The Role of Commodities

Familiarity with the asset class and historical practice have given equities a prominent and well-understood role in portfolios. Commodities do not enjoy these same benefits but their performance since the financial crisis has generated an increasing amount of debate about how and whether investors should use them. The next few paragraphs attempt to provide a straight-forward overview of the three key benefits that commodities may offer: 1) protection against inflation, 2) diversification and 3) excess return potential. Commodities may be subject to risks and greater volatility not associated with traditional investments in securities such as stocks and bonds.

Protection against inflation

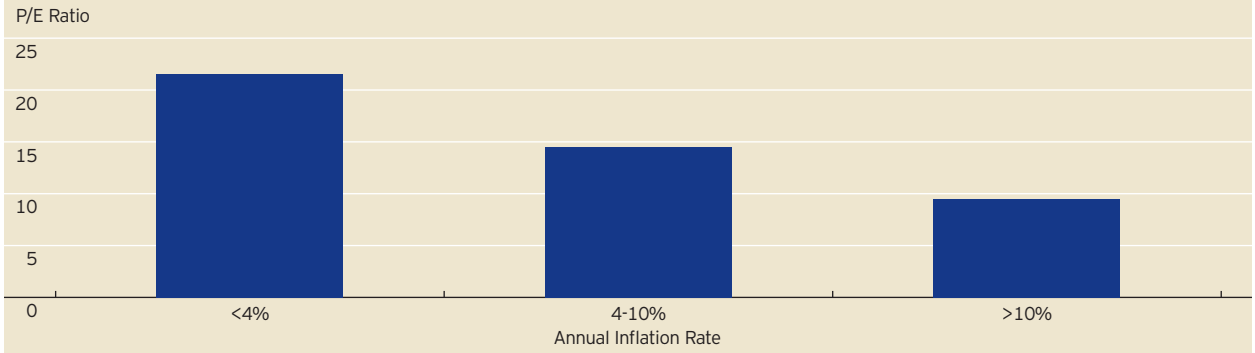
One often hears the argument that stocks offer an effective hedge against inflation. The simplest version of the argument is that earnings will rise along with inflation and therefore shareholders may be protected. This claim rests on the following simple equation:

Stock Price = Price/Earnings Ratio x Earnings

This assumes that the Price/Earnings (P/E) Ratio remains constant and that earnings grow in real terms. Unfortunately, the first assumption is not validated in periods where inflation rises substantially.

Consider the behavior of U.S. companies' P/E ratios during different inflation environments. We use a cyclically-adjusted P/E ratio to eliminate the effect of the business cycle.[1] As shown in Exhibit 1, the current level of inflation is ideal for equities. As inflation rises, the average P/E ratio falls. The same effect can be found for international companies as well.

Exhibit 1: P/E Ratio by Inflationary Environment



Source: Robert Shiller, Datastream, Invesco analysis. Data calculated from 12/1950 to 12/2010. Past performance cannot guarantee comparable future results.

Data as of December 31, 2010, unless otherwise stated.

1. We define the cyclically-adjusted P/E ratio as the inflation-adjusted S&P 500 price divided by inflation-adjusted trailing 10-year average earnings.

Earnings have historically grow along with inflation. However, real earnings growth was roughly zero during the 1970s and 1980s but much higher over the past quarter century. The question then becomes whether the change in valuation was sufficiently large to offset the change in earnings.

Since investors need to be compensated for risk with returns above the risk-free asset[1], the proper way to consider any asset's returns is relative to Treasury bills. As Exhibit 2 demonstrates, equity investors have not been compensated for accepting risk during periods of rising inflation. This conclusion confirms the findings of a variety of other studies (Gorton and Rouwenhorst found a -0.25 correlation between equities and inflation over 5-year rolling periods from 1959-2004).[2] Given the high starting level of cyclically-adjusted P/E —over 22x at the end of 2010 — one would expect the effect to be even greater if inflation were to accelerate meaningfully.

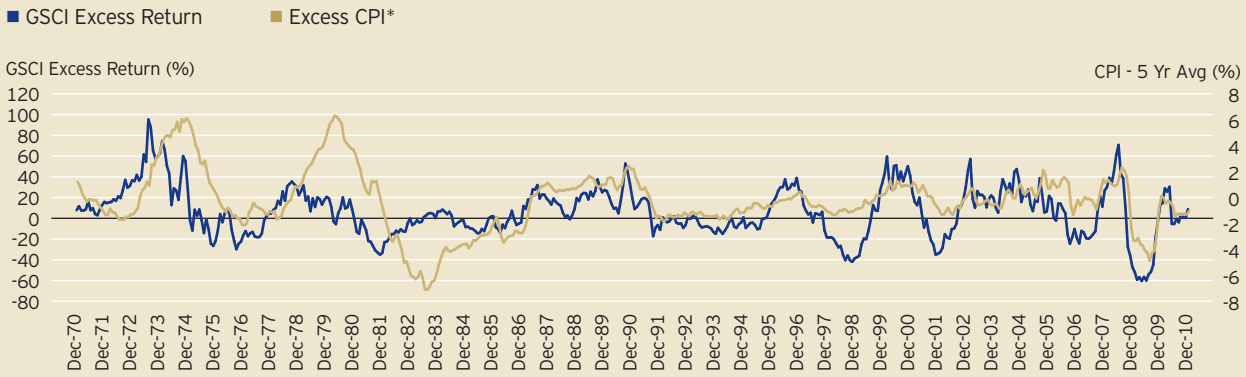
Exhibit 2: S&P 500 Excess Returns During Periods of Rising Inflation

Excess Return	Standard Deviation	Percent of Months with Positive Excess Return
0.28%	14.51%	51%

Sources: Datastreasm, Invesco analysis. Period covered: 8/1973 to 12/2010. Rising inflation defined as months when inflation was above its five-year average and the economy was not in an NBER-defined recession. Past performance cannot guarantee comparable future results.

In contrast, commodities have a distinctly positive relationship with inflation. The reasons for this span is the obvious flow-through effects of commodity prices (probably lower today in developed markets than historically) as well as monetary impacts when countries attempt to reduce the value of their currencies. Inflation is often separated into expected and unexpected inflation.[3] The chart below shows the one year excess return of the S&P/Goldman Sachs Commodity Index (GSCI) and one year unexpected inflation.

Exhibit 3: GSCI and Excess Inflation



Source: Datastream, Invesco analysis. Period covered: 12/1970 to 12/2010. Past performance cannot guarantee comparable future results.
* CPI is Consumer Price Index.

These findings are also consistent with those of prior studies; Gorton and Rouwenhorst found a 0.45 correlation between commodities and inflation over five-year rolling periods from 1959 to 2004.

1. A risk-free asset is an asset which has a certain future return. Treasuries (especially T-bills) are considered to be risk-free because they are backed by the U.S. government.
2. "Facts and Fantasies about Commodity Futures," February 28, 2005, by Gary B. Gorton and Geert K. Rouwenhorst.
3. Expected inflation is typically considered to be reflected in current asset prices. Unexpected inflation is the portion of inflation that is above or below the expected level. Inflation expectations are often viewed as extrapolation of historical levels. Following this convention we define unexpected inflation as current U.S. CPI less its five-year moving average.

Diversification

Investors can apply a straight-forward framework to consider the effect of economic growth on various assets. From the table in Exhibit 4, one would expect that government bonds – which could benefit when growth and inflation fall – to have a low or negative correlation with commodities. The relationship between equities and commodities is more ambiguous but one would still not expect a high correlation between the asset classes.

Exhibit 4: Asset Classes and Historic Response to Economic Variables

Asset	Performance as Economic Growth Rises	Economic Performance as Inflation Rises
Bonds	▼	▼
Equities	▲	▼
Commodities	▲	▲

Source: Invesco analysis. Time period represented September 1976 through December 2010. For illustrative purposes. Past performance cannot guarantee comparable future results.

As it turns out, this simple framework fits well with the historical record. Exhibit 5 contains a correlation matrix for a representative set of equities, government bonds, and commodities.[1] The matrix is color coded so that assets with a high correlation will have a bright red cell while two assets with a negative or low correlation will have a green cell. Four observations stand out:

1. The equities have a high correlation with one another (note the red square around the equities markets)
2. The bonds have a high correlation with one another (note the red square around the bond markets)
3. Equities and bonds have a low correlation with commodities
4. There is a low correlation among the commodity complexes (note the green square around the commodity complexes)

Exhibit 5: Correlation Matrix[1]

■ High correlation ■ Negative correlation

	S&P 500	TSX (Canada)	Europe ex-UK	Topix	U.S. 10-Year	Canada 10-Year	German 10-Year	JGB	Energy	Precious Metals	Agri-culture	Industrial Metals
S&P 500	1.00	0.78	0.76	0.45	0.00	0.11	-0.08	0.00	0.05	-0.06	0.19	0.21
TSX (Canada)	0.78	1.00	0.69	0.47	-0.08	0.08	-0.11	-0.02	0.22	0.17	0.23	0.32
Europe ex-UK	0.76	0.69	1.00	0.51	-0.16	-0.01	-0.06	-0.04	0.00	-0.08	0.15	0.18
Topix	0.45	0.47	0.51	1.00	-0.09	0.01	-0.07	-0.02	0.13	0.08	0.13	0.13
US 10-Year	0.00	-0.08	-0.16	-0.09	1.00	0.76	0.69	0.34	-0.09	0.03	0.01	-0.21
Canada 10-Year	0.11	0.08	-0.01	0.01	0.76	1.00	0.58	0.38	-0.01	-0.02	0.01	-0.20
German 10-Year	-0.08	-0.11	-0.06	-0.07	0.69	0.58	1.00	0.42	-0.14	0.01	-0.09	-0.15
JGB	0.00	-0.02	-0.04	-0.02	0.34	0.38	0.42	1.00	-0.11	-0.03	0.07	-0.04
Energy	0.05	0.22	0.00	0.13	-0.09	-0.01	-0.14	-0.11	1.00	0.18	0.09	0.16
Precious Metals	-0.06	0.17	-0.08	0.08	0.03	-0.02	0.01	-0.03	0.18	1.00	0.21	0.19
Agriculture	0.19	0.23	0.15	0.13	0.01	0.01	-0.09	0.07	0.09	0.21	1.00	0.23
Industrial Metals	0.21	0.32	0.18	0.13	-0.21	-0.20	-0.15	-0.04	0.16	0.19	0.23	1.00

Sources: Datastream, Invesco analysis. Period covered: 12/1985 to 12/2010. Past performance cannot guarantee comparable future results.

1. Commodity complexes are represented by the GSCI sub-indexes.

These observations have implications for the value of commodities in a portfolio as well as for the composition of a commodity investment. The low correlation of commodities with traditional asset classes should allow investors to create diversified portfolios with the potential to mitigate overall portfolio volatility.[1] The low correlation among the commodity complexes provides scope for high return simply through rebalancing. We will explore this idea more thoroughly in the next section.

Potential for Excess Return

Major studies on commodities, like those of Gorton and Rouwenhorst, consistently conclude that an investment in commodity futures has historically provided similar return and risk as equities. Despite the accumulation of theory and data of much of the last century, many investors remain unaware of the most important return drivers for the asset class. Compounding the problem is the fact that most commodity indexes fail to take advantage of these important properties. The exhibit below shows the four areas that contribute the greatest return potential.

Exhibit 6: Contributors to Return Potential

Structural Sources		Tactical Sources	
Storage Difficulty	Rebalancing	Optimal Roll	Tactical Allocation
Long-term returns driven by average term structure which is determined by difficulty and cost of storage	Potential rebalancing return is higher than that available for most other asset classes; most indexes ignore this	Term structure of commodity futures creates opportunity to achieve higher returns than available through front-month investments	Alter exposures to commodities based on three considerations: ■ Supply and demand balance ■ Economic environment ■ Price trends

Source: Invesco analysis.

The first area, Storage, could probably be better described as scarcity but the name reflects the influence of the Theory of Storage.[2] The essence of the theory is simple: market participants should be willing to pay a premium for immediate access to a commodity when it is scarce. This effect drives up the front month contract, placing the commodity in backwardation – which simply means that there is positive carry associated with an investment in the prompt month. Certain commodities have structural storage or supply issues that make them more likely to face this situation.

The second area is Rebalancing which we introduced earlier. As described by Erb and Harvey[3], the rebalancing return increases when asset volatility is high, correlation is low, and the number of assets is high but is only available when the portfolio is rebalanced to a fixed weight. Commodities fulfill the first two criteria particularly well but most commodity indexes fail to rebalance to a fixed weight, opting instead for the equivalent of market capitalization weighting.

The third area is Optimal Roll Yield. This return driver typically comes into effect when commodities are not in a state of backwardation. In essence, it simply attempts the effect of negative carry (or maximizes the effect of positive carry). A useful collateral effect of this driver is that it tends to reduce the volatility of an asset when forward returns are likely to be negative and increases the volatility when forward returns are likely to be positive.

The final area is Tactical Allocation. Researchers have often found that commodity returns are unusually serially correlated which explains, in part, why trend following has been a profitable and popular strategy among investors. In addition to trend, researchers have often found that term structure[4] and the economic environment[5] can also be predictive.

1. Diversification does not guarantee a profit or eliminate the risk of loss.
2. Journal of Farm Economics 30, "Theory of the inverse carrying charge in futures markets," 1948, pages 1-21 .
3. "The Tactical and Strategic Value of Commodity Futures," January 12, 2006, by Claude B. Erb and Campbell R. Harvey.
4. "Tactical Allocation in Commodity Futures Markets: Combining Momentum and Term Structure Signals," April 22, 2010, Ana-Maria Fuertes, Joelle Miffre, and Georgios T. Rallis.
5. "Dynamic Commodity Timing Strategies," July 1, 2004, Evert B. Vrugt, Rob Bauer, R. Molenaar, and Tom Steenkamp.

About risk

Exposure to the commodities markets may be subject to greater volatility than investments in traditional securities, such as stocks and bonds. The commodities markets may fluctuate widely based on a variety of factors, including changes in overall market movements, domestic and foreign political and economic events and policies, war, acts of terrorism, changes in domestic or foreign interest rates and/or investor expectations concerning interest rates, domestic and foreign inflation rates and investment and trading activities of mutual funds, hedge funds and commodities funds. Prices of various commodities may also be affected by factors such as drought, floods, weather, livestock disease, embargoes, tariffs and other regulatory developments. The prices of commodities can also fluctuate widely due to supply and demand disruptions in major producing or consuming regions.

Investments in commodity-linked notes involve substantial risks, including risk of loss of a significant portion of their principal value. In addition to commodity risk, they may be subject to additional special risks, such as risk of loss of interest and principal, lack of a secondary market, and risk of greater volatility, that do not affect traditional equity and debt securities.

Risks of derivatives include the possible imperfect correlation between the value of the instruments and the underlying assets; risks of default by the other party to the transaction; risks that the transactions may result in losses that partially or completely offset gains in portfolio positions; and risks that the transactions may not be liquid. Certain derivative transactions may give rise to a form of leverage. Leverage magnifies the potential for gain and the risk of loss.

Fixed-income securities are subject to credit risk and interest rate risk. Credit risk refers to the possibility that the issuer of a security will be unable to make interest payments and/or repay the principal on its debt. Interest rate risk refers to fluctuations in the value of a fixed-income security resulting from changes in the general level of interest rates. When the general level of interest rates goes up, the prices of most fixed-income securities go down. When the general level of interest rates goes down, the prices of most fixed-income securities go up.

A nondiversified investment invests a greater portion of its assets in a more limited number of issuers than a diversified investment and, as a result, is subject to a greater risk than a diversified investment because changes in the financial condition or market assessment of a single issuer may cause greater fluctuations in the value of the investment.

The S&P/TSX 60 Index is a capitalization-weighted index of 60 large, liquid companies in Canada that trade on the Toronto Stock Exchange (TSX).

The EURO STOXX 50 Index, Europe's leading Blue-chip index for the Eurozone, provides a Blue-chip representation of supersector leaders in the Eurozone. The index covers 50 stocks from 12 Eurozone countries: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal and Spain.

TOPIX tracks the performance of the Tokyo Stock Exchange (TSE). TOPIX is a measure of the performance of the largest companies (those in the First Section) of the TSE.

U.S. 10-Year is based on the U.S. 10-Year Treasury Bond. Canada 10-Year is the Canada 10-Year Government Bond. German 10-Year is the German 10-Year Government Bond. JGB is the Japan 10-Year Government Bond.

The S&P GSCI Energy Index is a sub-index of the S&P GSCI Index. The S&P GSCI is calculated primarily on a world production weighted basis, and is comprised of the principal physical commodities that are the subject of active, liquid futures markets. The S&P GSCI Energy Index includes Crude Oil, Brent Crude, Unleaded Gasoline, Healing Oil, Gas Oil and Natural Gas.

The S&P GSCI Agriculture Enhanced Select Total Return Index reflects the total return available through an unleveraged investment in specific commodity components of the S&P GSCI. The index contains only four commodities - corn, soybeans, sugar and wheat (Chicago) - and is modified to apply certain seasonal rolling rules.

The S&P GSCI Precious Metals Index is a sub-index of the S&P GSCI All Metals Index. The S&P GSCI Precious Metals Index includes Gold and Silver commodities.

The S&P GSCI Industrial Metals Index is a sub-index of the S&P GSCI All Metals Index. The S&P GSCI Industrial Metals Index encompasses Aluminum, Copper, Lead, Nickel, and Zinc. The S&P GSCI is widely recognized as the leading measure of general commodity price movements and inflation in the world economy.

All data provided by Invesco unless otherwise noted. Price-earnings (P/E) ratio, the most common measure of how expensive a stock is, is equal to a stock's market capitalization divided by its after-tax earnings over a 12-month period.

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