

Commodities

Handle with Care

- The allure of investing in commodity futures
- The dynamics of the futures market
- An in-depth look at futures' historical performance
- The perils of long-only, passive investing
- The best investment format for profiting from commodity futures

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Significant Research Conclusions

Investor interest in commodities—specifically via the buying of futures contracts—has been increasing as global demand for a wide range of raw materials has led to soaring prices. Strengthening the case for such investments are the long-term results of the most widely used commodity futures index, which boasts equity-like returns and powerful diversification benefits. In fact, its correlations with most asset classes have been negligible, and its performance during periods of rising inflation has been strong.

Despite these attributes, a thorough investigation of these investments leads us to recommend against their inclusion in a long-term strategic asset allocation. Our research finds:

- The performance record of the commodity futures index has been pulled up by a huge weighting in energy futures, whose returns have been atypical of the broader set. In fact, over the 20 years ending in 2005, the “average” commodity future underperformed both stocks and bonds.
- There are three elements of a commodity futures’ return: the return from commodity price changes, the return from “roll” (the spread between the price of the futures contract and the spot—or market—price of the underlying commodity), and the cash return (parties to the contract typically place their commitment in Treasury bills).¹
 - Over the last 50 years commodity prices have grown at an average of 2.5% a year, well below the rate of inflation. But capturing this return would have required unusual patience, because price levels tend to remain stagnant for decades, punctuated by bursts of performance.
 - The long-term return from roll for the average commodity future has been near zero, although the current spike in investor interest has pushed the prices of futures contracts—most notably those that are energy related—to levels where they are set to offer large negative returns from roll.
- Beneath these long-term averages lies massive dispersion in the performance of individual commodity futures.
 - Correlations between the various commodity sectors are near zero.
 - Returns of individual futures have diverged widely, ranging over the period we studied from 20% to (11)% per annum, with more than four in ten contracts posting negative returns.

These facts lead us to conclude that commodity futures are not a cohesive group of securities with a common set of performance drivers that investors can rely on to provide meaningful return for bearing investment risk. They are best evaluated one by one.

(continued)

¹ Parties to a futures contract are required to place only a small amount of their investment in a margin account. Typically, the majority of their commitment is placed in Treasury bills, which earn a virtually risk-free rate of return.

In fact, our research indicates that persistent pricing anomalies exist among and between individual commodity futures, offering opportunities that can best be exploited in a format in which the level of exposure can vary freely, and investments can be both long and short.

For example:

- Commodities' spot, or current, prices are responsive to such variables as real interest rates, price momentum, and a tendency to revert to their long-term average.
- The prospective return from roll has been a strong predictor of commodity futures' total

return. In general, buying futures trading at a discount to spot and selling futures trading at a premium to spot should add value over time.

Effective portfolio management exploits these types of relationships while taking advantage of the lack of correlation that exists between different commodity futures. Executed well, an actively managed portfolio of commodity futures can offer another potential source of added return, while adding little to overall portfolio volatility. A buy-and-hold approach, however, is likely to be far less effective. ■

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1. INTRODUCTION: COMMODITIES FOR THE LONG HAUL?

Ironically, it now takes about 1.4 cents' worth of zinc to make a penny and 6.4 cents' worth of (yes) copper to make a nickel. That may be a problem for the United States Mint, but it has been a boon for investors in those commodities. In fact, growing global demand for these and other raw materials has spurred a surge in commodity prices. Most dramatically, as of mid-2006 the price of oil had shot up by over 550% since 1999.

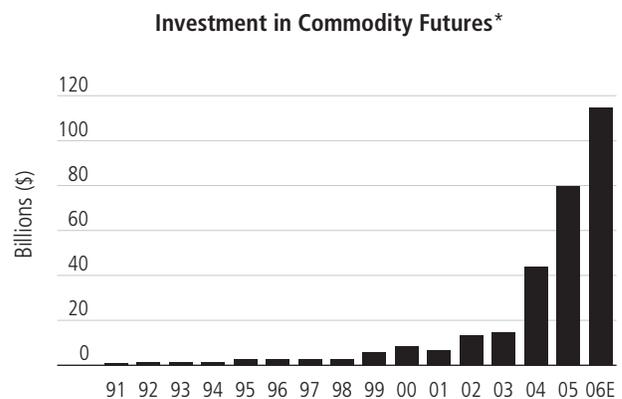
Having long conducted fundamental research into and invested in a wide range of commodity producers—from oil drillers and refiners to mining companies to agricultural enterprises—we at Bernstein are thoroughly familiar with the supply and demand factors that govern commodity prices. But the extraordinary global mania for commodities impelled us to examine more closely the pros and cons of investing in these raw materials through commodity futures contracts. Futures serve as proxies for commodities themselves and trade on public markets. And investor interest in them has been booming: Assets in commodity index futures have soared from less than \$10 billion in 1999 to what is projected to be more than \$100 billion in 2006 (*Display 1*).

The case for an investment in commodity futures can seem quite compelling. The most widely used index that tracks their performance, the

Goldman Sachs Commodities Index (GSCI), has posted long-term returns close to those of stocks, yet with a negligible correlation to stocks and to most other assets, providing valuable portfolio diversification. Moreover, commodity futures have offered a hedge against inflation—and inflation fears are rising from their low levels throughout the 1990s. Many institutions and private investors have added commodity futures to their portfolios, buying and holding them in anticipation of gains over time.

Display 1

Investors have rushed into the commodity futures market



* Passive investment in the Goldman Sachs Commodities Index (GSCI) and DJ-AIG Commodity indexes

Source: Dow Jones, Goldman Sachs, and AllianceBernstein estimates

Do Commodity Futures Deserve a Place in a Portfolio?

At Bernstein, we've long counseled clients to construct portfolios composed of different assets in fixed percentages that are determined by the risk/return potential of each. Low correlations between and among the assets can steady their portfolios over time. Given these parameters, should commodities be included in an overall portfolio?

After a thorough review of the fundamental drivers of commodity futures' performance along with their historical returns, we concluded that the case for assigning a permanent, long-only allocation to commodity futures rests on shaky ground. As it turns out, their gains have been sporadic, concentrated among just a few commodity types, and lower, on average, than those of both stocks and bonds.

Further, in our judgment, the groundswell of investor demand has depressed return prospects,

causing commodity futures in general to look unusually vulnerable today. These findings lead us to conclude that unlike stocks or bonds, commodity futures are not an asset class that investors can rely on to provide a meaningful return for bearing investment risk.

Paradoxically, the very performance idiosyncrasies that make commodity futures as a category unappealing for a long-only allotment to a portfolio make them quite attractive individually. They can be a potential source of additional return within an actively managed portfolio that can invest both long and short, and to varying degrees at different times. We believe that individual commodity futures' returns are in fact fairly predictable and that in-depth research can differentiate between those that are poised to appreciate and those that are likely to fall in value. ■

2. THE DYNAMICS OF THE FUTURES MARKET

The term “commodities” encompasses an eclectic collection of raw materials—wheat, cotton, sugar, coffee, beef, gold, copper, oil, and natural gas, to give a sampling—that, by and large, are used to produce other things. They can be broadly grouped into five categories: agriculture, livestock, precious metals, industrial metals, and energy (*Display 2*).

Commodities are bought and sold for cash at the going price on what is called the “spot market.” ExxonMobil stands ready to buy barrels of crude oil; Procter & Gamble looks to purchase beans to make Folger’s coffee; McDonald’s needs beef for Big Macs. But as all-too-tangible assets, most commodities are impractical for the ordinary investor to buy and hold. After all, if you decide that cattle are a sound investment, you might find it inconvenient to buy livestock and corral and feed them until they grow (literally) to fair market value. And buying the stocks of commodity producers is not the same as buying commodities. (See “A Closer Look: Can Stocks of Commodity Producers Stand In for Commodities?” on page 6.)

Futures Act as Proxies for Commodities Themselves

Enter a long-standing surrogate: commodity futures. These contracts are publicly traded, standardized agreements to buy or sell a specified quantity of a given commodity at a future date at an agreed-upon price—the “futures price.”² They’ve been used for more than a century, mainly by producers and consumers of commodities as a tool to hedge their businesses’ exposure to commodity price swings. Here’s how they work.

Imagine you’re a farmer ready to plant wheat that will be ready for sale in six months. If you could sell that crop at the *current* spot price of, say, \$4 a bushel, you’ll net a substantial profit. But like most commodities, wheat can be unpredictable: A bumper crop, for example, might flood the market, depressing prices; and if the price of wheat were to fall substantially, you could incur a heavy loss. So as a seller of wheat, you establish a short position in a wheat futures contract; you agree to deliver wheat

Display 2

Commodities consist of a wide variety of materials

Categories of Commodities		
Agriculture	Livestock	Energy
Wheat	Cattle	Crude Oil
Corn	Hogs	Natural Gas
Soybeans		Unleaded Gasoline
Coffee	Industrial Metals	Heating Oil
Sugar	Aluminum	Gas Oil
Cocoa	Copper	
Cotton	Zinc	Precious Metals
Oilseed	Nickel	Gold
	Tin	Platinum
		Silver

Source: Commodity Research Bureau (CRB) and Reuters

to another party in six months at an agreed-upon price. You’ve now got some insurance against a price drop, minimizing the risk to your bottom line.

Who might buy, or go long, this contract? One interested party might be a consumer of wheat—let’s say a large bakery chain. Its managers also covet protection, but in their case they fear the price of wheat will *spike*. Severe weather could spoil the harvest and create a supply shortage, causing the cost of making bread to rise, squeezing profits. By establishing a long position in wheat futures, they can lock in the price they will pay for wheat in the future, mitigating their risk.

A critical issue, of course, is the futures price upon which the parties agree, as that determines how costly it is for each to hedge. Depending on a host of factors, including the intensity of each party’s desire to offload the price risk, the amount they’re looking to hedge, and their expectations for the price of wheat in the future, the futures price they arrive at may be materially higher or lower than the current market price. And as potential supply/demand imbalances don’t affect both parties equally, it may be far more expensive for one party to hedge than the other.

² Futures are standardized contracts that are not actually entered into directly between buyers and sellers. A clearinghouse stands between the two interested parties and, in effect, guarantees that both buyer and seller will receive what they have contracted for. Participants need not worry about exchanging the physical commodity; instead, they can just enter into another contract that offsets the existing position before the contract expires.

A CLOSER LOOK: Can Stocks of Commodity Producers Stand In for Commodities?

An alternative approach to gaining exposure to commodity price changes may be to invest in the common stocks of commodity producers. After all, companies like Alcan, a large producer of aluminum; Phelps Dodge, a producer of copper; and ExxonMobil, the oil giant, should benefit if the prices of the commodities that they sell rise. That's certainly been the case over the last several years, as the stocks of most producers have tracked the ascent of commodity prices. We studied a longer-term record of performance, however, and found that although links between commodity stock returns and the corresponding commodities do exist, often the stocks do not make reliable proxies.

We studied the annual returns from a collection of oil exploration and production companies, aluminum producers, and miners of copper from around the world. We then compared them to commodity spot returns and found that they often move in the same direction. In 1998, the Asian financial crisis hurt global demand, sending the prices of crude, aluminum, and copper sharply lower—and those stocks followed suit (*display,*

facing page). In 1999 both commodity prices and stocks gained significant ground. But during other periods, this relationship broke down—at times in dramatic fashion. Take aluminum in 2001. The commodity weakened by more than 10%, but the stocks rallied as investors shifted into low-priced stocks following the bursting of the technology bubble. In 1997 crude oil prices took a heavy hit, but exploration and production stocks generated significant gains. Overall, the correlations of producers to commodities were approximately 0.3%—far from perfect.

There are numerous reasons why investors should expect the performance of producer stocks and commodities to diverge at times. First, commodity spot prices reflect the current supply/demand situation for the commodity. The equity prices of commodity producers, on the other hand, are more reflective of expectations of the future supply/demand relationship and its effect on company earnings. Further, in addition to having sensitivity to commodity prices, the stocks of commodity producers tend to be sensitive to broad stock market

The Role of Hedgers, Speculators, and Passive Investors

Here's where "speculators," another group of players in the futures market, come in. Speculators are commodity futures traders who enter the market not to hedge commodity price risk but to take it on—for the sole purpose of making money (*Display 3*). If producers are trying to off-load their commodity price risk by selling futures but there aren't enough consumers looking to hedge on the other side,

Display 3

Participants in the commodity futures market have different objectives

Futures Market Participants		
Type	Objective	Position
Producers	Hedge risk of falling prices	Seller (Short)
Consumers	Hedge risk of rising prices	Buyer (Long)
Speculators	Make money	Seller or Buyer

Source: AllianceBernstein

The stocks of commodity producers don't make dependable proxies for commodities themselves

	Returns 1996–2005					
	Oil Spot*	Oil Stocks*	Aluminum Spot	Aluminum Stocks	Copper Spot	Copper Stocks
1996	31.1%	67.3%	(9.5)%	0.4%	(22.4)%	5.5%
1997	(26.7)	10.5	2.0	1.3	(22.2)	(19.0)
1998	(39.6)	(48.0)	(18.3)	(6.9)	(16.2)	(24.0)
1999	140.2	44.8	24.3	60.2	19.6	69.6
2000	1.1	92.2	0.9	(28.6)	5.0	(30.8)
2001	(26.7)	(7.7)	(14.0)	33.0	(20.5)	0.3
2002	50.6	8.9	2.0	(20.3)	8.2	19.5
2003	7.4	82.0	13.2	80.2	38.2	182.2
2004	30.5	65.1	18.9	33.1	42.6	12.1
2005	44.5	74.9	21.5	26.7	45.8	56.3

* Spot is represented by crude oil, and stocks by oil exploration and production stocks.
Source: MJK Associates and FactSet

moves, as changes in interest rates or in economic growth can lift up or pull down a wide range of stocks. And owning a stock instead of the actual commodity exposes the investor to a host of company-specific factors—such as the decisions of company management—which

may significantly add to or detract from value. As we discuss here, these managers may hedge some of their exposure to commodity price risk through the futures market, reducing their sensitivity to spot moves—and thereby to stock-commodity correlations. ■

speculators might step in, provided they think the pricing of the future offers enough compensation for bearing the price risk. Speculators can either be buyers (long) or sellers (short) of the contract, depending on the opportunity and the direction they think the commodity is headed.

Portfolio investors represent an emerging, fast-growing group of participants in the commodity futures market. They take a passive approach to

commodity investing: They are always long—or buyers of—commodity futures contracts. Seeking to generate an investment return and to use futures to hedge their exposure to inflation, these investors hope for rising commodity prices and inexpensively priced futures contracts. ■

3. THE PROS AND CONS OF COMMODITY FUTURES

A review of the return history of the commodity futures index would seem to indicate that a long-only, passive approach has an attractive performance profile. As a starting point, we analyzed the historical return, risk, and correlation characteristics of the Goldman Sachs Commodities Index (GSCI). Just as the S&P 500 is a commonly used proxy for stocks and the Lehman Aggregate is for bonds, the GSCI is the most widely used index for commodity futures. Over the 20 years ending December 2005, the GSCI generated an annualized return approaching that of stocks but with notably more volatility (*Display 4*). One might surmise that commodity futures would appeal only to aggressive investors. However, there's more to building a successful portfolio than simply analyzing the risk-and-reward profiles of various investments in isolation.

Stock-Like Returns—Plus Diversification Benefits

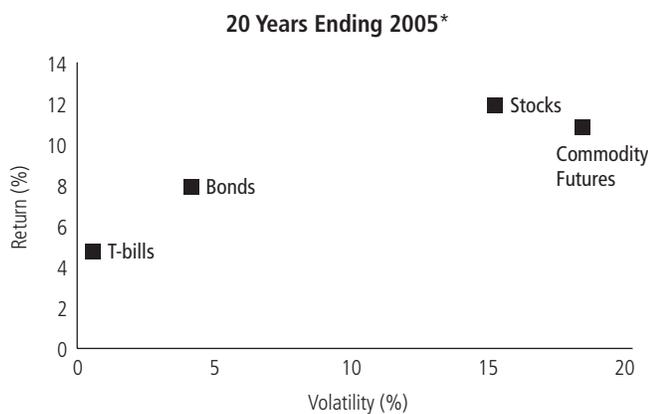
History has shown that few investments provide as much diversification as commodities. Over the past two decades, the GSCI has exhibited extraordinarily low correlations—around zero—to all major asset classes (*Display 5*).

This lack of relationship between commodity futures' returns and those of other asset classes is logical. Individual commodities may soar or plummet in the short term for myriad reasons that have no broad impact on stock and bond markets—a fire at a large oil refinery, political unrest in a developing country with huge copper mines, or severe, crop-ruining weather in the Midwest. And while some companies that sell commodities may benefit when prices rise, others may suffer if they are unable to pass through higher costs to their customers.

Beyond diversification, commodity futures can be attractive to investors for another reason: They can serve as a reasonable hedge against accelerating inflation. During all four episodes of rising inflation since the early '70s, commodity futures have outperformed both stocks and bonds (*Display 6*). Why do they exhibit this characteristic? First, commodities are part of the calculation of inflation measures like the Consumer Price Index (CPI), so rising commodity prices naturally flow through into the government's inflation computation. Second, periods of strong economic growth are often

Display 4

Commodities appear risky compared with other assets...



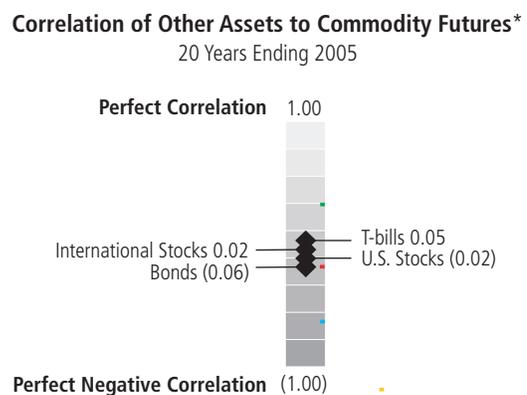
Past performance is no guarantee of future results.

* Stocks are represented by the S&P 500, bonds by the Lehman Brothers U.S. Aggregate Bond Index, T-bills by 3-month U.S. Treasury bills, and commodities by a fully collateralized investment in the Goldman Sachs Commodities Index.

Source: Federal Reserve, Goldman Sachs, Lehman Brothers, Standard & Poor's, and AllianceBernstein

Display 5

...But they also appear to offer diversification benefits



Past performance is no guarantee of future results.

* Stocks are represented by the S&P 500, bonds by the Lehman Brothers U.S. Aggregate Bond Index, T-bills by 3-month U.S. Treasury bills, international stocks by the Morgan Stanley Capital International (MSCI) index of Europe, Australasia, and the Far East (EAFE), and commodities by the Goldman Sachs Commodities Index.

Source: Federal Reserve, Goldman Sachs, Lehman Brothers, MSCI, Standard & Poor's, and AllianceBernstein

Display 6

Commodity futures often fare well during rising inflation

Annualized Returns During Inflationary Periods

Time Period	Change in Inflation (pts)	Commodity Futures* (%)	Stocks* (%)	Bonds* (%)
Jun 72–Dec 74	+9.0	55.8	(13.5)	3.1
Jan 75–Dec 76	(7.4)	(14.6)	30.4	12.5
Jan 77–Jun 80	+9.8	22.6	7.2	4.2
Jul 80–Dec 86	(13.5)	2.8	17.6	14.0
Jan 87–Dec 90	+5.0	29.7	11.8	8.5
Jan 91–Jun 02	(4.3)	2.5	12.4	8.0
Jul 02–Dec 05	+1.6	22.7	8.8	4.9

Past performance is no guarantee of future results.

*Commodity futures returns are represented by the GSCI, stock returns by the S&P 500, and bond returns by the Lehman Brothers U.S. Aggregate Bond Index.

Source: Bureau of Labor Statistics, Goldman Sachs, Lehman Brothers, Standard & Poor's, and AllianceBernstein

associated with accelerating inflation. As the demand for goods—along with the raw materials needed to make them—increases, commodity prices rise.

With returns just a tad below those of stocks, virtually no correlation to other assets, and a seemingly solid hedge against inflation—commodity futures might seem like a worthy addition to any diversified portfolio. But as we probed more deeply into commodity futures' appealing-sounding numbers, several issues emerged.

Commodities Index...or Energy Index?

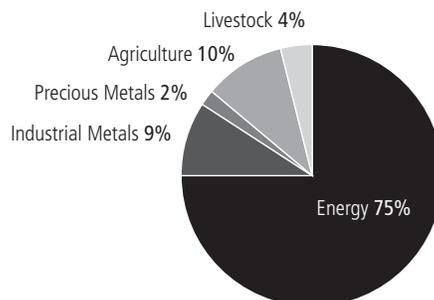
Let's start with those impressive historical returns; untangling them brings to mind slicing the Gordian knot. Because the GSCI is weighted by commodities' worldwide production—specifically the average dollar value of the amount produced over the prior five years—it assigns disproportionate clout to those commodities whose recent production volume has been the greatest.

Thus, as of this writing, energy futures comprise fully three-quarters of the weight of the GSCI (Display 7). To date, that has worked in favor of investors. Over the last 20 years, energy futures have posted annualized results in the high teens, a stunning per-

Display 7

Lately, GSCI returns have been dominated by energy futures

Composition of GSCI by Sector*



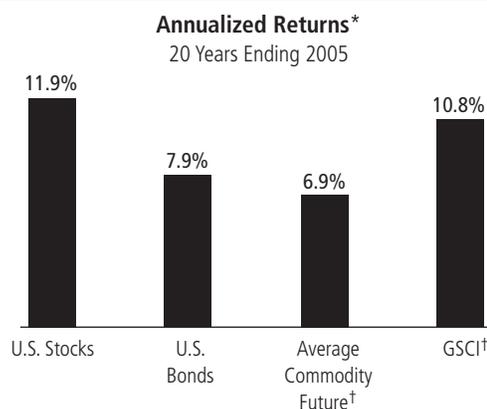
*As of June 15, 2006

Source: Goldman Sachs

formance that has materially boosted overall index returns for portfolio investors. But, going forward, investors now face the possibility that the returns posted by energy futures will fail to be as attractive (as we'll discuss on page 16). Meanwhile, the performance of the remaining pool of commodity futures has been less than remarkable.

Display 8

Commodity futures haven't done all that well, on average



Past performance is no guarantee of future results.

*U.S. stocks are represented by the S&P 500, U.S. bonds by the Lehman Brothers U.S. Aggregate Bond Index, and average commodity futures by all commodity futures traded on the Chicago Mercantile Exchange, Chicago Board of Trade, New York Mercantile Exchange, New York Board of Trade, London Metal Exchange, Kansas Board of Trade, International Commodity Exchange, Winnipeg Commodity Exchange, and Euronext Commodity Exchange (LIFFE) that had a CPI-adjusted monthly average daily trading volume in U.S. dollars that was greater than or equal to \$20 million.

†Fully collateralized

Source: CRB, Goldman Sachs, Lehman Brothers, MJK Associates, Standard & Poor's, and AllianceBernstein

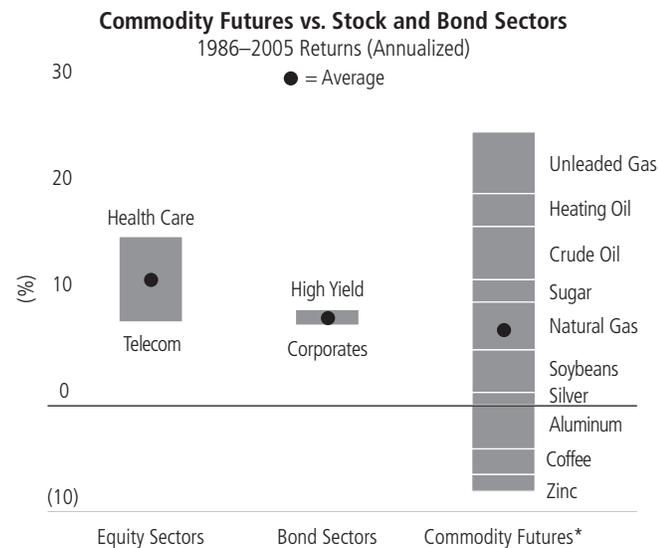
To correct for the GSCI's weighting skew to energy, we gathered data on a group of individual commodity futures spanning all five categories and calculated the average growth rate of each of the individual commodity futures over the last 20 years. Calculated this way, commodity futures don't look quite so dazzling. Their 6.9% average annual return lagged not only that of stocks—at nearly 12%—but also that of bonds, which grew at almost 8% (*Display 8, preceding page*).

Futures Flunk the Critical Asset Class Test

In fact, when we looked at the performance of different types of commodity futures, we found something quite significant: Returns were highly dispersed, far more so than is typical within the traditional stock and bond asset classes. The disparity among commodities is vividly illustrated by *Display 9*. Note first how the average annualized returns of the various S&P 500 sectors have ranged from 8% for telecommunications to 15% for health care over the 20 years

Display 9

Commodities are anything but a cohesive group of assets



Past performance is no guarantee of future results.

*Fully collateralized

Source: MJK Associates and AllianceBernstein

Display 10

Commodity sectors go their separate ways

	Livestock	Agriculture	Industrial Metals	Precious Metals
Energy	0.04	(0.07)	0.02	0.09
Livestock		(0.07)	(0.03)	0.04
Agriculture			0.20	0.04
Industrial Metals				0.10

Source: MJK Associates and AllianceBernstein

ending 2005. Regardless of the stock market sectors an investor may have owned, the rising tide of the market lifted all boats. Returns from the various bond sectors, meanwhile, bunched together at around 8%. With bonds, interest rates and sensitivity to changes in rates dominate performance.

In striking contrast, commodity futures roved all over the map, from annualized declines for zinc, aluminum, and coffee to 20%-plus returns for heating oil and unleaded gas. As no common driver of commodity futures' performance exists, no single underlying current sets their course.

Offering further evidence of the disparities among commodities, *Display 10* illustrates the correlations of commodity sectors to one another. Whether the comparison is between livestock and precious metals futures or energy and agricultural futures, correlation is virtually nonexistent. In fact, no two sectors have a correlation higher than 0.20. The lack of a common return driver for commodity futures leads us to conclude that they are not a cohesive asset class with similar characteristics that an investor can rely on to deliver meaningful excess returns over time. Commodity futures must be assessed one by one—from the bottom up—with a careful understanding of the components of return. ■

4. TRIPLE PLAY: THE COMPONENTS OF FUTURES' RETURNS

Understanding the attractiveness of any individual commodity future begins with assessing how it generates returns. There are three sources:

- *Commodity price movement:* Changes in the market price of the underlying commodity over the duration of the contract.
- *Roll return:* The difference between the future price and the spot price is the return available from roll. As time passes and the futures contract nears expiration, the futures price and the spot price converge, and the investor realizes roll return.³ Futures priced at a discount to the spot price yield a positive roll return, while those priced at a premium yield a negative roll return. (For more information on roll return, see “A Closer Look: Making Money in Futures—A Contango Lesson” on page 13.)
- *Collateral return:* To enter into a futures contract, the parties have to put up only a small percentage of the futures' value as a down payment. Often investors will place the remainder of their cash commitment in Treasury bills. The interest they earn is called the collateral return. Although these earnings (which were about 4.5% annually on average over the last 20 years) don't count as a direct gain from investing in the commodity future, they nonetheless factor in to the total return from the transaction.

On the Spot: A Long Wait for Not So Great Returns

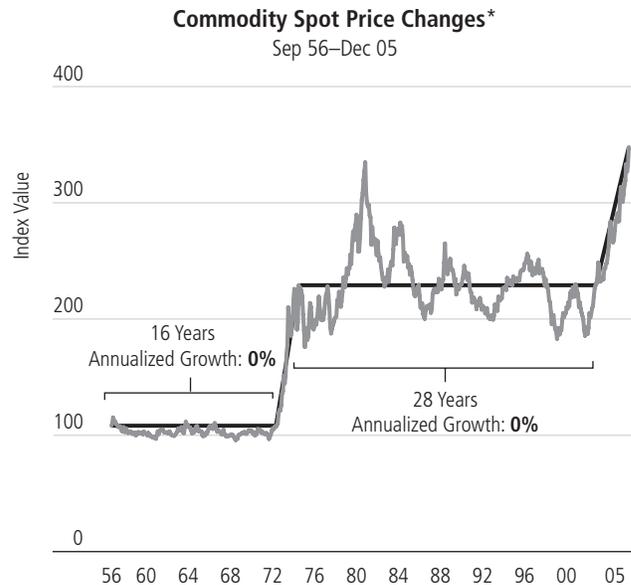
Let's start with commodity price changes. They are driven by a host of factors. Over the short term, political events and the weather can dominate; over the longer term, the key factors are more likely to be economic growth, scarcity (whether it is a renewable commodity or a depleting commodity), and technological improvements that lower the cost of production. For example, due to improvements in farming technology, the cost of producing wheat—a renewable commodity—has fallen by

approximately 15% over the last 10 years. In contrast, the cost of finding a barrel of oil—a depleting resource—has more than doubled, as improved technologies have failed to offset the increased costs that exploration and production companies incur as they drill in far-off corners of the world in the search for new reserves. It should not be surprising that wheat prices have been declining, while oil prices have been rising.

To get a long-term perspective on commodity price trends, we analyzed the Reuters-CRB spot price index—one of the few sources of commodity spot price data with a historical record dating back as far as 50 years. We found that commodity price growth has been relatively low. Since the mid-1950s, commodity prices have grown on average by only 2.5% per year—falling far short of the rate of inflation, which annualized at 4.1% over the period.

Display 11

Commodity prices: prolonged slumps—and sudden spikes



Past performance is no guarantee of future results.

* Reuters-CRB Index

Source: Reuters and AllianceBernstein

³ Since the owner of the contract is entitled to receive the commodity at expiration, the value of his right to that commodity approaches its market value—the price at which the owner can sell the commodity in the marketplace at the maturity date.

Further, the problem with commodity prices is that an investor might literally have to wait decades for them to ascend to a new, permanent, long-term plateau. From year-end 1956 to mid-1972—almost 16 years—commodity price movements resulted in a 0% annualized return, as *Display 11, preceding page*, illustrates. Had those investors with no inclination to put their investment capital to better use hung in through mid-1974, they would have benefited from a sharp upswing in prices: 42% annualized over that two-year period. Regrettably, this kind of prolonged slump/sudden spike is not a onetime event with commodities. Over the next 28 years, from mid-1974 through October 2002, commodity prices again rose 0% annually, on average. This malaise was broken by the recent spell of appreciation, which began in November 2002. Over the past 50 years, while commodity prices were advancing, on average, at an annualized rate of only 2.5%, their volatility was 11.2%. The lesson: Investors should be prepared for a difficult waiting game and low long-term commodity price growth.

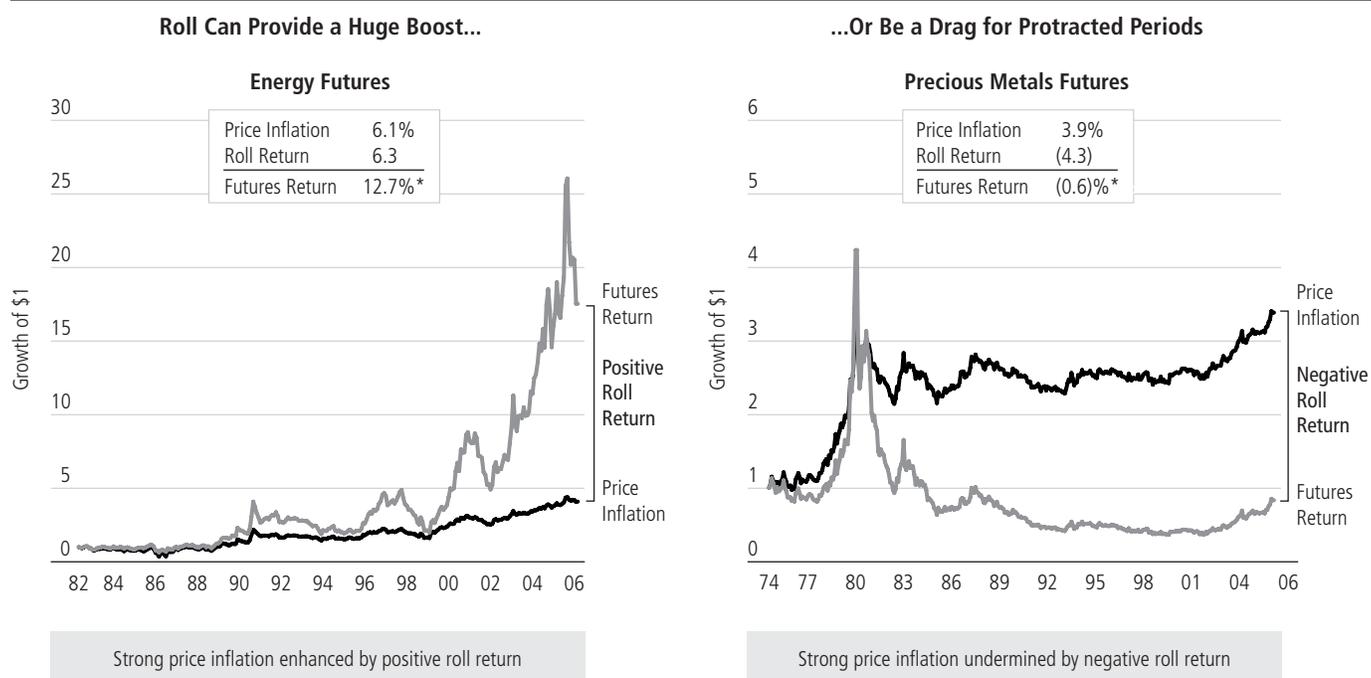
Rolling Up Gains—or Losses

If returns from commodity price increases have been episodic and slow in coming, has the return from roll added enough of an offsetting kick? Well, it certainly has been a key variable in the fortunes of particular futures contracts. Consider the two commodity sectors depicted in *Display 12*: energy, on the left, and precious metals, on the right. We went back to 1982, around the time oil futures began trading, and found that roll return has provided a big performance bonus. Spot price gains have returned about 6% a year, on average, over the past two decades, but because energy futures have typically traded at a sizable discount to the spot price, roll has been significantly positive. Thus, roll helped to more than double the total annualized returns of energy futures to over 12%.

But before getting too excited about the prospects for roll return, we should look at precious metals' futures, on the right. Precious metals' spot prices have risen at an annualized rate of about 4% over

Display 12

Whether negative or positive, roll has a powerful effect on individual commodity futures' returns



Past performance is no guarantee of future results.

Through March 31, 2006

*Totals do not equal sums of components due to compounding.

Source: MJK Associates and AllianceBernstein

A CLOSER LOOK: Making Money in Futures—A Contango Lesson

To understand how investors make money in commodity futures, let's walk through two examples. The basics apply whether an investor is long or short a commodity futures contract.

Say it's January and West Texas Intermediate crude oil is trading in the spot market at \$83 per barrel. Let's also say that an investor can go into the futures market and purchase a contract that will allow him to receive delivery of a barrel of oil in February at a futures price of \$80.

Commodity Price Movement: The first piece of the return puzzle is the movement of the underlying commodity—West Texas Intermediate—between the day the investor purchases the contract and the day he sells it (or it expires). If we assume that a barrel of oil increases from \$83 to \$84 over that time, he picks up \$1 in return due to the commodity's price appreciation (*display below, left*).

Roll Return: The next piece is the roll. Remember, futures contracts can be priced at either a discount or a premium to the current price, or spot price, of a commodity. Either

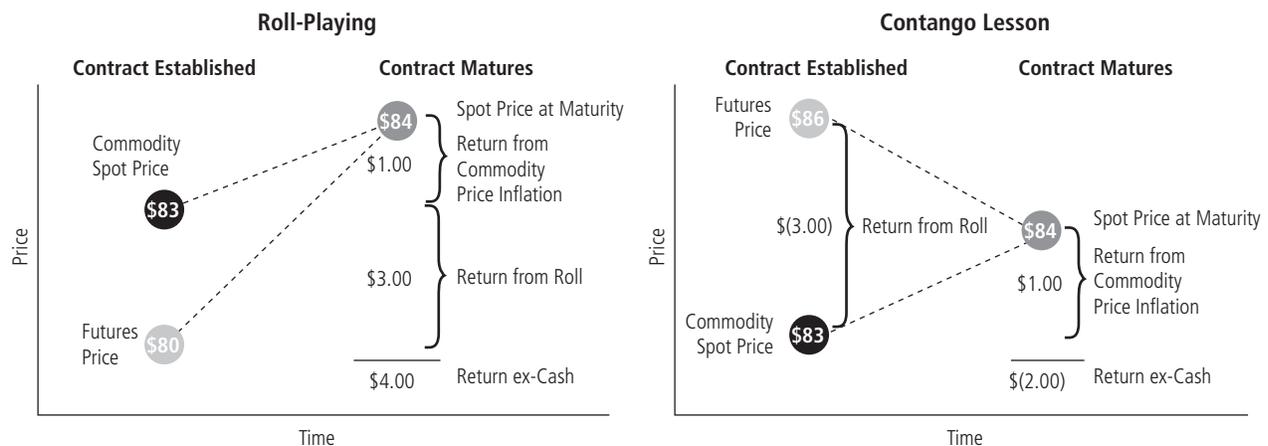
way, that differential evaporates over time, since the futures price will converge to the spot price as the contract nears expiration. Since our investor purchased his February oil contract at \$80, when the spot price was \$83—he'll pick up an additional \$3 in return from roll.* So the total return from the futures contract will be \$4: \$1 from price appreciation and \$3 from roll. When futures prices trade at a discount to the spot price, as in this example, they're said to be in *backwardation*.

In our second illustration, let's assume the futures price was much higher—that it cost \$86 to ensure February delivery of West Texas Intermediate (*display below, right*). That's a \$3 premium to the spot price. The technical term for a future priced at a premium to the spot price—as is the case here—is *contango*.

Here, the investor still picks up \$1 from commodity price appreciation, but loses \$3 to “negative roll.” The total “return” on this contract is therefore a loss of \$2. ■

* Investors also reap a cash return from investing their cash commitment to the futures contract, typically in Treasury bills.

How roll return and commodity price change work



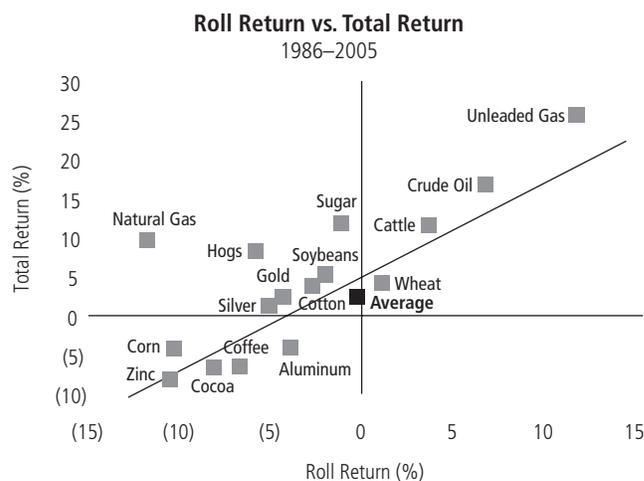
$$\text{Futures Return (collateralized)} = \text{Cash Return} + \text{Commodity Price Increments} + \text{Roll Return}$$

Source: AllianceBernstein

the past 30 years. But precious metals futures' prices haven't fared nearly as well—they've actually lost money! Why? Because these futures have almost always been priced at a hefty premium to the spot price—they've had a negative roll return. And the spot price performance hasn't been robust enough to overcome that headwind.

The importance of roll return isn't confined to these two sectors. In fact, it has been a dominant driver of total returns across commodity futures. To ascertain the relationship between the two, we plotted commodity futures' total return on the vertical axis and their roll return on the horizontal axis in *Display 13*. It turns out to be extremely strong. Futures that have generated positive roll returns have tended to produce good total returns, while those that have generated negative roll returns have tended to produce dismal total returns. (The latter has been the lot of coffee, cocoa, and corn futures.) A big drawback of a long-only investment strategy is that an investor typically will be purchasing a host of contracts that are priced to offer a large nega-

Display 13
Roll return tends to drive commodity futures' total returns



Past performance is no guarantee of future results.
 Source: MJM Associates, Reuters, and AllianceBernstein

tive roll return. When we averaged the full basket of commodity futures we studied, we found a less than impressive roll return of 0.2% a year over the past 20 years. ■

5. ROLL REVERSAL, OR THE PERILS OF BEING PASSIVE

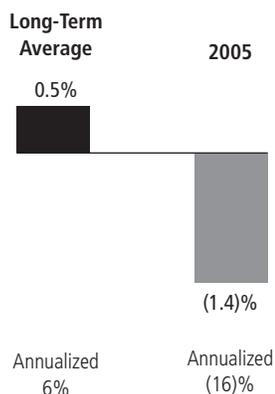
Roll return is not only helpful as a predictor of total returns, but it's also easily tracked in the marketplace—just look at the difference between the futures' prices and the spot price. Unfortunately, for many commodity futures—particularly energy futures—that differential has entered disturbing new territory of late. Long-only, passive investors have flooded into the market, pushing futures prices higher and thereby diminishing much of the opportunity for earning positive roll returns.

Take the most conspicuous case—crude oil futures. As of mid-2006, the futures curve for crude still had a significant upward slope. Investors had to pay a hefty premium to buy oil into the future. That's a big departure from history. Typically, crude has been priced at an average discount of 0.5% per month to the spot price (*Display 14*), which has worked out to an annualized return from positive roll on crude oil futures of about 6%, as we mentioned.

Display 14

Oil futures are priced to produce negative roll return

Monthly Roll Return from Oil Futures*



Past performance is no guarantee of future results.

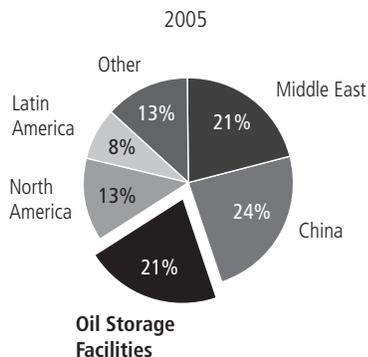
*West Texas Intermediate crude

Source: MJK Associates and AllianceBernstein

Display 15

Investors are a major source of growth in oil demand

Sources of Growth in Oil Demand



Source: Goldman Sachs, International Energy Agency, and AllianceBernstein

But more recently, roll has been costing investors around 1.4% per month. If this anomalous situation were to persist, crude oil futures would suffer a negative annual roll return of 16%. The spot price of crude would have to rise by more than 16% a year just for the futures contract to break even!

Still, investors in oil futures haven't felt much pain—at least not yet—because the price of crude has continued to appreciate rapidly. Ironically, our research indicates that investors' large-scale buying of oil futures may be artificially propping up the price of crude in the spot market. In a sign of how distorted the oil market has become, operators of crude oil storage facilities have been purchasing crude at today's lower spot price to deliver later at the higher futures price. (To do this, they enter futures contracts as sellers, or short parties.) As long as the cost of storing the oil is less than the difference between the futures price and the spot price, they can earn a profit virtually risk-free. In fact, we estimate that buying by these storage facilities in response to passive, long-only investors' demand now represents 21% of the growth in world demand for crude oil—behind only that of China and the Middle East (*Display 15*).

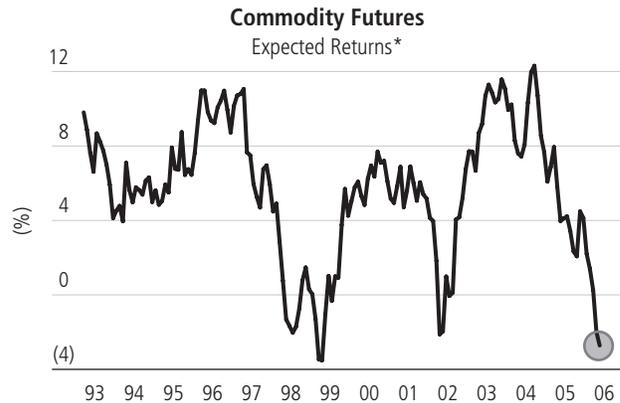
But what would happen if investors' fascination with crude oil futures were to wane, perhaps as a by-product of that forbidding negative roll return? Passive investment in commodity futures index funds might start to dry up, pressing crude oil prices downward. And that would not bode well for investors in a commodity futures index—like the GSCI—that leans heavily toward oil.

The Poor Outlook for Commodities in General

The attractiveness of commodities can vary substantially over time. In *Display 16*, we've charted our estimates of the aggregate return from the commodity futures in our study above the risk-free rate of Treasury bills during the past 13-plus years. In essence, this measure indicates whether being long an equal-weighted basket of commodity futures offers the prospect of positive returns for an investor willing to take on risk. For much of that time, commodity futures as a group did appear to offer an attractive return. But there were also several periods when investing in commodity futures did not appear to compensate investors for taking on risk. ■

Display 16

Commodity futures' expected returns have been volatile



Past performance is no guarantee of future results.

*AllianceBernstein's forecast average of expected returns for five commodity futures sectors, based on our expected-long-term-return model

Source: AllianceBernstein

6. A TACTICAL APPROACH TO COMMODITY FUTURES

Our research persuades us that always being a long-only investor in commodity futures is unwise. Commodity futures don't offer much in the way of long-term growth; their performance varies widely commodity by commodity; and their performance is highly volatile. Yet these very same characteristics, in the context of an investor willing to make active decisions over a much shorter time horizon, suggest to us a compelling strategy for generating returns from commodity futures: Make investment decisions commodity future by commodity future, taking advantage of those expected to appreciate by going long and those likely to depreciate in value by going short.

Getting a Fix on Commodity Price Movements

Of course, this approach requires that winning and losing commodity futures be predicted with some accuracy. We've identified several indicators we use in our expected return models to facilitate this. Not surprisingly, they're centered around forecasting changes in the spot price of the underlying commodity and capturing roll return. Although spot prices, subject as they are to such unpredictable supply and demand influences as weather and geopolitics, can be challenging to predict, our research indicates that it is possible to get a decent handle on spot price movements.

For starters, commodities, like many other financial assets, demonstrate significant price momentum: Once commodities begin to move—whether up or down—they tend to continue heading in that direction for some time before they undergo an overdue correction. Most participants and investors in the commodity futures market are slow to react to changes in commodities' underlying fundamentals that realign their supply-demand balance and that therefore ought to raise or lower their prices. By vigilantly monitoring those fundamentals and grasping their impact at the outset—this is where research comes in—active investors can gain an edge.

Another revealing but often overlooked clue to commodity price movements comes from interest rates. Short-term real—that is, after inflation—rates are directly related to overall economic activity. Lower rates tend to spur an increase in economic activity, and that points to a pickup in demand for commodities, which in turn tends to translate into rising commodity prices.

A third phenomenon commodity investors ought to be aware of is price reversion. When price momentum pushes prices too far out of line, price reversion inevitably sets in. This is the tendency of commodity prices to trend back toward their long-term averages, whether they have climbed too high or sunk too low. A too lofty commodity price ultimately brings about its own decline, because over time consumers conserve or find substitutes, thus lowering demand, while producers scramble to cash in on the high prices by tapping new supplies or developing alternatives, enhancing supply.

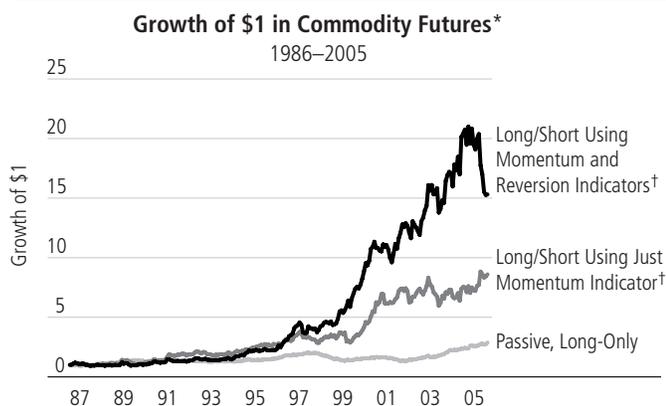
Leading Indicators: Cases in Point

To illustrate how effective these types of indicators can be in assisting in the selection of commodity futures, we simulated the performance of three portfolio strategies:

1. A long-only portfolio that assigns equal weighting to all the commodity futures in our study universe
2. A long/short portfolio that purchases commodity futures experiencing positive relative price momentum and sells short commodity futures experiencing negative relative price momentum
3. A long/short portfolio that purchases commodity futures that have attractive characteristics for both price momentum and price reversion and sells short those that have unattractive characteristics for that combination

Display 17, following page, graphs the growth of \$1 in these three portfolios. The portfolio that takes advantage of price momentum alone grows to nearly \$9 in 20 years, or about three times the

Price momentum and reversion provide clues to commodity selection



Past performance is no guarantee of future results.

* All portfolios are equally weighted and are rebalanced monthly.

† Portfolios are long commodity futures that fall into the top two quintiles based on the performance indicator and short commodity futures that fall into the bottom two quintiles based on the performance indicator.

Source: AllianceBernstein

amount of the passive, long-only portfolio. The portfolio that considers price reversion as an additional indicator does even better, generating more than five times the wealth of the long-only strategy.

Of course, paying attention to the roll return—the other important driver of total return from a commodity future—is also critical. Here, investors benefit from the fact that roll can be gauged directly from a commodity future’s price premium or discount to its spot price. More often than not, investors should be purchasers of contracts offering positive roll and short sellers of those offering negative roll.

Finding the Right Relationships

The last tool in an active management kit—yet in many ways the most crucial—is a comprehensive understanding of the relationships among commodities. As we’ve seen, commodities in general are anything but a cohesive group. Nevertheless, there can be pronounced linkages among commodities of similar type. Energy commodity futures encompass natural gas, unleaded gasoline, heating oil, gas oil (diesel), and two grades of crude oil, and all display meaningful similarities in their price movements. That makes sense, because gasoline, heating oil, and gas oil are all refined from crude oil, while natural gas often serves as a substitute for other fossil fuels.

Commodities that frequently follow similar price patterns, however, may not always behave alike when it comes to price momentum and price reversion. And, most important, they may have very different futures prices. For instance, West Texas Intermediate crude futures have recently been priced well above the spot price, while unleaded gasoline futures have traded well below the spot price. These sorts of opportunities among kindred commodities allow a manager with the ability to go both long and short to establish potentially profitable offsetting positions.

This strategy is not without some risk, however, as spot price relationships can diverge for periods of time. For instance, a shortage of refining capacity can drive up gasoline prices without any movement in crude prices. But capitalizing on the inherent—though indisputably complicated—correlations among related commodity futures (Display 18) through this sort of long-and-short strategy turns out to be less risky than just going long or short an entire commodity futures sector.

A long/short strategy can exploit relationships within commodity sectors

Average Correlations Within Commodity Sectors
1986–2005

Energy	0.7
Precious Metals	0.6
Livestock	0.5
Industrial Metals	0.4
Agriculture	0.2

Source: MJM Associates and AllianceBernstein

The tycoon J. Paul Getty was once asked his formula for success. “Rise early, work hard, and strike oil,” he replied. Not everyone can hope to be so lucky with commodities. Long-only commodity futures positions don’t belong as a permanent fixture in a diversified portfolio. But commodity futures can offer attractive opportunities within a hedge fund format that can fully exploit the opportunities—and idiosyncrasies—of futures through active management built around copious research. ■

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