
Insight

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Commodities: A Solution in Search of a Strategy



For Private Wealth
Management Clients

**Goldman
Sachs**

3 Commodities: A Solution in Search of a Strategy

Investing in gold and oil requires a much more sophisticated approach than many popular commodity-investing strategies suggest.

6 Is There a Strategic Role for Commodities in a Well-Diversified Portfolio?

The argument for a strategic allocation to commodities isn't new. But there is very little convincing data to support long-only futures exposure.

7 **Commodities Have Not Provided Real Returns Above Inflation**

11 **Do Commodities Provide Positive "Roll" Returns?**

12 **Do Commodities Provide Downside Protection?**

13 **Our Strategic Asset Allocation Recommendation**

15 Are Oil and Gold Opportunistic Investments Today?

While large price fluctuations are inevitable in the near term, we see no case for a tactical tilt toward gold or oil at this time.

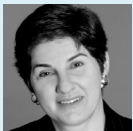
16 **Crude Oil**

19 **"Peak Oil" and the Long-Term Upside**

22 **Gold**

A Solution in Search of a Strategy

Commodities such as gold and oil have captured the imagination of many investors. But investing in commodities entails a high degree of uncertainty, and effective exposure in a portfolio – on either a strategic or tactical basis – is much more nuanced than taking a simple long futures position.



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WE DO NOT KNOW OF ANY INVESTMENT STRATEGY THAT CAN PRODUCE OUTSIZED RETURNS IN BOTH A STRONG ECONOMIC RECOVERY AS WELL AS A SIGNIFICANT ECONOMIC DOWNTURN. Yet the preponderance of the recent bullish commentary on gold is driven by a “heads you win, tails you win” investment thesis. The argument first states that if world economies fully recover, inflation will be inevitable, debt will be monetized, the dollar will be debased and gold, as the only store of real monetary value, will approach or even surpass its inflation-adjusted levels of about \$2,400 per troy ounce (toz) seen in early 1980. You win. The argument then continues to assert that in the alternative case, where the world economies falter and slip back into a deep recession, all confidence in governments and their monetary and fiscal policies will be eroded; people will abandon “fiat money” and take refuge in gold, driving it to or above the same \$2,400/toz level in the process. You win again!

The incongruity of this win-win argument typifies the incongruity of the gold mystique that has existed since the Egyptians first used gold bars as money as early as 4000 BC. The opening paragraph of the late Peter Bernstein’s 2000 book, *The Power of Gold: The History of An Obsession*, captures it well:

At the end of the 19th Century, John Ruskin told the story of a man who boarded a ship carrying his entire wealth in a large bag of gold coins. A terrible storm came up a few days into the voyage and the alarm went off to abandon ship. Strapping the bag around his waist, the man went up on deck, jumped overboard, and promptly sank to the bottom of the sea. Asks Ruskin: ‘Now, as he was sinking, had he the gold? Or had the gold him?’¹

We recognize that a day doesn't go by without some new captivating facts about gold. Since its trough in August, 1999, gold has increased 333% in nominal prices (a 15.2% compounded annual growth rate), has outperformed other precious metals by 2.7% (in the case of silver) to 0.6% (in the case of platinum), oil by 1.7%, equities by 17.2%, and US home prices – no surprise – by 10.6%, all on an annualized basis.² Some might even say that the level of interest in gold is reaching frenzied proportions. The year-to-date flow of funds into commodity-related exchange traded funds (ETFs) through November 2009 was \$28 billion, including direct commodity as well as equity-related commodity funds. This compares to a total net outflow of \$42 billion from US equity funds and inflows of \$42 billion into non-US equity funds (both figures include ETFs and actively managed funds).³ The SPDR Gold Trust Fund GLD, the massive gold bullion exchange traded fund, now holds the world's sixth largest gold reserves at about 1,118 metric tons – just less than the reserves held by the US, Germany, the International Monetary Fund, Italy and France, but more than China and Switzerland. Physical gold-backed ETFs, in aggregate, now hold a total of 1,495 metric tons.

Similar flows have been occurring in commodity hedge funds, prompting some such funds – such as Clive Capital, the world's largest – to close their doors to new investors. Other diversified hedge funds have launched gold-only funds and several prominent funds have increased their allocations to gold and gold-related equities. Even diversified long-only equity funds have stepped up investments in actual bullion as well as gold-related stocks, according to both Morningstar and Financial Research Corp.

In terms of investor interest in physical gold, demand has reached such high levels that in late November 2009, the US Mint had to suspend sales of 2009 American Eagle one-ounce bullion coins after its inventory was depleted. Of course, storage of all this physical gold has become an issue; in November, *The Wall Street Journal* reported that HSBC had asked their retail investors to remove their physical holdings of coins and bullion from HSBC vaults in New York to make room for gold holdings of their institutional clients.⁴

In yet another sign of the heightened level of exuberance, words like “peak gold” (implying a peak in gold production) and “unprecedented bids for bullion” are now entering the lexicon. Aaron Regent, the President and CEO of Barrick Gold Corp. (the world's largest producer of gold), recently expressed his view that “there is a strong case to be made that we are already at ‘peak gold,’” and in November, the mining company completed the unwinding of all its hedges of future production.⁵ This is the first time since the inception of Barrick's hedging program in 1987 that the company has removed all its hedges.

Even academics are joining the stampede toward gold – and, more broadly, commodities in general. After several research papers, including a 2004 National Bureau of Economic Research working paper titled *Facts and Fantasies about Commodity Futures* that made the case for a strategic allocation to commodities through the futures market, Gary B. Gorton and K. Keert Rouwenhorst of Yale University's School of Management have joined an investment management firm to actively manage commodity futures for clients.

It seems to us that the current fascination with gold and other commodities stems from two broad concerns.

First, should an appropriately diversified portfolio have a strategic allocation to commodities in order to improve the risk and reward trade-off in the portfolio? For example, will such an allocation provide some downside protection to the portfolio? Or will commodities hedge the portfolio against inflation? Will the commodity returns be uncorrelated with those of equities and bonds?

Second, should a portfolio have a tactical allocation to commodities, given the uncertainty of the current global economic environment? With liquidity spigots wide open and worries about high inflation, should a portfolio contain commodities to protect the real value of the portfolio? Shouldn't a portfolio invest in commodities to benefit from the rising demand from many emerging market countries like China? Won't “peak oil” and “peak gold” and peak-many-other commodities drive prices substantially higher?

In this edition of Insight, we explore these questions in detail. We begin by analyzing the data to see the extent to which a strategic allocation to commodities provides diversification benefits as well as a hedge against inflation; and as our title suggests, we find that an effective strategic approach to commodities is much more nuanced than simple, long futures exposure. We then examine the current supply and demand factors as well as the financial market dynamics affecting gold and oil to see if a tactical allocation to either one is warranted at this time. While we believe that gold could well see continued price appreciation in the near term, we do not think direct, long exposure to either commodity is suitable for most investors.

Is There a Strategic Role for Commodities in a Well-Diversified Portfolio?

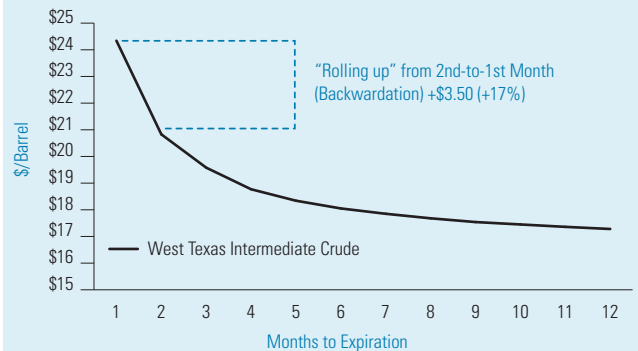
Commodities as a viable asset class has been a topic of discussion for many decades. As far back as 1930, John Maynard Keynes stated that “normal backwardation” in the futures prices of commodities (where futures prices are lower than expected spot prices for a particular commodity, as shown in [Exhibit 1](#)) would provide risk premiums to those investors who were, in effect, enabling commodity producers to hedge their risk of future price fluctuations. An oil producer, for example, which is intrinsically long crude oil by virtue of its business, can reduce its exposure to oil price fluctuations by selling a series of crude oil futures. The investor who is willing to buy those oil futures contracts is therefore providing a hedging service to oil producers and should get paid for that service – hence the normal backwardation risk premium.

In 1939, Nicholas Kaldor presented an alternative – and somewhat contradictory – theory stating that “convenience yield” is a source of risk premium in the commodity futures market. His view was that commodities that are difficult and expensive to store such as crude oil will have generally lower inventory levels; therefore, the market has to incentivize a producer to hold such inventories given storage costs, foregone interest and uncertain spot prices. This incentive appears in the form of a so-called “convenience yield” embedded in the difference between futures prices and higher expected spot prices. This yield is effectively realized by the producer as the futures prices ride up the backwardation curve toward the spot price. Where inventories are plentiful and storage is relatively easy, on the other hand, this convenience yield may be non-existent or even negative – the producer is effectively losing value as the higher futures prices slide down to the spot price. Such futures curves are described as having “contango” (see [Exhibit 2](#)).

In more recent history, there has been a focused discussion on the use of commodities in a diversified portfolio. At one extreme, a 2000 paper by Gerald R. Jensen, Robert R. Johnson

Exhibit 1: Backwardation

“Backwardation” occurs when the price of futures contracts rises to the expected spot price as the contract expiration date approaches. An extreme example of backwardation happened in oil futures in March 1996, when US commercial petroleum inventories fell 10% below their five-year seasonal average, driving spot prices up relative to the forward curve.

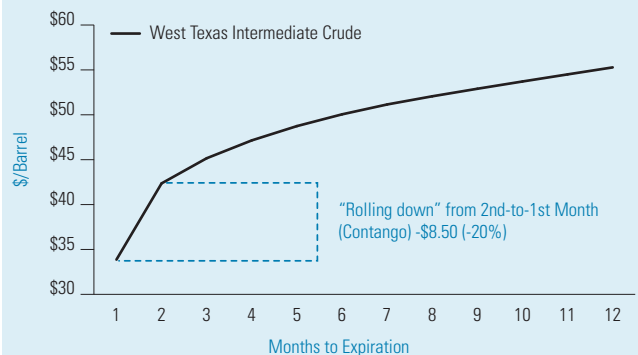


Data from March 19, 1996

Source: Investment Strategy Group, Bloomberg
For illustrative purposes only.

Exhibit 2: Contango

“Contango” occurs when the price of futures contracts falls to the expected spot price as the contract expiration date approaches. This phenomenon was acutely seen in oil futures in late 2008, when poor demand sent US inventory levels 10% above average, putting downward pressure on spot prices.



Data from December 19, 2008

Source: Investment Strategy Group, Bloomberg
For illustrative purposes only.

and Jeffrey M. Mercer suggested that investors, depending on their risk tolerance, should invest anywhere from 5% to as much as 36% of their portfolio in commodities using the S&P/GSCI Total Return Index as the commodities benchmark. In the more widely quoted 2004 paper by Gary B. Gorton and K. Keert Rouwenhorst (referenced above), the authors conclude that their index of equally weighted commodity futures provides the same risk premium as equities, has less volatility than equities and has negative correlation with equities and bonds – implying a very significant added strategic value to a portfolio.

Contrast this to a more recent paper by Claude Erb and Campbell Harvey, *The Tactical and Strategic Value of Commodity Futures*, published in the *Financial Analysts Journal* in 2006 and winner of the prestigious Graham and Dodd Award, which shows that the average returns of individual commodity futures have been “indistinguishable from zero.” The authors further explain that the different returns of the various commodity indexes are driven primarily by the different weightings of the futures contracts in the indexes and by different rebalancing methodologies, rather than the performance of the contracts themselves. They conclude that the returns to the various indexes are therefore returns of different active portfolio strategies and not returns of commodity futures per se.

Having thoroughly analyzed the available data and combed through the existing literature, we find ourselves generally aligned with this perspective. We have concluded that there is no consistent and reliable argument for a strategic allocation to a commodity futures index in a well-diversified portfolio.

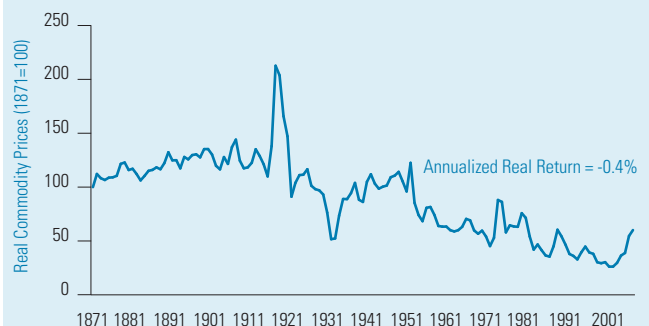
We make our case in three parts below. First, we show that one cannot assume that commodities provide a positive expected return above inflation. Second, we demonstrate that the return from backwardation (the “roll” up the futures curve shown in Exhibit 1) is not consistently and reliably positive; in fact, in recent history and across many commodity futures, the “roll” return has been negative due to contango in the futures market. Third, we show that, unlike high-quality bonds, commodity futures do not provide consistent and reliable downside protection; in fact, adding

commodities to an already well-diversified portfolio of bonds, stocks, hedge funds, private equity and real estate does not improve the risk/return profile of a portfolio unless one assumes a meaningful – and in our view, unrealistic – risk premium.

Commodities Have Not Provided Real Returns Above Inflation

Let’s first begin with the real returns of commodities. The longest publicly available data set on commodities is *The Economist’s* Index of Industrial Commodity Prices, with figures reaching back to 1845. According to this data, which has also been used for research by the International Monetary Fund and the World Bank, real commodity prices have been on a downward trend since 1871. As shown in Exhibit 3, real commodity prices have declined – lagged inflation, in other words – by 0.4% a year over the last 140 years. Real prices for agricul-

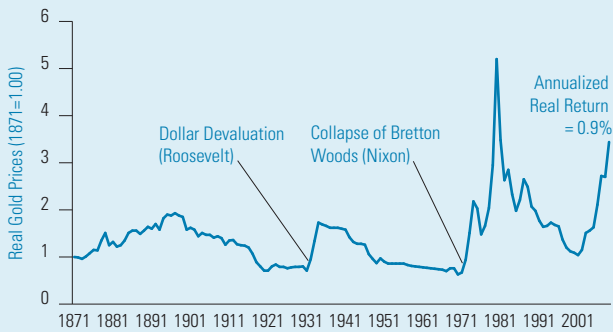
Exhibit 3: Decline in Real Prices of Industrial Commodities



Data through Year-End 2007

Source: Investment Strategy Group, The Economist, Bureau of Labor Statistics, Robert Shiller (Yale University)

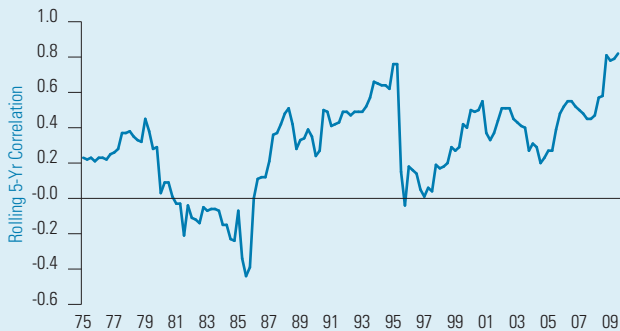
Exhibit 4: Real Value of \$1 Invested in Gold



Data as of November 2009

Source: Investment Strategy Group, Bloomberg, Datastream, Bureau of Labor Statistics, Robert Shiller (Yale University)
Past performance is not indicative of future results.

Exhibit 5: Correlation of Commodities with Inflation



Data as of Q3 2009

Source: Investment Strategy Group, Datastream, Bureau of Labor Statistics

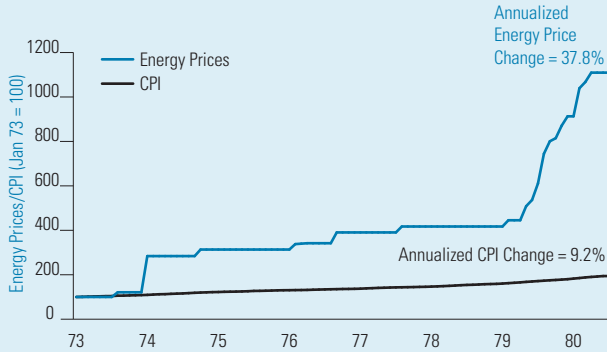
tural commodities and livestock have declined, respectively, by 2.1% and 3.3% a year since 1947. Gold has actually exceeded inflation by 0.9% a year since 1871, but as shown in [Exhibit 4](#), prior to the run-up of the last nine years, it essentially matched inflation. Oil has shown the strongest sustained performance, exceeding inflation by 2.6% a year since 1947. But this performance was driven by two distinct geopolitical events in 1973-74 (the Arab Oil Embargo) and 1978-80 (the Iranian Revolution and the Iran-Iraq War). In the three decades since 1980, oil prices have lagged inflation by 1.04% a year.

Another important factor to note is that, in the long run, commodities have a positive correlation with inflation of 0.38, but this correlation is not particularly stable. Looking at a graph of 5-year rolling correlations of quarterly S&P/GSCI versus the U.S. Consumer Price Index (CPI) in [Exhibit 5](#), one can see that commodities have had correlations as high as 0.82 and as low as -0.44. We would expect an effective hedge to have a higher overall correlation that is also more stable.

While commodities do not keep pace with inflation – and thereby do not provide any real returns – in the long run, there are periods where commodities do substantially outperform inflation. As can be seen in [Exhibits 6 and 7](#), oil and gold dramatically outpaced inflation during the high inflationary periods of the 1970s; but both lagged significantly over the subsequent two decades, as shown in [Exhibits 8 and 9](#). Such performance has led to a view that commodities might be a particularly effective hedge against *unexpected* inflation. To test this view, we examined periods where inflation exceeded expectations and note that commodities are not, in fact, a consistent and reliable hedge against such unanticipated inflation.

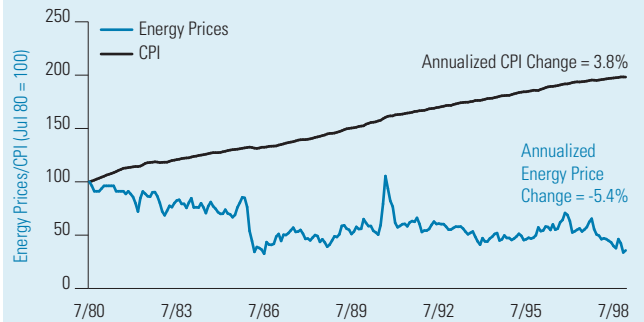
In [Exhibit 10](#), we see that certain commodities hedge unanticipated high inflation some – but not all – of the time. For example, between 1973 and 1981, when inflation averaged 9.3%, both oil and gold provided an excellent hedge, since this was a time of commodity-induced inflation (it included the Arab Oil Embargo, the Iranian Revolution and the Iran/Iraq War), while in the early 1950s, neither oil nor gold provided any hedging against unanticipated inflation. In the

Exhibit 6: Oil Prices Exceed Inflation in the 1970s



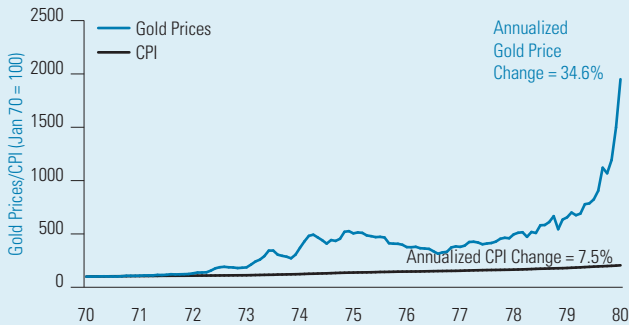
Source: Investment Strategy Group, Datastream, Bureau of Labor Statistics

Exhibit 8: Oil Prices Lagged Inflation in 1980–1998



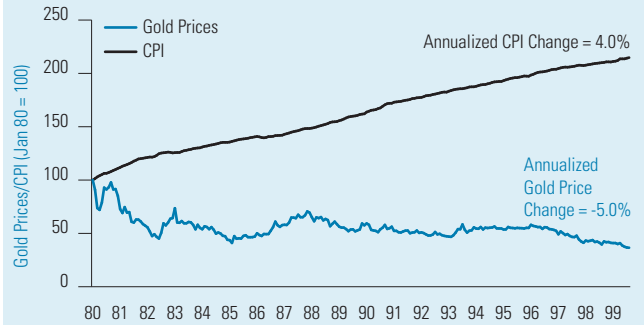
Source: Investment Strategy Group, Datastream, Bureau of Labor Statistics

Exhibit 7: Gold Prices Exceed Inflation in the 1970s



Source: Investment Strategy Group, Datastream, Bloomberg, Bureau of Labor Statistics

Exhibit 9: Gold Prices Lagged Inflation in 1980–1999



Source: Investment Strategy Group, Datastream, Bloomberg, Bureau of Labor Statistics

Exhibit 10: Annualized Real Returns During Unanticipated Inflationary Periods

	CPI Inflation	Energy Price	Non-Energy Prices	Gold Prices	US Equities	US Treasuries
Apr 46 to Feb 48	13.9%	36.8%	–	-13.9%	-21.8%	-13.0%
Oct 50 to Jan 52	6.4%	-6.4%	-10.7%	-6.6%	19.7%	-5.6%
Mar 73 to Nov 81	9.3%	20.9%	-5.4%	11.9%	-3.1%	-2.5%
Mar 87 to July 91	4.6%	3.1%	-2.4%	-6.7%	6.4%	3.2%

Source: Investment Strategy Group, Datastream, Barclays Capital, Ibbotson, CRB, Bureau of Labor Statistics, University of Michigan
Past performance is not indicative of future results.

more recent period of higher-than-expected inflation between 1987 and 1991, oil was the only major commodity to exceed inflation; however, both equities and bonds outperformed commodities during that time.

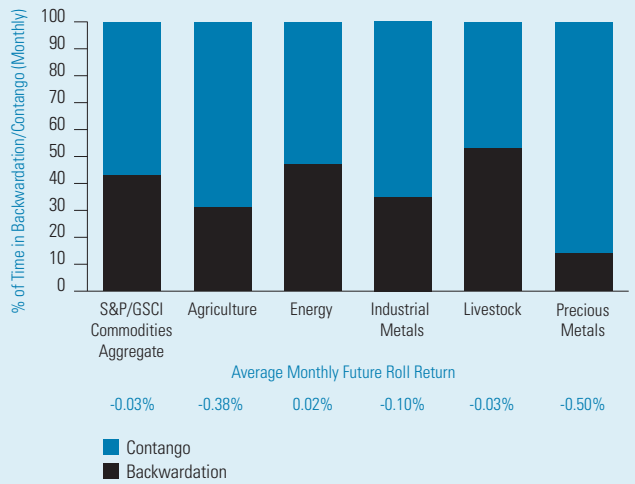
Looking at the correlation of quarterly S&P/GSCI with changes in the CPI, the average long-term correlation is 0.31, with a high of 0.69 and a low of -0.31 on a five-year basis. If we change the 5-year rolling correlations to 2-year or 10-year rolling correlations and change the quarterly returns to monthly or annual returns, the correlation levels and the stability of the correlation change significantly. Selecting such different time frames produces very divergent results; this leads us to conclude that the empirical evidence does not support the argument that commodities are an effective hedge against unanticipated inflation.

Even if they were reliably effective in such cases, we take issue with any hedge that only protects a portfolio against unanticipated inflation. Investors are affected by – and should care about – both expected and unexpected inflation. Even if there was an asset class that was an effective hedge against only unexpected inflation, it would be of limited use during periods of high and persistent – but not surprising – inflation, which is just as damaging to a portfolio’s purchasing power.

One possible explanation for the absence of any consistent hedging benefits from commodities can be found in the composition of the Consumer Price Index. Sixty percent of the index is comprised of services, including medical care, education, communications, transportation services and housing, while only 40% is represented by commodities. Inflation among these services has exceeded commodities inflation since 1935, and currently outpaces it by 0.9%.

Based on historical data and the structure of the CPI, we therefore conclude that commodities are not a consistent and reliable hedge against either expected or unexpected inflation.

Exhibit 11: Frequency of Backwardation and Contango

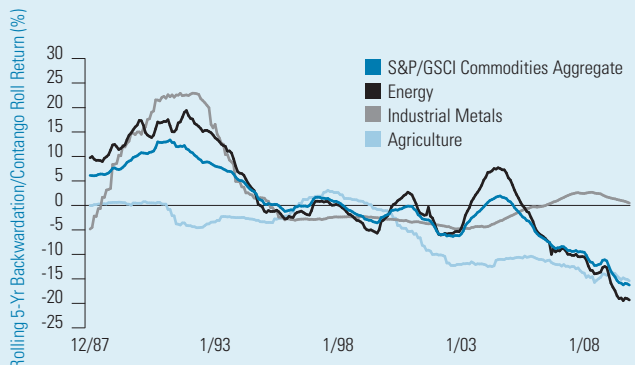


Data as of November 2009

Source: Investment Strategy Group, Datastream

Past performance is not indicative of future results.

Exhibit 12: Roll Return from Backwardation and Contango



Data as of November 2009

Source: Investment Strategy Group, Datastream

Past performance is not indicative of future results.

Do Commodities Provide Positive “Roll” Returns?

Another perceived source of returns to commodity futures has been the so-called “roll” return as futures converge to the spot price at their expiration. The roll return is positive when futures prices are lower than current spot prices and the shape of the futures curve is in backwardation, as shown in Exhibit 1. The roll return is negative when futures prices are higher than current spot prices and the shape of the futures curve is in contango, as seen in Exhibit 2. As mentioned earlier, there have been various theories about why some commodities that are hard to store, such as oil, should be in backwardation while some commodities that are easier to store, such as gold, should be in contango. But again, here, the empirical evidence regarding a positive return from the shape of the commodities futures curve is mixed.

Looking at the S&P/GSCI, in aggregate and by its components, we can see that since the inception of the index data in 1970 most of the commodities spend more calendar months in contango than in backwardation, and thus the average monthly roll return has been negative, as shown in Exhibit 11. Precious metals, especially gold, and agricultural commodities have exhibited the most contango both in terms of frequency and magnitude. In other words, future prices for these commodities were higher than their spot prices as much as 86% and 69% of the time, respectively, and the average monthly roll return of the futures contract was negative at -0.50% and -0.38%. In energy, however, the futures contracts were in contango much less, at 53% of the time, and the roll return has been marginally positive at 0.02%.

As with all data, the averages can mask the underlying trends. In Exhibit 12, one can see the rolling five-year roll returns of the S&P/GSCI and its three key components. Since the early 1990s, the magnitude and frequency of contango seems to have increased, resulting in negative roll returns. This is most pronounced in the agricultural and energy sectors. Exhibits 1 and 2, shown earlier, show an excellent example of a shift in the oil futures contract from extreme backwardation to extreme contango.

Three arguments have been put forth to explain the declining trend in the roll return. The first is that producers, especially oil companies, are not hedging their future oil production as much as in the past because they are not expecting any significant decline in prices; as such, the Keynesian “normal backwardation” would no longer exist and the risk premium therefore disappears. The second argument is that the increase in the allocation to various commodity futures indexes by institutional investors has taken away the risk premium as many investors try to capture the same premium. In their 2006 paper mentioned earlier, Erb and Harvey suggest a third possibility: that the declining trend “might just be statistical noise.”

To address this increased contango in the front end of many commodity futures, institutions have begun to offer enhanced indexes that roll their contracts further out on the curve. We think of such enhancements as the evolution of an active management strategy to generating excess returns and not an investment rationale for commodities as an asset class.

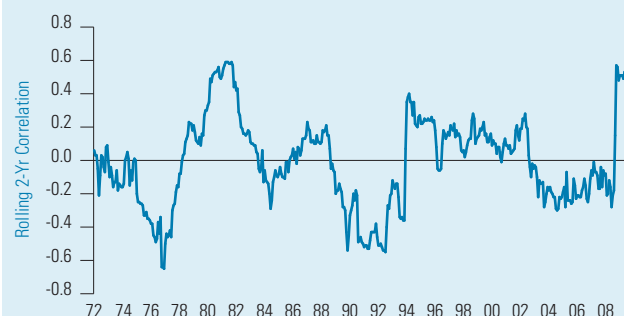
Based on historical data and the absence of a theoretically convincing argument, we therefore conclude that one should not invest in commodities as an asset class in anticipation of positive roll returns.

Do Commodities Provide Downside Protection?

While commodities may not deliver a positive risk premium, it is possible that the low correlation of commodities with a balanced portfolio of stocks and bonds provides some diversification benefit and improves the risk and return profile of a portfolio. Indeed, the rolling 2-year correlation of the S&P/GSCI with a 50% stock/50% bond portfolio since 1970 is relatively low at 0.02, with a high of 0.59 and a low of -0.65, as shown in Exhibit 13. And the historical risk/return profile of a 50% stock/50% bond portfolio does improve with an allocation to commodities. Between 1970 and November 2009, a 10% allocation to commodities funded out of stocks and bonds improved returns by 0.37% per year while holding annualized volatility at the same level as the 50% stock/50% bond portfolio.

In periods of significant equity market drawdowns, however, high quality bonds are a more reliable source of diversification. As shown in Exhibit 14, we have examined the post-World War II periods with significant market dislocations and geopolitical events. In some cases, such as during the 1973-1974 bear market that was partly triggered by the Arab Oil Embargo and the tripling of crude oil prices, commodities provided tremendous

Exhibit 13: Correlation of S&P/GSCI with a 50% Stock/50% Bond Portfolio



Data as of November 2009

Source: Investment Strategy Group, Datastream

downside protection. In other cases, such as in the stagflation period between 1980-1982, commodities underperformed equities. In the recent financial crisis, commodities again underperformed equities, and the 12-month rolling correlation between commodities and equities reached 0.76 in August 2009. Commodities did not provide any diversification benefits in the biggest equity market drawdown since the Great Depression, when it was needed most.

The results are quite mixed, in other words. And if we look at the biggest historical draw-

Exhibit 14: Performance of Commodities During Periods of Significant Equity Drawdowns

	Date	Cumulative Return During Equity Drawdowns					
		Total Return	S&P/GSCI		Gold	US Equities	US Treasuries
			Energy ¹	Non-Energy ¹			
1968 Recession	Nov 68 to Jun 70	- 9.12%	21.74%	-10.95%	-29.25%	2.63%	
1972 Oil Embargo	Dec 72 to Sep 74	139.46%	183.99%	139.46%	137.47%	-42.63%	6.06%
1976 Oil Embargo (Cont'd)	Dec 76 to Feb 78	15.72%	6.83%	15.72%	33.33%	-14.13%	2.97%
1980 Stagflation	Nov 80 to Jul 82	-19.70%	-5.11%	-19.70%	-44.84%	-16.91%	24.02%
1987 Black Monday	Aug 87 to Nov 87	1.78%	-0.25%	3.87%	8.39%	-29.53%	2.36%
1990 Gulf War	May 90 to Oct 90	43.51%	96.45%	-2.95%	3.45%	-14.69%	4.05%
1998 Russian Financial Crisis	Jun 98 to Aug 98	-13.30%	-15.60%	-11.07%	-6.44%	-15.37%	2.88%
2000 Dot-Com Bubble	Aug 00 to Sep 02	-7.88%	-8.62%	-8.55%	15.28%	-44.73%	24.84%
2007 Financial Crisis	Oct 07 to Feb 09	-53.40%	-60.33%	-35.32%	18.51%	-50.95%	13.30%

¹Commodities performance represents S&P/GSCI Total Returns whenever applicable; prior to index inceptions (Jan 83 for S&P/GSCI Energy and Jan-70 for S&P/GSCI Non-Energy), commodities performance is represented by price returns.

Source: Investment Strategy Group, Datastream, Bloomberg, Barclays Capital, Ibbotson, CRB, Bureau of Labor Statistics

Past performance is not indicative of future results. Indices are unmanaged. The figures for the index reflect the reinvestment of dividends but do not reflect the deduction of any fees or expenses which would reduce returns. Investors cannot invest directly in indices.

down of a 50% stock/50% bond portfolio and compare it to a similar-risk portfolio containing commodities, we find that the maximum draw-down of the stock/bond portfolio was -27.1% while that of the portfolio with stocks, bonds and commodities was -32.7%.

In a more forward-looking analysis, we find that a well-diversified portfolio comprised of stocks and bonds as well as hedge funds, private equity and real estate does not benefit from an allocation to commodities even with such low correlations, unless we assume a non-negligible positive risk premium. In the absence of a risk premium, the addition of commodities does not improve the Sharpe ratio (i.e. the return per unit of risk where risk is defined as the overall volatility of the portfolio) of a well-diversified portfolio.

Our Strategic Asset Allocation Recommendation

Based on the absence of an identifiable risk premium, a reliable inflation hedge or even a clear diversification benefit, we do not recommend a strategic allocation to a commodity futures index. However, that is not to say that investors should have no exposure to commodities; in fact, most already have significant exposure through their equity holdings. As shown in Exhibit 15, commodity-related stocks account for 19.5% of developed equities and 29.3% of emerging market equities.

When investors think of commodity-related stocks, however, it is important to bear in mind that a bigger portion of the returns of many such stocks comes from their overall equity market exposure rather than from their exposure to commodities. Take energy stocks. At 10.9% of developed equities and 15.9% of emerging market equities, energy stocks account for the largest portion of commodity-related stocks (in the S&P/GSCI, a production-weighted index that is re-weighted annually, energy commodities are also the largest component of the index at 70%). When we decompose the return of energy stocks, we find that we can attribute 36% of the returns to broad equity market returns (as measured by the S&P 500) and about 28% to energy commodities (as measured by the S&P/GSCI energy commodities). The remaining 36% is attributable to the idiosyncratic risk of the energy stocks.

Alternatively, we can look at the correlation of energy stocks with the broader market versus their correlation with energy commodities. The correlation with equities between January 1983 and November 2009 is 0.60 and has ranged between 0.22 and 0.87 on a rolling two-year basis, whereas the correlation with energy commodities is lower at 0.48, with a low of 0.01 and high of 0.79 on a rolling two-year basis. We start with 1983 because that is the inception date of the energy component of the S&P/GSCI. Therefore, it is important to recognize that by investing in commodity-related stocks, an investor, in general, is assuming more equity exposure than commodity exposure, but the commodity exposure is statistically significant and meaningful.

Exhibit 15: Commodity-Related Sectors in Equity Markets

	% of Developed World Market Cap	% of Emerging Markets Market Cap
Global Equity Sectors		
Energy		
Integrated Oil & Gas	6.10%	9.78%
Exploration & Production	2.94%	4.86%
Oil Equipment & Services	1.25%	0.13%
Coal	0.33%	1.14%
Other Energy	0.24%	-
Metals & Mining		
General Mining	1.61%	0.25%
Iron & Steel	1.60%	6.49%
Gold Mining	0.81%	1.02%
Platinum & Precious Metals	0.17%	0.66%
Other Metals & Mining	0.13%	0.15%
Others		
Specialty Chemicals	1.55%	0.70%
Commodity Chemicals	1.21%	1.67%
Building Fixtures & Materials	1.00%	1.55%
Farming & Fishing	0.28%	0.44%
Other Commodities	0.23%	0.45%
Total	19.45%	29.28%

Data as of December 2009

Source: Investment Strategy Group, Datastream

Given the tremendous interest in gold and gold stocks, we performed the same analysis on Barrick Gold. We selected Barrick Gold for two reasons: It is the largest gold producer in the world, and it is more of a gold mining company than a general precious metals or industrial metals mining company. When we decompose the returns of Barrick Gold, we see a different

We believe that active strategies within the commodity futures complex provide a significant opportunity to investors.

story than we did with energy: 20% of the returns is attributable to the equity market and 40% is attributable to changes in the price of gold. In this case, the gold stock is more of a commodity play than a broad equity play. Similarly, the correlation of the stock with gold is 0.59, much higher than its 0.21 correlation with US equities.

In addition to exposure through equities, we believe that active strategies within the commodity futures complex provide a significant opportunity to investors. For example, the equal-weighted index constructed by Gorton and Rouwenhorst produced substantial returns above both inflation and the spot returns of commodities. In our view, their index does not point toward a passive allocation to commodities; it actually demonstrates the historical returns of an active management strategy where the strategy is to equally weight a basket of commodity futures and rebalance the positions on a monthly or annual basis.

We should note that Erb and Harvey also believe that commodity indexes are actually “different portfolio strategies”: Unlike equity indexes, none of the commodity indexes are based on market capitalization since there is no market capitalization in the commodity futures market (for every investor that owns a long futures contract, there is a corresponding investor that is short the same futures contract; the net exposure adds up to zero!). Therefore, the design of each commodity index is a portfolio strategy around a basket of commodities. We

do not make strategic asset allocation recommendations based on portfolio strategies.

To take advantage of active commodity strategies, we recommend an allocation to two types of hedge funds: 1) macro-tactical trading hedge funds where the hedge fund manager’s goal is to provide uncorrelated returns through investing in a broad range of assets including commodity-related assets based on macroeconomic themes; and 2) commodity-focused hedge funds where the hedge fund manager’s goal is to provide uncorrelated returns through investing exclusively in a broad range of commodity-related assets (e.g., commodity futures, commodity options, commodity equities and in some cases, direct physical commodities).⁶

Commodity hedge funds can also use an array of strategies to take advantage of the high level of volatility in commodities. Annualized volatility in commodities ranges from a high of 56.4% in natural gas, to 34.3% for crude oil, to 19.7% for gold to 15.1% for feeder cattle.⁷ The average of the volatility of the 24 commodities in the S&P/GSCI is 29.9% and the volatility of the S&P/GSCI itself is 20.0%, due to the diversification benefit of a basket of commodities (this is similar to the diversification benefit of a basket of stocks: the average of the volatility of the stocks in the S&P 500 is higher than the volatility of the S&P itself).

These hedge funds use strategies including relative value trading based on historical relationships, price momentum, shape of the futures curves and fundamental research into supply, demand and inventory levels. But just as high volatility creates investment opportunities for savvy managers, it can also lead to significant losses. Silver in 1980 and oil in the mid-80s drove the Hunt brothers (sons of legendary oil tycoon H.L. Hunt) to eventual bankruptcy. Copper was responsible for a \$1.8 billion loss accumulated over 10 years that was uncovered at Sumitomo in 1996. Natural gas was responsible for the collapse of Amaranth Advisors LLC and MotherRock LP in 2006. Clearly, an investor should proceed with caution and significant due diligence when selecting commodity-oriented hedge funds.

Are Oil and Gold Opportunistic Investments Today?

As we set forth our tactical views on oil and gold – the two most widely discussed commodities in the last year or so – we are reminded of a comment by Rex Tillerson, the CEO of Exxon Mobil Corp. in March 2008. As crude oil prices moved above \$100/barrel on their way to a peak in nominal prices of \$147/barrel, Tillerson referred to the continued increases in the price of oil as “pretty crazy”; he attributed one-third of the rise in prices at the time to a weak dollar, one-third to geopolitical uncertainty and the remaining third to market speculation.⁸ More recently, the head of Saudi Aramco, Khalid Al-Falih, stated that with “so many financial investors and players who are not industry participants... you can never predict what the oil price is.”⁹

The insight of these two chief executives should not be underestimated. Exxon Mobil is the largest publicly traded non-state controlled oil company in the world and ranks third in the Petroleum Intelligence Weekly ranking of the top 50 largest oil companies in the world (including national oil companies). Saudi Aramco, Saudi Arabia’s national oil company, is ranked number one with the world’s largest oil reserves and the world’s largest estimated production capacity of 12.5 million barrels per day. When chief executives of two such oil companies refer to the impact of financial investors on market volatility and oil prices, we take heed and recognize the immense uncertainty in forecasting commodity prices in this environment.

We have thus proceeded with due caution and have concluded that the broad-based bullish view on commodities is not warranted at this time. In our view, the commodity markets will remain volatile for the foreseeable future; however, we are not expecting a sustained increase in commodity prices over the next year or so. Several factors contribute to this view: supply and demand forces in the oil market, the shape of the futures curve across many commodities, our generally favorable outlook for the dollar in the next 12-24 months and our view of technological innovation as an antidote to predicted shortages. We recognize that the consensus view tends toward higher returns for

the next several years due to strong demand from emerging markets (particularly China), continued weakness of the dollar and inflation; it is not surprising that at a recent Barclays Capital Commodities Investor Conference, 59% of those surveyed had increased their commodities exposure over the last 12 months and 63% expected to “initiate or increase” their exposure.¹⁰

In analyzing commodities and formulating our tactical views, we know that we cannot rely on one consistent framework to guide us in all environments. At times, fundamental supply and demand factors and various valuation metrics dominate the discussion; but at other times, much more unpredictable forces such as geopolitical events, weather, central bank decisions and the proverbial “fear and greed” drive prices. In good humor and an apt choice of words, *The Wall Street Journal* referred to some of these factors as “cosmic forces”!¹¹

Before we jump into our tactical views on oil and gold, we should note that while people talk about bullish and bearish views on commodities or total return targets for the broad commodities indexes, we believe that we have to look at individual commodities separately. Commodities are less homogenous and correlated to each other than, for example, stocks in a typical equity index. In 2009 through Dec. 22, the overall S&P/GSCI spot return was up 42.6% (the total return index was up only 7.7% due to the contango in the shape of the curve that dragged down returns). The spot returns are comprised of a positive 65.3% in crude oil but only a 1.6% return in natural gas within the energy sector, a positive 2.9% in soybeans but a negative 14.9% in wheat within the agricultural sector, and a positive 5.5% in lean hogs versus a negative 0.6% in live cattle within the livestock sector.

This dispersion of returns is not atypical in commodities. In 2007, copper was up 6% but zinc was down 45%; in 2001, coffee was down 30% but cocoa was up 73%. We measure this dispersion with more analytical rigor by looking at cross correlations. The cross correlation of the five commodity sectors (energy, industrial metals, precious metals, agriculture and livestock) in the S&P/GSCI Index is 0.18, while that of the 10 broad equity sectors (technology, materials,

consumer discretionary, industrials, healthcare, financials, consumer staples, energy, utilities and telecom services) in the S&P 500 is 0.58. Therefore, we think it is not as useful to talk about a broad view on commodities in the same way that we talk about our general views on US equities, for example, or developed market equities or high yield debt.

In this report, we have focused our tactical views on oil and gold: oil because it is the largest commodity produced annually as measured by total dollar value of annual production and as a percentage of the production-weighted S&P/GSCI (it is 65% of the index); and gold because it is the “commodity du jour,” recommended by many as the win-win investment strategy of 2010.

Crude Oil

From its trough on Dec. 22, 2008 through Dec. 22, 2009, crude oil spot prices, as reflected in the West Texas Intermediate price and reported by Bloomberg, were up 135%. But that impressive return bears qualification. First, it was only available to those who bought a physical barrel of oil at the Cushing, Oklahoma terminal. For those investing in oil futures, as measured by the S&P/GSCI total return, oil was up only 13% over that period (the difference, as mentioned earlier, is due to the contango of the futures curve in oil). It was also a fleeting opportunity; if we use the price on Dec. 31, 2008 as our starting point, the crude oil price increase was less than half, at 66%, highlighting the immense volatility in commodities.

One can point to five factors as plausible explanations for the increase in prices to the current level of \$74/barrel. First and foremost, we believe that a significant part of the increase is driven by the virtual elimination of the risk of a Great Depression-style global economic meltdown. Other possible factors are a decrease in the value of the dollar, fears of high inflation, expected increases in demand from the emerging market countries and resumed talk of underinvestment in the energy sector and peak oil. It is also important to remember that while oil has recovered from its December 2008 lows, it is still about 50% below its July 2008 peak.

Let’s first look at the relationship between oil and the dollar. The dollar is, in fact, slightly negatively correlated with oil with an average 12-month rolling correlation of -0.11. The latest 12-month correlation stands at -0.47. As oil prices have increased from their lows in late December 2008, the dollar has depreciated by 5.2%. Since its peak level during the financial crisis in March 2009, the dollar has depreciated by 12.8%.

While the current increase in the price of oil has coincided with a fall in the dollar, this relationship is not very stable; there are many periods where oil and the dollar have been positively correlated. From November 1985 through

While the current increase in the price of oil has coincided with a fall in the dollar, this relationship is not very stable.

April 1987, for example, the dollar depreciated by 21% and oil dropped by 37%. No negative correlation there. Similarly, between December 1998 and February 2002, the dollar rallied 17% against a trade-weighted basket of currencies and oil rallied 80%! The explanation for this shifting correlation is that many other factors drive changes in the price of oil. In fact, on average, movements in the dollar explain only 16% of the changes in the price of oil.

We do not recommend overweighting crude oil as a hedge against further deterioration in the dollar. First, the dollar-oil relationship is not stable enough to be a primary driver of returns. Furthermore, we believe that the dollar is, in fact, cheap, and our long-term view of it is favorable. While the dollar might depreciate further, we believe that the US economy will outperform Europe, the UK and Japan, and its currency will adjust accordingly sometime over the next 12 months.

Another explanation for the rally in oil has been an expectation of higher inflation. With an expected debt/GDP ratio of over 70%, a Federal Reserve balance sheet of \$2.2 trillion as of year-end 2009 and a near-zero interest rate policy,

some have argued that inflation is inevitable and commodities – both oil and gold – are an effective hedge against it.

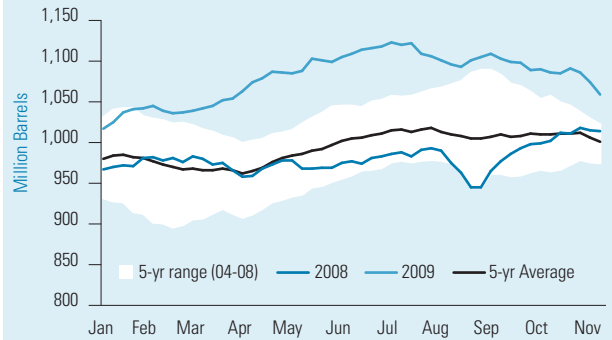
As shown in our discussion above, commodities are not an effective hedge against generalized inflation; they are an effective hedge against commodity-induced inflation as witnessed in the 1970s during the Arab Oil Embargo, the Iranian Revolution and the early part of the Iran-Iraq War. So buying commodities to hedge against generalized inflation brought about by extensive fiscal stimulus and loose monetary policy is not effective in our view. Furthermore, we are not worried about inflation in the current environment. As detailed in our 2010 Outlook, there is significant excess capacity globally, from labor to industry to most services. Inflation, as measured by the Headline Consumer Price Index, has been 1.8% over the last year; consensus for the next 12 months is 2.0%. In our view, a muted inflation level of 2-3% will not drive up oil prices in the next year or two.

Turning to supply and demand for oil over the next 12-24 months, it seems that most of the data points to stable or lower prices in the near term. Take inventory levels; at 1.06 billion barrels, commercial inventories in the US (which exclude the 726 million barrels stored in the Strategic Petroleum Reserves) are above the high end of the range seen in the last five years, as shown in [Exhibit 16](#). US distillates, including diesel and heating oil, are 26% above their five-year average ([Exhibit 17](#)).

Looking globally, official Organisation for Economic Co-operation and Development (OECD) inventories stand at a strong 2.73 billion barrels, as shown in [Exhibit 18](#). According to the International Energy Agency (IEA), there is another 150 million or so barrels of crude oil and products stored in tankers in the high seas; you may have noticed a recent article in *The Wall Street Journal* about how the oil tankers used as floating storage off the coast of southeast England have raised concerns about a possible oil spill that could ruin the area's beaches!¹²

At these levels, inventories cover 59.4 days of OECD consumption (reliable inventory data on all emerging countries is not readily available).

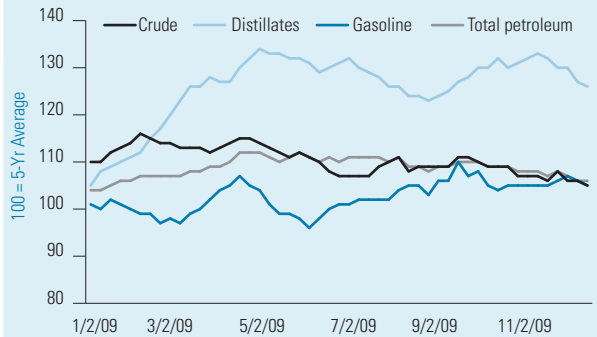
Exhibit 16: US Commercial Petroleum Inventories



Data through December 18, 2009

Source: Energy Information Administration, Investment Strategy Group

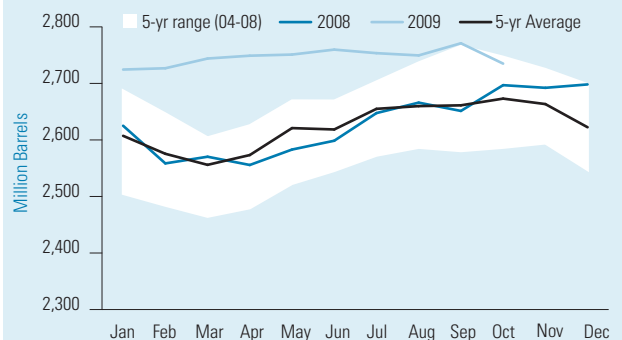
Exhibit 17: US Inventories Relative to Their 5-Year Averages



Data through December 18, 2009

Source: Energy Information Administration, Investment Strategy Group

Exhibit 18: OECD Commercial Petroleum Inventories



Data through October 31, 2009

Source: International Energy Agency, Investment Strategy Group

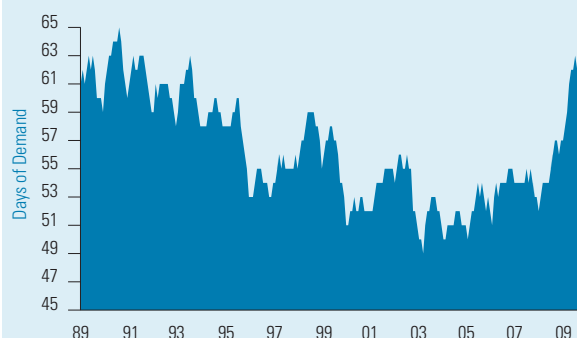
As can be seen in [Exhibit 19](#), this coverage ratio is substantially above the 20-year low of 49.3 days and not far from the 20-year high of 64.6 in 1990. Such high levels of inventory coincide with lower levels of demand. In the US, total petroleum product demand is 8.9% below its five-year average.

With such high levels of inventory as a backdrop, small supply and demand imbalances become a little less critical. And as is typical in the oil industry, there is a wide range of estimates on supply, demand and excess capacity. It is clear that the rebound in global growth will reverse the drop in demand we saw in 2009. IEA estimates that oil demand will increase by about 1.5 million barrels per day (b/d) ([Exhibit 20](#)). At the low end of the range, OPEC estimates an increase of about 800 thousand b/d, while our colleagues at Goldman Sachs Global Economics, Commodities, and Strategy (ECS) Research estimate 2.2 million b/d. The average of eight highly-regarded forecasters is about 1.3 million b/d. This incremental demand can be met from both OPEC and non-OPEC sources.

On the supply side, the IEA estimates an increase in non-OPEC supply of about 400,000 b/d and an increase in OPEC Natural Gas Liquids (NGLs) of about 900,000 b/d. The call on OPEC supply is estimated to increase by about 230,000 b/d. In the most optimistic scenario, FACTS Global Energy estimates supply exceeding demand by about 1.5 million b/d; in a more pessimistic scenario, our colleagues at Goldman Sachs's ECS Research expect a shortage of about 580,000 b/d. We should note that in spite of repeated warnings of depleting oil wells, non-OPEC production has actually surprised to the upside in 2009, as shown in [Exhibit 21](#), by about 990,000 b/d.

It seems to us that with a combination of high inventory levels, increased production in non-OPEC countries, marginal increases in OPEC crude production and increases in OPEC NGL production, prices do not have much further upside from current levels, barring a major geopolitical event. Even if economic growth exceeds our expectations and drives up consumption, OPEC spare capacity is quite significant. As shown in [Exhibit 22](#), year-end 2009 spare capacity is estimated at 5.5 million

Exhibit 19: Industry Inventories – Days of Forward Cover



Data as of December 11, 2009

Source: International Energy Agency, Investment Strategy Group

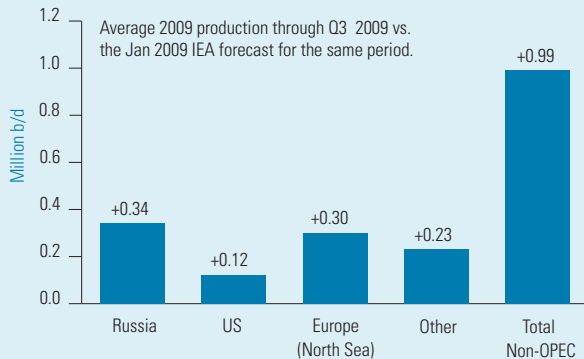
Exhibit 20: IEA Supply and Demand Balance 2008-2010

Million b/d	2008	2009 (e)	2010 (e)
Demand			
Total OECD	47.6	45.5	45.5
US	19.5	18.8	18.9
Europe	15.3	14.6	14.6
Japan	4.8	4.3	4.1
Other	8.0	7.8	7.9
Total non-OECD	38.7	39.3	40.8
China	7.9	8.3	8.7
Middle East	7.1	7.3	7.6
Other	23.7	23.8	24.5
Total Demand	86.2	84.9	86.3
Supply			
OPEC NGLs	4.5	4.9	5.7
Non-OPEC	50.7	51.3	51.7

Data as of December 11, 2009

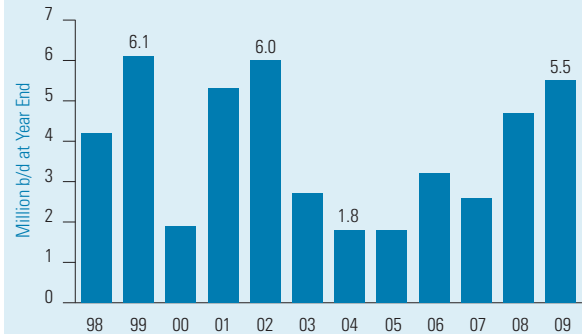
Source: International Energy Agency, Investment Strategy Group

Exhibit 21: Recent non-OPEC Upside Production Surprises



Source: International Energy Agency, Investment Strategy Group

Exhibit 22: OPEC Spare Capacity is High



Data as of December 22, 2009

Source: Bloomberg, Investment Strategy Group

b/d, which is 3.7 million b/d above the low levels seen in 2004 and 2005. This spare capacity is expected to increase by up to 1 million b/d in 2010 and excludes any growth in Iraq's production capacity. While Iraq's future production capacity is highly uncertain given the structural and political problems the country faces, it is reasonable to assume that the increase in production will be over 2-3 million b/d in the next few years. In the last year, Iraq has signed deals with several major oil companies including Exxon Mobil, BP, Royal Dutch Shell, China National Petroleum Corporation and Eni with incentives to increase production quickly. In fact, some have estimated an increase in production capacity by as much as 10 million b/d by 2020.

For the near term, we estimate prices will range between \$60-85 per barrel. The low end of the range among major contributors to the Bloomberg consensus survey for year-end 2010 is \$60. Goldman Sachs research is at the high end at \$95 per barrel. Some OPEC members have indicated a preference for stable prices in the \$70-80 range; the futures curve for end of 2010 is \$80 per barrel. With current prices at about \$74 per barrel and six-month realized volatility at 36%, we do not believe that a tactical overweight to oil is warranted at this time. While we realize that "financial buyers" may drive short-term prices higher, we think that the supply and demand factors point toward stable or slightly declining prices. Furthermore, our view of muted

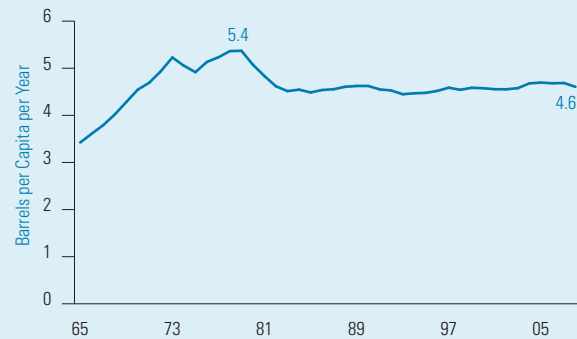
inflation for the next two years does not provide any tailwind and our favorable view of the dollar might actually provide a slight headwind to sustained oil price increases.

"Peak Oil" and the Long-Term Upside

One of the common themes that pervades most oil discussions is the impending shortage of supply to meet the increasing demand from emerging markets. People conjure images of hundreds of millions of cars in China and India juxtaposed with declining production in non-OPEC countries, attacks and kidnappings in Nigeria's Niger Delta and 24,000-foot deep wells in the offshore Tupi field in Brazil. Such discussions end with a conclusion that oil prices are on a significant upward trajectory. At the extreme, the discussion ultimately leads to "peak oil" – a point in time when the maximum rate of global production is reached, and after which production declines. In 1956, M. King Hubbert predicted peak oil production in the US between 1965 and 1970 (US peak production was, in fact, reached in 1970) and globally by 2000 (this obviously has not occurred, and we do not expect it to in the foreseeable future). Peak oil theorists generally believe that supply shortages will be very disruptive to global economies.

We do not believe in peak oil. First, improvements in energy efficiency and concerns about carbon emissions have led to a decline in global oil consumption per capita per year since 1979,

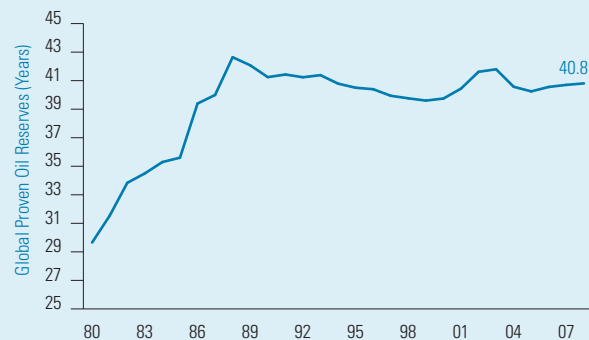
Exhibit 23: Global Oil Consumption Per Capita Per Year



Data as of December 29, 2009

Source: BP Statistical Review of World Energy 2009, World Bank, Investment Strategy Group

Exhibit 24: Ratio of Proven Global Oil Reserves to Annual Consumption



Data through 2008

Source: BP Statistical Review of World Energy 2009, Investment Strategy Group

as shown in [Exhibit 23](#). Even more amazing to us is the fact that the ratio of proven global oil reserves to consumption has held quite steady near the 40-year level; in other words, in spite of increasing overall consumption and depletion of reserves of many fields, proven global oil reserves have steadily increased with consumption to maintain this reserve-to-consumption ratio, as shown in [Exhibit 24](#).

In addition, technological improvements in exploration and production have increased recoverable reserves from existing fields and made deep-water fields such as Tupi accessible. In spite of earlier predictions that no major finds were going to occur, these discoveries have surprised to the upside, as shown in [Exhibit 25](#). For example, in 2008, the US Geological Survey reported 3.65 billion barrels of undiscovered technically recoverable oil in the Bakken formation in North Dakota. While production in the Bakken dates back to 1970, improvements in horizontal drilling and hydraulic fracturing and the higher prices that make such techniques economical have increased the recoverable reserves substantially. In another example, Chevron has been trying to extend the life of one of the world’s oldest oil fields, the Kern River, by using enhanced recovery techniques involving high-technology temperature sensors to monitor production.¹³ It is worth noting, incidentally, that not all the discoveries will require higher production costs.

Outside the United States, the potential for significant discoveries is also high. As shown in [Exhibit 26](#), with the exception of North America and Latin America, most of the drilling activity is small relative to the current estimates of proven world reserves: The Middle East holds 60% of the world’s proven reserves, yet accounts for only 15% of the world’s drilling activity; Africa has 10% of the proven reserves, yet accounts for just 4% of drilling activity.

In our view, the peak oil theories are alarmist and unwarranted. After steady price increases in the 1970s from a low of \$1.80 per barrel to a high of \$44 per barrel (which is equivalent to \$109 per barrel in today’s dollars), it was common to hear about production peaks and long term oil shortages. Some 30 years later, the message is being repeated. However, we go back

Exhibit 25: Major Oil Finds of the Past 10 Years

Field	Country	Discovered	Recoverable Reserves (Billion Barrels)	Estimated Production Cost (\$/barrel)
Jubilee	Ghana	2007	1.2	\$29
Miran West	Iraq	2009	1.1-2.5	\$30
Jidong Nanpu	China	2007	1.7	\$35
Blocks 1, 2 & 3	Uganda	2009	1	\$35
Santos Basin	Brazil			\$38-50
Vesuvio		2009	1	
Guará		2009	1.25	
Iara		2008	3-4	
Tupi		2007	5-8	
Bakken formation	US	2008	3.7	\$60
Block 31	Angola	2006	1.8	\$60-70
Block 32	Angola	2005	1.6	\$65
Korchagina & Filanovskogo	Russia	2006	2	\$85
Kashagan	Kazakhstan	2000	10-15	\$100-110
Ferdows/Mound/Zagheh	Iran	2003	7-9	n/a
Azadegan	Iran	2003	5-9	n/a

Data as of December 22, 2009

Source: Investment Strategy Group, Goldman Sachs Global Economics, Commodities and Strategy Research, company reports

to Economics 101: Higher prices beget higher supply, albeit with some lag and at higher marginal costs. So while we don't believe in oil shortages in the foreseeable future, we do think that, on average, marginal costs will be higher, thereby putting a floor on prices and supporting a sustainable increase in prices toward the \$80-\$100 range over the next several years.

Our expectation of broadly higher prices represents only a modest and gradual increase over current levels, and it is not significant in the context of oil's volatility level (which averaged about 40% over the past decade). As such, we don't believe that investing in oil futures is an optimal long-term solution at this time. Furthermore, contango will be a persistent drag on returns and short-term downside risk, given oil's volatility, is significant.

For those who have a strong bullish view, we recommend investing through the public or private equity market, where an effective operator can add value in the long run irrespective of the direction of prices and provide some downside protection should oil prices decline to the low end of our 12-month range (which, as noted above, is \$60-85 per barrel). Exhibit 27 shows how a major oil company performed well over an 18-year period where oil prices declined over 70% in nominal terms.

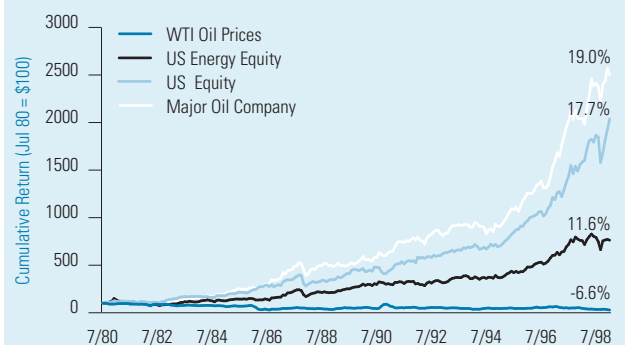
Exhibit 26: Oil Rig Count Versus Proven Reserves by Region

	Reserves (YE 2008)		Drilling (2008)	
	Billion brls	% of World	Oil Rigs	% of World
North America	71	6%	506	40%
Latin America	123	10%	266	21%
Middle East	754	60%	194	15%
Far East	42	3%	175	14%
Europe	62	5%	68	5%
Africa	125	10%	45	4%
Others	81	6%	NA	NA
World	1258	100%	254	100%

Data through December 2008

Source: Baker Hughes, BP Statistical Review of World Energy 2009, Investment Strategy Group

Exhibit 27: Oil Companies Can Outperform Even When Oil Prices Decline



Data as of December 29, 2009

Source: Datastream, Empirical Research, Ibbotson, Investment Strategy Group
Numbers listed are annualized returns

Gold

For thousands of years, gold has held a special status as a perceived store of value and a symbol of wealth. The oldest large stash of gold was found in a cemetery in Bulgaria dating back some 6000 years. The oldest coin that has been discovered is from 2700 years ago, and is an alloy of gold and silver found in Ephesus in modern-day Turkey. In many cultures, gold coins are given to children to mark special holidays, gold rings are exchanged between newlyweds and gifts of gold have conferred the highest levels of esteem, affection and appreciation throughout human history.

In spite of its long history and special status, gold is one of the hardest commodities for most investors to evaluate. And for value investors such as Warren Buffett, the task is nearly impossible. In 1998, at a speech at Harvard University, Warren Buffett is quoted as saying: “It gets dug out of the ground in Africa or someplace. Then we melt it down, dig another hole, bury it again and pay people to stand around guarding it. It has no utility. Anyone watching from Mars would be scratching their head.”

At this point in time, we feel like Martians; to quote the late economist Peter Bernstein, “Nothing is as useless and useful all at the same time.”¹⁴ Nevertheless, gold has rallied 56% from its recent low in November 2008 and 333% since its trough in August 1999 to its current price of about \$1100/toz. There are four plausible explanations for the increase: 1) concerns about the continued depreciation of the dollar; 2) fears of high inflation due to massive liquidity as well as governments’ alleged desire to create inflation as a means of reducing the debt burden; 3) expected increases in demand from investors to capture potential incremental returns and, importantly, as an insurance policy against a significant double-dip recession, in which gold becomes the currency of last resort; and 4) an expected rise in demand from central banks (especially emerging market central banks) in an effort to diversify their reserves away from dollar-denominated assets.

Our first task is to formulate some metrics for gold so that our asset allocation recommendations can be grounded in a sound framework. We begin by examining the extent to which the

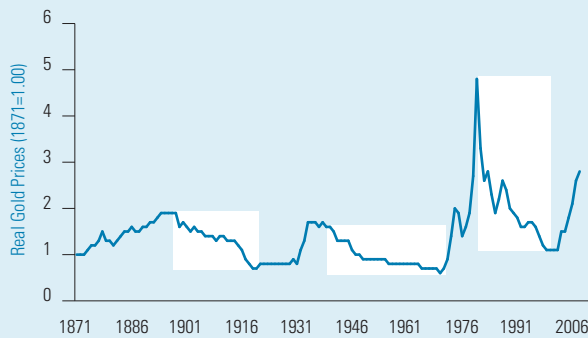
dollar and real interest rates affect gold prices. If there is a strong relationship, then our view of the dollar and interest rates might inform our view of gold. As many have postulated, gold is negatively correlated with the dollar and with real interest rates. Looking at 12-month rolling correlations, gold is more negatively correlated with the dollar than with real interest rates. Its negative correlation with the dollar is -0.34 and the range is quite wide, with a low of -0.89 and a high of 0.62. Its negative correlation with real rates, as measured by the Federal Funds Rate minus 12-month CPI, is only -0.11, and the range is also very wide with a low of -0.78 and a high of 0.73.

Analyzing this further, we look at the relationship of changes in gold prices to changes in both the dollar and in real rates. Here, we find that changes in the dollar explain 26% of the changes in gold and changes in real rates explain 10% of the changes in gold. So a view on the dollar is somewhat – but not critically – important to our view on gold and our view on interest rates, while still relevant, is much less important. And neither factor – alone or in combination – explains more than 36% of the changes in gold prices. Interestingly, the impact of rates becomes more significant when real rates are less than 1%.

On the surface, our favorable view of the dollar and our favorable view of a reasonable economic recovery with a modest increase in real rates by late 2010 would imply a negative view of gold. However, these two factors only explain a little over a third of the changes in gold prices. Furthermore, there are many periods where the correlations have been positive, indicating that gold moved more in line with the dollar and real rates. From August 1987 to May 1993, for example, the dollar depreciated 11.1% against a trade-weighted basket of currencies, but gold also declined by 17.1%. In fact, upon further examination of past monthly data, we note that about 36% of the time since 1970, gold and the dollar have moved in the same direction. So while our favorable view on the dollar leads us to be cautious about gold, our expectations of continued low real rates have a much smaller – albeit slightly positive – impact on our view on gold.

Exhibit 28: An Imperfect, Inconsistent Hedge

Historically, gold has been an effective hedge against rising prices, but only over the very long term. The metal often fails to keep up with inflation – as these multi-decade periods indicate.



Data through November 2009

Source: World Gold Council, Investment Strategy Group

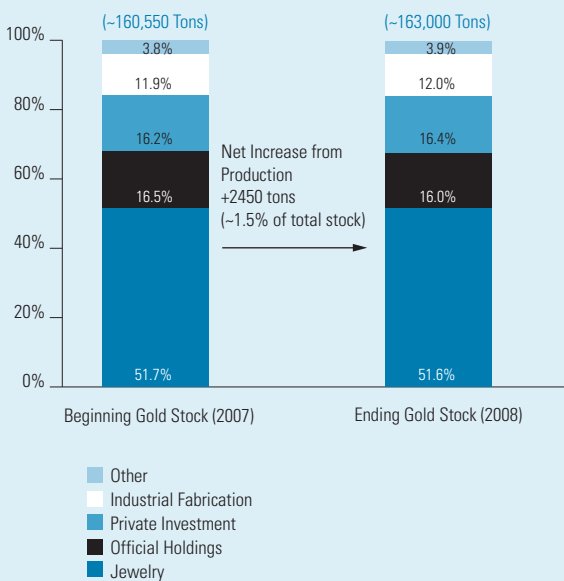
Another explanation for the rally in gold has been inflation expectations. As discussed above, the combination of a high expected debt/GDP ratio of over 70%, a Federal Reserve balance sheet of \$2.2 trillion as of year-end 2009 and a near-zero interest rate policy has prompted some market observers to state that high inflation is inevitable. We do not share that view. We expect a muted level of inflation of about 2-3% rather than the levels of inflation seen in the 1970s that drove gold prices up to about \$2400 in 2009 nominal dollars.

Irrespective of the outlook for inflation, it is important to recognize the limited hedging benefits of gold. Both the monthly and quarterly correlation of gold with inflation are negligible at 0.04 and 0.09 respectively. It is only if we look at annual data that we see a positive correlation of 0.30 but even then, the correlation fluctuates sharply on a rolling 10-year basis. As shown in [Exhibit 28](#), gold keeps pace with inflation over the very long run, but not over short to intermediate periods. So even if inflation does exceed 2-3%, it is not obvious to us that gold will be the best hedge to own.

So we turn to the supply and demand factors. Let's review some of the basic supply and demand data about gold. Most importantly, unlike oil and other consumable commodities, the stock of gold above ground does not decrease, so when we talk about supply, we need to talk about total stock, total annual production and total "scrap" gold comprised of items (mostly jewelry) that can be recycled to meet new demand. To quote Peter Bernstein, "Unlike any other element on earth, almost all the gold ever mined is still around, much of it now in museums bedecking statues of the ancient gods... some on the pages of illustrated manuscripts, some in gleaming bars buried in the dark cellars of central banks, a lot of it on fingers, ears and teeth. There is a residue that rests quietly in shipwrecks at the bottom of the sea."¹⁵

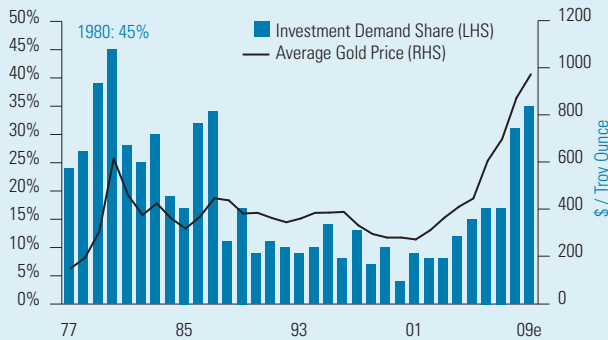
As shown in [Exhibit 29](#), the current physical stock of gold is about 163,000 tons, with the vast majority held in the form of jewelry. This stock increases with annual production. So from 2007 to 2008, new production from mines totaled 2,450 tons and was added to the prior year-end stock of 160,550 tons. Interestingly,

Exhibit 29: Physical Stock of Gold and Net Increase



Source: World Gold Council, Investment Strategy Group

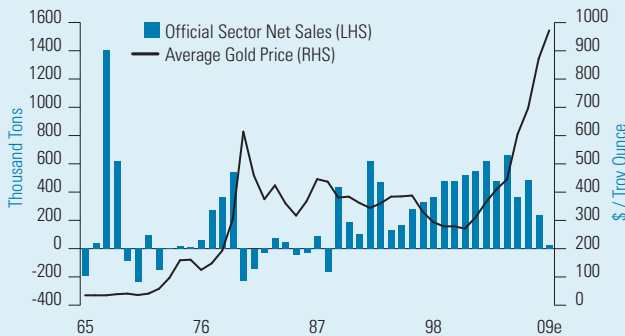
Exhibit 30: Gold Investment Demand



Data as of December 22, 2009

Source: CPM Gold Yearbook 2009, World Gold Council, Bloomberg, Investment Strategy Group

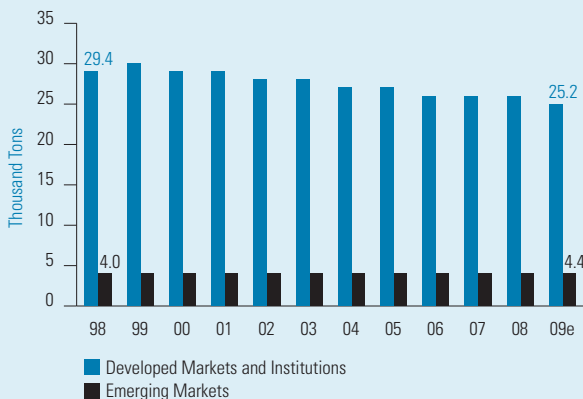
Exhibit 31: Annual Official Sector Net Sales



Data as of December 22, 2009

Source: CPM Gold Yearbook 2009, World Gold Council, Bloomberg, Investment Strategy Group

Exhibit 32: Central Bank Gold Reserves: Developed Markets Versus Emerging Markets



Data as of December 22, 2009

Source: World Gold Council, Investment Strategy Group

additional supply to meet the demand for gold came from recycled gold. In 2008, the last year for which full-year data is available, scrap gold amounted to 1,050 tons of old rings, chains and bracelets. The 2009 scrap tonnage is probably higher. A December 2009 article in *The Wall Street Journal* discussed how “gold parties,” in which newly formed businesses convene groups of neighbors who want to sell their gold for cash, have become the new Tupperware parties in suburban America.¹⁶ A pattern of increased recycling of gold jewelry also occurred in the late 1970s and early 1980s. On Jan. 12, 1980, *The New York Times* reported similar selling where people would line up for hours to sell their gold and silver jewelry. Just over a week later, on Jan. 21, gold prices peaked at \$850/toz.

As we look at the supply and demand picture, the two most important factors – and biggest uncertainties – in the near term are investor demand and central bank activity. The biggest and most notable change on the demand side was the increase in investment demand starting in the second half of 2008. As shown in Exhibit 30, investment demand increased from 17% in 2007 to an estimated 35% in 2009 while jewelry demand, which tends to be more price-elastic (especially in India, the largest consumer of gold jewelry), dropped by 17%.

As we discussed above, the demand for gold ETFs, gold bullion, gold coins and gold stocks is reaching euphoric proportions – and such euphoria can continue for a long time. Fears of policy mistakes and sovereign credit risk, as well as doubts about the ability of governments to navigate the current environment, may last for a while. But by the same token, an improving global economy, better data out of the United States with respect to growth, employment and housing, and a bipartisan effort to address the long-term budget deficit in the US might allay those fears as early as mid-2010. In such a case, the investment demand for gold might disappear quite suddenly, with no natural buyer of that volume of gold at current prices. As we mentioned earlier, physical gold-backed ETFs now hold about 1,495 tons of gold, which is larger than the gold reserve holdings of China and of Switzerland.

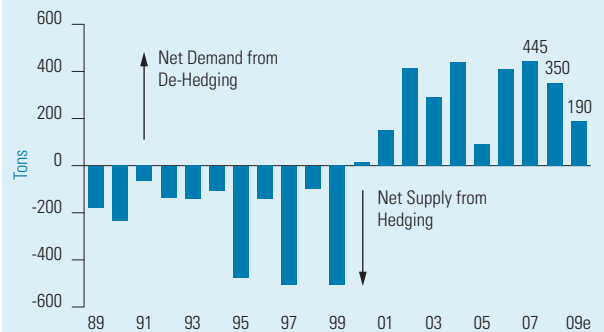
But for now, we can readily see that investor fear is likely to lead to continued investment demand, which will in turn drive prices significantly higher. Some analysts have targets of \$1350 based on anticipated continued investor flows. Some have speculated that prices can reach the inflation-adjusted levels seen in January 1980, which in today's dollars is equivalent to \$2400. Others have said that if we revert to the pre-1971 gold standard without a dollar devaluation, gold would have to be priced at over \$6,400, given the size of the US Treasury's gold reserves and the stock of US dollars as measured by M1. These price projections remind us of oil targets of \$200 to \$400 two years ago.

Finally, we should examine the impact of central bank activity on gold demand. Over the last two years, there have been several announcements about a handful of central banks adding physical gold to their reserves. At the top of the list is China, which announced that it had increased its reserves by about 450 tons over the last five years. India bought 200 tons from the International Monetary Fund in November 2009. On a smaller scale, Russia added 70 tons to its reserves; the Philippines, 22 tons; Sri Lanka, 10 tons; and Kazakhstan, Mexico and Belarus each added 2.5 tons in 2008 and 2009.

While the emerging market countries have been adding to their gold reserves recently, the overall official sector, which includes central banks and multinational organizations, has been a net seller of gold over the last decade. As shown in [Exhibit 31](#), however, the pace of sales has been declining and is estimated to be flat to negative at the end of 2009 when final data is released.

A great deal of attention is focused on whether central banks of emerging markets will continue to make meaningful additions to their reserves. While their actions receive a lot of attention, it is important to keep the size of most of these purchases in perspective. As [Exhibit 32](#) illustrates, the overall amounts in emerging market central banks are not significant relative to those of the developed market central banks. So unless there is a significant shift away from the dollar into gold as a better store of value for the larger central banks, we do not anticipate central bank activity to have an overwhelming

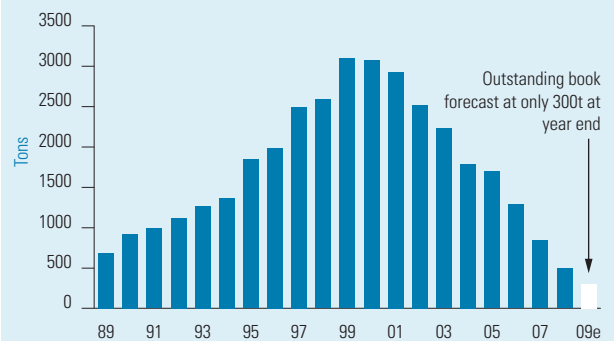
Exhibit 33: Net Supply/Demand from Producer Hedging Activities



Data as of December 22, 2009

Source: World Gold Council, Investment Strategy Group

Exhibit 34: Outstanding Producer Hedge Positions



Data as of December 22, 2009

Source: World Gold Council, Investment Strategy Group

and lasting impact on gold prices.

One factor that probably put some upward pressure on gold prices over the last several years has been the de-hedging activities of producers. Since 2000, producers have reduced their hedges of future production by purchasing back gold futures. As one can see in [Exhibit 33](#), the removal of these hedges had contributed to as much as 450 tons of additional demand per year in some years, compared to net supply of a similar magnitude in years like 1999. From the data shown in [Exhibit 34](#), it seems that most of the de-hedging is over. To the extent that this de-hedging provided some upward pressure on prices, its removal from the market is no longer a positive for gold prices.

We recommend that clients who are considering an investment in gold begin by clarifying their objectives. First, is investing in gold an expression of a bearish view on the dollar? In such a case, while we are not bearish the dollar and, in fact, have a favorable view of it, we would recommend diversifying some of one's equity exposure away from US assets. That seems like a more effective and less risky hedge against dollar depreciation.

Second, for those who are looking at gold purely as an investment opportunity with upside potential, then we recommend two strategies: either invest in gold with some downside protection through structured notes, or consider gold-related equity exposure through public and private equity where excellent operators can better manage the downside. While the upside potential of owning gold bullion or gold ETFs is tantalizing, the downside is also significant. After peaking on Jan. 21, 1980 at \$850, prices dropped by 17% on Jan. 22. By March 18, in less than two months, prices had dropped a total of 43%.

Our concern with direct gold exposure at current prices is that at the earliest signs of a broad reassessment of the global economic outlook, especially that of the US, prices can drop quite precipitously. A structured note can provide some upside but limit the downside. Similarly, investing in gold mining companies provides some upside but limits the downside from significant gold price drops, because an effective mine operator actively manages the gold exposure. As Barrick Gold's founder and chairman wrote to shareholders in the 2008 Barrick Annual Review: "While a \$1000 investment in Barrick at our founding in 1983 would today be worth \$39,000, that same investment in gold bullion would today be worth only around \$2,000." We should note that in the Investment Strategy Group, we have no view on individual companies; we just use Barrick as an example of a company that can manage the upside and downside of gold in the long run more effectively than a typical investor owning the commodity directly. But remember, the exposure of commodity-related stocks to commodities varies; as noted earlier, when we decomposed the returns of commodity-related equities, most have more

equity exposure than commodity exposure – gold companies being a notable exception.

Third, for those who feel a general concern about the state of the world and feel that fiat currencies across the globe have lost and will continue to lose their value, then physical gold, with all its attendant insurance and storage costs, might seem suitable. In a global depression, gold may well turn out to be the best insurance policy – but that is not a tested hypothesis. In fact, during the recent financial crisis and deep recession, the dollar rallied 24.3% as a safe haven while gold actually declined over 30% from its peak in March 2008 through its trough in November 2008. As economist Nouriel Roubini pointed out in his Dec. 11, 2009 piece, *The New Bubble in the Barbarous Relic That is Gold*, "in a depression or near-depression, one would be better off stockpiling canned food and other commodities like oil that are useful for riding out Armageddon."¹⁷

There is no doubt that gold has special qualities. It is chemically inert so it maintains its radiance. It has unusual density so small amounts can function as money for large denominations. It is very soft and malleable, enabling it to be used for gilding and for illustrated manuscripts. And most importantly, it is imperishable. So one can understand the value being attributed to gold beyond its immediate uses. As Peter Bernstein said, "Gold reflects the universal quest for eternal life – the ultimate certainty and escape from risk."¹⁸ And at times of crisis, gold might provide an excellent "escape from risk." But the key question is whether our clients' diversified portfolios need gold as an escape from the risk that currently remains. We do not believe so.

Conclusion

Commodities are clearly essential to our lives. We need agricultural commodities to eat. We need energy commodities to heat our homes and to drive our cars. We need industrial commodities to build our bridges and our offices. And we need precious commodities for jewelry, electronics and solar panels. But being essential to our lives does not make them essential in our diversified portfolios.

Upon extensive analysis of the risk and return characteristics of commodities, we find that a long-only exposure to futures-based commodity indexes in a well-diversified portfolio is not necessary. A typical moderate-risk portfolio with global public equities already has some exposure through commodity-related companies, since commodity-related equities represent 19.5% of developed equity benchmarks and 29.3% of emerging market equity benchmarks. We recommend some incremental exposure through commodity-related hedge funds including macro-tactical trading hedge funds and through private equity, where effective operators are more likely to add value and reduce the downside.

On a more tactical basis, we think that arguments for a significant rise in oil prices are not compelling and the risk/return characteristics of a tactical tilt away from equities or fixed income to fund a long position in oil make such a move unwarranted. On gold, which is the hardest of the commodities to evaluate, we think the momentum can drive prices higher than the current \$1,100 levels. But we don't think prices at these levels are justified in the long run given our views of a recovery, a stronger dollar, interest rates and inflation (please see our 2010 Outlook publication for a detailed discussion of our views). We cannot recommend a tactical tilt toward gold when we are expecting lower long-term prices.

Finally, we want to conclude by providing some historical perspective on these topics. Over the decades – or more accurately, over the centuries – fear of shortages of resources has been a regular occurrence. In 1798, Thomas Malthus stated that “the power of population is indefinitely greater than the power in the earth

to produce subsistence for man,” implying that population growth would exceed agricultural and livestock commodities and famine was inevitable.¹⁹ In the mid-1800s, concern about shortages in whale oil – the prime lubricant and illuminant in the US at the time – drove prices up 143%. (Within a few years thereafter, whale oil was replaced by petroleum.) In 1968, Paul Ehrlich wrote that “India couldn't possibly feed two hundred million more people by 1980... and hundreds of millions of people will starve to death.”²⁰ As a result of Nobel Laureate Norman Borlaug's work that improved yields in rice and wheat, the Green Revolution spread across Asia and Africa, improving the lives of billions of people.

In an interesting book, *The Doomsday Myth: 10,000 Years of Economic Crises*, professors Charles Maurice and Charles W. Smithson surveyed 10 historical resource shortages and showed how market forces alleviated the crises through innovation and technology: New materials are discovered, substitutions are made, yields – be they in agricultural commodities, human labor, or oil wells – are all improved and crises are alleviated.²¹ As our clients read about those asset management firms that now suggest investors own *physical* commodities – such as livestock, corn and soybeans – they may want to remind themselves of all the food subsidies that different governments around the world provide to sustain their farmers, and determine how they can make a reasonable net return after the costs of managing the physical assets including storage, transportation, insurance and management fees. ■

Footnotes

1. Peter Bernstein *The Power of Gold: The History of an Obsession*, 2000
2. Bloomberg spot prices for the commodity returns, the S&P 500 for the equity returns, and the FHFA House Price Index for home prices
3. Investment Company Institute and AMG Data
4. *The Wall Street Journal*: A Mad Rush as Gold Bugs Get the Boot, November 24, 2009
5. Interview with *The Daily Telegraph* at the RBC's annual gold conference, November 11, 2009
6. Alternative investments such as hedge funds entail substantial risks.
7. Commodity volatility figures are based on the S&P/GSCI Total Return indexes.
8. *MarketWatch, Inc.*, Exxon CEO says oil spike not caused by shortages, March 5, 2008
9. *Financial Times*, Oil Heavyweight ponders fast-changing landscape, November 12, 2009
10. Investor thinking: Commodities Investor Conference Survey Results 2009, published by Barclays Capital on December 10, 2009
11. *The Wall Street Journal*, The Force Behind the Unlikely Rise by Oil, December 3, 2009
12. *WSJ*, Global Oil Glut Roils an English Tourist Village, December 2, 2009
13. *The Wall Street Journal*, Chevron Engineers Squeeze New Oil From Old Wells, October 9, 2009
14. Bernstein, *Ibid*
15. Bernstein, *Ibid*
16. *Wall Street Journal Weekend Edition*, December 19-20, 2009
17. Roubini *Global Economics*, December 11, 2009
18. Bernstein, *Ibid*
19. Thomas Malthus, *An essay on the principle of population*, 1798
20. Paul Ehrlich, *The Population Bomb*, 1968
21. Charles Maurice and Charles W. Smithson, *The Doomsday Myth: 10,000 Years of Economic Crises*, Hoover Institution Press, 1984

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