

## Commodity Price Cycles

How long do they last? – part 1 of 2

By John Robertson

Reading time: 5-10 mins

*Increased commodity price volatility makes resource sector investors nervous. As usual, commodity market turning points are not for the faint-hearted. But there is a valuation rainbow on the horizon for equity investors.*

Resource sector equity investors are faced with three issues:

1. whether commodity markets are near a cyclical turning point;
2. if they are, how large an adjustment is likely to ensue; and
3. whether resource equities should be forgotten about until the beginning of the next cycle.

In this and next month's edition of *ATC Digest*, I will seek to throw some light on each of these issues, against the backdrop of raw material commodity prices well above any price levels experienced in recent memory and, on the balance of probabilities, possibly near a cyclical peak.

### The cyclical position

According to data from the International Monetary Fund (IMF), average metal prices in May were 50% higher than at any time in the past 45 years. Fuel and energy raw material prices were over 100% higher.

These record prices follow four consecutive years of above average global economic growth, including the well documented impact of China and India on raw material demand. Speculative influences, fuelled by ample global liquidity, have also been supportive.

Meanwhile, Ben Bernanke, Chairman of the US Federal Reserve Open Market Committee, singled out increases in oil and other commodity prices for particular attention in a speech<sup>1</sup> at the beginning of June warning that:

“the Committee must continue to resist any tendency for increases in energy and commodity prices to become permanently embedded in core inflation”.

The Federal Reserve's caution that it might put its weight behind bringing the cycle to an end is consistent with its past behaviour. In other words, current conditions have many of the hallmarks of a typical cyclical turning point.

### The price formation process

In prior editions of *ATC Digest*, I have used a price-inventory reaction curve of the type illustrated in the **first chart** to show how the commodity price formation process works.

I first used this analytical framework based on empirical work I undertook as an investment bank economist in 1988 and, since then, it has been employed by me and many analysts to describe the evolution of a commodity price cycle.

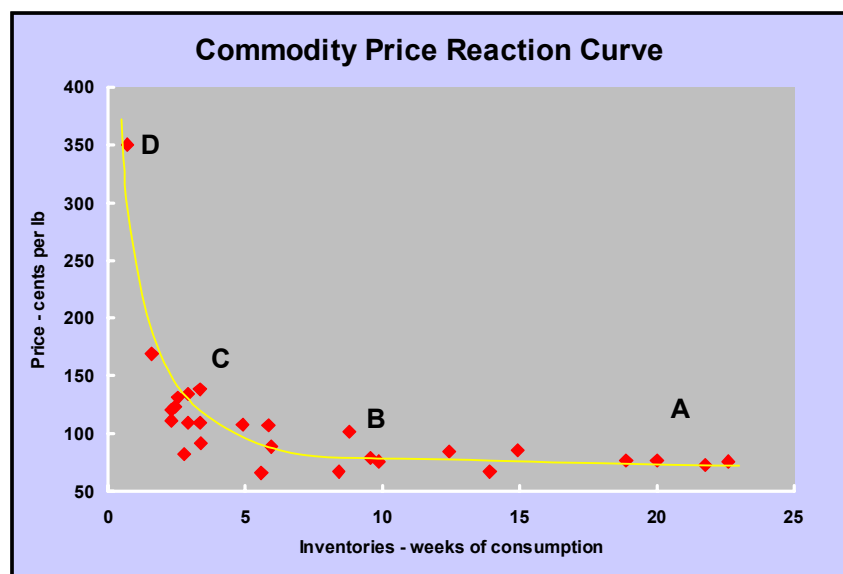
In this case, the chart is based on annual US copper industry data since 1986, but similar relationships can be observed across commodities and over different time periods. The key feature of this price-reaction curve is

the non linear relationship between prices (vertical axis) and inventory changes (horizontal axis).

While some commentators will focus on raw material usage (e.g. the impact of China) and some others might emphasise supply side adjustments (e.g. labour disputes in South America) in evaluating the state of a commodity market, the combination of the two is the important factor; that is, how demand and supply interact to affect inventories.

Strong consumption growth for a particular commodity, such as we have seen in China, may or may not affect prices. Whether it does depends on whether growth in supply is adequate to cover the additional demand. However, even then, excess demand (i.e. falling inventories) might not be sufficient to generate an increase in prices in the short-term.

When inventories are high (around point A, for example, on the price reaction curve), even a large downward movement in inventories toward point B might not cause any significant price change. In this phase of the cycle, with ample inventories available and surety of supply, the marginal cost of obtaining extra material is low and the risks negligible.



<sup>1</sup> Speech to the *International Monetary Conference*, Washington DC, USA, 5 June 2006.

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However, as inventories begin falling past a critically low point (such as C), the price response suddenly becomes disproportionate to the size of their change, as though a retaining wall has suddenly tumbled.

Past such a point, the risk premium rises. Potential raw material users reappraise the chance of insufficient inventories constraining their businesses and decide to pay more.

At this stage, too, larger quantities of speculative funds enter the market attracted by the potential financial returns from betting on shortages.

Once prices have begun to rise, further small contractions in stocks available for purchase force price rises (toward D) which can be quite dramatic. This is where we are positioned in the current price cycle with inventories at historically low levels and prices well up the reaction curve.

The flip side of the rapid ascent is a swift fall. The reaction curve implies that even small increases in inventories, reflecting barely any change in the market balance, can be significant enough to cause a sharp fall in prices, such as may occur if the market moved from point D to point C.

That provides a framework to help explain why:

- ▼ prices rise in the first instance;
- ▼ the trough in a price cycle can be so prolonged;
- ▼ the price reaction sometimes seems so disproportionate to a change in underlying conditions;
- ▼ large price movements can occur over short periods of time; and
- ▼ price volatility typifies markets near the top of a price cycle.

### The futility of forecasting

This approach to describing the commodity price formation process also illustrates how difficult price forecasting can become, if it was not already difficult enough.

When markets are in the phase of the price cycle illustrated by the upward sloping part of the reaction curve between points C and D, price forecasting should probably be treated as a near impossible analytical task.

The price-reaction curve illustrates how inventory movements are the result of shifts in supply and shifts in demand interacting.

Since the forecaster must get both right to make an accurate forecast (or through sheer dumb luck benefit from conveniently coinciding countervailing errors), the task gets tougher as inventories contract, since only very small supply movements or minute changes in consumption could have a dramatic impact on inventories and, therefore, prices. The science of forecasting neither demand nor supply is that precise.

The reaction curve highlights the inherent instability at the top of the cycle. When the market is positioned at a point such as D, there are probably only two ways forward.

One way is a very sharp decline in prices. The other is a very sharp rise if inventory availability is reduced by still more. Either might be possible, but neither is easily forecasted because both alternatives depend on impossibly finely tuned models of demand and industry supply.

In this part of the cycle, the least likely outcome is probably for prices to hover around current levels because that implies, unrealistically, inventories remaining suspended on a knife edge in a way that needs a rare combination of circumstances. Tossing a coin might be as good a way as any for a forecaster to proceed.

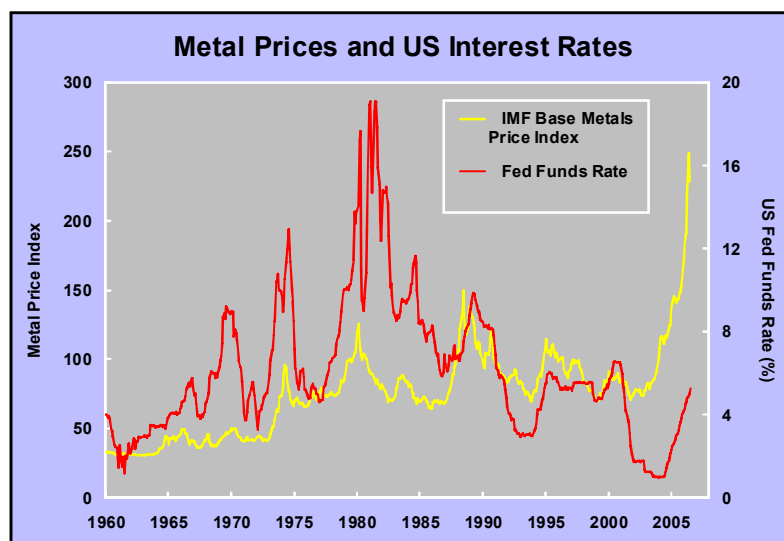
### Liquidity: another ingredient

Liquidity conditions also play an important role in setting how high prices will go.

Excess financial liquidity is the fuel for speculative activity. Speculative funds grow as money supply expands beyond the productive needs of the economy, creating the circumstances for asset price inflation. Ultimately, interest rates are used to rein in asset values by stopping the flow of liquidity needed to support higher prices.

The liquidity factor is illustrated in the **second chart**. It shows the metals price index published by the IMF and the Fed Funds settings by the US Federal Reserve Open Market Committee. Both data series cover the period January 1960 to June 2006.

The strong connection between turning points in interest rate cycles and metal price cycles illustrated in the chart is consistent with the analysis by Nouredine Krichene<sup>2</sup> of energy commodity prices which concludes:



<sup>2</sup> Krichene, Nouredine, 'A Simultaneous Equation Model for World Crude Oil and Natural Gas Markets', IMF Working Paper 05/32, February.



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“crude prices tend to fall in response to rising interest rates and...to firm up in response to falling interest rates...”.

In other words, part of the buoyancy in energy markets is also attributable to the way US monetary policy has been conducted in recent years.

Abnormally low US interest rates seem to have played a role in sustaining the current commodity price cycle. For all the talk of China and India, the chart suggests that US monetary policy settings alone would have suggested, on the historical evidence, that metal prices should be pushing to new record high levels. And, of course, the focus on US interest rates understates the connection between prices and liquidity. Until recently, Japanese interest rates, for example, were effectively zero.

### How large an adjustment?

One concern for investors, if they think prices will fall, is how large a drop might be ahead. The framework outlined above suggests that any drop will be very large and that it would be self delusional to think prices might fall, but only briefly and, then, only by a moderate amount.

Copper prices offer some empirical evidence of what might unfold as a cycle turns. *thebigpicture Economics* has used monthly copper price data since January 1860 as part of an analysis of longer term price and market movements. The data have been compiled by splicing together series of US producer prices and London Metal Exchange prices using information from a combination of US government bodies, industry sources, formal markets and international economic agencies.

Aside from simply its availability, other virtues of using copper data to illustrate what can happen are:

▼ the profile of the metal as a widely traded commodity with terminal markets in both north America and Europe; and

▼ its status as a widely recognised proxy for what is happening in a broader range of global commodity markets.

From January 1860 to May 2006, on my reckoning, there have been 16 price peaks and 16 troughs (treating the average price in April 2006 as a peak for the current cycle).

▼ The average elapse of time from the trough of a price cycle to a price peak is 62 months. The current copper price cycle is, therefore, relatively mature at 84 months old.

▼ As the price-inventory relationship suggests, it is likely to take longer for prices to rise than for them to subsequently fall. The average duration from a peak price to a price trough is 46 months.

▼ The average size of the fall in copper prices from their peak to their trough has been 56%.

▼ The duration of the up-cycle has been getting longer and the down-cycle shorter. However, the size of the cyclical fall has not changed greatly over time. In the second half of this timeframe, the average fall is 53% with a relatively tight range of 44% to 62%.

▼ On average, once the copper price starts to fall, about half the prospective fall occurs in the first 10 months of price decline or, in the second half of the time frame, six months.

While these statistics do not take explicit account of the fundamentally important price-inventory relationship underpinning price movements, they do offer some interesting perspectives on the level at which prices might subsequently stabilise in the current cycle.

It would take a brave analyst in the face of this history to suggest that anything other than a price fall of around 50% is on the cards once the copper market, for example, turns.

Copper prices currently in the vicinity of US\$3.50 a pound are 120% higher than the previously highest cyclical peak. Replicating the 50% benchmark reduction in prices from current levels (let alone anything higher) implies that, between now and mid 2009, the copper price will fall to US\$1.75 a pound, a dramatic slump but a cyclical trough some 200% above the average trough price of the past 40 years, and even 70% above the average of all copper prices during the past twenty years.

### The investor's dilemma

This is, perhaps, the most bullish news for the resources sector: the prospect of a change in conditions which will still permanently support higher industry profitability (or operations with substantially higher costs) than could be countenanced in the past.

This poses a dilemma for equity investors: whether to be frightened by the changes which might be underway (i.e. any bursting of the commodity price bubble) or whether to treat them as an historical opportunity which occurs only in exceptional circumstances.

*These are the topics taken up in the second of this two part series on commodity related issues.*

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Timing of Copper Cycles

Peaks	Troughs	Peaks	Troughs
Jul 1864	Jul 1861	Mar 1937	Dec 1932
Apr 1872	May 1870	Jan 1956	Jun 1938
Feb 1880	Feb 1879	Apr 1966	Feb 1958
Jul 1888	Jun 1886	Apr 1974	Jan 1971
Aug 1899	Jun 1894	Feb 1980	Dec 1975
Mar 1907	Apr 1902	Dec 1988	Jun 1982
Dec 1916	Apr 1911	Aug 1995	Nov 1993
Mar 1929	Aug 1921	May 2006	Apr 1999