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# COMMODITIES? ABSOLUTE! INTELLIGENT EXPOSURE? YOU BET!

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Barclays Capital

Commodities have been one of the outstanding investments over the past five years. However, given the nature of recent media coverage, the casual observer might be forgiven for thinking that all commodity prices are being swept higher on a tide of speculative buying, pushing prices ever farther away from fundamental values. This is further exacerbated by a significant inflow of investment money into the asset class. A rational investor faced with the media chorus of "bubble, bubble, bubble" might decide that commodities are just not worth the risk. The analysis in this paper suggests that would be a mistake, and that the case for investing in commodities is as strong as ever.

## Commodities – competitive returns

Over the past 12 months, commodity investments have been at the forefront of the alternative asset class agenda as investors have sought ways to counter the modest performance of the more traditional asset classes. However, robust commodity performance is not a new phenomenon – commodities have performed consistently over the past ten years, comparing favourably with those of long-term equity and bond market returns (Table 1).

**Table 1: Relative Performance of Global Commodity Indices (as at 28-May-2008)**

| | | Returns (annualised)[1] | | |
|---|---|---|---|---|
| | Year to Date Change in Index | Last 12 months | Last 5 years | Last 10 years |
| ***Commodity Indices*** | | | | |
| S&P GSCI™ TR | 32.6% | 71.4% | 19.6% | 14.9% |
| DJ-AIG Composite Index TR | 18.6% | 31.1% | 16.3% | 12.3% |
| Deutsche Bank DBLCI TR | 30.2% | 80.0% | 28.0% | 22.0% |
| Rogers International Index | 20.7% | 53.0% | 22.6% | n/a |
| ***Bond, Equity and Hedge Fund Indices*** | | | | |
| JPM Govt. Bond Index TR | 1.5% | 9.7% | 3.5% | 5.8% |
| S&P 500 Composite Index TR | -4.5% | -7.3% | 9.1% | 3.9% |
| CSFB/Tremont Hedge Fund Index | -0.24% | 5.2% | 10.5% | 8.3% |

Source: Barclays Capital, Bloomberg

## CCommodities as an inflation hedge

Historically, equities have been considered to be an asset class that, at a minimum, keeps pace with inflation. However, recent experience of increased volatility and the sharp downturn in equity markets in late 2007 that continues, unrelenting, in 2008 reminds us of the risks of investing in equities to counteract rising inflation. Given the global equity markets have provided no shelter from rising inflation, investors seeking protection would have done well to turn their attention to the commodities market.

When comparing the performance of all real assets during the four most notable periods of inflation: deflation during 1929, high inflation during 1974, low and stable inflation in the early 2000's (2002 is considered representative of this period for the purpose of this paper), and high inflation over the 12 months ending 30-Jun-2008, we see that commodities achieved positive returns while equity returns were negative (Table 2). Notably, commodities were the only asset class to post positive returns during the high inflationary environment of 1974. Throughout this paper we have used the S&P GSCI Commodity Index (GSCI) as representative of commodities as an asset class as it uses a transparent, economically motivated indexing strategy, is highly liquid, and has the longest return series.

**Table 2: Real Annual Total Returns**

| | 12 months ending 30-Jun-2008 | 2002 | 1974 | 1929 |
|---|---|---|---|---|
| Equities | -14.9 | -24.5 | -58.0 | -14.1 |
| UK Government Bonds (Gilts) | -0.2 | 6.7 | -29.0 | -1.0 |
| Property | -14.8 | 6.6 | -29.4 | |
| Commodities | 76.4 | 16.0 | 15.8 | |

Source: Barclays Capital, GSCI, S&P 500 Index, IPD.

The fact that different asset classes have provided the best inflation hedge over different time periods reinforces the need for a diversified portfolio. For example, a diversified portfolio would have received inflation protection from commodities in the early 1990s, while equities and property provided a better hedge later in the decade. This suggests that the investor looking for constant inflation protection must invest in a *diversified portfolio of real assets at all times, including an allocation to commodities*.

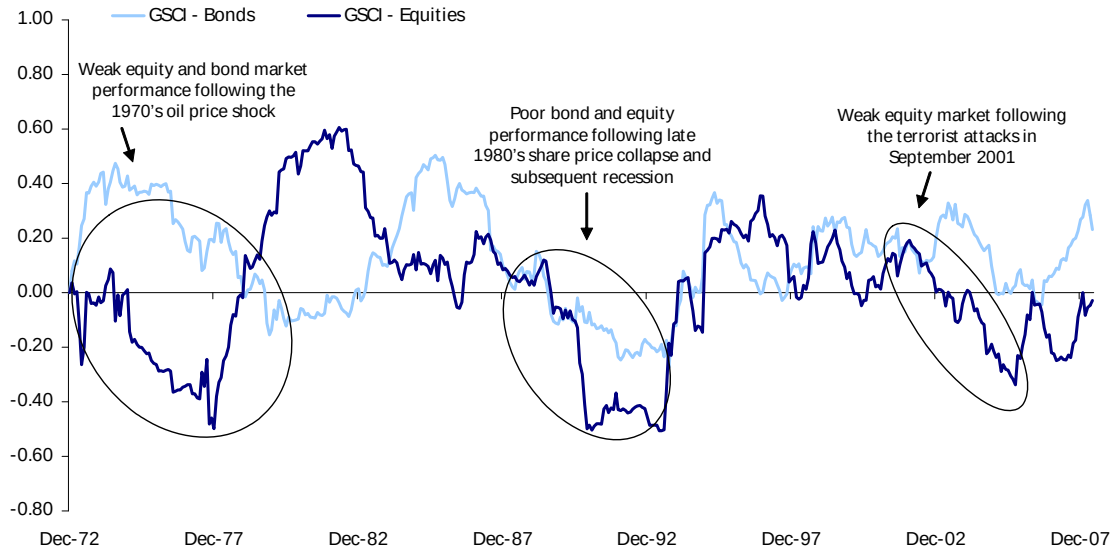
## Commodities correlations – negative when most needed

The historical negative correlation between commodities and other asset classes – and the diversification benefit that this provides to an investor portfolio – is a key factor in favour of investing in commodities.

Over the 8 years to 30 June 2008, the GSCI exhibited a 0.04 negative correlation with the Citigroup Australia Government Bond Index[1] and a 0.01 positive correlation with the S&P/ASX 200.

Significantly, our analysis of rolling three-year correlations between commodities, stocks and bonds show that while the correlations vary between positive and negative over the past 30 years, they tend to be most strongly *negatively* correlated when the returns from equities and bonds are weakest. For example, the 1970s oil price shock, the late-1980s share price collapse and the collapse of the global equity markets in the aftermath of the 2001 terrorist attacks demonstrate the negative correlation of commodities during periods of poor equity performance (Figure 1).

**Figure 1: Rolling correlations for commodities with stocks and bonds**



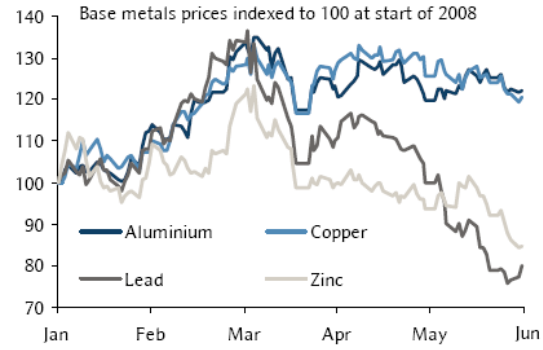

In addition, correlations are low between individual commodities. Table 3 highlights the correlations between ten individual commodities over the last 10 years ending 30-Jun-2008. These correlations suggest that over the long term, an allocation to a *diversified* commodity strategy would reduce overall volatility thus improving the risk-adjusted return of the strategy.

**Table 3: Correlation of monthly returns of individual commodities[2] (30 Jun 1998 to 30 Jun 2008)**

| | Corn | Silver | Crude Oil | Copper | Wheat | Gold | Unleaded Gasoline |
|---|---|---|---|---|---|---|---|
| Corn | 1.00 | | | | | | |
| Silver | 0.15 | 1.00 | | | | | |
| Crude Oil | 0.00 | 0.19 | 1.00 | | | | |
| Copper | 0.01 | 0.39 | 0.19 | 1.00 | | | |
| Wheat | 0.47 | 0.11 | 0.08 | 0.11 | 1.00 | | |
| Gold | 0.13 | 0.65 | 0.22 | 0.31 | 0.18 | 1.00 | |
| Unleaded Gasoline | -0.02 | 0.09 | 0.86 | 0.19 | 0.06 | 0.16 | 1.00 |

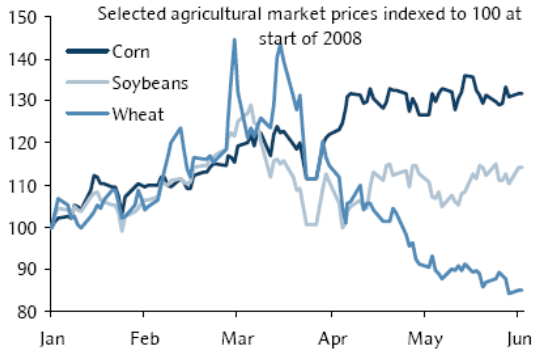
Notably, low correlations are also exhibited between commodities within the same sub-sector. For example, and as a short-term example, whilst copper and aluminium moved 20% higher in the first six months of 2008 due to supply losses and strong demand, softening market balances saw lead and zinc move sharply lower over the same period (Figure 2). In agricultural markets, the steady rise in corn prices diverged significantly from soybeans and wheat (Figure 3). These divergent trends have also been evident in refined oil products and precious metals markets.

**Figure 2: Base metals performance in 2008 has been diverse**




*Source: EcoWin, Barclays Capital*

**Figure 3: The prices of corn, soybeans and wheat have diverged sharply in 2008**




*Source: EcoWin, Barclays Capital*

In summary therefore, not only do commodities exhibit a negative correlation with traditional asset classes when most needed, they also exhibit divergent trends within commodity sub-sectors. This provides for significant profitable investment opportunities over both the short and long-terms, and, if invested intelligently, provides an excellent addition to a diversified portfolio.

## Commodities – an imperative inclusion in a portfolio

Numerous studies have highlighted the diversification benefits derived from including commodities in a portfolio, including those by JP Morgan (2006) and Gorton and Rouwenhorst (2005) which suggest that the inclusion of commodities in a diversified portfolio significantly improves the portfolio's risk/return profile.

To examine the effect of adding commodities to a diversified portfolio, we have analysed the historical risk and return characteristics of a diversified portfolio with incremental allocations to commodities of 0% to 50%. For the purpose of this analysis, we have assumed a diversified portfolio to comprise 45% Australian equities, 25% International Equities, 20% Australian Property and 10% Australian bonds[3]. Between 30-Jun-2001 and 30-Jun-2008, this portfolio would have yielded 6.43% p.a, with an annualised volatility of 8.82%.

When we introduce an allocation of commodities to this diversified portfolio in increments of 10%, the return gradually increases while the risk initially falls (as a result of diversification benefits ) before increasing, as per a typical efficient frontier (Figure 4). The optimal allocation to commodities is the point on the frontier where the risk-adjusted return, as measured by the *sharpe ratio*[4], is greatest. The sharpe ratio is a relative measure of a portfolio's return-to-risk ratio, and can be

thought of as the amount of excess return generated for each unit of risk assumed. The greater the ratio, the better the historical, risk-adjusted performance.

When we introduce a 20% commodities allocation to the diversified portfolio, we see a significant increase in return with a corresponding decrease in the volatility of the portfolio. When we introduce a 30% commodities allocation, we see a further increase in return and a marginal increase in volatility (Figure 4). Thus, an allocation to commodities of approximately 27% to the diversified portfolio would result in an increase in return of approximately 4.46% p.a while the portfolio's annual volatility remains unchanged (Table 4). By way of comparison, Ibbotson Associates (2006) place the optimal share of commodities in a diversified portfolio within a range of 22% to 29%[5].

**Figure 4: Impact of the inclusion of Commodities (30 Jun 2001[6] to 30 Jun 2008)**

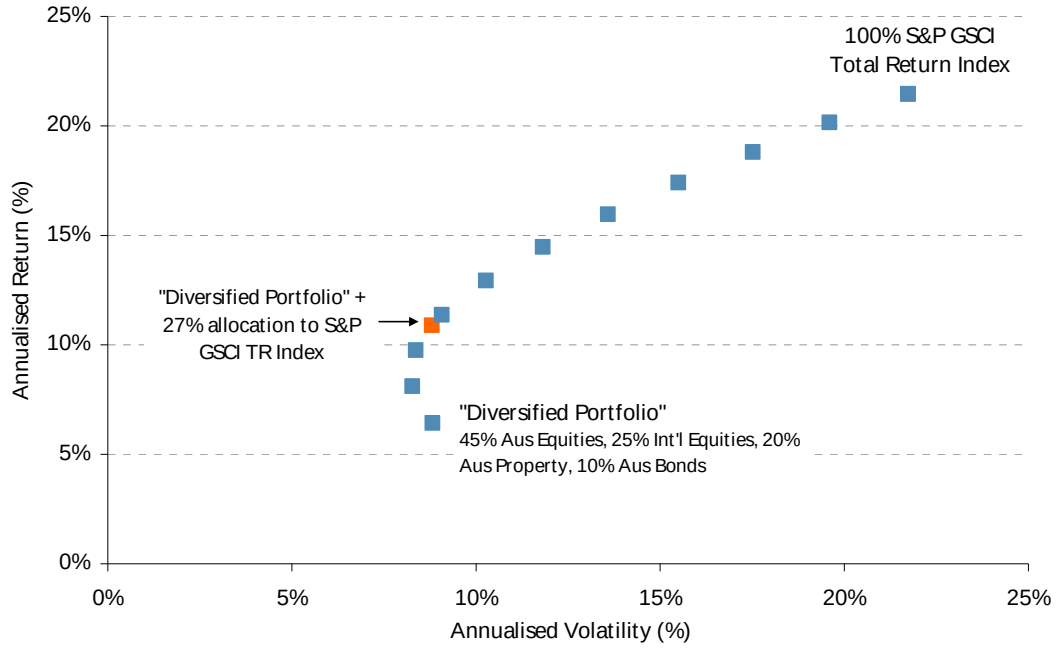



**Table 4: The Impact on a Portfolio Risk/Return Profile with the Inclusion of Commodities**

| | Annualised Excess Return[7] | Annualised Volatility[8] | Sharpe Ratio[9] |
|---|---|---|---|
| Diversified Portfolio | 6.43% | 8.82% | **0.08** |
| + 10% allocation to Commodities | 8.11% | 8.27% | **0.29** |
| + 20% allocation to Commodities | 9.76% | 8.36% | **0.49** |
| **+ 27% allocation to Commodities** | **10.89%** | **8.80%** | **0.60** |
| + 30% allocation to Commodities | 11.37% | 9.07% | **0.64** |

This analysis suggests that within the framework of a diversified portfolio, an allocation to commodities can *significantly improve* a portfolio's risk/return profile.

### Is there any upside left in the market?

The underlying level of most commodity prices is expected to trend higher over the ensuing years, as shown in Figure 5.

These forecasts are based on three key assumptions:

- **Commodity demand is expected to continue growing strongly** – The continued emergence of China and India as the major driver of global commodities demand is based upon the combined forces of industrialisation, urbanisation and income growth.
- **Below-trend growth in supply** – Due to improved producer discipline, reduced exploration spending, increased environmental and political risks, and a simple lack of large mineral deposits, there is only modest committed supply growth over the next three to five years.
- **Rapidly increasing production and capital costs –** rising prices for energy, raw materials, equipment and labour have been exacerbated – especially for non-US commodity producers – by the weakening of the US dollar. These cost increases are not just cyclical; rather for many commodities, prices have to be much higher than in the past if producers are to be incentivised to expand output to meet higher demand growth.

**Figure 5: Barclays Capital annual average commodity price forecasts**

| | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008E | 2009E | Long Term |
|---|---|---|---|---|---|---|---|---|---|
| Base Metals | | | | | | | | | |
| Aluminium | US$/t | 1,431 | 1,716 | 1,900 | 2,568 | 2,640 | 3,345 | 4,500 | 3,200 |
| | Usc/lb | 64.9 | 77.8 | 86.2 | 116.5 | 119.8 | 151.7 | 204.1 | 145.1 |
| Copper | US$/t | 1,778 | 2,865 | 3,682 | 6,731 | 7,129 | 8,328 | 8,200 | 5,000 |
| | Usc/lb | 80.7 | 129.9 | 167.0 | 305.3 | 323.4 | 377.8 | 371.9 | 226.8 |
| Lead | US$/t | 515 | 886 | 977 | 1,286 | 2,592 | 2,785 | 2,525 | 1,500 |
| | Usc/lb | 23.4 | 40.2 | 44.3 | 58.3 | 117.6 | 126.3 | 114.5 | 68.0 |
| Nickel | US$/t | 9,637 | 13,846 | 14,750 | 24,271 | 37,276 | 26,041 | 23,875 | 19,000 |
| | Usc/lb | 437.1 | 628.0 | 669.0 | 1,100.9 | 1,690.8 | 1,181.2 | 1,083.0 | 861.8 |
| Tin | US$/t | 4,894 | 8,484 | 7,375 | 8,761 | 14,542 | 19,836 | 16,400 | 12,500 |
| | Usc/lb | 222.0 | 384.8 | 334.5 | 397.4 | 659.6 | 899.8 | 743.9 | 567.0 |
| Zinc | US$/t | 828 | 1,049 | 1,383 | 3,274 | 3,251 | 2,069 | 1,900 | 2,000 |
| | Usc/lb | 37.5 | 47.6 | 62.7 | 148.5 | 147.5 | 93.8 | 86.2 | 90.7 |
| Base Metal Index^ | | 74.7 | 107.1 | 121.7 | 197.6 | 237.2 | 246.6 | 0.0 | |
| Precious Metals | | | | | | | | | |
| Gold | US$/oz | 364 | 410 | 445 | 604 | 697 | 891 | 840 | 650 |
| Silver | US$/oz | 4.9 | 6.7 | 7.3 | 11.6 | 13.4 | 15.8 | 13.7 | 10.4 |
| Platinum | US$/oz | 692 | 844 | 896 | 1,139 | 1,304 | 2,120 | 2,300 | 1,500 |
| Palladium | US$/oz | 200 | 229 | 202 | 319 | 354 | 423 | 390 | 400 |
| Energy | | | | | | | | | |
| WTI | US$/bbl | 31.0 | 41.5 | 56.7 | 66.2 | 72.3 | 116.9 | 123.2 | 137.0 |
| Brent | US$/bbl | 28.5 | 38.0 | 55.1 | 66.1 | 72.7 | 115.2 | 121.7 | 135.5 |
| US Natural Gas | US$/mmbtu | 5.5 | 6.2 | 9.0 | 7.0 | 7.1 | 10.7 | 10.2 | 10.5 |

*Note: ^Economist Intelligence Unit weight. Source: Datastream, Barclays Capital*

Investors are now able to extract attractive returns without being dependent on commodity price appreciation due to the significant growth in sophisticated commodity-based products.

Historically, commodity indices have been one of the most versatile and popular vehicles to access the investment benefits of commodities. However, being long-only, these index investments are

susceptible to poor performance in rising or falling markets, or both. For this reason, Kaplan (2007) believes that these long only indices do not best serve investors as investment vehicles or benchmarks. He explains that long-only commodity indices generate negative roll yields when commodity markets are in contango (when distant delivery prices exceed near delivery prices) and can therefore generate negative returns when commodity markets are rising. Therefore, long only strategies are susceptible to poor performance in rising or falling markets, or both.

Strategies that are able to sell short (i.e., sell on the anticipation of a falling market and buy back at a cheaper price at a point in the future) are better able to consistently extract attractive returns from the commodity markets in all market conditions as they are not solely dependent on price appreciation to generate performance.

In the current market environment, the ability to add value on both long and short exposures in a single portfolio is an attractive option.

## Conclusion

In the context of portfolio construction, the case for including commodities in a portfolio is **overwhelming**, particularly in the current environment, for the following reasons:

- Commodities as an asset class have – over time – proven to be the most efficient hedge against inflation, particularly during unexpected spikes in inflation as in the current environment.
- The diversification benefit of including commodities in a portfolio is clear from the historically negative correlations with equities and bonds. More noteworthy, however, is that these correlations have been most negative during periods of poor equity and bond performance – as in the current environment.
- As a result of these diversification benefits, an allocation to commodities of approximately 10% significantly improves the risk/return profile of a traditional portfolio. The result is an increase in return with a corresponding decrease in volatility.
- We believe there is still upside in commodity prices. However, given the significant growth in different types of more sophisticated commodity-based investor products, it is possible for investors to extract attractive returns without being dependent on simple price appreciation.

These reasons, coupled with the growing number of more sophisticated investor products that are able to take both long and short positions, support the case for investment in commodities is as strong as ever, and commodities justify a significant share in any portfolio.

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**ENDNOTES**

[1] Citigroup World Government Bond Index – Australia Total Return Index

[2] Individual commodity performance is represented by the sub-sectors of the GSCI TR Index.

[3] The commodity series is represented by the Goldman Sachs Commodity Total Return Index; the Australian equities series by the S&P/ASX 200 Index; the international equities series by the MSCI World ex-Australia Index; the Property Series by the S&P/ASX 200 Property Index; and the bond series by the Citigroup AusBIG Bond Index.

[4] The sharpe ratio is calculated as the portfolio's annualised return in excess of the risk-free rate divided by the standard deviation of the portfolio's excess returns. The risk free rate in this example is the Australian 1-month LIBOR (BBSW).

[5] Based on data from 1983-2006

[6] 30-Jun-01 was chosen as the start date as this is the inception date of the Citigroup AusBIG Bond Index.

[7] Excess return over Australian 1-month LIBOR (BBSW)

[8] Annualised volatility equals annualised standard deviation of portfolio returns

[9] Sharpe ratio equals annualised excess return divided by the annualised volatility