Commodity price forecasting

Base metals and gold prices: strong influence of US dollar valuation

Executive summary
- Conventional view is commodity prices are controlled by resource supply and demand.
- However, major underlying control on prices is valuation changes of United States Dollar.
- Since United States Dollar valuation has just come off a very low valuation, it is more likely that commodity prices will remain stable, or even decrease, in the next 3–6 years.

Introduction
Accurate forecasts for medium-term commodity prices are essential when resource companies are committing to capital expenditures. Too often commodity forecasts tend to be extrapolations of current trends, invoking after the fact observations to justify a trend. Commodity forecasts for base metals and gold can do a lot better than this, if it is accepted that the primary control on medium-term prices is US Dollar valuation.

Conventional wisdom is that base metal prices are set primarily by the interaction of supply (existing and new production) and demand (global economic activity). Gold prices are set in accordance with inflation rates, exchange rates and the status of the global geopolitical situation. Since different factors affect these commodities, there should not be a link between prices.

This paper questions the relevance of such approaches, suggesting instead that the major underlying control on commodity prices is appreciation and depreciation of the United States Dollar. While this is not a new premise, it does not appear to be widely known in the financial and resources industries. If the premise is correct, any appreciation of the United States Dollar in the coming years will likely decrease, or hold stable, commodity prices. Such a prediction is unsettling for those working in the resources industry, but has to be faced.

Commodity prices and the US Dollar
In an April 2008 publication, the American Geological Institute presented data showing a strong link between oil and gold prices during 2000–08. The link between oil and gold prices has since been analysed by this author over the longer timeframe since 1980 and found to be valid (refer July issue of Society of Petroleum Engineers News).

Figure 1 shows the base metal and gold prices from 1980 to May 2009. The base metal US Dollar prices are derived from the Reserve Bank of Australia Commodity Index, detailed in Table 1. The proportions in this index reflect their share of Australian base metal exports. Note the recent price surge during 2006–08 for gold and base metals. While base metals have since retraced this gain, gold continues to maintain stratospheric prices.

This paper considers the effect that US Dollar valuation changes have on commodity prices for base metals and gold. If commodity prices are largely controlled by US Dollar movements, we should expect a constant ratio for gold price divided by base metal price. The ratio of 10 ounces of gold divided by base metal price is shown in Figure 1. The ratio is remarkably stable since 1982, averaging around 30 ± 9. At end May 2009, the ratio of 55 is well above average, indicating either base metals could rise in price and/or gold fall in price. Analysis in this paper suggests the latter is far more probable.

Most of the recent commodity price rises were attributed to supply/demand and the industrialisation of China. However, consider this – since commodity prices are quoted by sellers in United States Dollars, how much of the change in prices could be attributed to a valuation change of US Dollar? Figure 2 shows the US Dollar exchange rate since 1980 against its major trading countries.

Table 1. Composition of the RBA base metals index

<table>
<thead>
<tr>
<th>Metal</th>
<th>Proportion (%)</th>
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</thead>
<tbody>
<tr>
<td>Aluminium</td>
<td>51.6</td>
</tr>
<tr>
<td>Copper</td>
<td>17.8</td>
</tr>
<tr>
<td>Nickel</td>
<td>16.6</td>
</tr>
<tr>
<td>Zinc</td>
<td>9.6</td>
</tr>
<tr>
<td>Lead</td>
<td>4.5</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
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Fig. 1. Base metals and gold price changes maintained a similar ratio during 1982 to 2009.
Observe the US Dollar reached a 40-year high against other currencies in 1985; and a 40-year low in mid 2008. While it has since appreciated, note it is still well below the long-term median valuation.

**Introducing the Currency Weighted Index**

Next, we define the currency term *Trade Weighted Index* (TWI). This is the weighted average of exchange rates of a home and foreign currencies, with the weight for each foreign currency equal to its share in trade with the home country. Those trading partners that constitute a larger portion of an economy’s exports and imports receive a higher index. The TWI is a more comprehensive analysis than comparing two currencies, for example, the Australian Dollar and the United States Dollar. Higher TWI values indicate the home currency is appreciating in value, and vice-versa. Figure 2 shows the US Dollar TWI.

Figure 3 shows base metals and gold prices, with gold price plotted as one-third ounce, since 1980 with US Dollar TWI plotted as inverted scale on the right-hand side. An inverted scale demonstrates an opposite relationship between variables.

Observe:
- Strong appreciation in US Dollar from 1980 to 1985 was accompanied by a decline in gold price. (It will be demonstrated later that the magnitude of the 1985 currency appreciation was extremely anomalous. Therefore a close match between dollar and commodity prices may not be expected.)
- Strong depreciation in US Dollar from 1985 to 1987 was accompanied by an increase in commodity prices.
- Period of overall US Dollar stability from 1988 to 1995 was accompanied by overall stable commodity prices.
- US Dollar was surprisingly stable from early 1980s, US Dollar depreciated very strongly (60%) while economy appreciated strongly (3.2% pa growth).
- From early 1980s, US Dollar depreciated year-on-year (45%), even though economy averaged 2.8% pa growth.
- During 1996–2001, US Dollar strong appreciation (40%) while economy averaged 3.2% pa growth.
- Since April 2008, US Dollar appreciated strongly (38%) while economy averaged 2.8% pa growth.
- Since April 2008, US Dollar appreciated by 8% while economy has been in recession.

**Why should the US Dollar have so much influence?**

Over half of the total amount of US currency outstanding is circulating abroad (Regional Economist, April 2006, see [http://www.stlouisfed.org/publications/re/2006/b/pages/deficit.cfm](http://www.stlouisfed.org/publications/re/2006/b/pages/deficit.cfm)). Put simply, the US economy is by far the world’s largest and will remain so for at least decades. The current global financial crisis will pass, having weeded out many unsustainable business practices. The survivors of American businesses will emerge leaner and stronger, ready to continue their strong entrepreneurial activities.

If the US Dollar and commodity medium-term prices have an inverse relationship, then trend forecasts for commodity prices should be largely based on expectations of currency movement. To do this, we need an understanding of the magnitude and length of past appreciation and depreciation movements, together with health of the US economy.

Figure 4 shows the United States quarterly change in real GDP since 1970 and US Dollar TWI movements since 1973. Observe:
- US Dollar was surprisingly stable during the turbulent 1970s, when the world was in global recession (caused by inflation and OPEC oil shocks).
- From early 1980s, US Dollar appreciated very strongly (60%) while economy averaged 2.4% pa growth.
- During 1985–95, US Dollar depreciated (45%), even though economy averaged 2.8% pa growth.
- During 1996–2001, US Dollar strong appreciation (40%) while economy averaged 3.2% pa growth.
- During 2002–08, US Dollar depreciated (38%) while economy averaged 2.8% pa growth.
- Since April 2008, US Dollar appreciated by 8% while economy has been in recession.

**Does economy affect currency?**

These observations pose the question – how strongly is currency movement linked to economic health? It is expected that over the long-term, currency is a zero-sum result with appreciations and depreciations cancelling out. Economic growth is an overall positive result. Therefore correlation between currency and economy should not be high.
The correlation between US Dollar movement and economic performance is weak at best, as expected. Therefore confident predictions of US Dollar future movement, based on views of health of the US economy, are suspect (even though superficially plausible).

To return to the premise that commodity supply/demand does not underpin medium-term price trends, I contend the evidence is strong. Consider the near-constant ratio for price of base metals divided by gold since 1982 (Figure 1). These commodities have significant unrelated supply/demand factors — if so, why the near constant ratio? If demand for base metals were a significant factor, then why does price fall during the mid-late 1990s when economic activity was strong?

Does US Current Account affect currency?

Next we consider whether the US Current Account, the difference in import/export for trade in goods and services and earnings on investments, influences currency valuation. Figure 5 shows the currency monthly variation compared with quarterly values for Current Account as a percent of seasonally adjusted GDP.

Observations:
- During 1970–83, Current Account/GDP was a relatively low stable value. Currency variation was also quite stable until 1981, followed by strong appreciation during 1981–85.
- During 1988–91, Current Account/GDP improved markedly while the US Dollar remained at a stable low value.
- Since 2008, Current Account/GDP improved markedly while the US Dollar appreciated quite strongly.

Figure 6 shows the rolling 5-year correlation of US Dollar TWI with Current Account as percent of real GDP (seasonally adjusted). The correlation between the two variables, while very volatile, is overall negative indicating that currency has an underlying opposite relationship with Current Account as percent of GDP.

Predicting commodity prices in the medium term

I finish with an outlook for movement of the US Dollar and commodity prices over the medium term.
Predicting that commodity prices will not rise significantly over the medium term is contrary to that of most forecasters, who expect that increasing demand from the world economies will increase commodity prices! The trouble with this prediction is that economic health is only weakly linked to currency movement. There are other, more important, factors in play.

Note I am not dismissing the role of supply/demand in price setting taught in economics courses. Rather this paper contends there are two supply/demand mechanisms in play. There is the supply/demand for commodities, but there is also an independent, more important, supply/demand for the US Dollar. Simply considering supply/demand for commodities contains an error, because it ignores the other demand function. Say the supply/demand for commodities remained constant, but the supply of US Dollar increased – commodity prices should rise in apparent US Dollar terms, while really remaining constant.

Conclusions
Making accurate forecasts for commodity prices is always problematic, particularly with the current massive fiscal supply of printed money. The United States is being financed by foreigners, especially China and Japan. These parties (Russia included) are considering moving away from the US Dollar as a reserve currency. This is quite a threat. It could mean the end of the US Dollar as the world’s reserve currency, with subsequent collapse in valuation. However, such a decline would reduce the real value of all foreign investments in the United States. If foreign holders of major assets tried to sell their holdings, large losses would result. This is a disincentive for foreigners to provoke the collapse of the US Dollar. The threat of loss of currency status may be sufficient to stop the US from continuing to run the printing presses.

My head hurts when pondering the range and complexity of factors controlling commodity prices. Therefore, a rational approach is to assign probabilities, based on US Dollar current valuation compared with long-term median, for predictions of increasing, stable or decreasing prices in the medium term. A probabilistic approach has been very successful in assessing merits of petroleum exploration and development projects, so why not extend the process to commodity prices?

In summary, supply and demand are important factors affecting commodity prices, but currency movements underpin medium-term price trends. It is instructive to have an historical view on past price trends with an understanding of US Dollar appreciation and depreciation movements. Short-term commodity price trends, such as the recent base metal surge and decline during 2006–08, are not controlled by currency but speculators.

Time will tell what impact valuation changes of the US Dollar will have on commodity prices in the next five or more years. On the balance of probabilities, the successful explorers and developers will be those who minimize subjective views and do not extrapolate current price trends. As always, we live in interesting times!

References