demand forecasts, conducting technical analysis studies that draw on a range of multidisciplinary approaches, etc.

Effective portfolio construction. Portfolio construction and risk management are critical to a manager's success. These activities include: trade sizing and duration, trade entry and exit, risk management through stop/loss programs, scenario analysis and diversification.

- **Trade sizing.** Managers vary in the ways they seek to extract alpha from individual trades. Certain managers rely on large, long-term directional bets, while others will look to execute a series of smaller, relative-value trades on an ongoing basis. Managers typically target a specific volatility level at the fund level and structure trades with a consideration for the historical volatility for a particular contract or spread. Some managers place higher importance on recent volatility (e.g., one month), while others will consider multi-year periods. Most managers use Value at Risk (VaR)¹⁰ analysis in trade sizing; however, Russell tends to place a higher importance on the stress testing process employed by a manager. Stress event scenarios can include correlation shifts, market shocks, forward curve shifts, etc.

¹⁰ For an overview of VaR, please see Duffie and Pan (1997)

- **Trade timing.** The timing of trades is important for both long-term fundamentally based programs and shorter-term active programs. Trade timing is critical for positions that are designed to capitalize on long-term structural dislocations in the market. Commodity pricing shifts can take considerable time to play out and interim volatility can be high. Russell has a positive view of managers who carefully consider the catalyst and the period in which they expect their fundamental opinion to be realized by the market. For short-term implementation, we believe managers who employ traders with experience observing technical data and investment flows have an advantage.
- **Risk management.** Risk management is closely tied with portfolio construction and trade sizing. Again, we believe stress testing and diversification are among the most important elements to a manager's risk management process. Additionally, stop-loss processes vary and should be evaluated in the context of a manager's strategy. Finally, managers who rely heavily on options trading have an additional level of risk management considerations and should employ sophisticated options-modeling software.

Active Commodity Investing Risks

In addition to a thorough assessment of commodity trading skill, the evaluation of active commodity managers should also incorporate an understanding of the risks unique to commodities trading. Below, we detail some risk factors that a prudent investor should consider when considering an active commodities allocation.

Exhibit 9: Active Commodity Investing Risks

Active Commodity Investing Risks	
Liquidity Risk	As in any other investment, when the accumulated position size becomes significant, commodity managers should be aware of the impact on price should they need to unwind that position. Managers should be able to demonstrate that they are cognizant of this risk by not only modeling it, but also by establishing effective policies that limit this exposure. This risk is particularly important for managers using over-the-counter (OTC) instruments in their portfolios.
Collateral Management	Many commodity investment products rely solely on the CCF market for their alpha proposition. However, as mentioned earlier, 2008 dealt a significant blow to a number of managers that were actively managing their collateral and seeking additional returns above and beyond the 90 day T-bill rate assumed by the indexes. A complete analysis of the commodity offering should include a thorough assessment of the types of fixed income investments and the relative skills of the individuals running that part of the investment book.
Credit/Counter-party risk	While the majority of commodity managers trade on-exchange (NYMEX, CBOT, etc.), some managers employ custom derivatives. These can range from swaps for broad sector exposures to niche investments in commodities that are not exchange traded (such as coal). While the large banks that participate as counterparties have tended to be well-capitalized, there is some concern that recent downgrades may impact their requisite collateral levels. Where possible, the use of ISDA (International Swaps and Derivatives Association) master agreements can mitigate some of these risks by specifically addressing the losses due to default. Generally speaking, investors should look for managers who maintain a diverse set of counterparties on which they perform regular due diligence.

Speculative Limits	Speculative limits and hedging exemptions are garnering considerable attention in Washington following the commodity price rallies of 2007 and 2008. As of the writing of this paper, the Commodities Futures Trading Commission (CFTC) and interested parties in Washington are considering imposing more stringent position limits on market participants. The limits that are prevalent in agriculture could be extended to energy contracts and generally include caps on the number of contracts a single investor can hold. It is advisable to consider a manager's size and implementation methodologies in light of these proposed changes. Larger managers have the potential of reaching speculative limits and limiting their growth and value add potential going forward.
Delivery Risk	While it is unlikely that an investor will ever be forced to take delivery of a physical commodity, there are stories of non-commercial players being heavily 'squeezed' during delivery periods. Awareness of contract roll dates, delivery dates, etc. is crucial.
Model/Analytics Risk	The proliferation of buy-side risk analysis systems has been primarily focused on major asset classes such as equities and bonds. Relatively few commodity-specific systems have been introduced into the marketplace. Standard financial models may not be applicable to the commodities markets. Systems that rely on Gaussian or neo-Gaussian (e.g. 'fat tails') assumptions may not be well suited for a market that exhibits trending and abrupt, frequent price discontinuities. Generally, we look for managers who employ sophisticated modeling techniques that incorporate both VaR and stress-testing processes.

CONCLUSIONS AND SUMMARY

The options for financial investors seeking to gain exposure to commodity futures markets continue to evolve. Currently available investment vehicles offer the opportunity to access traditional return sources in commodity markets while adding more value through active trading strategies. Returns in commodity investing have historically provided attractive diversification and risk/return properties relative to those of traditional asset classes. Thus, we believe that an institutional investor's decision to allocate to commodities should be considered as part of a strategic allocation.

APPENDIX – MARKET PARTICIPANTS AND THE THEORY OF NORMAL

Backwardation¹¹

The behavior of the futures market is derived from its participants and their motivations. We can segregate the participants into two groups, hedgers and investors. Investors' goals are to capture an insurance premium in exchange for accepting price volatility. Active investors should have an enhanced set of tools with respect to identifying and buying commodities with positive insurance premiums.

Hedgers

As the term implies, hedgers wish to reduce or remove the risk arising from a position or anticipated position in the underlying physical commodity market. Hedgers can be either long or short in the futures market. A long hedge involves purchasing futures in anticipation of requiring a commodity for production at some point in the future. For example, a flour miller may wish to purchase wheat futures to guarantee the price of future wheat requirements. The risk of a price rise increasing the cost of production and reducing profit is hedged away.

Other hedgers may sell ("short") futures contracts to hedge against falling prices. For example, a wheat farmer may be able to secure today a price for the future harvest which is in excess of the cost of producing the wheat. This ensures a certain profit margin and removes the price risk.

Either way, it is important to recognize that the hedgers' rationale for entering into the futures market is to reduce or remove an existing risk. There may be a degree of price sensitivity, but as will all individuals entering into an insurance arrangement, the hedgers will be prepared to pay a premium to remove the risk.

Investors

Investors on the other hand are drawn to the market in order to earn profits. To the extent that the natural long and short hedgers do not offset each other, investors are needed by the market. Investors are accepting the price volatility being given up by the hedgers and therefore require a premium to accept this additional risk. Investors as a group can take long or short positions in the market.

The Theory of Normal Backwardation

In an efficient market, the current futures price must settle where investors are prepared to offset the net hedging position (either long or short). If the hedgers have a net short position, then to encourage investors to take long positions in the futures market, the current futures price must be below the expected spot price at expiry. Equally, if hedgers as a group have a net long position, the current futures price must be above the expected spot price at expiry to encourage investors to take short positions.

Keynes (1930) argued that hedgers will generally be net short. An illustration of the rationale for this is provided in Greer (2000). Greer's example considers a meatpacker who buys beef from a cattle farmer. The meatpacker is a natural buyer of beef and has no incentive to hedge his demand, because it is possible to pass on any price volatility to the consumer of the product. Therefore, it is only the cattle farmer who needs to hedge, and the farmer will do so by taking short futures position. In this scenario, the farmer must be prepared to sell futures at a price below the expected future spot price. This phenomenon, where the current

¹¹ An excerpt from "Investing in Collateralized Commodity Futures," by Yvonne Ooi and David Rae (2005), Pages 9-11

futures price is below the expected future spot price, is termed “normal backwardation” and results in an expected gain to the investor taking the long futures position.

If hedgers want to take a net short position in the futures market, they can do so only by selling futures at a price below the expected future spot price. In the event that the expectation is correct (i.e., the actual spot price at delivery equals the expected future spot price), the investor holding a long position in the futures market will earn a profit equivalent to the insurance premium paid by the hedger.

Of course, the insurance premium may not always accrue to long investors; there may be periods in which long hedgers outweigh other market participants, with an insurance premium being paid to short investors. If these market conditions persist, a CCFs investor (holding long-only positions) will suffer negative returns. However, across a diversified basket of commodities, over the long term the theory of normal backwardation postulates that on average the insurance premium will accrue to investors with a long position.

The normal backwardation theory has been subjected to careful examination. For example, Miffre (2000) finds strong evidence supporting this theory for commodity markets.

If the market behaves rationally, expectations for the future spot price will be based on all currently available information. This does not mean that the expectations for the future spot price will be correct on every occasion, merely that the errors will be distributed normally, with no persistent bias. The difference between the expected future spot price and the actual spot price is determined by “expectational variance”—in other words, it is the market’s prediction error. Under the rational efficient market assumption, the expectational variance has a mean of zero and should not affect the long-run return expected from holding a diversified portfolio of CCFs. It will, however, impact the nature of the returns—namely, the variability of returns and the correlation with other asset classes.

Greer (2000) argues that the expectational variance will display a positive skew (the big prediction errors are when the actual future spot price exceeds the expected spot price), because the events that cause a change to the actual spot price tend to be linked to shrinkage in supply, causing price increases. This is more obvious when looking at individual commodities. For example, poor weather impacting the sugar crop or war affecting the oil supply would both tend to lead to a positive expectational variance experience in these two commodities.

In practice, it is not possible to determine separately the magnitude of the insurance premium and the expectational variance, because the expected future spot price is an unobservable quantity.

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Commodity futures and forward contract prices are highly volatile. Trading is conducted with low margin deposits which creates the potential for high leverage. Commodity strategies contain certain risks that prospective investors should evaluate and understand prior to making a decision to invest. Investments in commodities may be affected by overall market movements, and other factors such as weather, exchange rates, and international economic and political developments. Other risks may include, but are not limited to; interest rate risk, counter party risk, liquidity risk and leverage risk. Potential investors should have a thorough understanding of these risks prior to making a decision to invest in these strategies.

The risk of loss in trading commodities can be substantial. You should therefore carefully consider whether such trading is suitable for you in light of your financial condition. In considering whether to trade or to authorize someone else to trade for you, you should be aware of the following: If you purchase a commodity option, you may sustain a total loss of the premium and of all transaction costs. If you purchase or sell a commodity future or sell a commodity option, you may sustain a total loss of the initial margin funds and any additional funds that you deposit with your broker to establish or maintain your position. If the market moves against your position, you may be called upon by your broker to deposit a substantial amount of additional margin funds, on short notice, in order to maintain your position. If you do not provide the required funds within the prescribed time, your position may be liquidated at a loss, and you will be liable for any resulting deficit in your account. Under certain market conditions, you may find it difficult or impossible to liquidate a position. This can occur, for example, when the market makes a "limit move." The placement of contingent orders by you or your trading advisor, such as a "stop Loss" or "stop limit" order, will not necessarily limit your losses to the intended amounts, since market conditions may make it impossible to execute such orders. A "spread" position may not be less risky than a simple "long" or "short" position. The high degree of leverage that is often obtainable in commodity trading can work against you as well as for you. The use of leverage can lead to large losses as well as gains.

Off-Market Transactions. In some jurisdictions, and only then in restricted circumstances, firms are permitted to effect off-exchange transactions. The firm with which your adviser deals may be acting as your adviser's counterparty to the transaction. It may be difficult or impossible to liquidate an existing position, to assess the value, to determine a fair price or to assess the exposure to risk. For these reasons, these transactions may involve increased risks. Off-exchange transactions may be less regulated or subject to a separate

PRINCIPAL RISK FACTORS

Commodity Trading is Speculative and Volatile. Commodity interest prices are highly volatile. Price movements for commodity interests are influenced by, among other things: changing supply and demand relationships; weather; agricultural, trade, fiscal, monetary and exchange control programs and policies, international political and economic events and policies, changes in national and international interest rates or inflation, labor activity, crop disease, the purchasing and marketing programs of different nations, currency devaluations, activities of market participants such as hedgers and speculators and emotions of the marketplace. Disruptions in production facilities or supplies of physical commodities may increase price volatility. The supply and demand for physical commodities are influenced by the various economic sectors that require such commodities (e.g., global and domestic industrial, transportation, packaging and construction/building sectors). In addition, governments from time to time intervene, directly and by regulation, in certain markets, particularly those in currencies and interest rates. Such intervention is often intended to influence prices directly. None of these factors can be controlled by an adviser and no assurance can be given that an adviser's advice will result in profitable trades for a participating customer or that a customer will not incur losses.

Commodity Trading is Highly Leveraged. Commodity prices are highly leveraged. Because of the low margin deposits which are required in a commodity futures trading account, a high degree of leverage is obtained. Accordingly, a relatively small price movement in a commodity futures contract may result in immediate and substantial losses to the account.

Commodity Trading May Be Illiquid. It is not always possible to execute a buy or sell order at the desired price, or to close out an open position, due to market illiquidity. Such illiquidity can be caused by intrinsic market conditions or it may be the result of market conditions (e.g., illiquidity) and/or the operation of the rules of certain markets (e.g., the suspension of trading in any contract or contract month because of price limits or "circuit breakers") may increase the risk of loss by making it difficult or impossible to effect transactions or liquidate/offset positions. This may increase the risk of loss. Further, normal pricing relationships between the underlying interest and the future, and the underlying interest and the option may not exist. This can occur when, for example, the futures contract underlying the option is subject to price limits while the option is not. The absence of an underlying reference price may make it difficult to judge "fair" value.

Options. Transactions in options carry a high degree of risk. Depending upon the type of option (i.e., put or call) the extent to which the value of the options must increase for a position to become profitable, taking into account the premium and all transaction costs, can be substantial. If the option is on a future, the futures position will be associated with liabilities for margin. If the purchased options expire worthless, the positions will suffer a total loss and will consist of the option premium plus transaction costs. If the trading strategy contemplates purchasing deep-out-of-the-money options, you should be aware that the chance of such options becoming profitable ordinarily is remote. Selling ("writing" or "granting") an option generally entails considerably greater risk than purchasing options. Although the premium received by the seller is fixed, the seller may sustain a loss well in excess of that amount. The seller will be liable for additional margin to maintain the position if the market moves unfavorably. The seller will also be exposed to the risk of the purchaser exercising the option and the seller will be obligated to either settle the option in cash or to acquire or deliver the underlying interest. If the option is on a future, the seller will acquire a position in a future with associated liabilities for margin. If the option is "covered" by the seller holding a corresponding position in the underlying interest or a future or another option, the risk may be reduced. If the option is not covered, the risk of loss can be unlimited. Certain exchanges in some jurisdictions permit deferred payment of the option premium, exposing the purchaser to liability for margin payments not exceeding the amount of the premium. The purchaser is still subject to the risk of losing the premium and transaction costs. When the option is exercised or expires, the purchaser is responsible for any unpaid premium outstanding at that time.

Trading decisions may not attempt to keep commission costs down. Commodities trading programs can average a substantial number of trades in any given timeframe. Commission to equity costs range depending on commission cost. On any particular account, however, this will further depend on any additional commissions, NFA exchange fees and exchange rates.

An FCM Might Fail. Under CFTC regulations, FCMs are required to maintain customers' assets in a segregated account. If a participating customer FCM fails to do so, the customer may be subject to a risk of loss of the funds on deposit with the customer FCM in the event of bankruptcy. In addition, under certain circumstances, such as the inability of another customer of the FCM or the FCM itself to satisfy substantial

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First used: September 2009