Russell Investments

Russell Research

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Structuring a commodities portfolio

In the last decade, commodities investing has gone from niche to common, from being perceived as risky and high stakes to being counted as an important element of diversification in reducing one's portfolio level volatility. The evolution of commodities investing has been driven largely by a maturation of the active investment community, the improvement in passive delivery of well-known benchmarks and increasing awareness on the investor side.

Introduction

Many nations have built their wealth out of the raw materials within their borders. In the oil-rich nations of the Middle East and the bread-basket regions of the American Midwest, the Ukraine, and south-central Asia; in Indonesia and Africa, with exotic hardwoods, and in southern Africa and Colombia, with precious metals and gems — growing and extracting wealth from Mother Earth is big business and has been for millennia. Yet, as has been the case with many real assets, how investors access such investments is new and different. In particular, while opportunities still exist for investing directly in growth and extraction, these types of investments may require special expertise to assess.

Today the options for investors looking to gain exposure to these markets run the gamut from passive and enhanced indexing, active long investing and even pure-alpha long/short fund strategies. Commodity exposures can be gained by holding the commodity futures themselves (either in a fund structure or directly) or by investing in commodity-linked equities. The primary benefits of a commodity investment within a portfolio relate to its low expected correlation with traditional asset classes and its expected relationship with inflation over time.

Investors are drawn, in particular, to portfolios of highly liquid collateralized commodity futures (CCFs), due to their historical returns and diversification to equities and bonds and their potential for providing inflation protection over long periods of time. In addition to holding CCFs, investors may also hold physical commodities, commodities ETFs, swaps,

uncollateralized futures, long and short futures holdings and commodity-linked equities.[1] Because of the popularity of CCFs in the commodity space, this paper is focused mostly on CCFs.

The pages that follow include exhibits designed to demonstrate the properties of CCFs; an exposition on Russell's choice of benchmark, the Dow Jones UBS Commodity Index (DJ-UBS); and illustrations of how Russell recommends including CCFs in a model portfolio context.

The three primary reasons for including CCFs in a portfolio are diversification, returns prospects and a longstanding relation to inflation.

Rationale for inclusion in a portfolio

The three primary reasons for including CCFs in a portfolio are diversification, returns prospects and a longstanding relation to inflation. As well, CCFs are highly liquid securities, and they enjoy a rich opportunity set for active management.

In the most typical benchmark-like scenarios, CCF investing involves three components: purchasing near-month commodities futures; collateralizing that futures purchase at 100% (with a combination of margin requirements and invested cash); and rolling the futures contracts before expiry.

DIVERSIFICATION

CCFs have shown low historical correlations to equities and to equity-bond mixes.[2] In Exhibit 1, we observe the correlations of real assets, including DJ-UBS to represent CCFs, both separately and together, to an equity-bond mix. It is notable that DJ-UBS has the lowest historical correlation of the listed real assets with the equity-bond mix. To illustrate the effect of the global financial crisis (GFC) that began in September 2008, we include the pre-GFC sample period. The GFC dramatically increased the correlations of all liquid asset classes as investors sold anything that would sell to meet cash flow needs. Even in this unusual period, commodities remained one of the stronger sources of diversification. Because of the unique drivers to commodity returns, we expect correlations to return to historical levels over time.

Exhibit 1: Correlations of various markets to Russell 3000® and BarCap Agg

Index	Sample period	S&P Listed Infra	EPRA NAREIT	DJ-UBS	Russell Global ex- US	BarCap Agg
Russell 3000®	February 1991–June 2010	0.65	0.68	0.26	0.77	0.10
	February 1991–August 2008	0.52	0.56	0.07	0.74	0.05
BarCap Agg	February 1991–June 2010	0.29	0.19	0.06	0.05	
	February 1991–August 2008	0.24	0.14	0.00	-0.05	

S&P Listed Infra = S&P Listed Infrastructure (December 2001–June 2010) and UBS Global Infrastructure & Utilities (October 1997–November 2001).
BarCap Agg = Barclays Capital U.S. Aggregate Bond Index
EPRA NAREIT = FTSE EPRA NAREIT Index
DJ-UBS = Dow Jones UBS Commodities Index Total Return.
Indexes are unmanaged and cannot be invested in directly. Past performance is not indicative of future results.

[1] Commodity-linked equities are simply listed stocks with a strong exposure to commodities. Examples may include oil company stocks, mining company stocks, etc. We do not cover commodity-linked equities here for two reasons. First, they do not offer the same degree of diversification to equities as are available with CCFs. CCFs are more distinct as a separate asset class. Second, accessing commodity-linked equities is quite similar to accessing other specialist equity funds, and requires less explanation.

[2] The February 1991 start of the sample period is reflective of the available history for the DJ-UBS Commodity Index.

RETURNS

CCFs have historically offered attractive returns. The investor earns a cash return (essentially a Treasury Bill return, as most collateral is invested in T-Bills) plus the return of the rolled futures contracts.[3] (The active management opportunities are reviewed in a subsequent section of this paper). The average excess return over Treasury Bills has been greater than 3% over the February 1992 through December 2009 sample period. The source of returns is highly debated, but returns have been robust for decades.[4] Ross (2010) offers the rebalancing of lowly correlated, mean-reverting assets as a viable explanation for historical return levels and also lists several previous studies with other identified return sources.

In Exhibit 2 we observe the historical returns for the DJ-UBS, the equity-bond mix defined above and a combination of equity-bond mix (at 80%) with CCFs (at 20%). Indeed, we observe that adding CCFs to an equity-bond mix has the effect of largely preserving historical return levels while reducing (or at the very least stabilizing) volatility.[5] Notably, this effect was dampened in the wake of the GFC. Prior to GFC, CCFs materially increased the Sharpe ratio from 42% to 63%. One of the effects of the GFC has been to lower the Sharpe ratios of portfolios with CCF to the level of those without CCFs. However, even including this time of material stress, the addition of CCFs has not seemed to erode long-term returns or to increase volatility.[6]

Exhibit 2: Historical monthly returns DJ-UBS, equities and fixed Income

Index	Sample Period	Total Annualized Return	Standard Dev.	Sharpe Ratio
DJ UBS	February 1991–June 2010	5.23%	14.57%	8%
	February 1991–August 2008	8.20%	13.10%	10%
Russell 3000®	February 1991–June 2010	8.30%	15.17%	27%
	February 1991–August 2008	10.26%	13.62%	34%
BarCap Agg	February 1991–June 2010	6.97%	3.80%	54%
	February 1991–August 2008	6.87%	3.68%	66%
60/40 Equity-Bond Mix	February 1991–June 2010	8.07%	9.38%	42%
	February 1991–August 2008	9.15%	8.37%	50%
48/32/20 Eq-Bond-CCF	February 1991–June 2010	8.09%	9.32%	42%
	February 1991–August 2008	9.45%	7.38%	63%

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

COMMODITIES AND INFLATION

The U.S. Consumer Price Index (U.S. CPI) may be decomposed in a variety of ways. As of December 2010, goods derived (in part) from raw materials make up approximately 40% of U.S. CPI, with services making up the remainder.[7] One might take from the construction of U.S. CPI that commodities should have a strong influence on U.S. CPI levels. While cost-

[3] Please see Appendix for an explanation of cash plus rolled futures returns.

[4] A long list of papers discussing the sources of CCF returns may be found in Ross 2010.

[5] Results for different sample periods are available from the authors.

[6] Sharpe Ratio is (Return of Investment – Return of Cash)/Standard Deviation of Investment.

[7] The U.S. CPI percentages come from the U.S. Bureau of Labor Statistics website: http://www.bls.gov/cpi/#data. In this paper, we use the CPI-U or Consumer Price Index for All Urban Consumers, seasonally adjusted percentage change form.

push inflation has been experienced in the past (most notably in the 1970s with regard to oil markets), many factors influence U.S. CPI, such that a correlation between monthly commodities and U.S. CPI is only +0.22.[8] For the same sample period, the U.S. CPI's correlation with the Russell 3000® Index is +0.07 and with the Barclays Capital U.S. Aggregate Bond Index (BarCap Agg), -0.12.

So why is the monthly correlation between the U.S. CPI and commodities not higher? Many things influence price levels, including actions by the Federal Reserve Bank and other reserve banks globally; labor productivity; and the prices of inputs, such as commodities, but also including facilities costs. Moreover, the volatility of commodities and other liquid assets swamps any relationship commodities might have with short-term inflation. Lower frequency data tends to dampen this volatility; for example, using annual data, DJ-UBS shows a 0.75 correlation to U.S. CPI from 1991 through 2009. Murray and Ross 2010 show many details on correlations of various assets to inflation with multiple data frequencies. While the short-term volatility associated with commodities may frustrate an investor seeking to hedge inflation, a long-term relationship is quite apparent. Ultimately, as we observe in Exhibit 3, adding commodities and other real assets to a portfolio indicates it will improve its ability to outpace inflation over the long term.

Exhibit 3: Historical frequency of outperforming U.S. CPI by 3% or more

	EPRA NAREIT	DJ-UBS	S&P Listed Infra	Russell 3000®	Russell Global ex- US	BarCap Agg.	60/40	48/32/20 Eq-Bond-CCF
Rolling 3 Years	65%	64%	71%	63%	62%	71%	64%	73%
Rolling 5 Years	64%	64%	89%	58%	52%	70%	57%	67%
Rolling 10 Years	96%	87%	100%	74%	44%	92%	75%	87%
Through Aug 2008	100%	100%	100%	100%	100%	100%	100%	100%
Feb 1991 – Jun 2010	100%	0%	100%	100%	0%	100%	100%	100%

Sample period is February 1991 through December 2010. The starting point is purely a function of the available history for the DJ UBS. Results are specific to the sample period chosen.
Indexes are unmanaged and cannot be invested in directly. Past performance is not indicative of future results.

A most fascinating observation from Exhibit 3 is that DJ-UBS is one of the few asset-class representations not outperforming CPI + 3% cumulatively over the entire sample period. While DJ-UBS may have a higher correlation to inflation than other asset classes and nicely assists the entire portfolio in outpacing inflation, it may not do so in isolation.

Distinct from other asset classes

Individual physical commodity prices are determined by their own demand and supply conditions. Physical suppliers (producers) will be influenced by a variety of factors, including environment, geopolitical events, labor issues and weather. Physical demanders (consumers) will be driven by global and local economic development, demographic shifts, currency fluctuations, technological change and political factors.

Individual physical commodity prices are determined by their own demand and supply conditions.

[8] We calculated a 0.22 correlation of U.S. CPI with DJ-UBS from February 1991–June 2010.

Exhibit 4: Price-driving factors in commodity markets

Environmental	Environmental risk is a significant factor in commodities markets, especially in the agricultural and energy sectors. "Desert-ification" and increasing contamination of water tables will put pressure on agricultural commodities, while energy commodity fundamentals will always include a consideration of environmental impacts.
Geopolitical	Continued unrest in the Middle East, along with sporadic rioting over agricultural commodities, is 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 the U.S. dollar. 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 of some commodities (including wheat, rice and oil).
Technological Change	Technological change can have a material impact on commodity prices, particularly in 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.

CCFs have yet another layer or two of important influence. While spot prices are governed by the market factors affecting producers and consumers, futures are even more complex. As will be described in more detail below, most commodities investors are rolling near-month futures contracts to gain exposure to commodities markets. In Exhibit 4, we show some detailed information about several commodities spot price drivers.

COLLATERALIZED COMMODITIES FUTURES

The primary method of gaining commodities exposure is via CCFs. For the investor with a mind toward liquidity and ready diversification across sectors, commodities may be accessed through the futures market. The method made popular by well-known indexes such as the DJ-UBS is to purchase a notional value in near-month futures (e.g., $100 invested equals $100 of exposure to commodities). While the futures exchange may require that only 10% be held on margin, and considering that the margin will earn a cash return (usually 30-day Treasury Bills), to fully collateralize that investment, the investor will then post the remaining 90% in a similar cash account (also, typically, 30-day Treasury Bills). When a near-month futures contract for any individual commodity is purchased, eventually that futures contract will expire and cause physical delivery of the commodity. To avert physical delivery *and* stay invested in the asset, the investor would sell the futures contract just prior to expiry and purchase the next near-month contract. Such a practice is commonly called "rolling" a futures contract. Due to the need to continually roll futures contracts, the investor never actually earns spot return, but rather a derivative of spot that is influenced by the shape of the futures curve. If it is upward- (downward-) sloping, i.e., in contango (backwardation), then the investor is consistently paying (getting paid) to stay in the commodities market. Contango is a particularly prickly subject with investors who are benchmark-sensitive. However, compared with benchmark definitions, active managers

may be more free to avoid contango when the movements of spot prices do not justify paying to be in the market.

PHYSICAL COMMODITIES

The primary challenge of investing in physical positions is the need to store the commodities. Holding physicals is potentially attractive when storage is easy, as in the case of some metals. Holding physical gold in the form of coins or bars is quite common among smaller investors. Larger investors may buy bullion that is stored in a professional facility, but will need to cover storage and security costs. Specialist firms will assist investors desiring to hold physical gold. Agricultural commodities can be difficult to store, due to spoilage, and this is generally the domain of more sophisticated investors. Energy commodities may often be stored, but doing so can be quite costly.

COMMODITY ETFS

Commodities may be accessed through Exchange Traded Funds (ETFs). The commodity ETF investor will want to be certain that the ETF has a history of closely tracking the commodity benchmark, as many have exhibited substantial tracking error.

COMMODITY-LINKED EQUITIES

In some cases, there are ways to gain exposure to commodities through equity holdings. The benefits of utilizing equities include liquidity, easy access for retail investors (as with any other equity investment), and analysis and mechanics similar to those employed with other equity investments. The drawbacks of commodity-linked equities are that linkage with commodity prices may not be as strong as the investor desires, and that the level of diversification to other equities (as compared with CCFs) may be low.[9] To illustrate the relationship among commodity-linked equities, U.S. equities and CCFs, we include Exhibit 5. While the correlation between the Russell 3000® and the DJ UBS is 0.36, the correlations between the commodity-linked equity composite and the Russell 3000® is approximately double that.

Exhibit 5: Correlations of monthly returns for commodity-linked equities, U.S. equities, and CCFs.

Index	Commodity-Linked Equities	Russell 3000®
Russell 3000®	0.71	
Dow Jones UBS	0.63	0.36

Sample period January 1999 through December 2010
Commodity-linked equities are an average of the energy and materials sectors of the Russell 3000®, weighted to reflect their index representation on an annual basis.
Indexes are unmanaged and cannot be invested in directly. Past performance is not indicative of future results.

Investors interested in commodity-linked equities have a few options. They may seek out active managers who specialize in this area, look to specialized ETFs or listed closed-end funds,[10] and even consider index products.

[9] Commodity-equities (as defined by the Materials & Processing and Energy sectors of the Russell 3000® Index) comprise roughly 15% of the index at the writing of this paper.

[10] Any investor looking at listed closed-end funds should be aware of (sometimes deep) discounts that often follow an initial public offering.

Major asset class segments

CCF indexes offer four major sectors: energy, metals, agriculture and softs. Some indexes will separate industrial from precious metals, and some view livestock separately from the rest of the agricultural commodities. Softs are described in Exhibits 5 & 6 below. Going beyond CCF indexes, commodities (or, more generally, raw materials) may include timber, uranium, coal, electricity, gems and any other grown or extracted materials. A more liberal interpretation of "raw materials" may include a nexus with real estate or infrastructure as well as timberlands, gas and oil fields, commercial farms and the like. The binding tie here is growth and extraction.

Benchmark

Several commodities benchmarks are well known in the industry. Benchmark providers need to make two essential decisions: which commodities to include, and how to weight them. Some prefer to cast a wide net to include a very broad roster of commodities, many of which are relatively illiquid, with the result that an index can be difficult to efficiently and cheaply implement. Others develop a sample of commodities representing the major components of various segments.

The two most liquid and widely used indexes are the S&P GSCI (Goldman Sachs Commodity Index) and the DJ-UBS. Other well-known indexes include the Reuters-Jefferies Index and the Rogers International Commodities Index (RICI). The Reuters-Jefferies and RICI contain illiquid commodities, and are thus less practical for investors seeking liquidity. All of these indexes roll front-month contracts to represent their constituents. This restriction to front-month contracts creates many opportunities for active managers to add alpha. The practices of active managers are reviewed below. Investors seeking index returns will often replicate by using swaps.

Russell believes that due to its diversification and liquidity, the DJ-UBS is the more appropriate benchmark for active investing.

The S&P GSCI is well known for its massive allocation to energy (typically upwards of 70% of the index); it offers less diversification among commodities markets. The S&P GSCI derives this massive allocation to energy by relying on production weights and includes only highly liquid CCFs. The DJ-UBS has a maximum allocation to any sector of 33% and uses both production and liquidity to set its weights. As a result, the DJ-UBS is more diversified than the S&P GSCI while maintaining a similar level of liquidity. The DJ-UBS reconstitutes annually.

Russell believes that due to its diversification and liquidity, the DJ-UBS is the more appropriate benchmark for active investing. For a detailed exposition of Russell's choice of benchmark, see Paris 2010. Exhibit 6 shows the various allocations of DJ-UBS to its underlying components. Exhibit 7 shows the same for the S&P GSCI.

Exhibit 6: The Dow Jones-UBS Commodity Index constituents - 2011

DJ-UBX Index Constituents – 2011 Target Weights

Energy (33%)		Agriculture (28.4%)		Metals (31.1%)		Softs (7.5%)	
Natural Gas	11.2%	Live Cattle	3.4%	Aluminum	5.2%	Sugar	3.3%
Crude Oil	14.7%	Lean Hogs	2.0%	Copper	7.5%	Cotton	2.0%
Gasoline	3.5%	Wheat	4.6%	Zinc	2.8%	Coffee	2.4%
Heating Oil	3.6%	Corn	7.0%	Nickel	2.3%		
		Soybeans	7.9%	Gold	10.4%		
		Soybean Oil	2.9%	Silver	3.3%		

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

Exhibit 7: The S&P Goldman Sachs Commodities Index constituents - 2011 target weights

S&P GSCI Index Constituents – 2011 Target Weights							
Energy (71.8%)		Agriculture (13.1%)		Metals (11.3%)		Softs (3.8%)	
Crude Oil	32.7%	Wheat	3.6%	Aluminum	2.6%	Sugar	2.6%
Brent Crude	15.0%	Kansas Wheat	0.9%	Copper	4.0%	Cotton	1.9%
Gasoline	4.9%	Corn	4.3%	Zinc	0.7%	Coffee	1.0%
Heating Oil	4.6%	Soybeans	2.7%	Nickel	0.8%	Cocoa	0.3%
Gas Oil	6.3%	Live Cattle	2.6%	Lead	0.5%		
Natural Gas	3.2%	Feeder Cattle	0.4%	Gold	2.7%		
		Lean Hogs	1.5%	Silver	0.5%		

Source: Morgan Stanley. Indexes are unmanaged and cannot be invested in directly.

Liquidity issues

The DJ-UBS and other indexes are highly liquid collections of commodities futures. CCFs are generally highly liquid particularly when trading in the front month of the largest 20 commodities. Some thinly traded commodities, such as greasy wool, are less liquid though priced on exchanges. Moreover, as one moves away from front-month contracts into 6-, 12- or 24-month contracts, liquidity may be reduced materially. Commodity index futures, ETFs and commodity-linked equities are likely to be quite liquid.

Commodity investing may be illiquid in the case of private investing. For example, investments in timberland, oil and gas fields, privately owned mines or commercial farms behave like private equity investments and may have lock-ups. These investments are likely to have a very unique return profile, which improves their ability to diversify equity and debt exposures. As well, their evaluation requires a high level of skill and they command high initial investment capital (often in the range of $5-$10 million for each investment). Therefore, creating a diversified portfolio of private commodities may prove challenging.

Cash Flows

There is no yield associated with CCFs. Investors needing cash flows from their CCF holdings may either sell futures contracts prior to the expected roll date to liquidate, or redeem at roll by rolling fewer contracts (or by selling any time). In the case of index futures or ETFs, it is a similarly straightforward process to liquidate as needed.

Exposure to commodities through equity positions of producers will typically provide a dividend yield that is comparable to yield available in the broad equity market. Similarly to other equities, dividends may be received as cash flows. Alternatively, equity securities may be sold for cash flow purposes.

Active management potential and common strategies

In recent years, active 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 seen 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 forward 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, outright long or short directional bets, and options trading.
- 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.

TRADING CCFS[11]

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 it is 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. Managers are also able to add value relative to the benchmark by rolling their positions before or after the index roll dates. This strategy can provide considerable excess return opportunities, due to the large numbers of assets that are rolled during the index period.
- **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 (e.g., “crack spreads,” such as crude/gasoline).[12] Spread trades are typically 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, but managers will typically avoid 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

[11] Kayser, Lee (Sep. 2009). “Active Commodity Investing.” *Russell Research Report*

[12] ”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.

volatility, or to structure relative-value trades similar to those via spread trading with futures contracts.

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:

- **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 inventories. 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.

ACTIVE MANAGEMENT STRATEGIES[13]

Active managers of CCFs can generally be categorized into a small number of buckets—most typically Enhanced Indexers, Fundamental, and Price-driven (or Systematic). These strategies can be combined within a single product or as specialized vehicles, and they offer excellent diversification to each other.

- **Enhanced Indexers.** For many investors, including individuals who are not "qualified investors," enhanced indexing is likely the only possible way of achieving excess of benchmark performance. Enhanced indexers are mostly restricted to curve positioning, with an emphasis on rolling futures before or after indexers, and taking some risk in the collateral (enhanced cash). Enhanced cash involves utilizing some strategies designed

[13] The excess return and tracking error targets provided in this section are based on conversations Russell has had with multiple managers over time. Information is collected during the manager research process and the target ranges provided is derived from these conversations. Targets are not intended to predict the performance of any actual investment and we expect that actual performance will vary by investment.

to improve the performance of the collateral over the Treasury Bills return. In the wake of the recent global financial crisis, cash enhancement is less popular. More to the point, enhancing cash does not create a "commodities alpha," and is inconsistent with the idea of active commodities investing.

Excess return target: 1% to 2%.

Tracking error target: 2% to 4%.

- **Fundamental.** Fundamental commodity managers focus on developing a picture of the "balance sheet" for a raw material. This balance sheet reflects either the current or the projected state of supply/demand — sometimes called "stocks to use." This is very similar to a stock analyst's re-creating a company's financial statements and then comparing them to the public filings. Rather than relying only on reports released by agencies such as the U.S. Department of Agriculture or U.S. Energy Information Administration, a fundamental commodities manager will endeavor to create an alternative (and in their opinion, more accurate) description of the supply/demand balance. They may use a combination of third-party or in-house specialist resources. Fundamental managers may be fully discretionary, completely systematic, or some combination of the two. A manager considered discretionary will exercise complete control over positions, relying primarily on bottom-up information and industry knowledge to size the positions and enter/exit trades.

  Benchmark relative active managers:
  Excess return target: 2% to 4%

  Tracking error target: 4% to 8%

  Absolute return (benchmark unaware hedge funds) active manager:
  Total return target: 10% to 20%

  Standard deviation target: 15% to 25%

- **Systematic/Price-driven.** These strategies are systematic and model-based. Once a model identifies a directional price signal, a position is taken (long or short) to participate in the price momentum. Trade entries and exits are implemented by the use of trading "stops" or by signals generated by models with different time horizons. Because of the price-focused nature of this type of strategy, the same model may be traded across multiple commodity markets. Finally, trading models may be characterized by the specific technique employed, including break-out, reversal, mean reversion or pattern-recognition. This approach is also associated with the managed futures managers.

  Absolute return (benchmark unaware hedge funds) active manager:
  Total return target: 10% to 15%

  Standard deviation target: 15% to 25%

Model weights within the asset class

The universe of long-only commodities managers is small—dozens rather than hundreds. This small universe is dominated by enhanced indexers. Within the commodities asset class, investors would benefit from combining fundamental managers with price-driven managers and possibly enhanced indexers. For individual investors, where enhanced indexing and commodity-linked equities are the extent of possible active management, diversification is more difficult to achieve, and the choices are more limited.[14] Including

[14] Most individual investors in the U.S. are limited to "40 Act" funds. In many European countries, the UCITS protocol created similar restrictions. The 40 Act precludes such funds from purchasing commodities futures. Therefore, only minor deviations from indexes are possible. High- net-worth investors and institutional investors have all of the

enhanced indexers may be less attractive for benchmark-agnostic investors. The excess return patterns of fundamental and price-driven managers should be quite diversifying.

Benchmark-agnostic investors may choose to include some highly active long-only or long-biased managers with long-short managers, commodity-linked equity managers and/or managed futures managers. ETFs may also be attractive if the investor has confidence in the ability of the ETF to replicate its underlying securities.

Conclusion

Commodities can be an important diversifier to equity and bond portfolios. They offer low levels of historical correlations, attractive return histories and the potential for improving a portfolio's stability during times of inflation. Investors with liquidity restrictions may be limited to working with CCFs to gain exposures. Individual investors may be further restricted to enhanced indexes or commodity-linked equities. Investors with a tolerance for lower levels of liquidity may be able to employ commodities long-short funds or even private investments in the broader category of raw materials. Risk-averse investors will be attracted to the diversification. Return-seeking investors can find opportunities to enhance returns through the active management of benchmark-agnostic funds (and possibly private investments). For most investors, commodities have the potential to enhance the portfolio's risk/reward characteristics over the long term.

Commodities can be an important diversifier to equity and bond portfolios. They offer low levels of historical correlations, attractive return histories and the potential for improving a portfolio's stability during times of inflation.

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options discussed in the previous section available to them. For the Investment Advisers Act of 1940 (40 Act) see http://www.sec.gov/rules/extra/iarules.htm. For details on Undertakings for Collective Investment in Transferable Securities (UCITS), a European protocol for retail investors, see http://www.fsa.gov.uk/Pages/library/index.shtml.

Appendix – Spot, Roll, and Yield

The standard decomposition of commodities futures return is spot, roll and yield.

Spot	defined as the ephemeral return associated with the spot price (flat price) of commodities.
Roll	defined as the difference between the rolled futures contract return and spot return.
Yield	defined as the return of the collateral and is usually equal to a cash rate, such as 1-month or 3-month T-Bills.

These terms can be somewhat misleading. For example, one often hears about the "roll return" being negative and a hindrance to earning the more attractive "spot return." The truth is that no futures investor actually earns spot—in fact, for most investors earning spot is not an option. To earn spot return, the investor must hold physical commodities. However in holding physical commodities, the investor must pay storage, insurance and often security costs. (Spoiled pork bellies are not only worthless, but probably expensive to unload, and security at Fort Knox does not come costlessly.) The futures investor only earns only the return from the futures and is not necessarily "losing money" from roll. The returns of futures may indeed differ from the returns of spot. This different return pattern may be more or less attractive than a physical return; but is certainly more liquid and, at the very least, achievable for many investors. We find it most instructive to think of the difference between futures and spot return as either the cost of being liquid in commodities markets, or in the case of a positive difference, a reward for making a market for someone else. To help illustrate these concepts, we include the subsection below.

SPOT, ROLL AND YIELD EXAMPLE: THE CASE OF KRYPTONITE

Let's assume we have an investor, Clark, with $100 to invest with the commodity Kryptonite. The spot price of a unit of kryptonite on February 15 is $99. That means that if Clark wants to take delivery on kryptonite, he would pay $99 for it. Unfortunately, kryptonite is very delicate to store (it must be kept in a lead vault), and it requires both security and insurance, which runs $1 per month. Moreover, Clark is not really interested in "owning" kryptonite; he just wants to have an investment in it, because he understands that another investor, Lex Investments, is driving the price up by purchasing in bulk. So ultimately Clark determines that buying a futures contract is the way to go. The price for the kryptonite 1-month futures contract is $100. Note that the 1-month futures contract is "more expensive" than the spot contract, and that this means that kryptonite is in *contango*. (If the 1-month future were less than spot, we would define this market as being in *backwardation*.)

In purchasing a futures contract, Clark is obligated by the futures exchange to post 10% on margin, which is in this case $10. This margin will be invested in Treasury Bills (T-Bills). Note that Clark still has $90 after posting this margin. To establish an unlevered investment, Clark will fully collateralize his futures purchase by posting the additional $90 (and 90%) and invest that collateral, again in T-Bills. With the purchase of the futures contract, Clark will earn a futures return on the notional amount of the contract, $100, and a T-Bill return on the same $100.

Now we fast-forward to March 14, and the futures contract is close to expiration. At this time the value of Clark's futures contract is $107.25, and the value of his collateral is $100.05. The market value of spot kryptonite is $107. (Note that they are close to convergence.) However, the spot price is largely extraneous information; Clark never engaged in the spot market, so in reality the price and price movements of spot kryptonite are irrelevant to him (we will come back to this point). Clark earned 7.25% from the kryptonite futures and 0.05% from the collateral, resulting in a total return of 7.30%.

So what about that spot, roll and yield? See Table A1 for details. Let's start with **yield**, because that is easy. Yield is the return on the T-Bills and equals 0.05%. Next, let's tackle **spot**. Spot is the return of spot kryptonite. On March 14, spot kryptonite is $107, providing a return of 8.08%. Finally, let's explain **roll**. Roll is equal to the futures return, 8.08%, less the spot return, 7.25%, resulting in a -0.83% roll return. Clark purchased commodity futures and T-Bills. He did not, at any time, invest in spot. Now let's review what happened here and debunk some myths:

- **Debunking Myth #1: Negative Roll ≠ Losing Money** – The futures contract earned 7.25%. The spot earned 8.08%. In the industry jargon, this means that the roll was a negative 0.83%. **Clark earned 7.25% from the futures contract.** Therefore, the jargon of the industry suggesting that Clark "lost money" on the roll has led us to a false conclusion. Suppose Clark had purchased physical kryptonite at the spot price. He would have incurred storage, security and insurance costs, and his return would have been 7.07% (less than the ephemeral 8.08% spot return *and* the realized futures return of 7.25%).
- **Debunking Myth #2: Contango ≠ Losing Money** – When Clark purchased his kryptonite futures, the market was in contango. **Clark made a positive return on his futures purchase in a contango market.** The relative prices of spot and futures are irrelevant to the investor. The only relevant prices are those of the futures price purchase and the futures price sale. These two prices define the return for the investor.

Exhibit A1: Numerical example of Collateralized Commodity Futures Return

	Feb 15 Value	March 14 Value	Return
Spot	**99.00**	**107.00**	**8.08%**
1-month futures contract	**100.00**	**107.25**	**7.25%**
T-Bills	100.00	100.05	0.05%
Roll return			-0.83%
Spot with costs	99.00	106.00	7.07%

THE MORAL OF THE STORY

The current jargon for collateralized commodity futures is that the investor earns spot, roll and yield. The only part of this trio that the investor truly earns is yield. Spot is unattainable, and roll is an artificial construction. The true return for the investor in collateralized commodity futures is the futures return and yield.

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