The Passive Approach to Commodity Investing
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Executive Summary

- Investing in commodities is one potential avenue to improve the risk/return profile of a portfolio in the current environment of low bond yield and low equity-risk premium. The emergence of commodity exchange-traded funds has facilitated access to commodity markets while preserving the most advantageous features of passive commodity investing.
- Commodity trading is conducted with futures contracts and results from the interaction between hedgers and speculators, which creates the dynamism of the commodity market. Some sophisticated investors take an active approach by investing in specific commodities. But most investors will opt for a passive approach through ETFs and mutual funds that follow one of the commodity indexes such as the Goldman Sachs Commodity Index or the Dow Jones AIG Commodity Index.
- It is argued that investing through these passive vehicles allows investors to enjoy roughly the same benefits they would have derived from diversified, fully collateralized positions in the individual commodities futures. The advantages of integrating a passive commodity investment in a portfolio include better diversification, better protection from inflation (especially unexpected inflation), and an interesting expected return. The article shows the risk-reduction benefits from introducing commodities into a traditional 60/40 stock/bond portfolio.
- It is reasonable to assume that the expected return over time of the spot price of a given commodity is close to zero. Despite that, passive commodity investing can earn positive returns due to an implicit "insurance premium" in the futures contract, to index rebalancing, and to the return of the T-bills used to fully collateralize the positions in futures.
- A study examines and verifies that these sources of returns materialized into actual returns from 1970 to 2006.

Investing in commodities, as well as in alternative vehicles such as private equity or direct real estate, has been increasingly investigated in the last few years as a potential avenue to improve the risk/return profile of a portfolio in the current environment of low yield on bonds and low-risk premium on equities. Although commodity investing offers advantageous properties, it was typically not recommended for most retail investors because of operational complications associated with direct investment (margin calls and considerable minimum investments). Recently, this situation changed with the emergence of numerous commodity exchange-traded funds (ETFs). These ETFs greatly facilitate the access to commodity markets while preserving the most advantageous features of passive commodity investing.

The term *commodities* encompasses a wide spectrum of products, each of which

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has its own dynamics. A non-exhaustive list of the most traded commodities is provided in Table 1.[1] Commodities can be classified into five categories. The first category, by far the one that has received the most hype in the last few years, is Energy. This category includes the closely followed barrel of oil, whose price is reported every day by media around the world. This category also includes natural gas as well as two oil derivatives: gasoline and heating oil. Precious Metals represent the second segment of the commodity market. Gold receives the bulk of the attention devoted to this category, which also includes silver, palladium, and platinum. Industrial Metals include copper, aluminum, lead, nickel, zinc, and tin. Under Agricultural, wheat and corn are the most traded. More exotic agricultural commodities such as cacao, coffee, and sugar also fall in this category, as do soybeans and orange juice. Cotton, silk, wool, rubber, and lumber are also considered agricultural commodities, even though they are not food related. Finally, live cattle, feeder cattle, and lean hogs compose the fifth segment of the commodity markets, Livestock.

What Creates the Dynamism of the Commodity Market?

Commodity trading is generally conducted with futures contracts. In the case of direct investment, investors would be required to handle futures transactions themselves. With the ETF approach, the futures' dealing is simply delegated to the ETF provider. Therefore, no matter which case applies, commodities trading will invariably involve futures contracts. A futures contract is an agreement between two parties to buy an asset at a certain time in the future for a certain price. Obviously, both a buyer and a seller are required for such a contract to exist. In the commodity market, these two roles are assumed by two types of players: hedgers and speculators. It is worth noting that both parties can be both buyers and sellers, depending on the situation. Typically, hedgers are the commodity producers—for example, farmers and mining or oil drilling companies. Here, the hedgers want to fix the price they will receive in the future for their production. Alternatively, hedgers could be the commodity users, like transport companies, food producers, or jewellers. These hedgers want to fix the price they will pay in the future for their inputs. These two types of hedgers sometimes constitute the two sides of a trade, but more often, hedgers will take the short side (producers who want protection from falling prices) and speculators will take the long side. A speculator is simply an investor who wishes to take a position in the market to bet on the future direction of a commodity's price with the hope of making a profit.

Positions in futures are rarely closed by delivering or accepting delivery of the physical commodity. Rather, positions are almost always closed by entering the opposite position of the original one. As such, investors earn a profit when they offset futures contracts to their benefit. If they hold a buyer position, they earn a profit if the future price rises. Inversely, investors that have a seller position earn a profit if the futures price falls.

Two Approaches to Commodity Investing: Active and Passive

Investors looking to add commodities to their portfolio can adopt two approaches. The most sophisticated investors can opt for an active approach, which essentially consists of taking bets on specific commodities. To do so, active investors thoroughly examine each commodity (with the help of fundamental or quantitative models) to determine which commodities would be good short-term investments, and which should be ignored or sold short.

Since the first approach can be quite demanding in terms of required skills and time required to perform a thorough analysis of each commodity, many investors opt for the second approach to commodity investing: the passive one. Passive investors do not continually seek the short-term hot commodity. Rather, they hold a long-term diversified portfolio, tracking one of the published commodity indexes more or less closely. Commodity ETFs on the market all adopt such a passive approach and follow one of the commodity indexes. These indexes are designed to provide a dynamic representation of broad trends in the overall commodity market. Two of the most popular commodity indexes are the Goldman Sachs Commodity Index (GSCI) and the Dow Jones AIG Commodity Index (DJAIG).

The GSCI covers 24 commodities and is annually weighted according to the world production quantities of each component. The GSCI is characterized by a strong bias for the energy sector. Energy commodities accounted for more than 65 percent of the index as of January 2007.

The DJAIG covers 20 commodities and is annually weighted according to both

Table 1: The Wide Spectrum of Exchange-Traded Commodities

Energy	Agricultural
Crude Oil	Wheat
Heating Oil/Diesel	Corn
Unleaded Gas (Gasoline)	Soybeans
Natural Gas	Coffee
Precious Metals	Rice
Gold	Palm Oil/Soybean Oil
Silver	Sugar
Platinum	Azuki Beans
Palladium	Cocoa
Industrial Metals	Barley
Aluminum	Canola
Copper	Orange Juice
Zinc	Oats
Lead	Soybean Meal
Nickel	Cotton
Tin	Silk
Livestock	Wool
Live Cattle	Rubber
Lean Hogs	Lumber

The above list encompasses all commodities included in the Rogers International Commodities Index. With 35 different commodities, this index is one of the broader published commodity indexes.

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the world production quantities and the liquidity in the futures market of each component. Contrary to the GSCI, the weight of each component is restricted to between 2 percent and 15 percent. Moreover, no category (energy, livestock, and so on) can account for more than 33 percent of the index.[2]

The commodities composing these two indexes are listed in Table 2, together with their weights in the indexes.

How to Easily Gain a Passive Exposure to Commodities

Institutional investors or very wealthy and sophisticated retail investors could assemble their own futures portfolio with the help of a futures commission merchant[3] or a related intermediary. However, this is not the path we advocate in this paper because direct futures investment entails operational difficulties such as margin calls and considerable minimum investments.

Investors can completely avoid the futures markets and still achieve a performance very close to a long passive investment in commodities futures. One option is to invest in a mutual fund that tracks a commodities index. For example, PIMCO offers a fund anchored to the Dow Jones-AIG Commodity index and Oppenheimer manages a fund tied to the GSCI. As previously mentioned, ETFs on commodities have recently surfaced as another convenient way to gain exposure to commodity indexes. For example, Barclay's manages the iShares GSCI Commodity-Indexed Trust (GSG), an ETF designed to track the GSCI minus 75 basis points. The PowerShares DB Commodity Index Tracking Fund (DBC) is another commodity ETF designed to track the performance of a recently introduced index: the Deutsche Bank Liquid Commodity Index—Excess Return Optimum Yield.

It should be noted that investors in these mutual funds or ETFs should enjoy roughly the same benefits they would have derived from diversified fully collateralized positions in the individual commodities futures minus a certain fee, usually around 75 basis points. We discuss these benefits in the remainder of this article.

Table 2: Constituents of the Goldman Sachs Commodity Index (GSCI) and the Dow Jones AIG Commodity Index (DJAIG)

GSCI Weights as of January 23, 2007									
Energy	**67.14%**	**Industrial Metals**	**11.31%**	**Precious Metals**	**2.59%**	**Agriculture**	**13.73%**	**Livestock**	**5.23%**
Crude Oil	32.95%	Alumunium	3.94%	Gold	2.27%	Wheat	3.17%	Live Cattle	3.01%
Brent Crude Oil	13.62%	Copper	3.59%	Silver	0.32%	Red Wheat	1.15%	Feeder Cattle	0.59%
Unleaded Gas	1.20%	Lead	0.47%			Corn	4.11%	Lean Hogs	1.63%
Heating Oil	5.51%	Nickel	1.87%			Soybeans	1.93%		
Gas/Oil	4.72%	Zinc	1.45%			Cotton	0.96%		
Natural Gas	9.15%					Sugar	1.39%		
						Coffee	0.79%		
						Cocoa	0.22%		
DJAIG Target Weights as of January 2007									
Energy	**33.00%**	**Industrial Metals**	**18.51%**	**Precious Metals**	**9.12%**	**Agriculture**	**30.24%**	**Livestock**	**9.15%**
Natural Gas	12.55%	Alumunium	6.80%	Gold	6.83%	Wheat	4.72%	Live Cattle	6.14%
Crude Oil	12.72%	Copper	6.19%	Silver	2.29%	Corn	5.63%	Lean Hogs	3.01%
Unleaded Gas	3.94%	Zinc	2.80%			Soybeans	7.75%		
Heating Oil	3.79%	Nickel	2.72%			Soybean Oil	2.85%		
						Sugar	3.12%		
						Cotton	3.15%		
						Coffee	3.02%		

Note: Weights may not total 100% due to rounding.

Why Integrate a Passive Commodity Investment in a Portfolio?

The crucial question to ask is why commodities should be included in a traditional portfolio mainly composed of stocks and bonds. Three points are worth considering.

The most obvious argument to include commodities in a portfolio is for diversification purposes. The risk factors driving the commodity market are completely different from those moving the bond, stock, real estate, or private equity markets. As a result, the correlations of commodities with other asset classes are very low and the investment in commodities can lower the risk level of the portfolio. Figure 1 shows the impact on risk and return of the introduction of a certain weight of commodities in a traditional 60/40 stocks/bonds portfolio over a recent 37-year period (1970–2006). Stocks are represented by the S&P 500 composite index, bonds by Lehman Brothers U.S. aggregate index,[4] and commodities by the GSCI. When we add commodities to the portfolio, we keep a 60/40 proportion in the remainder of the portfolio. For example, if we allocate 10 percent of funds to commodities, the rest of the portfolio will be composed of 54 percent stocks (60% * 90%) and 36 percent bonds (40% * 90%).

Despite the fact that the commodity index (GSCI) was more volatile than the 60/40 portfolio over the period (18.8% versus 10.0%), a weight of 24 percent in that index would have reduced the risk level of the traditional portfolio by as much as 13.5 percent. While the marginal impact on risk turns positive from a commodity weight of 24 percent, a weight of up to 45 percent would have reduced the risk level of the 60/40 portfolio over the last 37 years. Figure 1 also shows that the impact on ex-post return of the introduction of the commodity index in the traditional portfolio is positive due to its higher average

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return over the period than the stocks/bonds portfolio (11.5 percent versus 10.3 percent).

A second rationale for commodity investing is to get protection against inflation, or more precisely, against unexpected inflation. Commodities are among the rare asset classes that respond positively to a higher-than-expected inflation environment. Most investors fear inflation, as it erodes their purchasing power over time. Therefore, an asset that generates more revenues when inflation picks up would be of great interest. In other words, investors ideally seek a positive correlation between their assets and unexpected inflation, as commodities offer. Figure 2 shows the annualized three-year unexpected inflation and annualized three-year GSCI total return over a 1980–2006 period. The unexpected inflation is computed from the difference between realized inflation and U.S. inflation expectation compiled by the University of Michigan.

As mentioned earlier, commodities tend to move in the same direction as unexpected inflation. The correlation over the 26-year period is positive at 53 percent.[5] From 2003 to 2005, the large (and mainly unexpected) increase of oil prices has put considerable pressure on general prices, which later translated into unexpected inflation. During these three years, the GSCI was one of the most rewarding investments, returning, on average, 23.2 percent. Correlation with unexpected inflation is an important plus for an asset class, since it will tend to pay investors when they need it the most.

The two previous points certainly argue in favor of commodities, but in the end, the expected return is the important cut-off argument. The following section takes a closer look at the sources of long-term expected return for a commodity portfolio.

Figure 1: Risk and Return Impact of the Introduction of a Passive Commodity Index over the 1970–2006 Period Versus a Traditional 60%/40% Stocks/Bonds Portfolio

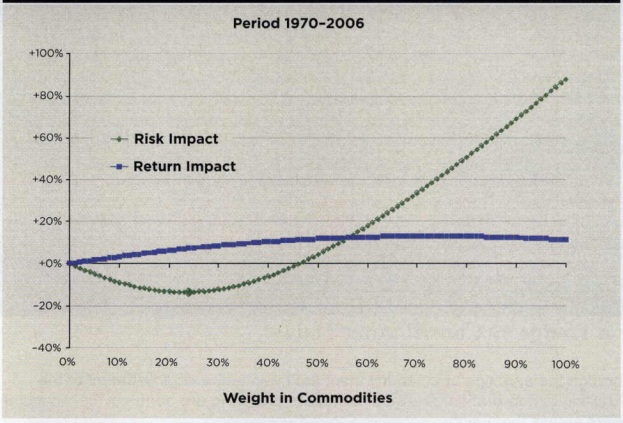
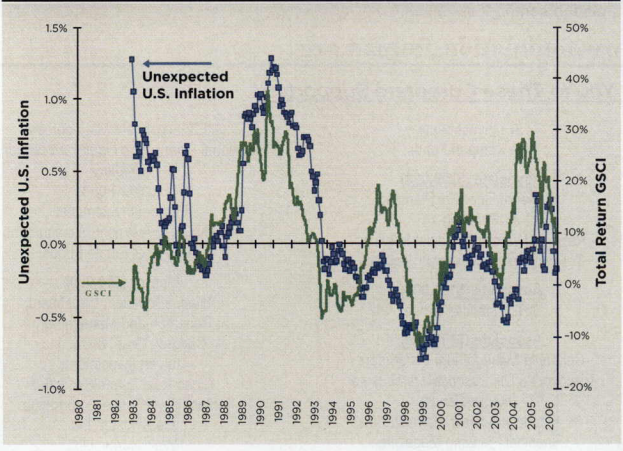


Figure 2: Annualized 3-Year Unexpected Inflation Versus Annualized 3-Year GSCI Total Return over the 1980–2006 Period



Sources of Expected Return for Passive Commodity Investing

Common wisdom suggests that it is not unreasonable to assume that the long-term real expected return of the spot price of a commodity is close to zero (Cashin and McDermott 2002, Gorton and Rouwenhorst 2004). The concept of real expected return refers to the expected return remaining after inflation

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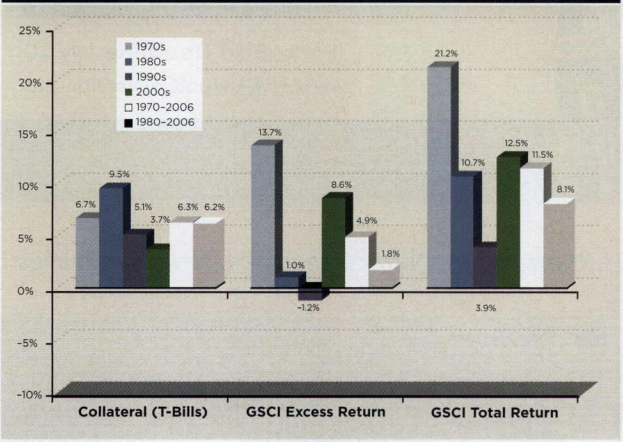
Figure 3: GSCI Annualized Average Return over Different Sub-periods and the 1970–2006 Period



has been subtracted. Inflation reflects the general increase in the price of goods and services. Given that commodities are the simplest of all goods, why would the price of this basket of things appreciate more than the general basket of goods and services (inflation)? After all, a commodity does not create value like enterprises do. A commodity does not finance investment projects for which creditors charge interest. Therefore, contrary to stocks or bonds, commodities should not command a positive real return. Cashin and McDermott (2002) report a downward trend in real commodity prices of about 1 percent over the last 140 years. Accordingly, the ex ante nominal return of a commodity spot price should be roughly equal to inflation, at best.

With a limited potential for long-term real expected appreciation of the spot price, commodities investing might appear unattractive. Yet other sources of return, mainly derived from the modus operandi of passive commodity investing, can enhance the value of commodities in a diversified portfolio. Greer (2000) offers a complete explanation of these additional sources of return, which we summarize below.

Insurance premium in the futures market. As a speculator, the investor is usually the counterparty of a hedger. Hedgers use the futures market to avoid risk, protecting themselves against price changes. Speculators assume risk for hedgers, thus providing insurance. As in any insurance transaction, the insurer charges a premium. In the commodity market, the premium will typically be paid by establishing a forward price slightly lower than the actual expected price. On average, commodity investing through long positions in the futures market generates a positive real return, in part due to an insurance premium paid by hedgers. Active management is not necessary to capture this return.

Rebalancing bonus. A second source of return is derived from the construction scheme and the maintenance operations (rebalancing) of the commodity indexes. Within commodity indexes, periodic rebalancing takes place to reset the weights of each commodity to prescribed weights. In the presence of uncorrelated, mean-reverting, and very volatile index components (such as those of commodities), this automatic rebalancing rule should provide an additional return by always buying the futures that have depreciated (and that should rebound) and by selling those that increased in value. The index is thus expected to produce a positive return even if each and every component generates an average return of zero. On average, commodity investing through a diversified basket of independent commodities generates a positive real return, in part due to a rebalancing bonus.

Return on the collateral. Investing in commodity futures requires only the outflow of a small portion of the notional amount (the margin). This procedure results in a leveraged position. Investors can nullify this leverage by investing the difference between the notional amount and the margin in T-bills. By doing so, they end up with a fully collateralized, non-leveraged position. The providers of all commodity ETFs on the market fully collateralize their futures portfolio in such a fashion. As a result, a third source of return when investing in commodity ETFs is the return on the T-bills posted as collateral. This source is considered tertiary because this component of return has

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nothing to do with the commodity market itself.

Collectively, the three sources of positive real return provide rationales for commodities investment beyond diversification and inflation protection.

> "The emergence of commodity ETFs has made it easier than ever for retail investors to gain a passive exposure to commodities."

Historical Return

After discussing the theoretical sources of return for a passive investment in a commodities futures index, we now verify if these sources have materialized into actual return from 1970 to 2006. We distinguish the contribution of the collateral (T-bills return) from the other sources of return (excess return). Excess return comprises the insurance premium and the rebalancing bonus that we described above, in addition to the unexpected inflation plus the real ex-post return on the commodities' spot price. Figure 3 presents average realized return over the 1970s, 1980s, 1990s, and 2000–2006, and over the 1970–2006 and 1980–2006 periods.

We notice that the GSCI Total Return was particularly high in the 1970s and, to a lesser extent, in the 2000s. These two decades are associated with huge spikes in oil prices. The decomposition between the two sources of return shows that the excess return was huge in the two aforementioned decades and very low (or even negative) in the 1980s and 1990s. The collateral return is always positive and much more stable than the excess return. In the 1980s, the collateral return accounted for more than 90 percent of the total return of 10.7 percent. Over the last 37 years (1970-2006), the commodity index produced an average total return of 11.5 percent, of which 6.3 percent comes from the collateral and 4.9 percent from the excess return associated with the commodities. Excluding the 1970s, the GSCI return falls to 8.1 percent, of which 6.2 percent comes from the collateral and only 1.8 percent from the excess return.

Conclusion

The emergence of commodity ETFs has made it easier than ever for retail investors to gain a passive exposure to commodities. This paper describes why such an exposure is desirable. A passive investment in commodities yields significant diversification and inflation protection benefits. Because of its approach,

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passive commodity investing is also interesting in terms of expected return. At the beginning of this paper, we looked at the wide spectrum of commodities on which futures contracts are traded. We then briefly discussed the interaction of hedgers and speculators, which creates the dynamism of the commodities markets. In the last part of the paper, we confirmed, by examining historical data, that the theoretical sources of return of passive commodity investing materialized into actual returns. We must therefore conclude that passive investment in commodities, while not necessarily a panacea, is definitively worth considering.

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Endnotes

1. The list encompasses all commodities included in the Rogers International Commodities Index. With 35 different commodities, this index is one of the broader published commodity indexes.
2. The DJAIG Commodity Index is rebalanced to target weights on an annual basis only. Hence, during the course of the year, the market effect can push the weight of a particular commodity below 2 percent or higher than 15 percent.
3. The Commodity Futures Trading Commission (CFTC) defines futures commission merchants as "Individuals, associations, partnerships, corporations, and trusts that solicit or accept orders for the purchase or sale of any commodity for future delivery on or subject to the rules of any exchange and that accept payment from or extend credit to those whose orders are accepted."
4. Because the Lehman Brothers U.S. aggregate index starts in 1976, we represent bonds by the P&R U.S. Treasury Note ten-year index from 1970 through 1975.
5. Figure 2 suggests a correlation coefficient higher than 53 percent. This number is actually greatly influenced by the disconnection between the two series at the very far left of the graph. Had we calculated the correlation from 1983 to 2005 rather than from 1980, the correlation coefficient would have reached 68 percent.

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