

Copper

Looking Beyond the Cycle

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**AJM 2nd Annual Copper Forecast Conference
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bhpbilliton

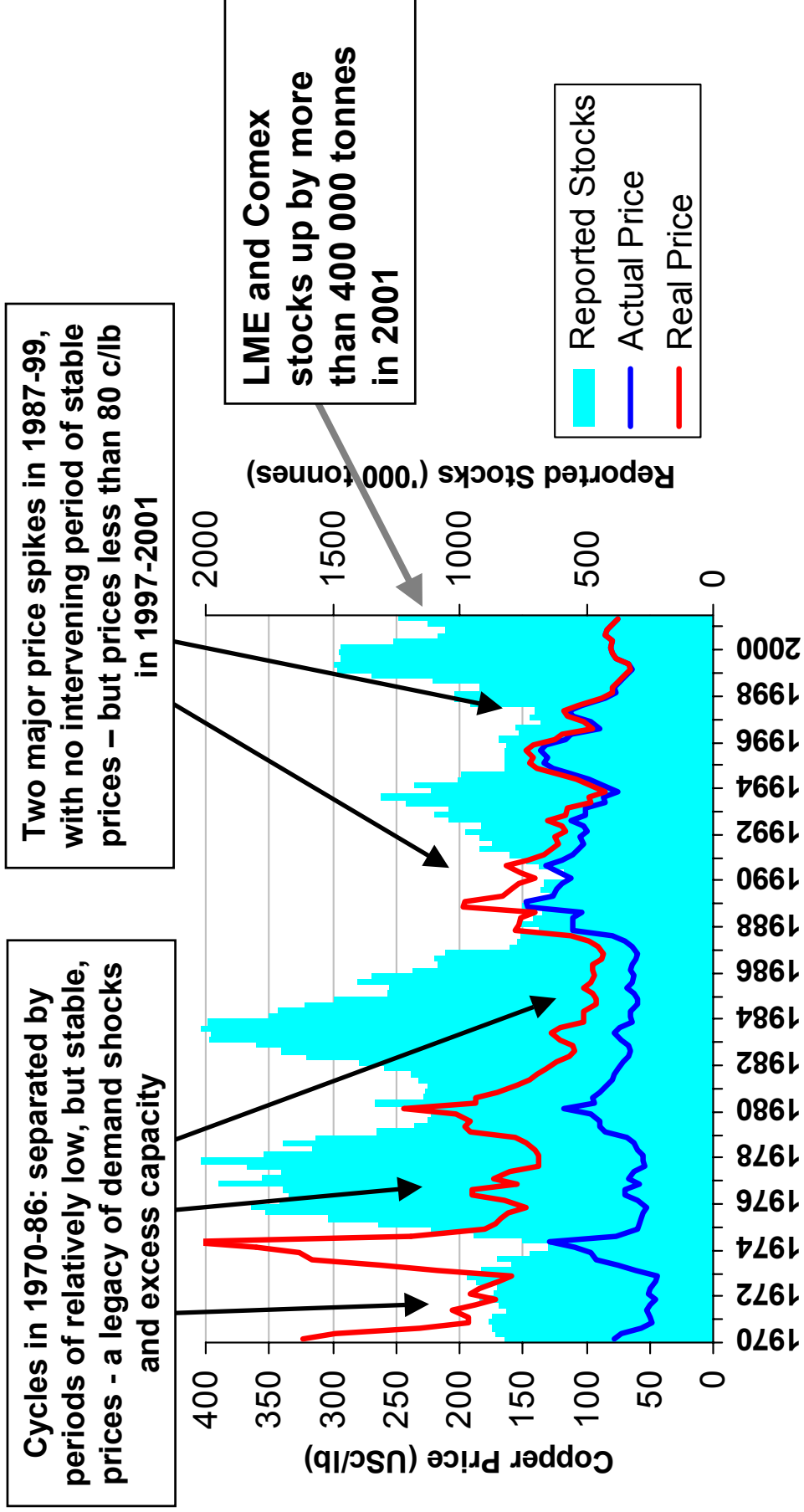
A glance back!

- **Forecast of LME price at year-end made by delegates in September 2000 at AJM Copper**
- **Lowest 86 c/lb**
- **Highest 121 c/lb**
- **Average 95 c/lb**

- **Price at close 29 December 82 c/lb**
- **Q3 2000 Average 85 c/lb**

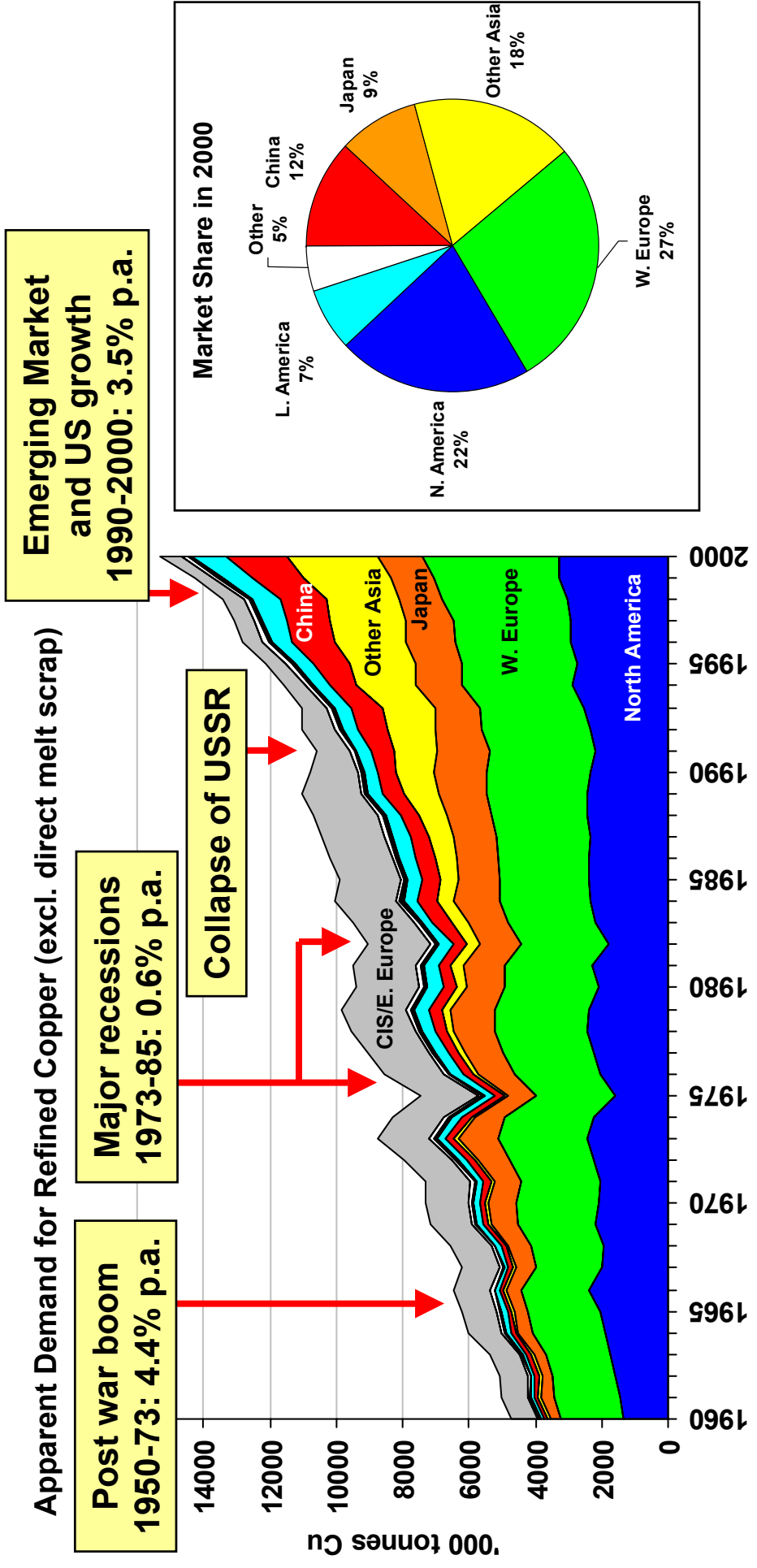
Prices – bouncing along the bottom

... sowing the seeds for the next boom?



Emerging market share above 40% (refined Cu)

... but demand advancing in all regions except Japan and the former Soviet Bloc – growth spurt in the second half of the 1990s



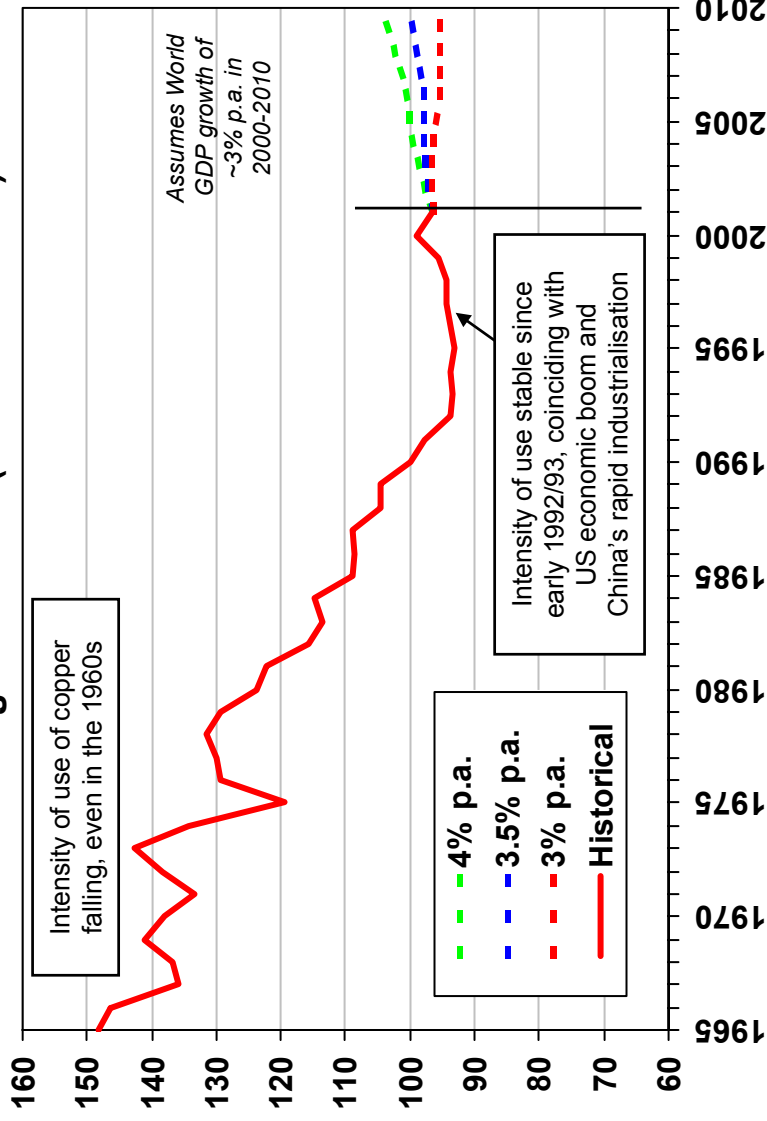
Stable “intensity” could persist

... indicating world copper demand growth of >3% p.a., in line with the 1990-2000 trend

... Forecast of higher demand growth would require a higher than expected increase in World GDP or a sustained rise in intensity of use

Higher growth is possible, but too many industry projections are based on trough-to-peak trends in the 1990s

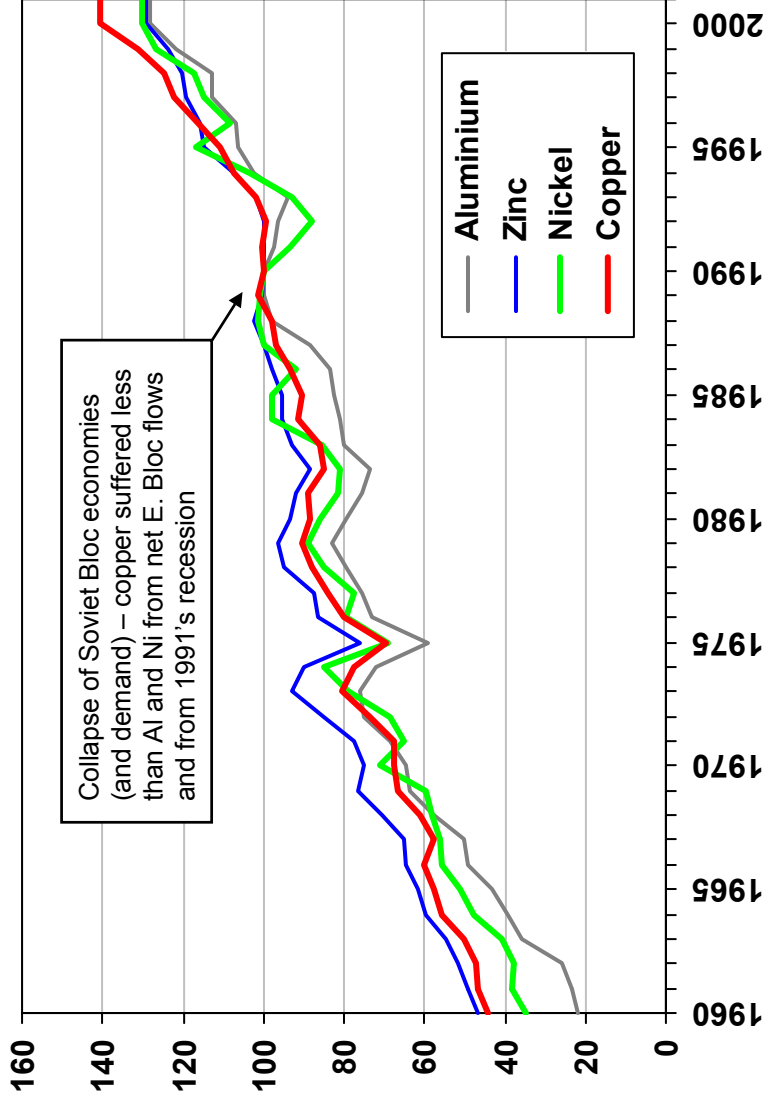
Copper Demand/World GDP at different forecast demand growth rates (Index: 1990=100)



Copper demand – outpacing other metals

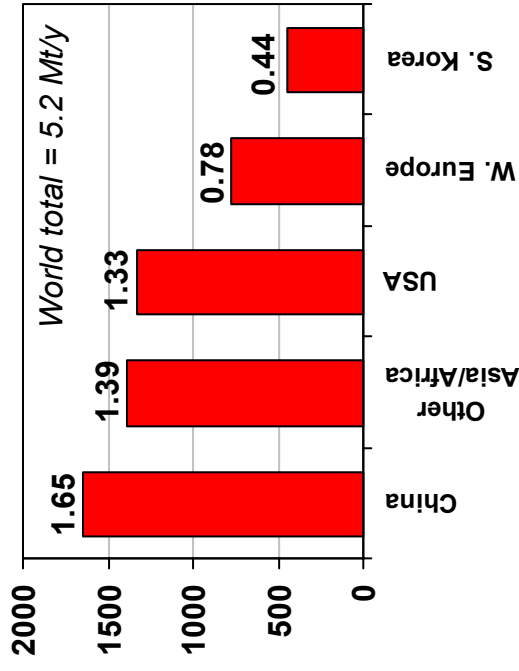
... but all have benefited from world economic expansion, especially since the 1992/93 recession

World Metal Demand (Index: 1990=100)



Trends in “final” use of copper reveal the importance of China, Asia’s emerging markets and the USA in the 1990s – these areas account for 85% of 1990-2000 growth

Increase in Copper Demand in Copper-Containing Products in 1990-2000 ('000 t Cu)

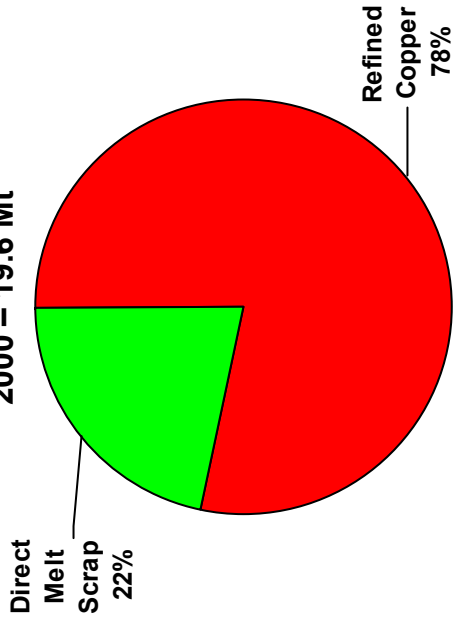


“Final” Demand – by sector and product

Energy cable ... accounts for more than third of the market

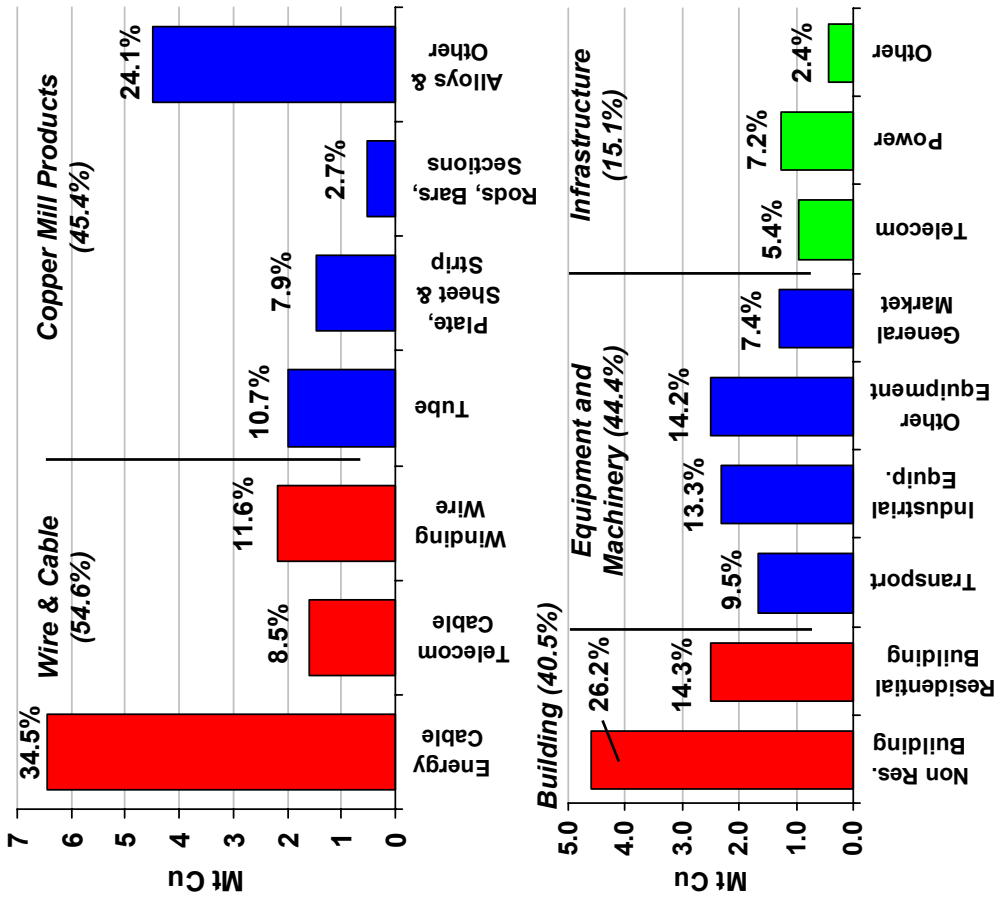
Scrap use is lowest in wire and cable – but recycling could accelerate as scrap rates for “new economy” products rise

“Total” Copper Consumption:
1998 – 17.6 Mt
2000 – 19.6 Mt



Source: Bloomsbury Minerals Economics – data for 1998 (demand for copper in copper-containing products), BHP Billiton

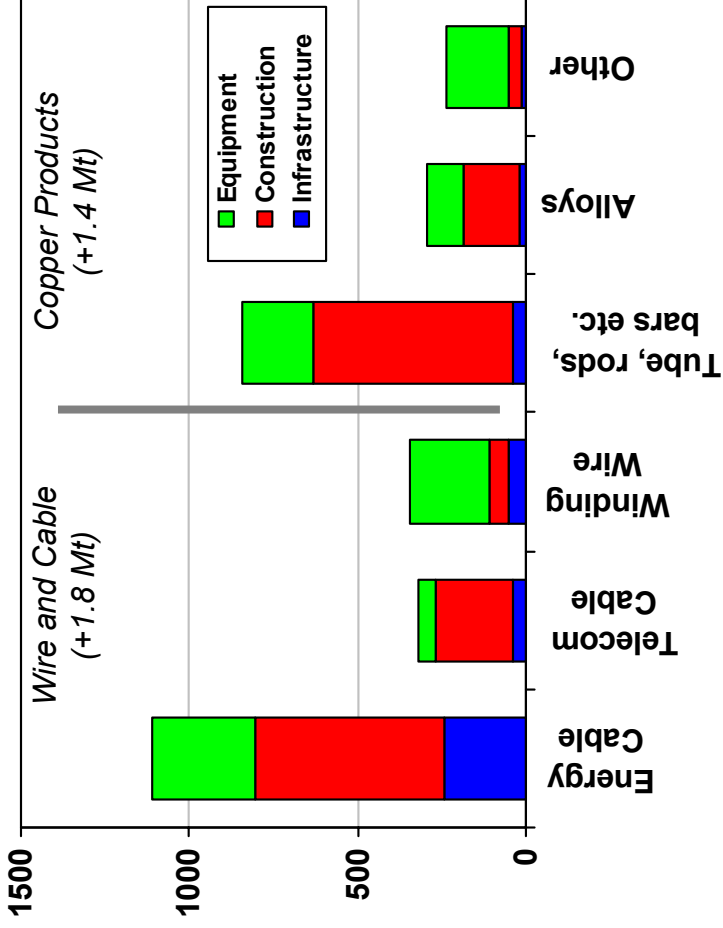
Market Share by Segment/Product in 1998



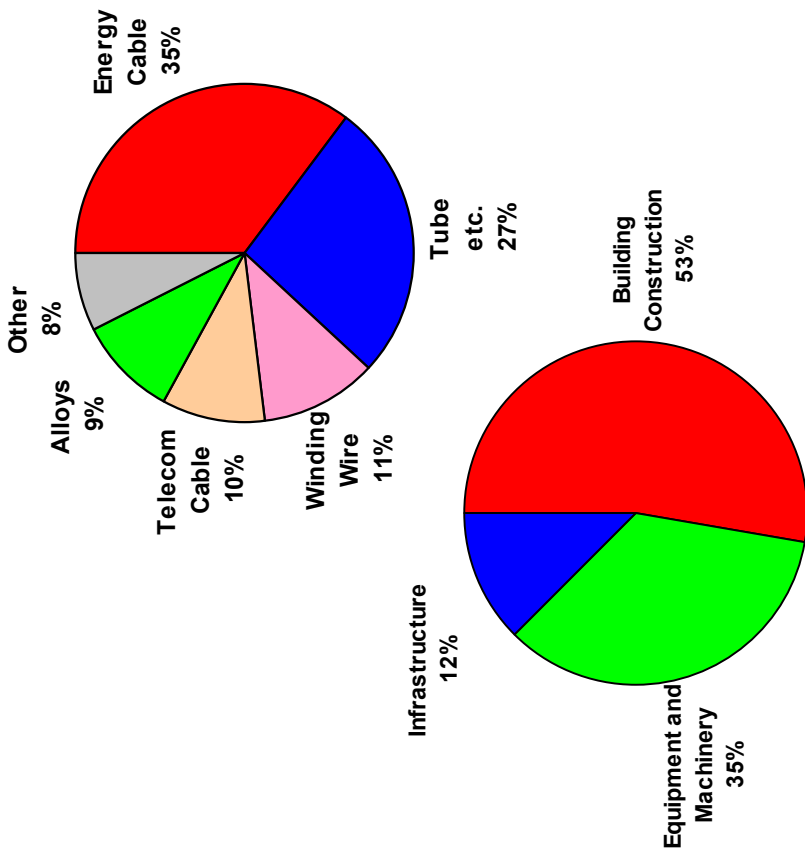
Construction drives growth

... principally in energy cable and tube

World Increase in Copper Consumed by Market Segment in 1990-1998 ('000 t Cu – incl. secondary)



Copper Demand Growth by Sector and Product in 1990-1998
(Contribution to total increase - %)

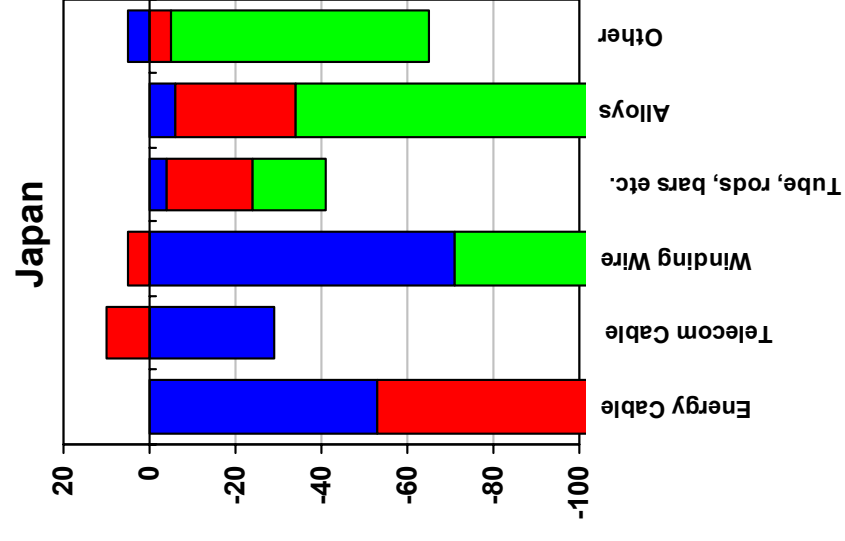
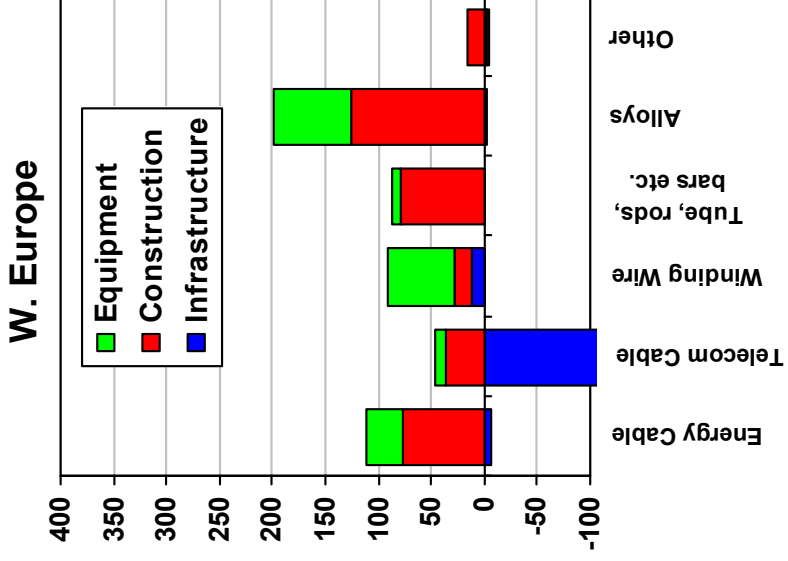
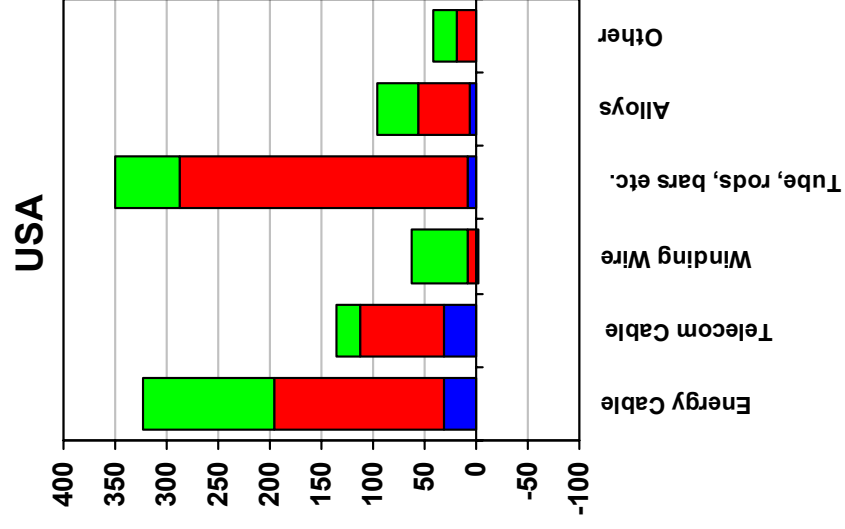


Source: Bloomsbury Minerals Economics

Led by USA in the industrialised world ...

A US growth story – dominated by use in buildings. European copper demand growth is patchy and modest. Japan has fallen behind

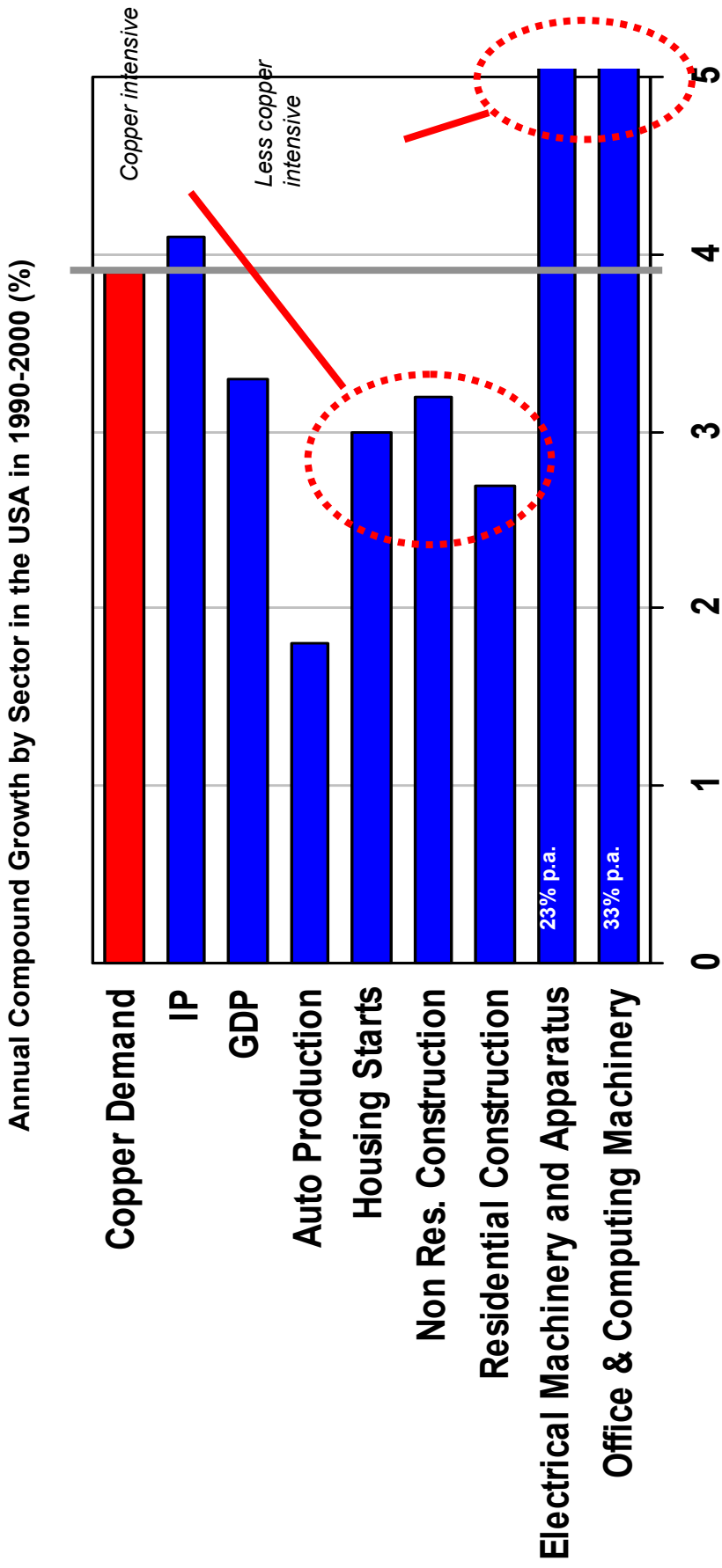
Increase in Copper Consumed by Market Segment and Region in 1990-1998 ('000 t Cu)



Source: Bloomsbury Minerals Economics

US demand intensity

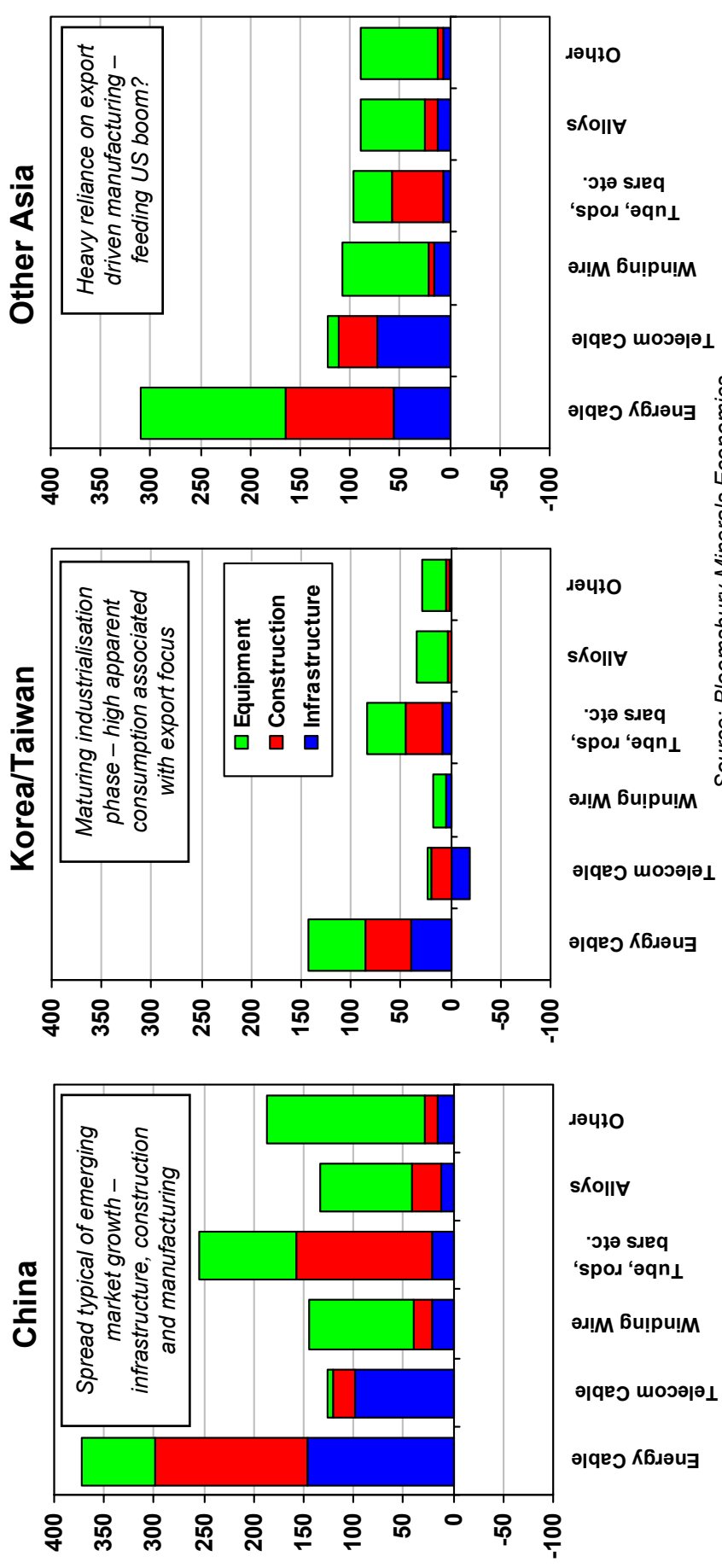
... relatively high in the US construction sector. Copper is “powering” the US growth phase, centred on IT and rising per capita wealth



And Asia's growth?

Centred on China – use of copper (and other metals) eclipsing underlying GDP expansion. Rising manufacturing base elsewhere in Asia is also important

Increase in Copper Consumed by Market Segment and Region in 1990-1998 ('000 t Cu)



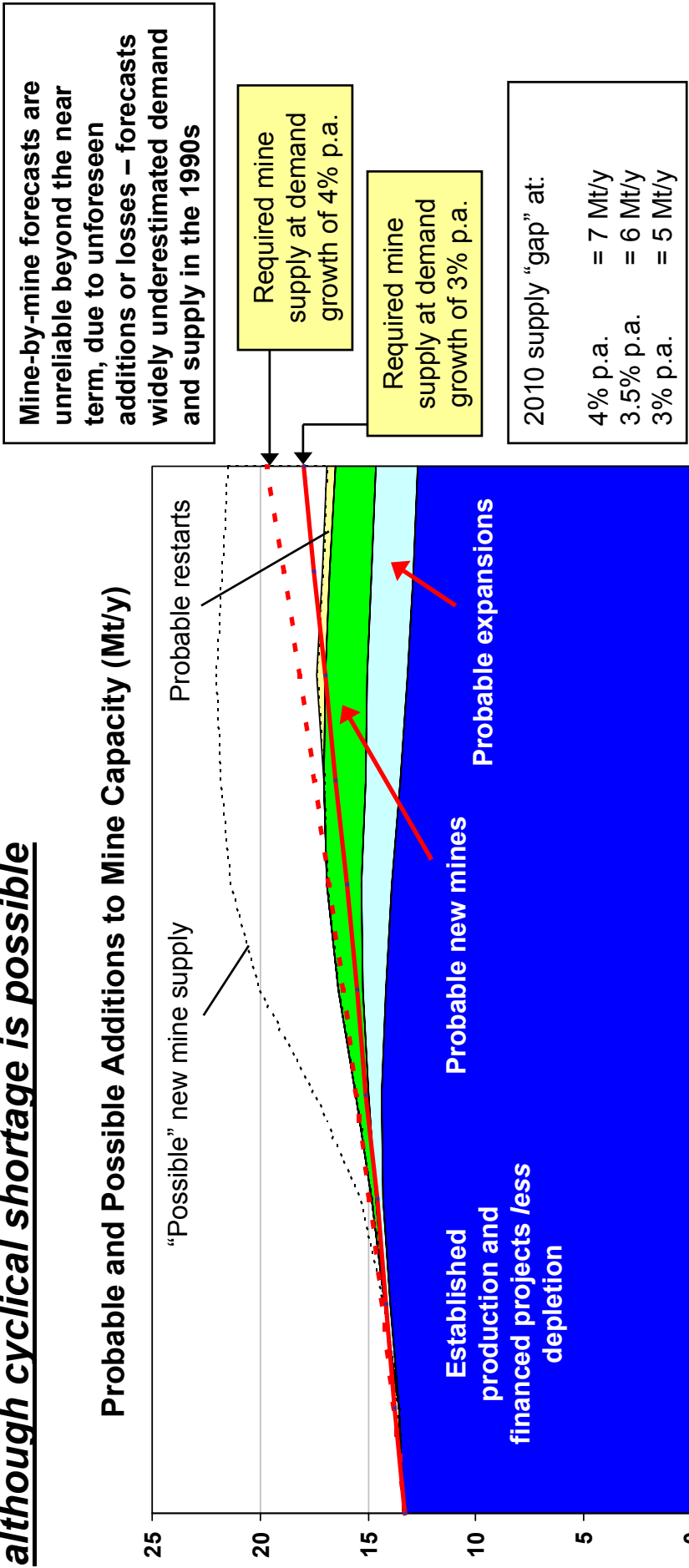
Source: Bloomsbury Minerals Economics

Strong demand growth – in a complex system

- **Copper a major beneficiary of the technology boom**
 - Predominantly a US pattern in the 1990s
 - Associated with workplace and “lifestyle” products
 - A feature of strong economic growth (business investment) and wealth creation
 - But some other metals have benefited too – e.g. aluminium
- **Maintenance of strong demand growth probably requires:**
 - Renewed strong economic growth in USA and/or
 - Repeat of US phenomenon (and wealth effect) elsewhere
 - Sustained high levels of investment activity and strong economic growth in China and emerging markets
- **Forecast of 3-3½% p.a. demand growth in 2000-2010**
 - In line with expected expansion of World GDP

No “structural” shortage of supply

... except at very high demand growth rates. Established mines and “highly likely” expansions and projects are expected to meet demand until 2007-08, although cyclical shortage is possible

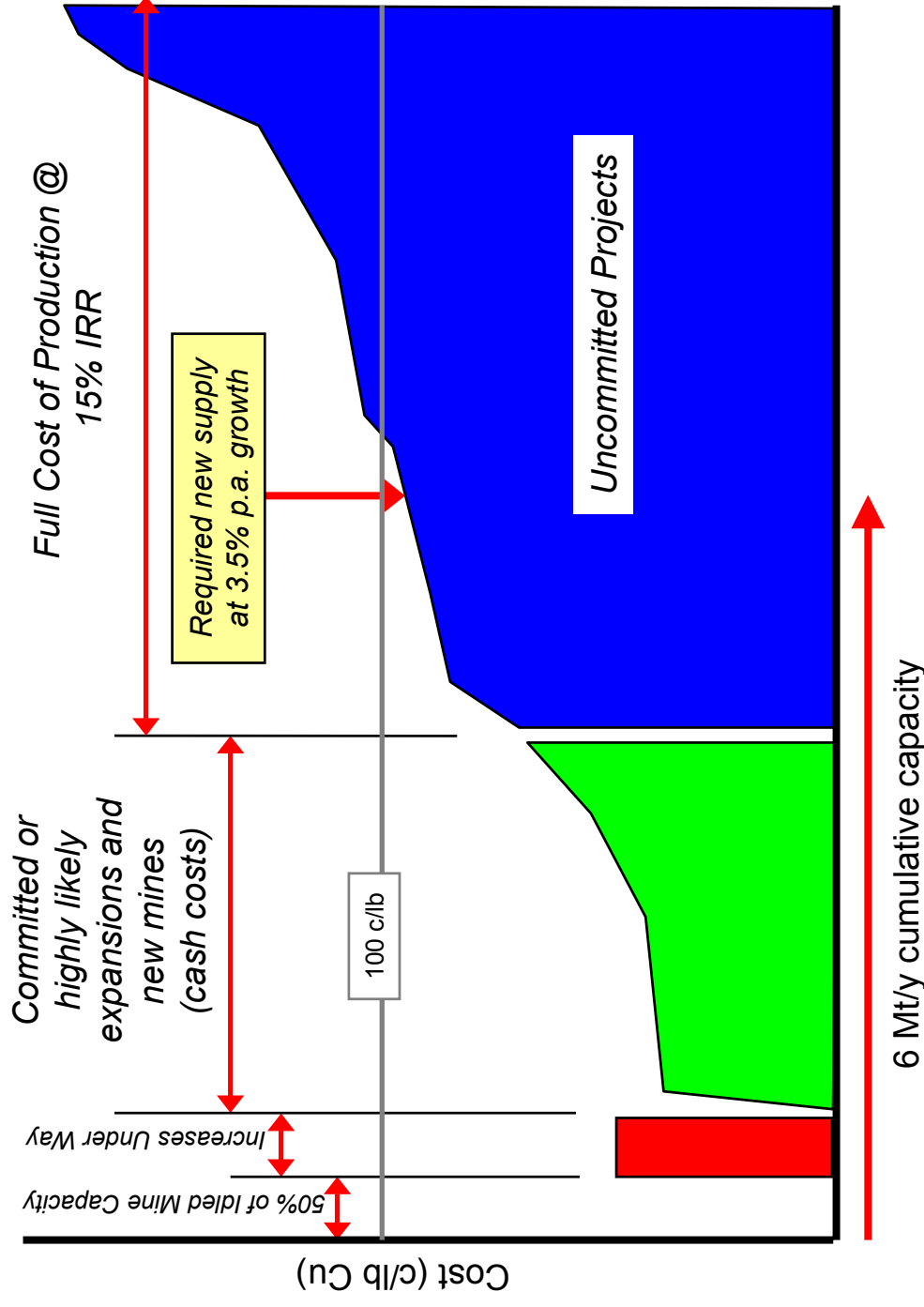


“Incentive” prices?

About 6 Mt/y of identified new capacity is “viable” at perceived long run prices of less than US\$1.00 c/lb

Analysis excludes effects of depletion but also omits a number of “likely” projects for which cost details are unavailable

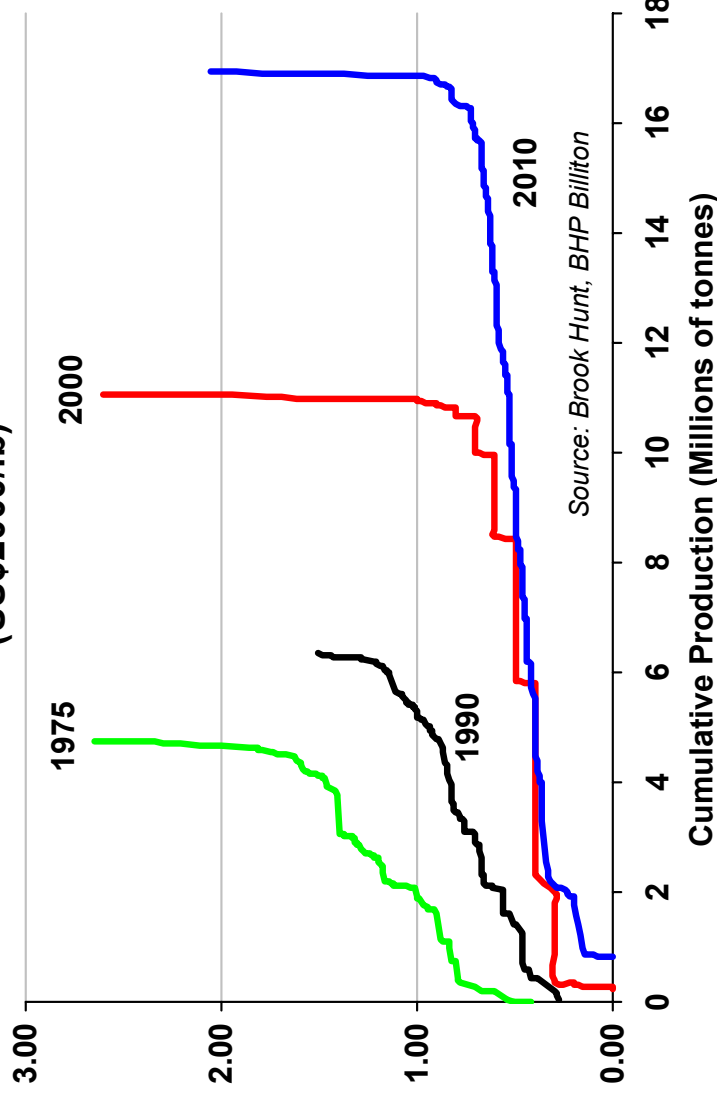
As in the past, high cyclical prices can be expected to woo some project developers, despite inadequate returns for all investors



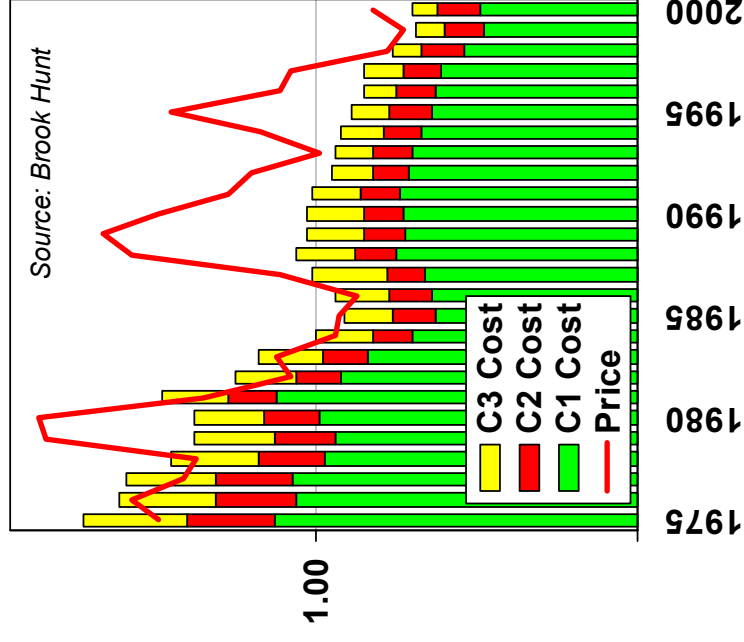
Costs (and prices) in decline

Real prices fell by 1.3% p.a. in 1950-2000 and by 1.9% p.a. in 1975-2000, reflecting similar reductions in “steady state” industry costs (C1) during this period. Further productivity gains are expected to translate into real long run (trend) price decline as producers pursue cost reduction strategies

C1 Cost Curves – 1975, 1990, 2000 and 2010
(US\$2000/lb)



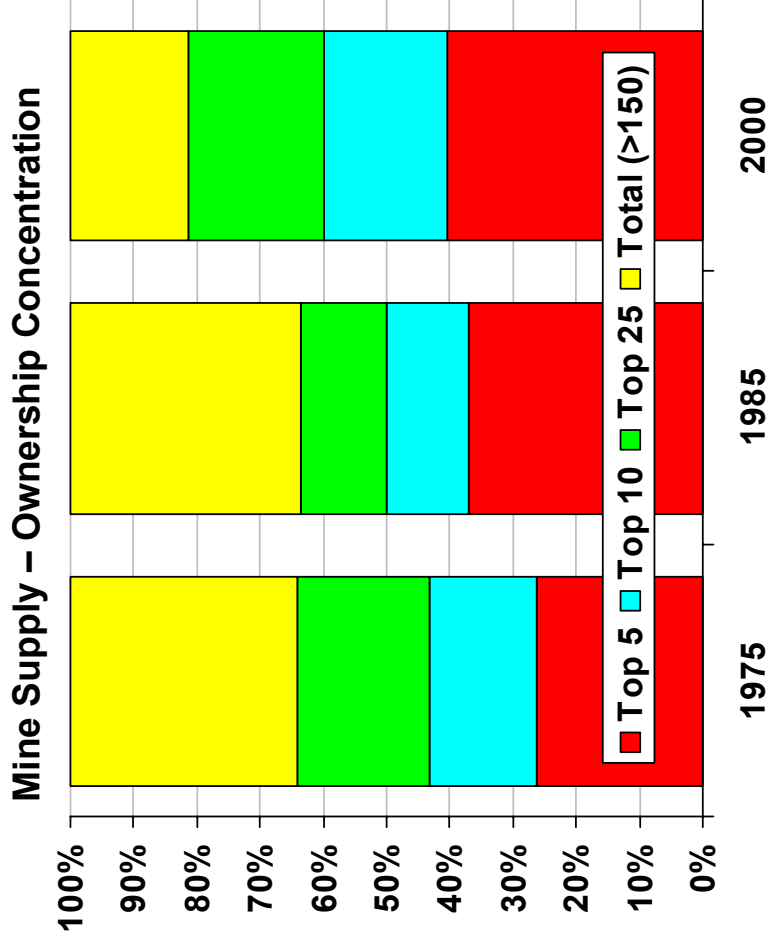
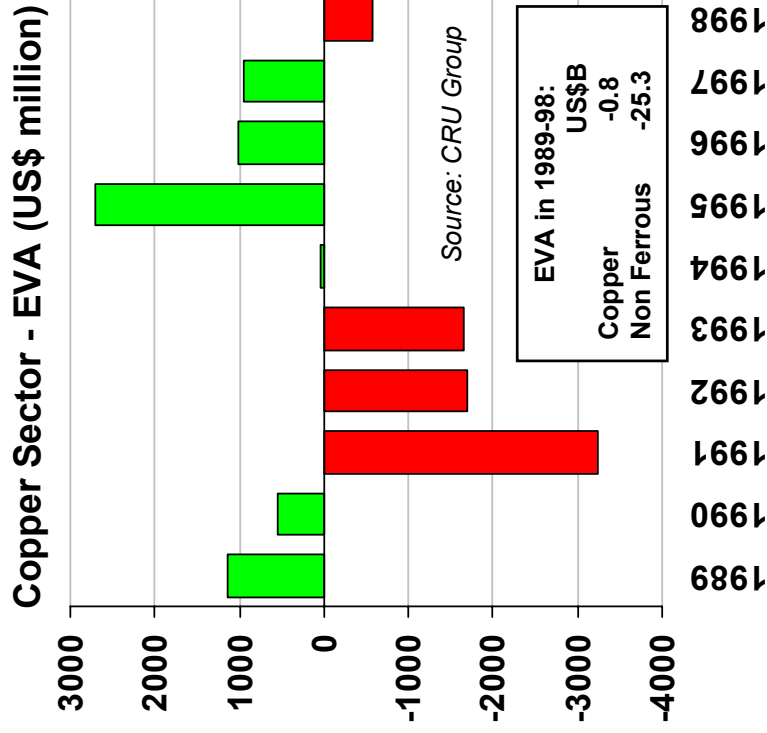
Average Copper Mine
Production Costs (US\$2000/lb)



Poor “average” performance

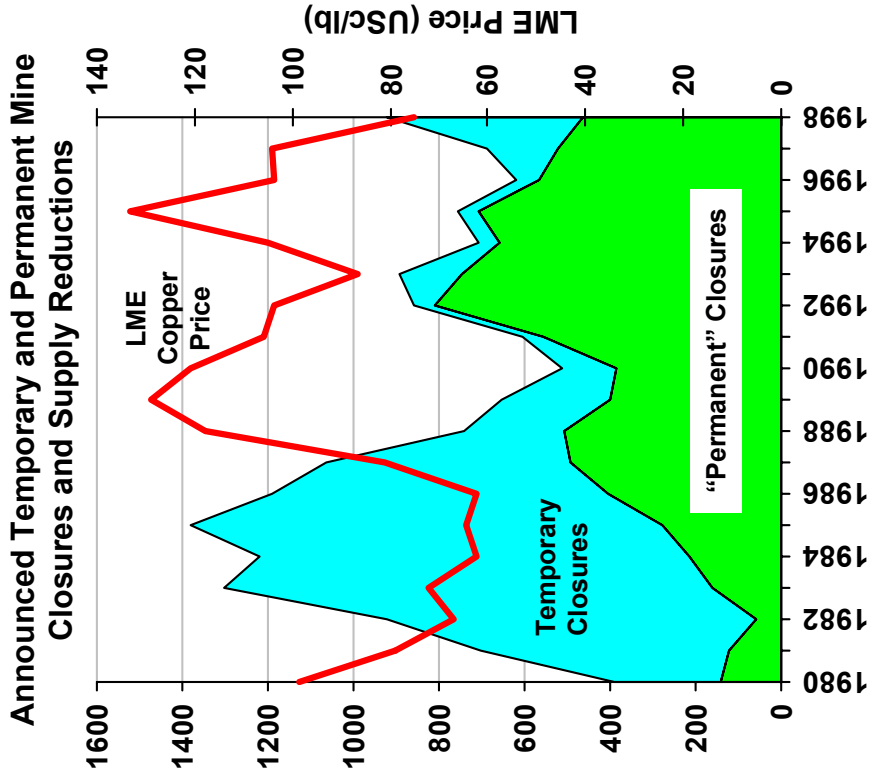
Little overall value created, despite a decade of high prices – but masking high returns for some producers

... but industry concentration is unlikely to reduce fragmented ownership of “second tier” mines – overall supply discipline is weak

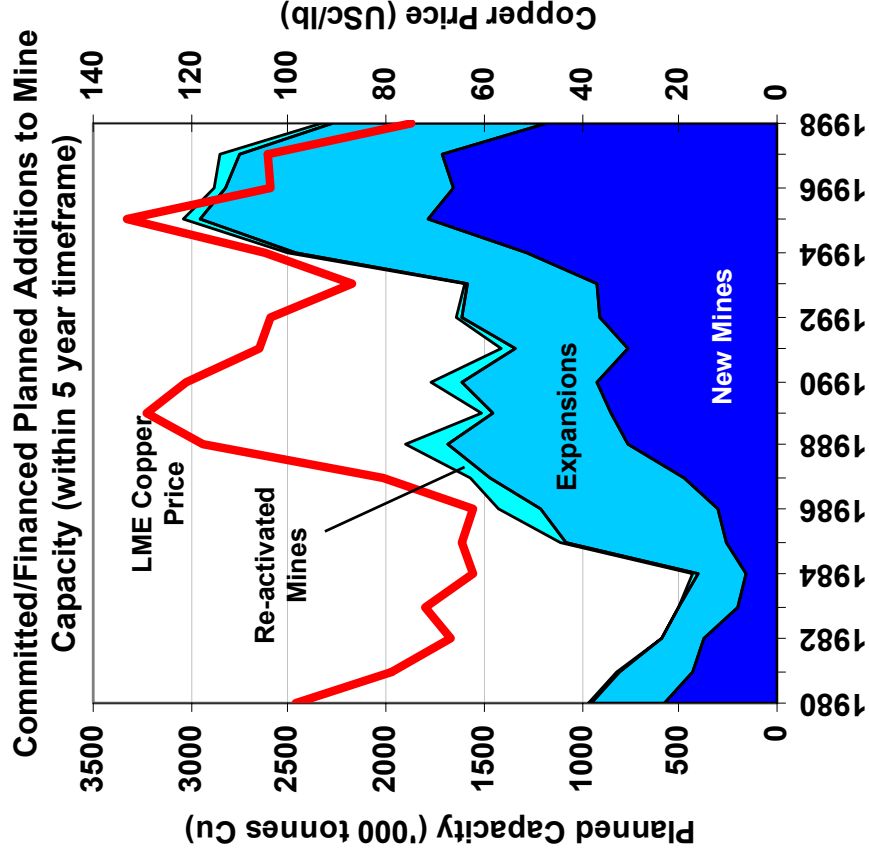


Price cycle – a powerful influence

Prompting mine closures when prices are weak ...



... And influencing decisions to invest in new supply in good times



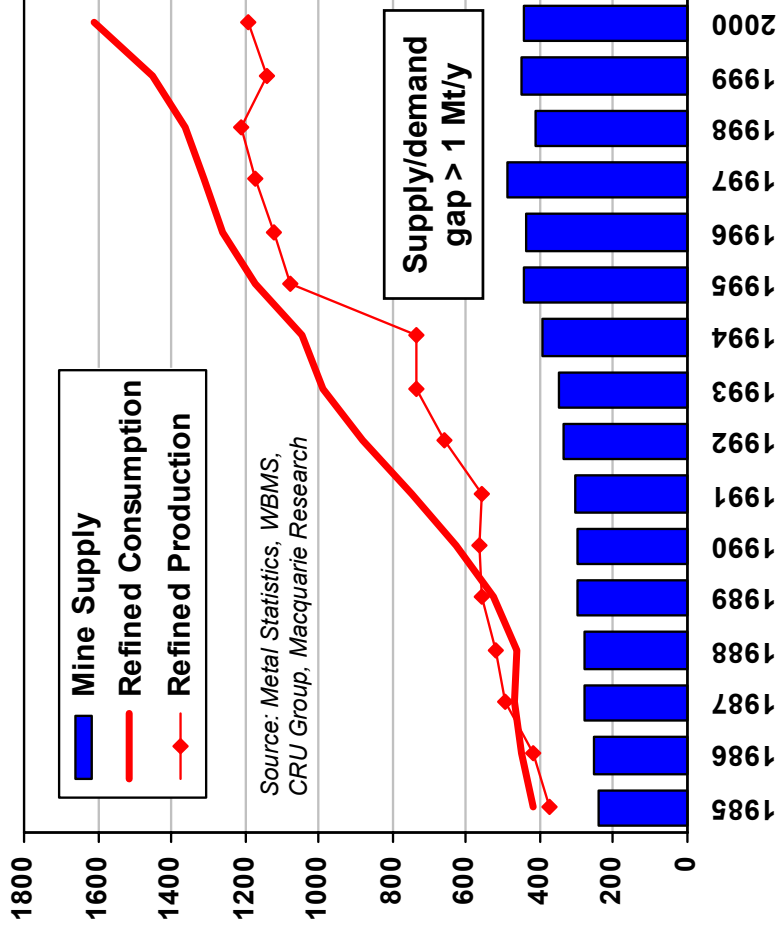
Other assumptions ... but with caveats!

- **Resources/reserves not running out.** Limited scope for introduction of very low cost “mega” operations (no more Escondida’s and Grasberg’s waiting in the wings)? But “average” resource quality not deteriorating rapidly
- **No sudden supply disruption.** Major losses or additions to supply excluded from base case forecast – but risks of supply shocks remain
- **Advanced technology - evolutionary, not revolutionary, influence on industry cost reduction.** Leach/EW processing for sulphides emerging, but unlikely to result in rapid, industry-wide plunge in production costs. Broad improvement to persist
- **Smelting/Refining Capacity - no long lasting bottleneck giving rise to higher prices.** Steady reduction in tariff barriers (e.g. Japan) unlikely to result in major loss of smelting/refining capacity – sufficient new capacity encouraged by cyclical increases in TCRCs, local market incentives, and “strategic” imperatives
- **Scrap contribution not expected to surge** – except during periods of high prices. Sustained strong demand growth centred on building applications means long residence times for copper’s key uses. However, higher contribution from scrapped equipment (e.g. PCs) could emerge

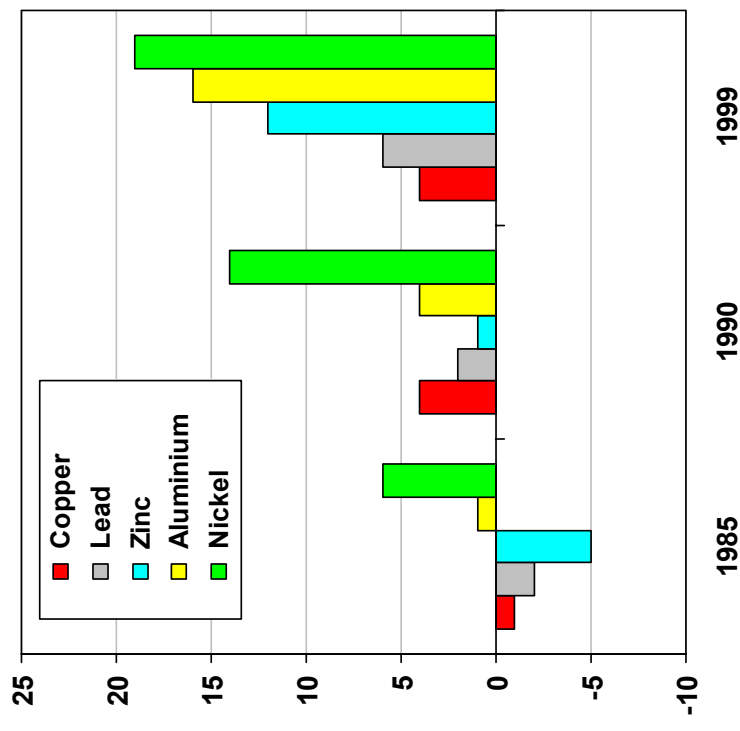
... And no disruption from former E. Bloc trade

A positive net influence: lower risks of rapid supply growth in China than for aluminium and zinc

China – Copper Demand (Refined) and Production ('000 t Cu)



Net E. Bloc Exports as a % of Western Consumption



Supply - characterised by ...

- **Ample physical resources and sufficient reserves?**
 - Expansions and projects expected to meet demand until 2007-08?
 - Potential decline of US production base an important caveat
- **Commodity price cycle influencing investment decisions**
 - Leading to periods of over and under investment in new supply
 - Producers unable to distinguish between price trend and price cycle
 - Permanent upward shift in prices above current “average” (~90 c/lb) is improbable, especially if believed by many producers
- **Consolidation and value focus does not herald real price trend rise**
 - Producers cannot expect to regain major influence over pricing – industry too fragmented to orchestrate real long run price rise
 - Strategies continue to centre on revenue growth and cost reduction
 - Survival instinct and steep exit barriers hamper removal of poor assets
 - Real costs – and hence prices – will continue to fall
- **Rewards for disciplined, value-focused companies – but success built on outstanding market knowledge, not gambling on price**

But the future remains very uncertain

...There are plenty of wild cards!

For example:

- **US supply – is the sun setting?**
- **Russia – a riddle wrapped in a mystery!**
- **Central Africa – untapped treasure trove?**
- **Any potential Bougainvilles?**
- **Major demand shocks (positive or negative)?**

Summary

- **Dealing with price cycles remains a major challenge for producers – “lumpy” investment in new capacity**
 - **Strong longer term demand growth prospects – possibilities of very high growth, but also risks of setbacks!**
 - **Heavy reliance on China (and emerging markets) and US demand growth**
 - **No looming physical resource scarcity – but US production critical**
 - **Collective investment efficiency and supply discipline unlikely to emerge rapidly; sector still comprises many owners**
 - **Permanent severe capital rationing an implausible outcome – but companies with highest returns will be rewarded**
 - **Producers maintaining strong focus on cost reduction and revenue growth – real price decline in a commodity business likely to persist**
- ... There are no easy fixes! Cannot afford to be “average”**

Outstanding value is "hidden"!



.... Escondidas are rare!