Strategic and Tactical Perspectives on Gold

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Gold is getting a lot of attention from investors, in large part because it has outperformed all major asset classes over the past several years. There are also other, more fundamental reasons why investors are looking towards gold. The looming specter of inflation and a weaker dollar tends to motivate interest in real assets. The long-term perspective on precious metals typically focuses on the low correlation between gold and other asset classes. Indeed, when investors are selling off equities, they often pile into precious metals, as we have seen in recent years.

There is considerable debate, however, among academic experts on what role, if any, precious metals should play in long-term asset allocation. Financial theory has trouble categorizing gold as an asset class because nothing about it inherently gives reason to expect a long-term real positive return. (see here)

That said, gold has provided a 'store of value' and has historically delivered attractive returns, especially from the standpoint of the recent 'lost decade' in equities:

Years Through 2008	70	50	30	10
Average Annual Return	5.8%	8.1%	6.0%	12.6%
Annualized Standard Deviation in Return	15.9%	18.5%	19.0%	16.7%

Historical returns from holding gold (in USD, no cost of carry)

Gold goes through extended periods of high or low performance.[1] The correlation between successive months' returns on gold is highly statistically significant over the last fifty years. The annualized standard deviations in returns (formed using monthly data) thus tend to understate the risk associated with gold, since the serial correlations tend to fatten the tails of a distribution. The annualized standard deviation in returns on gold over the 50-year period using 12-month returns is 22% (vs. 18.5% shown above).

All of this cautions against simply looking at historical returns from gold.

There are good reasons for investors to maintain a long-term strategic allocation to gold, which has clear, positive portfolio benefits (due to low correlation to other asset classes). That said, gold is in an historic run-up in value and has been generating

[1] In technical terms, this means that gold has serial correlation in returns

unsustainably high returns. Because of its high price and rising volatility, there is significant tactical risk in gold.

How, then, can one pragmatically maintain exposure to gold while limiting downside risk? Take a small leveraged position using options on GLD. This provides exposure to the upside, in case gold continues to climb, but also creates a floor on losses if gold tanks.

Historical correlations and volatility

How do we rationalize the positive returns from simply holding a physical commodity such as gold? For many investors, gold provides protection against the contingency of rampant inflation. As such, one might argue that the long-term returns for holders of gold are rational because the financial system rewards those who provide access to this ultimate form of reserve currency. But even if this is the case, there must be some rational way to value gold—it cannot be a great investment at any price.

The creation of the gold ETF (GLD) has made it far easier to invest in gold as a pure commodity. In fact, GLD is the sixth-largest holder of bullion in the world (see here). GLD provides a useful way to explore gold as an investment, not least because it has exhibited far lower volatility than the CBOE Gold Index (^GOX), which tracks the performance of gold-mining firms. (see here) GLD was launched in late 2004, so it now has a sufficient track record to provide some interesting insights.

Based on three years of trailing data through the end of August 2009, the correlations between GLD and a series of 'core' asset class funds are shown below:

Asset Class		GLD	AGG	TIP	SPY	VGPMX	QQQQ	IWM	EEM	DJP	TLT
Gold	GLD	100%									
Aggregate Bond	AGG	38%	100%								
TIPS	TIP	47%	74%	100%							
S&P500	SPY	3%	31%	38%	100%						
Precious Metals	VGPMX	46%	40%	63%	75%	100%					
NASDAQ 100	QQQQ	-9%	19%	29%	91%	68%	100%				
Russell 2000	IWM	0%	29%	32%	95%	70%	88%	100%			
Emerging Markets	EEM	24%	33%	44%	88%	89%	85%	83%	100%		
Commodities	DJP	56%	15%	51%	49%	82%	40%	43%	63%	100%	
Long Term Bonds	TLT	24%	76%	49%	-5%	4%	-19%	-8%	-6%	-8%	100%

As expected, GLD exhibits a low correlation to large-cap stocks (SPY), small-cap stocks (IWM), and even a fairly low correlation to precious-metal producers (VGPMX). Gold is supposed to provide a hedge against inflation, so it is reassuring that GLD correlates more highly to inflation-protected bonds (TIPS) than to nominal bonds (AGG). It also

makes sense that the correlation between GLD and AGG (which has a moderate sensitivity to interest rates) is higher than between GLD and TLT (which has high sensitivity to interest rates). DJP tracks the Dow Jones AIG Commodity Index, a component of which is gold.

Including gold in a portfolio is attractive because of gold's low correlation to major asset classes. By adding an asset class with low correlations and positive expected returns to a portfolio, investors can increase expected return without increasing risk. That outcome is contingent upon gold having a *positive* expected return, of course, but also upon a manageable level of volatility. As we consider gold as an investment, it is important to have a sense for the basic portfolio statistics:

Ticker	Beta	Annualized Standard Deviation in Return	Average Annual Return
GLD	0.02	20.6%	15.7%
AGG	0.09	5.5%	5.4%
TIP	0.17	8.9%	4.3%
SPY	1.00	19.5%	-4.2%
VGPMX	1.56	41.2%	7.9%
QQQQ	1.09	23.6%	4.1%
IWM	1.15	23.8%	-3.5%
EEM	1.44	32.0%	9.5%
DJP	0.57	23.6%	-8.2%
TLT	-0.04	16.2%	7.7%

Historical statistics for three years through August 2009 (Beta is with respect to the S&P500)

Over the past three years, the volatility of GLD has been very close to that of the S&P500, around 20%, but the average return on GLD has been almost 16%, beating all other major asset classes. This, of course, is a big reason why so many investors are interested in gold. Money flowing into asset classes tends to chase performance.

Gold in a Monte Carlo framework

Alternatively, we can look at a Monte Carlo projection for these asset classes that have been calibrated so that the projected volatility for the S&P500 is consistent with long-dated options on SPY (and otherwise using all default settings and the same three years of data as input). This approach provides useful insights into the relative pricing of risk.

Ticker	Beta	Annualized Standard Deviation in Return	Average Annual Return
GLD	0.02	27.3%	8.7%
AGG	0.09	7.3%	2.3%
TIP	0.17	11.8%	3.8%
SPY	0.99	25.8%	8.2%
VGPMX	1.56	54.5%	17.4%
QQQQ	1.09	28.2%	9.0%
IWM	1.15	29.9%	9.6%
EEM	1.44	37.3%	11.9%
DJP	0.57	31.2%	9.2%
TLT	-0.04	21.4%	6.8%

Monte Carlo Projections

These projections are relevant for the next several years, because we have calibrated the volatility of the S&P500 to this time-frame. Over much longer periods, we can expect (hope) that broad market volatility will settle down to a level more consistent with its long-term history. (For the S&P500, that's around 15%.) In the immediate future, however, signs in the market suggest that volatility will remain high. The projected 8.7% expected return is higher than historical returns for gold over any of the periods of above, but the volatility is also substantially higher than for any long historical period. The projected volatility of 27.3% is very close to the current implied volatility in long-dated options on GLD (Jan 2011 options have implied volatility of 28%).

The Monte Carlo projections reflect *expected* values. When an asset class has substantially outperformed its expected returns over an extended period, it is because of a downward correction (and vice versa). When we compare the last three years to expected returns as a measure of valuation, the results are quite striking:

Ticker	***Expected*** Annual Return	Trailing 3 Yr Annual Return	Expected - Trailing	
GLD	8.7%	15.7%	-6.9%	Over Valued
AGG	2.3%	5.4%	-3.0%	
TLT	6.8%	7.7%	-0.9%	
TIP	3.8%	4.3%	-0.5%	
EEM	11.9%	9.5%	2.4%	Under Valued
QQQQ	9.0%	4.1%	4.9%	
SPY	8.2%	-4.2%	12.4%	
IWM	9.6%	-3.5%	13.1%	
DJP	9.2%	-8.2%	17.4%	

Expected vs. Trailing Returns

This approach to estimating valuation is purely statistical and uses no fundamentals—it is only part of the story. That said, it has historically been a useful indicator. Even though the projected average return for GLD is above the historical returns for gold for any of the long periods of history discussed at the start of this article, the trailing returns are higher still. It is also noteworthy that while GLD is the most overvalued of the asset classes in the table above, commodities (DJP) are the most undervalued. Investors have been selling off commodities as a whole at the same time that they have been buying gold! This suggests that the money flows into gold are not merely a rational response to inflation fears. Similarly, while TIPS have very slightly outperformed their expected returns, a fear of inflation is inconsistent with the fact that TIPS have underperformed nominal bonds (AGG and TLT). If fear of inflation was driving returns, TIPS would outperform nominal bonds.

The disproportionate run-up in gold may instead reflect some behavioral bias towards gold as a 'safe' store of value, but it mostly owes to simple performance-chasing. A good indication that the run-up in gold is largely driven by performance-chasing is the fact that the Morningstar *investor returns* lag the *total returns* on GLD by 2.2% per year over the trailing three years through August 2009.

The historical data suggest that gold is selling at a premium relative to other commodities and relative to inflation-protected bonds, which is consistent with the Monte Carlo projections.

The Monte Carlo projections of fair value must be understood in the context of the fact that projected returns using portfolio theory rest on somewhat shaky ground. Portfolio theory has trouble explaining the expected returns that have been observed for commodities. That said, our estimates for the expected returns from the Dow-Jones AIG Commodity Index are consistent with historical and projected values from Ibbotson, which provides some sense of consistency and rationality.

While gold looks valuable from the perspective of strategic asset allocation, because of its low correlation to equities, there is cause for concern that gold's big run-up in prices recently may have left it overvalued. From a tactical perspective, it is preferable to buy into the components of an asset allocation when they are out-of-favor, not amid a multi-decadal run-up in price. Gold last experienced a run-up similar to its recent rise in the late 1970's, and the price of gold lost more than 50% in the two years that followed.

An interesting and infrequently discussed alternative for investors who want exposure to gold but may be concerned about a decline is to establish a floor by buying call options on GLD. There are options available on GLD with expirations out to January 2011. (see here) The $100 call option on GLD for January 2011 allows the owner to purchase GLD at $100 at any point between today and Jan 21, 2011. This option can be purchased for $12.90.

The current prices of GLD call options are fair. When I computed the price of this call option in the Monte Carlo simulation, this price is almost exactly what the model yielded, once we calibrated the projected future volatility for the S&P500 as described earlier. The implied volatility of the Jan 2011 options on GLD (which are very close to the value generated by the Monte Carlo simulations) is about 28%. (see here) This is higher than the near-dated options (October 2009), which have implied volatility of about 22% as of this writing. The options market is projecting higher future volatility for GLD in 2010-2011, consistent with the Monte Carlo simulations. Both the options market and the Monte Carlo simulation are projecting a period of volatility for gold substantially higher than its long-term averages. Over the last 30-50 years, gold has exhibited annualized volatility of around 19% (see earlier table). A period of 28% annualized volatility will be quite a shock. At this level of risk, there is a chance (albeit a small one) of more than a 50% decline in a year.

A recommended strategy for gold

So where does all of this leave us? Gold has out-performed substantially in recent years, but this, by itself, is not reason enough to buy it, just as $140+ oil was not a good reason to buy oil. Gold's low correlation to equities argues for some allocation in a long-term portfolio, and the fact that gold has provided some much-needed defense in diversified portfolios in the recent bear market is a great example of the value of low correlation. Many asset classes are beaten down, and gold is probably overpriced, so while gold may decline, there is a reasonable probability that other asset classes will outperform in that scenario. This is the strategic argument for having some allocation to gold.

From a tactical perspective, however, gold is very expensive and is due for reversion to the mean if history and Monte Carlo simulations are correct. It is very hard to make the case that the run-up in gold represents a rational response to the risk of inflation when other inflation-trackers gave been declining or have at least lagged far behind gold.

Some investors will want to hold gold for idiosyncratic reasons: They may like the idea of being able to keep it in their own safes in case banks fail, or they may like the historical narrative for gold as a store of value. I am not going to dispute these points.

Those who view gold as an inflation hedge, however, should think twice. For those who really want to hold gold, buying long-dated options to achieve a leveraged position and buying bonds (either nominal or inflation-protected, depending on how strongly one wants to bet on inflation) can provide a floor on losses in the event of a decline in gold prices. (Rather than buying one share of GLD with $100, that is, you buy a Jan 2011 / $100 call option for $12.90 and invest the remaining $87.10 in bonds.) This approach seems especially timely given that the options market in gold is signaling a substantial increase in volatility (risk) in coming years and that options have historically provided good estimates of future volatility for a range of asset classes. (see here)

With this approach, you get the upside of gold with an absolute floor on a $100 investment of $87 between now and January 2011. The leverage ratio (the fraction of money invested in calls vs. bonds) can be adjusted, of course, depending on how large a bet one wishes to take on gold. For investors who prefer simply to take a long position in gold, the long-term role of gold as a diversifier still holds up, but the big run-up in price in recent years and the high implied volatility on GLD suggest that the next few years will be very risky for this asset class.

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