

## **Copper – Looking Beyond the Cycle**

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*“A hopeful disposition is not the sole qualification to be a prophet”*

*– Winston Churchill*

Ladies and Gentlemen

It is not always a comforting experience to look back at forecasts, especially when they are your own. In an uncertain and complex world, I learned long ago not to form too fixed a view of the future. After accepting the kind invitation from our hosts to address the 2<sup>nd</sup> Annual Copper Forecast Conference I therefore thought it wise to check what I said at last year’s inaugural event. Fortunately, there is not too much incriminating evidence.

At that time LME copper prices were 15 months into a steady, if uninspiring, recovery from the trough of early 1999 and heading towards 90 c/lb. The mood at AJM’s 1<sup>st</sup> Annual Copper Forecast Conference was one of cautious, rather than unguarded, optimism. I must confess that, at least in the quiet corners of the hotel lobby, I was one of those thinking a move above US\$1.00/lb could be on the cards.

The upward path was not entirely clear of obstacles, but stocks were relatively light and demand was generally buoyant, despite lingering concerns about the US’s economic staying power. It was not hard to form a view that prospects for the New Year were reasonably bright.

There were some positive signs too on the supply side of the equation, with a perception that supply growth is ebbing following the wave of major capacity additions of the mid to late 1990s. A quiet optimism was growing that a period of above trend prices lay just around the corner. Significant ownership changes had taken place, with the consolidation of assets in the hands of Phelps Dodge and Grupo Mexico. The resources sector at large had recognized its generally poor historical financial performance and unsatisfactory returns for its shareholders – resource companies were exploring better ways of measuring and creating shareholder value.

Surely an annoying coincidence, but copper prices have headed south ever since last year's gathering. We now face the prospect of a fifth consecutive year of annual prices below long run trend, and there is limited confidence in a rapid revival of fortunes by the earlier part of 2002.

With the vagaries of forecasting firmly in mind, though, I shall refrain on this occasion from making firm prophecies for 2002; it is far safer, and ultimately more valuable, to look beyond the cycle and consider its effects, and, importantly, the influence of these shorter term twists and turns on producer sentiment.

First, it is necessary to gain a perspective on the events of the 1990s, starting with demand. In this respect 2001 stands out as very disappointing – and potentially disconcerting – for the downturn signals an abrupt end to almost a decade of remarkably strong and relatively stable growth in world demand for copper.

On a global basis refined consumption expanded at a rate of 3.5% p.a. in 1990-2000, a rise of almost 4.5 Mt to more than 15 Mt/y. Including the direct use of scrap, which makes up just over 20% of supply, the market expanded by more than 5 Mt/y. Looked at in terms of copper used in goods and products, more than

80% of this growth came from three regions – China, the emerging markets of East Asia, and the USA.

Strong demand for copper-containing products associated with emergence of the “new economy” has also been an important (if not widely understood) factor, primed by a decade of strong economic growth in the USA, and an investment boom associated with new technologies. Copper is the medium “powering” the IT revolution, reflected in prominent growth in demand for energy cable in building construction applications. Rising per capita wealth, underpinning demand for “lifestyle” products, has benefited copper on a wider base though – a phenomenon also giving rise to buoyant demand for other metals, especially aluminium.

The rolling forward of this complex socio-economic trend is reliant on a world that soon returns to strong and sustainable economic growth, but it is unclear how the US pattern will evolve and translate to other parts of the globe – it is not yet a feature of Europe’s or Japan’s markets and, while it is easy to envisage an extremely optimistic scenario, the current downturn brings added risks of lower than expected growth rates for copper (and other metals) beyond the current cycle. Cycles are often catalysts for longer lasting change.

China has also emerged as a cornerstone of demand growth since the mid-1980s. Major infrastructure investment and construction activity have taken annual refined consumption to almost 2 Mt/y (two thirds derived from mine supply overseas), eclipsing the lengthy decline in Japan. China’s rapidly rising demand for copper – above the pace of GDP expansion – is a key element in the apparent stabilizing of copper’s intensity of use since the early 1990s.

The fact that nickel and aluminium, even zinc, have experienced similar trends suggests that macro-economic, rather than metals specific, influences are the main driving forces. Although there is more to come (China accounts for 40% of

2000-2010 forecast demand growth), setbacks are possible – signs of inflated construction activity for example are typically ignored in the most bullish forecasts. On the other hand, the staging of the 2008 Olympic Games may have broader, positive ramifications for regional metal demand.

Rapid industrialization and the building up of an export orientated manufacturing base in East Asia were major ingredients of the trend of the past 10-15 years. Asia's surge, led initially by S. Korea and Taiwan, is a consequence of the diversion of *apparent consumption* from mature economies. Today's cyclical weakness is revealing a strong link to US growth (especially for electronics and electrical goods) – a point not at first apparent in studying data for refined consumption.

Future trends are a function of a complex set of global and regional influences in which de-materialization and substitution pressures are unlikely to abate, but which for copper arguably pose fewer threats than for many other materials. It seems reasonable to assume copper demand will maintain strong growth of about 3-3.5% p.a. in 2000-2010, adding 5-6 Mt/y to today's annual consumption. Higher growth rates are possible – some forecasters are pointing to rates of 4% p.a. or greater – but reliance on these, especially over the duration of a full cycle, is risky.

Asia (excluding Japan) remains a crucial axis; equally the assumption that the USA is not facing an extended downturn is central to this forecast.

Producers were slow to recognise a copper demand boom that is now more than a decade old (2001 may represent the first year since 1992 when world copper demand declined). Few commentators imagined that the US economic growth story would last the decade. Rather, high *cyclical* copper prices triggered a wave of additions to mine capacity in the 1990s. This phase saw the emergence and growth of Escondida and Ertsberg-Grasberg as premier suppliers. The addition of

several large “flagship” mines (Olympic Dam, Collahuasi, Alumbrera, Batu Hijau, Los Pelambres) underlined an emphasis on exploiting economies of scale. However, many smaller mines were also developed.

Chilean operations contributed most to growth, but supply also rose in the USA, as oxide ore and dump leaching/electro-winning technology permitted the exploitation of deposits previously classified as uneconomic. The US revival was largely unexpected, and the outlook for this important production base remains uncertain following recent acquisition activity – the outcome here is a major wildcard for price prospects.

SxEw took away some of the need for new traditional smelting/refining capacity. Nevertheless the custom smelting base grew, led by new plants protected by tariff barriers in East Asia and India. SxEw technology also reduced capital cost barriers to mine development for smaller and medium sized operators (although unit operating and capital costs are not demonstrably lower than for sulphide projects).

With losses from the African Copperbelt compensated by new supply in other regions, the scale of capacity additions created fears of imminent and long lasting supply surplus. Following a decade of high prices – exacerbated by rogue trading – the mood turned gloomy as the emerging market crisis unfolded in 1997/98. Many producers modified their assumptions for long run copper prices downwards, typically from a (flat real) forecast of US\$1.00/lb to within a range of 85-95 c/lb, precipitating write-downs on investments made on the basis of higher expected prices. A tardy recognition of long run real commodity price decline encouraged a widespread downgrading of nominal price forecasts in evaluation models.

Prices have averaged less than 80 c/lb in 1997-2001. Not surprisingly, the list of projects for which firm development commitments have been made has become

shorter, encouraging *anticipation* of market tightness once strong demand growth resumes (albeit the expected timing of this recovery is being rolled back). As in the past, commitments to invest in new supply will likely gather pace once the price cycle is on the upswing – some project developers will believe the hypothesis that the copper price will be forced to rise to a level high enough to provide adequate returns on investment for all new supply required to satisfy demand.

However, they will not be able to discern between a cyclical running up of prices, exacerbated by lags in investment in new supply, and a structurally higher price reflecting a world in which investment decisions are perfectly tuned to match demand. When, in fact, is a trend a trend?

The slowing down of additions to mine capacity has raised questions about the quality of the resource base. There is a school of thought that a long run copper price of US\$1.00/lb is required to justify development of sufficient greenfield projects to match growth in demand (at 15% IRR). This may be true but for it to come about we would need to believe that all investment decisions are economically perfect – history suggests otherwise and it is probably more prudent to test ‘incentive prices’ at lower rates of return, in line with historical performance.

Today’s emphasis on capital productivity and shareholder value creation *should* work to discourage the development of sub-economic mines by value-focused companies. Rather than forsake growth, though, many producers are likely to direct considerable attention on expansion opportunities utilizing the existing supply base and associated infrastructure. Many major operators continue to display a commitment to growth through expanding production and aggressive cost reduction programs – these are universal strategies.

It is unlikely that the quality (or quantity) of available resources will soon deteriorate to an extent that cannot be offset by real cost savings, or by the opening up of

better quality resources in regions previously inaccessible to exploration and development. Fortunes for the US production base remain an important caveat in this assumption.

Real operating costs have fallen by about 1.5% p.a. since 1985, and between 1.3% (C1) and 1.9% (C3) since the 1950s. A similar reduction in real prices indicates that the benefit of cost improvements overall has transferred to consumers. The copper mine cost curve has broadened and flattened as a result of cost declines both at new mines and at many longer established operations. The focus on cost reduction and productivity improvement (both capital and operational efficiency) has, if anything, intensified.

Advanced technology (including the possible introduction of hydrometallurgical processing for sulphides) can be expected to contribute to an inexorable downward trend in industry costs, and producers will continue to exploit increasing economies of scale. Benefits will accrue to those operators able to outperform the sector at large. Low cost copper mines will continue to provide a source of outstanding profits and high returns for disciplined investors.

Producers focus intensely on cost reduction during times of weak demand and low prices (some even do this through *increases* in production in an attempt to reduce unit costs). However, whilst many high cost producers are forced to cut production to stem further losses, permanent closure of mines – the *removal*, not idling, of capacity – takes place slowly. The ability of high cost operators to cut costs is often underestimated, even if they continue to generate inadequate returns – psychological and economic exit barriers remain relatively steep in the base metal industry.

There is a tendency for forecasters to underestimate supply potential from the established production base and from brownfield expansion. For example, a

glance back at a number of prominent industry forecasts made in 1995 reveals a common underestimating of demand – and hence mine supply – for the year 2000. This is not a criticism of the industry's consultants – it is merely an observation of the immense difficulty of making accurate forecasts.

Picking one example, not atypical, mine supply turned out to be 2 Mt higher in 2000 than predicted five years earlier, but less than half the projects listed as likely to come into play were in fact introduced. They were not needed – the forecast understated the contribution from expansion programs (including many small increments) and exaggerated the effects of depletion/attrition. Assumptions of sustained long run real price rises based on long lasting supply scarcity are therefore very risky in the absence of very convincing evidence.

In a commodity market supplied by well over 100 separate owners, a return to producer price setting would seem highly improbable. Migration of many of the best assets into fewer hands does not necessarily herald an era of greater *overall* supply discipline – many smaller mines and projects fall under independent ownership.

It cannot be assumed that all decisions to invest in new mines will be based on rigorous price and other input assumptions, or that lenders and investors will rapidly enforce systemic discipline.

Extended periods of above average prices are quite likely to occur in the future – but they are very difficult to predict. When they arrive, developers/promoters may believe they herald a permanent shift upwards in long run prices, enabling the development of lower grade reserves in expectation of satisfactory returns. The appetite for growth and the temptation to reinvest profits in building more capacity will perpetuate the feast-to-famine characteristics of a commodity business under fragmented ownership.



The price cycle will continue to influence sentiment. Quarter-on-quarter and year-on-year price swings of +/-20-30% are typical of the past 10 years. The average length of the four major cycles since 1970 is 7 years, a reversion to the trend-line of 3.5 years. However, the duration of the cycle is unpredictable, influenced by changes in the business cycle, inventory adjustments and leads and lags in investment in new production capacity.

Difficulty in forecasting is compounded by lack of reliable historical data, especially for final product demand and inventories. Predictive models are therefore useful mainly as tools for testing business and marketing strategies – superior knowledge of market and competitor behaviour is more important than price forecasts alone, yet it is easy for strong convictions to build around simple numerical forecasts.

The art to this (not very precise) science is therefore to identify critical drivers of change, and to determine how to take advantage of inevitable shifts in the sand.

Many thanks for your kind attention.

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