



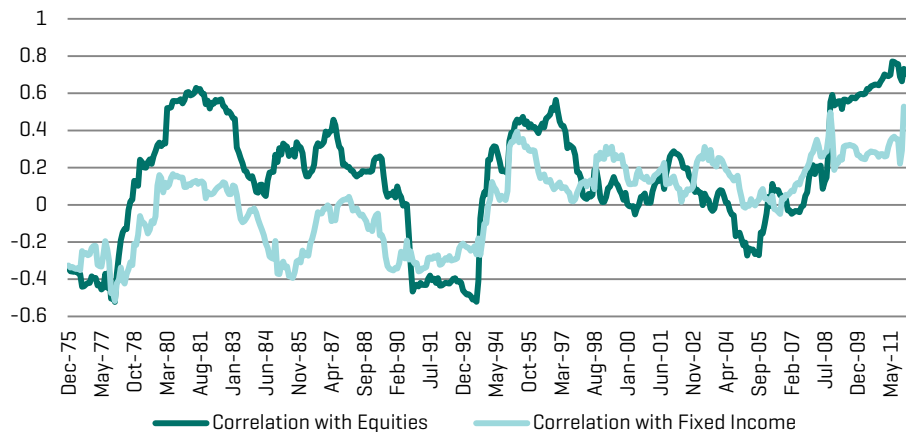
COMMODITY INVESTMENTS: THE MISSING PIECE OF THE PORTFOLIO PUZZLE?

The Role of Commodities in Asset Allocation

Investors often look to commodities as a way to potentially gain enhanced portfolio diversification, protection against inflation, and equity-like returns. As such, commodities have gained traction among institutional and retail investors in recent years, either as a separate asset class or as part of a real assets allocation.

Generally, commodities have low or negative correlation with traditional asset classes over the long-term, and can act as a portfolio diversifier. For example, from December 1972 to June 2012, the S&P GSCI® had a correlation of -0.02 and -0.08 with global equities and fixed income, respectively. However, during periods of global economic downturn such as in the early 1980s, early 1990s and late 2000s, commodities' correlation with other asset classes—especially equities—tended to sharply increase before reverting to relatively low levels (see Exhibit 1).

Exhibit 1: Rolling 36-Month Correlation with Equities and Fixed Income



Source: S&P DOW JONES INDICES, MSCI, Barclays. Data from December 1972 to June 2012. This article uses MSCI World and Barclays Global Aggregate to represent equities and fixed income, respectively. The analysis period is chosen based on the availability of index data.

While asset class correlations are useful indicators, a more fundamental way to assess the portfolio diversification potential of commodities is to examine how their underlying risk factors differ from those of other asset classes. This is because risk factors, rather than asset classes, are the fundamental building blocks for asset allocation and portfolio diversification. On one hand, systematic risks, such as economic and liquidity crises, can affect all risky asset classes including commodities, causing spikes in cross-asset class correlations. On the other hand, many supply and demand factors that affect commodity prices, such as geopolitical, weather-related, and environmental risks, are fundamentally different from the typical risk factors affecting other asset classes, making commodities a unique asset class.

Contributor:

Xiaowei Kang, CFA
Director
Index Research & Design
xiaowei_kang@spdji.com

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Furthermore, as Gorton and Rouwenhorst (2006) pointed out, commodities tend to perform differently than other asset classes over the business cycle. For instance, when equity returns dropped significantly in the early stages of recession, commodities generally performed well (see Exhibit 2). These characteristics set commodities apart from other asset classes and suggest that they may improve the diversification of a traditional portfolio over a long-term horizon.

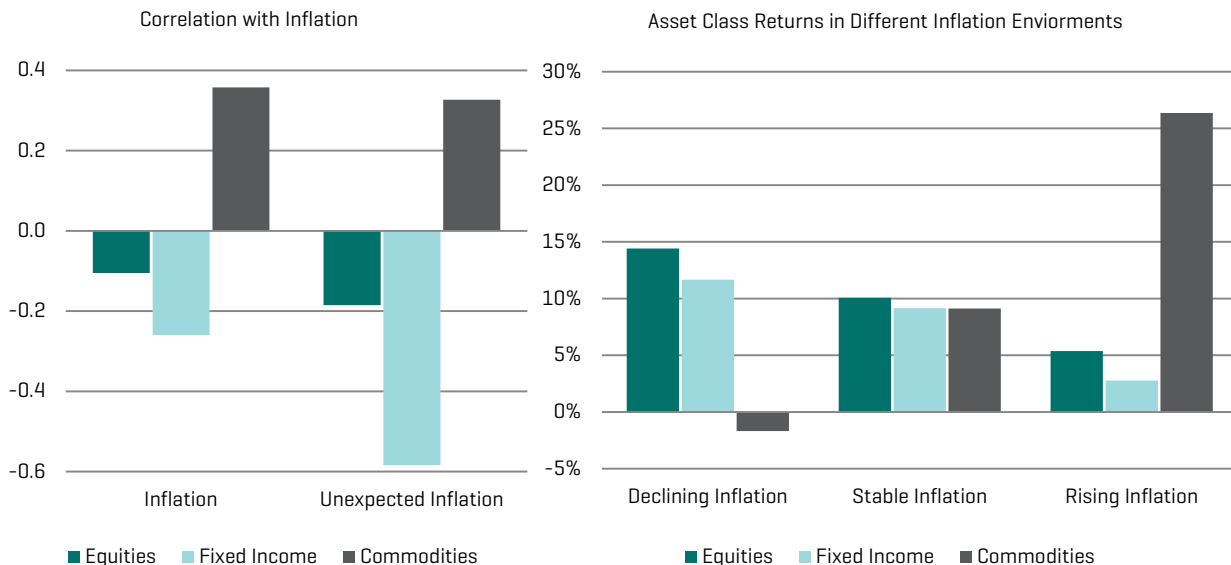
Exhibit 2: Asset Class Returns during Different Stages of the Business Cycle



Source: S&P DOW JONES INDICES, MSCI, Barclays, NBER. Data from December 1972 to June 2012. The NBER business cycle expansion and contraction phases are divided into equal halves to indicate early/late expansion and early/late recession respectively. Charts are provided for illustrative purposes. Past performance is no guarantee of future results.

Since commodity prices are among the direct drivers of inflation, commodities are often considered one of the key real assets that can protect against rising inflation. While equity and fixed income returns are negatively correlated with inflation, commodity returns have a significant positive correlation with both expected and unexpected inflation (see Exhibit 3). Commodities tend to thrive in rising inflation environments while equities and fixed income assets generally generate poor returns, bringing both inflation protection and diversification benefits.

Exhibit 3: Potential Inflation Protection Benefit from Commodities (1972 – 2012)



Source: S&P DOW JONES INDICES, MSCI, Barclays, Federal Reserve. Data from December 1972 to June 2012. Periods of stable inflation include all calendar quarters where inflation rises or declines less than 0.25% from the previous quarter. Charts are provided for illustrative purposes. Past performance is no guarantee of future results.

Sources of Commodity Index Risk and Return

Commodity index investments offer efficient exposure to the asset class and may provide potential diversification and inflation protection benefits with relatively low cost. A commodity index's excess return measures the excess over the return from the collateral used to buy futures contracts, and can be separated into two sources: spot return and roll return. Spot return captures the price movements of commodity futures contracts, and roll return reflects the gain or loss from rolling the futures position. For a fully collateralized investment, the total return reflects both the excess return and the collateral return from U.S. Treasury bills. All three components of the S&P GSCI's total return – the spot return, roll return, and collateral return – have varied significantly over time, leading to very different total returns over the past few decades (see Exhibit 4).

Exhibit 4: S&P GSCI: Breaking Down Total Returns (Annualized)					
	Spot Return	Roll Return	Excess Return	Collateral Return	Total Return
1970-2012	4.3%	-0.8%	3.4%	5.8%	9.3%
1970s	9.9%	2.8%	12.7%	8.2%	20.8%
1980s	-2.0%	5.0%	3.0%	9.3%	12.3%
1990s	1.2%	-0.7%	0.5%	4.9%	5.4%
2001-2012	8.0%	-9.2%	-1.1%	1.9%	0.8%
1970-2012	4.3%	-0.8%	3.4%	5.8%	9.3%

Source: S&P DOW JONES INDICES. Based on S&P GSCI index data from December 1970 to June 2012. Charts are provided for illustrative purposes. Past performance is no guarantee of future results.

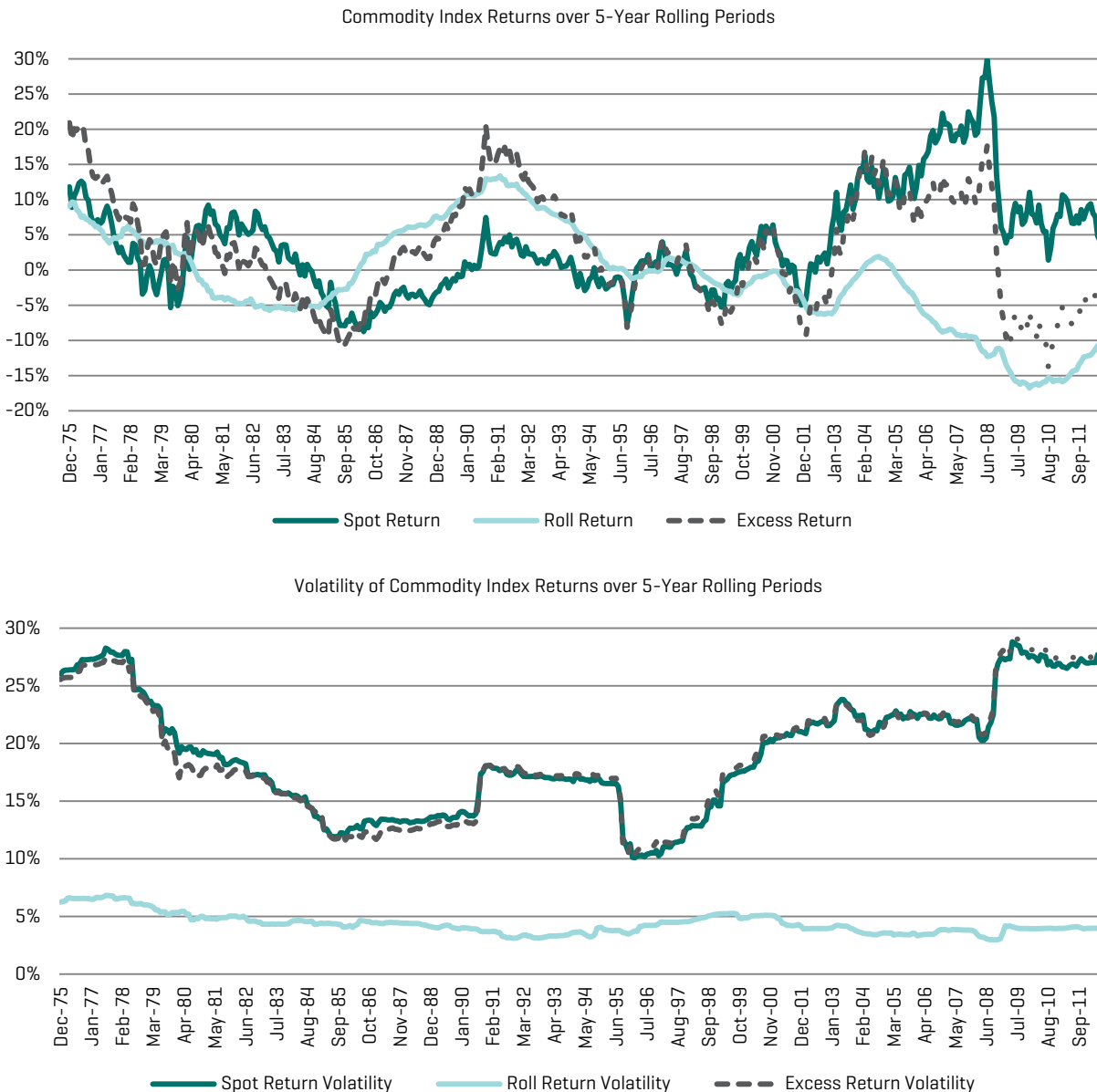
Treasury bill returns are not unique to commodity investments, so the focus is on excess return and its two often-uncorrelated components, spot return and roll return. Spot returns are primarily driven by the supply and demand for particular commodities. Roll returns are determined by the term structure of particular commodity futures, which may largely be explained by storage costs, physical inventory levels and shocks to those levels.

Studies such as that of Kimberly (2007) suggest that spot returns are the dominant drivers of commodity index return variation over time, while roll returns have little explanatory power for the return variation. However, that hinges greatly on the length of the investment horizon. Over monthly or quarterly horizons, spot returns explain the majority of the excess return variation (see Exhibit 5). However, over medium-term horizons of three to five years, roll returns become increasingly important factors in commodity index returns.

Exhibit 5: Contributing Factors to the S&P GSCI's Excess Returns					
	R-Squared of Linear Regression of Commodity Spot or Roll Return on Excess Return				
	Monthly Returns	Quarterly Returns	Annual Returns	3-Year Annualized	5-Year Annualized
Spot Return	0.94	0.91	0.78	0.50	0.25
Roll Return	0.01	0.07	0.16	0.31	0.32

Source: S&P DOW JONES INDICES. Based on S&P GSCI index data from December 1970 to June 2012.

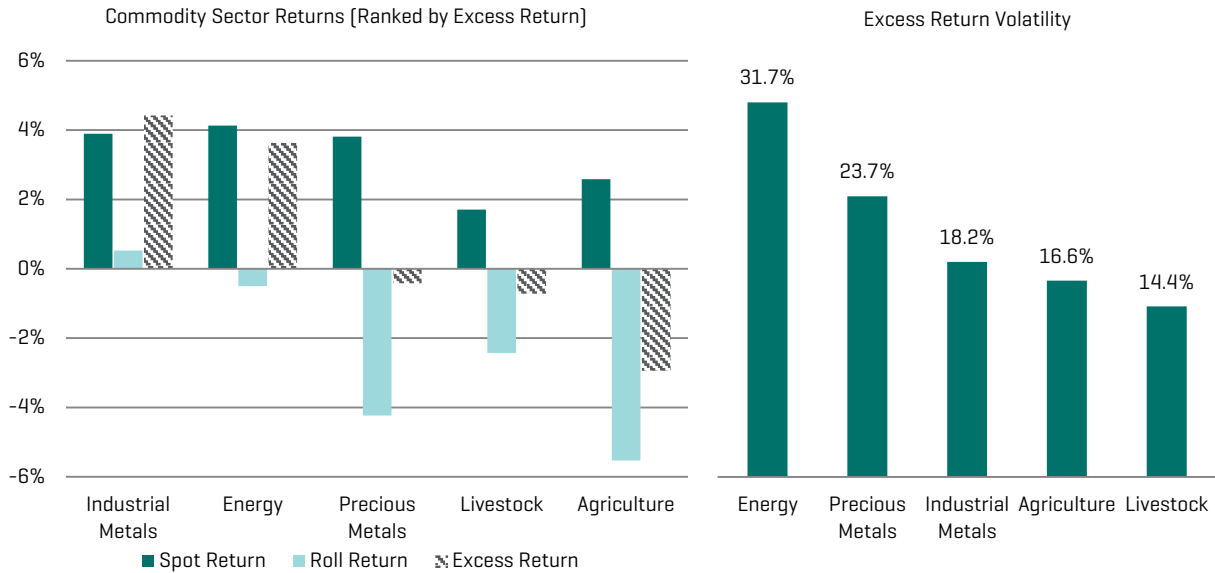
More intuitively, examining the S&P GSCI's five-year rolling spot, roll and excess returns from December 1970 to June 2012 illustrates that roll return has been an important component of commodity excess return over five-year horizons (see Exhibit 6). For instance, the roll return significantly outpaced the spot return in the early 1990s, contributing as much as 13% per year over five-year periods. Since the mid-2000s, negative roll yield has greatly depressed commodity returns. This also highlights the dynamic nature of commodity futures curves, and that neither contango nor backwardation should be regarded as the prevalent state of the commodity markets. In addition, Exhibit 6 shows that the spot return volatility can almost be seen as the sole contributor to the volatility of the S&P GSCI's excess return due to the relatively low volatility of roll returns.

Exhibit 6: S&P GSCI Risk and Return over Rolling Five-Year Periods

Source: S&P DOW JONES INDICES. Based on S&P GSCI index data from December 1970 to June 2012. Charts are provided for illustrative purposes. Past performance is no guarantee of future results. This chart may reflect hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

Variations in commodity risk and return can also be examined across different commodities and sectors. Commodity markets are heterogeneous, so there is often a low correlation among individual commodity futures and significant variation in their returns (see Exhibit 7). In particular, the variation in roll returns among commodity sectors was more significant than the variation in spot returns. At the same time, the realized volatility of commodity returns varied greatly across sectors, with energy futures being the most volatile. These observations highlight the importance of sector exposures in determining the risk and return of commodity indices.

Exhibit 7: S&P GSCI Commodity Risk and Return by Sectors (1982 – 2012)



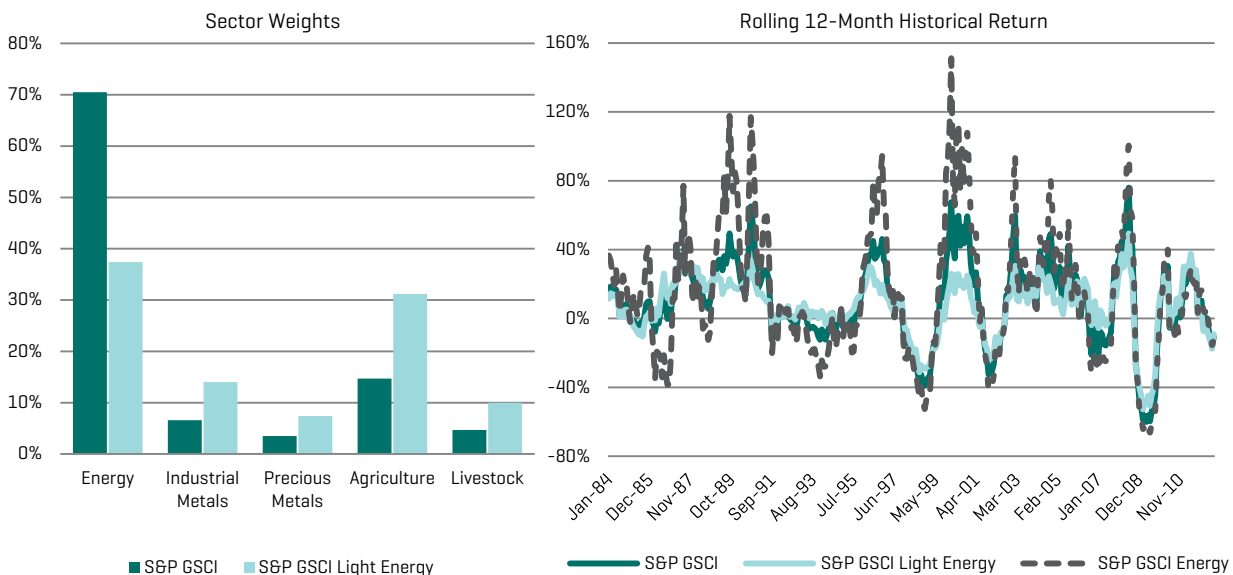
Source: S&P DOW JONES INDICES. Based on S&P GSCI index data from December 1982 to June 2012. Charts are provided for illustrative purposes. Past performance is no guarantee of future results. The S&P GSCI Energy index history goes back to December 1982.

Evaluating Commodity Indices

A commodity index used for benchmarking can be built in a number of different ways. In turn, the index construction methodologies, such as contract selection criteria, weighting schemes and rolling mechanisms, can affect the index’s risk and return characteristics as well as its investment applications.

For instance, an index’s specific contract selection methodology and weighting scheme determine its sector exposures. The S&P GSCI contains 24 commodities with liquid futures markets, weighted primarily by world production. Its weighting scheme reflects the relative significance of the individual commodities in the global economy, so the index is weighted heavily to energy commodities. This means that the S&P GSCI is more influenced by the spikes and dips of energy prices, and therefore its returns are more volatile than those of indices such as the S&P GSCI Light Energy, which is less exposed to energy commodities (see Exhibit 8).

Exhibit 8: Commodity Benchmarks with Different Sector Exposures

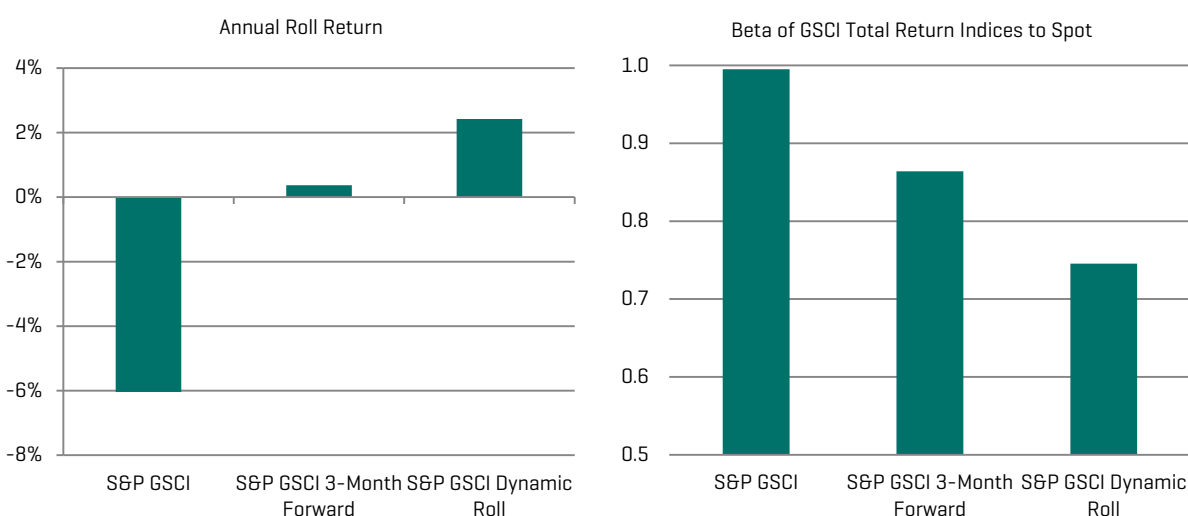


Source: S&P Dow Jones Indices. Index return data from December 1982 to June 2012. Sector weights as of December 2011. Charts are provided for illustrative purposes. Past performance is no guarantee of future results.

Roll return's significant impact on index performance over medium- or long-term horizons emphasizes the importance of evaluating the index's rolling mechanism. Standard commodity indices such as the S&P GSCI typically track returns on the front end of the futures curve and roll monthly to the next nearby futures contracts. The front month contracts are more liquid and more responsive to short-term commodity supply and demand factors, so these standard commodity indices are generally considered to be market benchmarks. However, in periods when commodity futures curves are in contango, these rolling mechanisms can lead to negative roll yields that drag down index returns.

A simple approach to mitigating the potential effects of contango is employed by forward indices such as the S&P GSCI 3-Month Forward, which utilizes predefined longer-dated commodity futures contracts. More recently, some investors have adopted more dynamic rolling mechanisms that account for the dynamic nature of commodity futures curves. For instance, the S&P GSCI Dynamic Roll indices aim to systematically minimize the impacts of negative roll yields by rolling into longer-dated contracts when a commodity is in contango (and rolling into the nearby futures contracts when a commodity is in backwardation).

Exhibit 9: Trade-Offs between Roll Return and Beta Exposure



Source: S&P Dow Jones Indices. Data from December 1994 to June 2012. Charts are provided for illustrative purposes. Past performance is no guarantee of future results. This chart may reflect hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

For example, the standard S&P GSCI lost an annualized 6% in roll return between December 1994 and June 2012, while the S&P GSCI 3-Month Forward and S&P GSCI Dynamic Roll indices displayed significantly enhanced performance because of their positive roll yield (see Exhibit 9). However, the trade-off is that these alternative indices may utilize less-liquid futures and may not track commodity spot returns as closely as the standard index. Such trade-offs between roll return, liquidity, and beta exposure suggest that standard commodity indices may be more effective for tracking spot prices closely over the short-term, while the enhanced or dynamic roll indices may be better suited for underlying investment vehicles over longer-term horizons.

Beyond index construction methodologies and risk and return characteristics, commodity indices may also be evaluated in the context of the intended asset allocation objectives, such as portfolio diversification and inflation protection potential. To illustrate this, consider the risk and return characteristics of theoretical multi-asset portfolios with 50% allocated to global equities, 30% allocated to global fixed income, and 20% allocated to commodities through various indices (see Exhibit 10). Notably, the volatility of the portfolio with its commodities allocation in the S&P GSCI is only slightly higher than that of the portfolio with its allocation in the S&P GSCI Light Energy (11.1% versus 10.5%), despite the much greater volatility of the S&P GSCI. This can be explained in part by energy commodities being less correlated with financial assets, which leads to lower correlation between the energy-heavy S&P GSCI and equities/fixed income. Another observation is that the dynamic roll indices significantly improved the portfolio's performance while retaining the diversification benefits of the standard indices.

Exhibit 10: Risk & Return Profile and Diversification Characteristics of Different Commodity Indices in Theoretical Portfolios

1994 - 2012	S&P GSCI	S&P GSCI Dynamic Roll	S&P GSCI Light Energy	S&P GSCI Light Energy Dynamic Roll
Risk and Return of Commodity Index				
Total Return	4.2%	13.0%	2.4%	9.1%
Volatility	22.9%	17.9%	16.3%	13.7%
Correlation with Equities and Fixed Income				
Equities	0.28	0.28	0.38	0.37
Fixed Income	-0.04	-0.10	0.01	-0.04
Risk and Return of 50% Equity / 30% Fixed Income / 20% Commodity Portfolio				
Total Return	6.6%	8.2%	6.0%	7.3%
Volatility	11.1%	10.4%	10.5%	10.2%
Sharpe-Ratio	0.33	0.50	0.29	0.43

Source: S&P Dow Jones Indices. Data from December 1994 to June 2012. Charts are provided for illustrative purposes. Past performance is no guarantee of future results. This chart may reflect hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

The commodity indices also exhibited similarly high correlations with inflation. Furthermore, their inflation beta¹, the sensitivity of their returns to inflation, was very high at greater than 10 during the examined period (see Exhibit 11). Such high sensitivity to inflation is unique to commodity investments and suggests that a small allocation to commodities may provide the overall portfolio with a level of protection against inflation. Interestingly, the S&P GSCI and S&P GSCI Dynamic Roll indices have even higher inflation beta than the corresponding Light Energy indices.

Exhibit 11: Inflation Protection Characteristics of Different Commodity Indices

1994 - 2012	S&P GSCI	S&P GSCI Dynamic Roll	S&P GSCI Light Energy	S&P GSCI Light Energy Dynamic Roll
Correlation with Inflation	0.74	0.76	0.72	0.74
Inflation Beta	16.64	15.71	11.59	11.88

Source: S&P Dow Jones Indices. Data from December 1994 to June 2012. Charts are provided for illustrative purposes. Past performance is no guarantee of future results.

Conclusions

Despite the recent spike in cross-asset class correlations, commodities remain an asset class set apart by distinct risk factors that may enhance the diversification of traditional portfolios. Their superior performance relative to equities and fixed income in times of rising inflation may also help mitigate the negative effects of inflation risk.

Commodities have historically delivered equity-like performance over the long-term, albeit with significant variations in recent decades. A closer look at the roles of spot and roll return in performance variation over time suggests that spot return is the dominant driver of commodity index return variation over short-term periods, but roll return becomes increasingly important over longer-term horizons. Furthermore, due to the heterogeneous nature of commodity markets, there is significant cross-sectional variation across commodity sectors, which illustrates the importance of sector exposures in driving the risk and return of commodity index investment.

The building blocks of constructing a commodity index can also have significant implications on both its risk and return characteristics and investment applications. For instance, when evaluating standard

¹Inflation beta measures the sensitivity of asset returns to inflation. For instance, an inflation beta of 3 indicates that an inflation rate of 1% may be accompanied by an asset return of 3%. The inflation beta in Exhibit 10 is measured against realized inflation.

versus enhanced/dynamic roll indices, trade-offs exist between roll return, liquidity, and beta exposure, which indicate that they may have different potential applications.

Furthermore, commodity index investments should also be evaluated in the context of the overall intended asset allocation objectives, such as portfolio diversification and inflation protection potential.

S&P Dow Jones Indices Index Research & Design Contact Information

Global Head

Frank Luo	+1 212-438-5057	frank_luo@spdji.com
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New York

Berlinda Liu	+1 212-438-7834	berlinda_liu@spdji.com
Aye Soe	+1 212-438-1677	aye_soe@spdji.com
Peter Tsui	+1 212-438-1493	peter_tsui@spdji.com

Beijing

Liyu Zeng	+86 10-6569-2947	liyu_zeng@spdji.com
-----------	------------------	---------------------

Hong Kong

Priscilla Luk	+852 2532-8050	priscilla_luk@spdji.com
---------------	----------------	-------------------------

London

Xiaowei Kang	+44 (0) 207 176 8443	xiaowei_kang@spdji.com
Daniel Ung	+44 (0) 207 176 8340	daniel_ung@spdji.com

Sydney

Simon Karaban	+ 61 2 9255 9847	simon_karaban@spdji.com
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S&P Dow Jones Indices acquired the GSCI from Goldman Sachs on February 2, 2007 and it was subsequently renamed the S&P GSCI. Goldman Sachs began first publishing the GSCI related indices in 1991 but has calculated the historical value of the GSCI beginning January 2, 1970 based on actual prices from that date forward and the selection criteria, methodology and procedures in effect during the applicable periods of calculation (or, in the case of all calculation periods prior to 1991, based on the selection criteria, methodology and procedures adopted in 1991). The GSCI has been normalized to a value of 100 on January 2, 1970, in order to permit comparisons of the value of the GSCI to be made over time.

The inception date of the S&P GSCI Dynamic Roll Index and S&P GSCI Light Energy Dynamic Roll Index was January 27, 2011, at the market close. All information presented prior to the index inception date is back-tested. Back-tested performance is not actual performance, but is hypothetical. The back-test calculations are based on the same methodology that was in effect when the index was officially launched. Complete index methodology details are available at www.spindices.com.

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