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The International Copper Study Group
September 2010 Meeting, Antofagasta, Chile

Investment in copper futures as a new, yet still readily understood, *fundamental* force in the market.

Presentation by Peter Hollands, Managing Director of Bloomsbury Minerals Economics Limited

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Four key aspects of the BME presentation

- Relationships between prices and stocks were stable for many years, then changed abruptly from August 2005. To understand what might have caused the change, the reasons behind the old relationships need to be studied.
- There are now not just one but *two* key market balances: production versus consumption in the physical market; investment longs v. stock holders' shorts in nearby futures.
- How one can still forecast even though twin balances now drive the price or, - how to treat investment longs as a simple extension of conventional fundamentals.
- Postscript: counter-arguments and alternative interpretations of the above exist but are at best just partial truths, BME believes.

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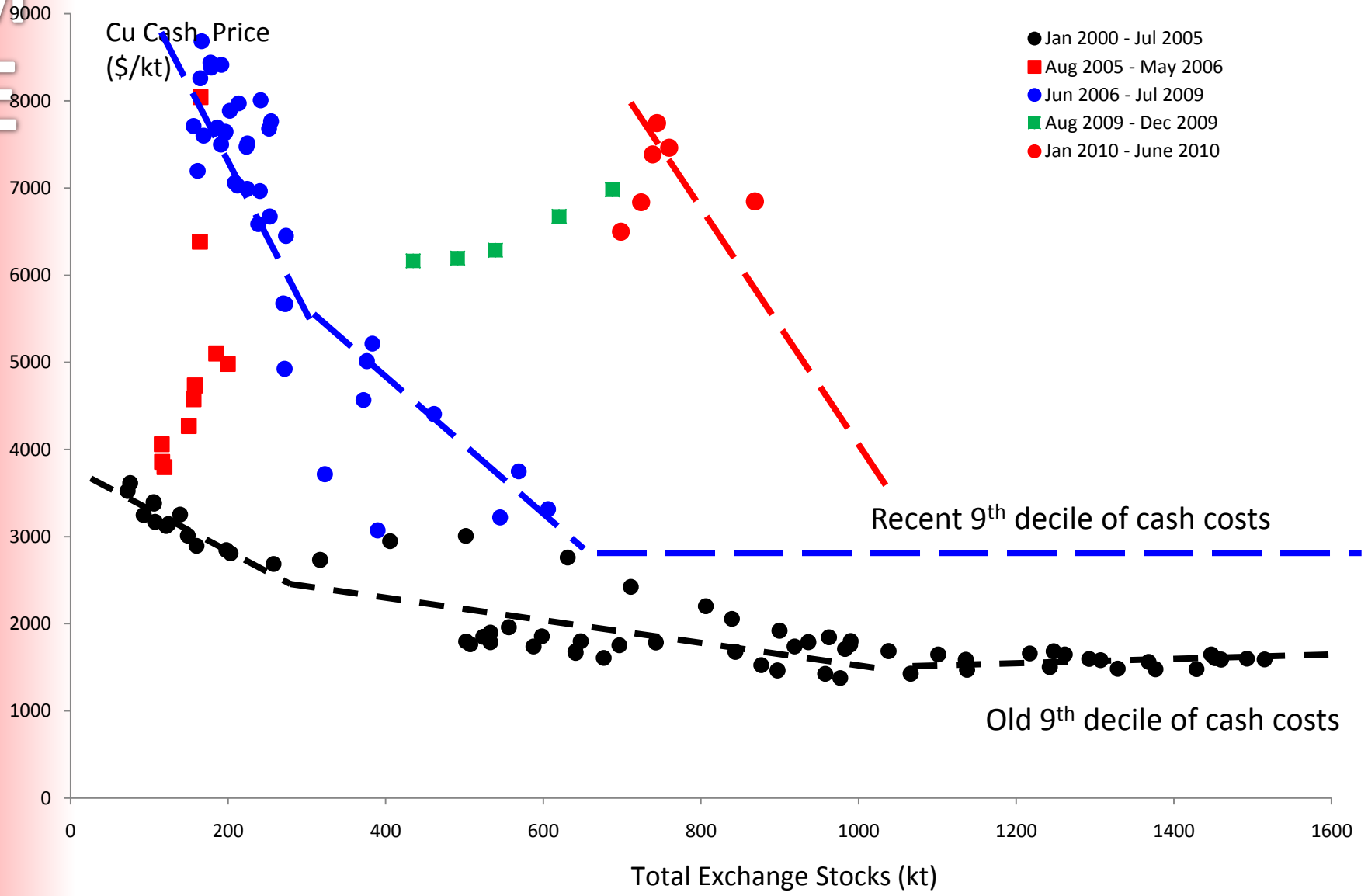
Part 1:

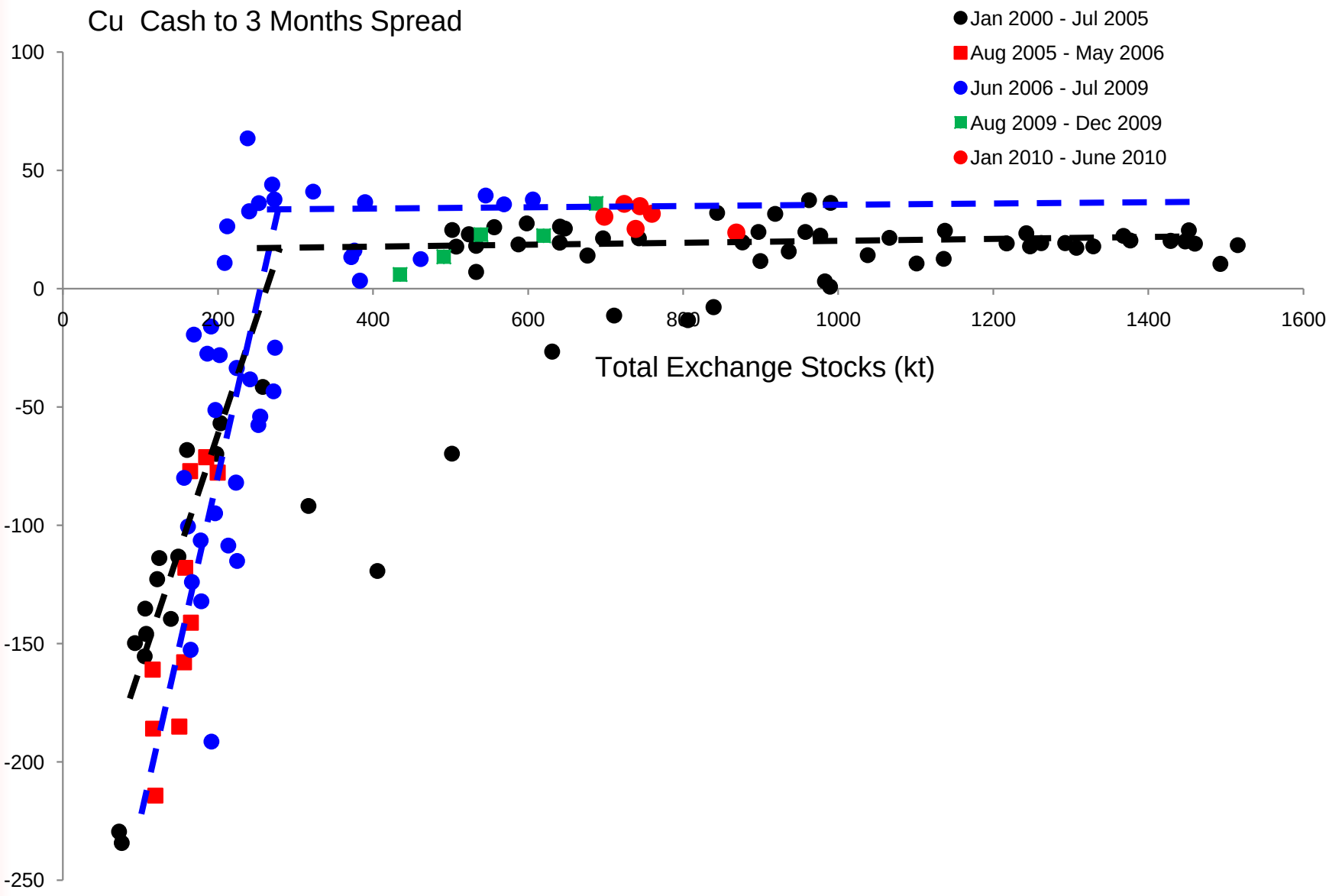
Relationships between prices and stocks were stable for many years, then changed abruptly from August 2005.

To understand what might have changed, the reasons behind the old relationship need to be studied closely.

Relationships between prices and exchange stocks were stable to July 2005, with a clear 'pinch point' between around 250-300 Kt



The old 250-300 Kt 'pinch point' was also the boundary between backwardation and contango markets



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Stocks have always influenced prices in two different ways, the first continuously but the second depending on whether the market is in contango or is backwardated

- The level and direction of change of *total stocks* are good indicators of physical market conditions generally and, via sentiment, they continuously but *indirectly affect prices.*
- There is a second route whereby stocks affect prices. When stocks are above the pinch point, a contango emerges and ownership of exchange stocks passes from the copper trade to banks. Only then are *exchange stocks* hedge sold forward to earn the contango, thus *directly depressing prices*.
- Investors' longs now offset such exchange stock owners' contango-earning hedge shorts and in doing so have raised the price corresponding to any given stock level.
- BME's price models accommodate these effects.

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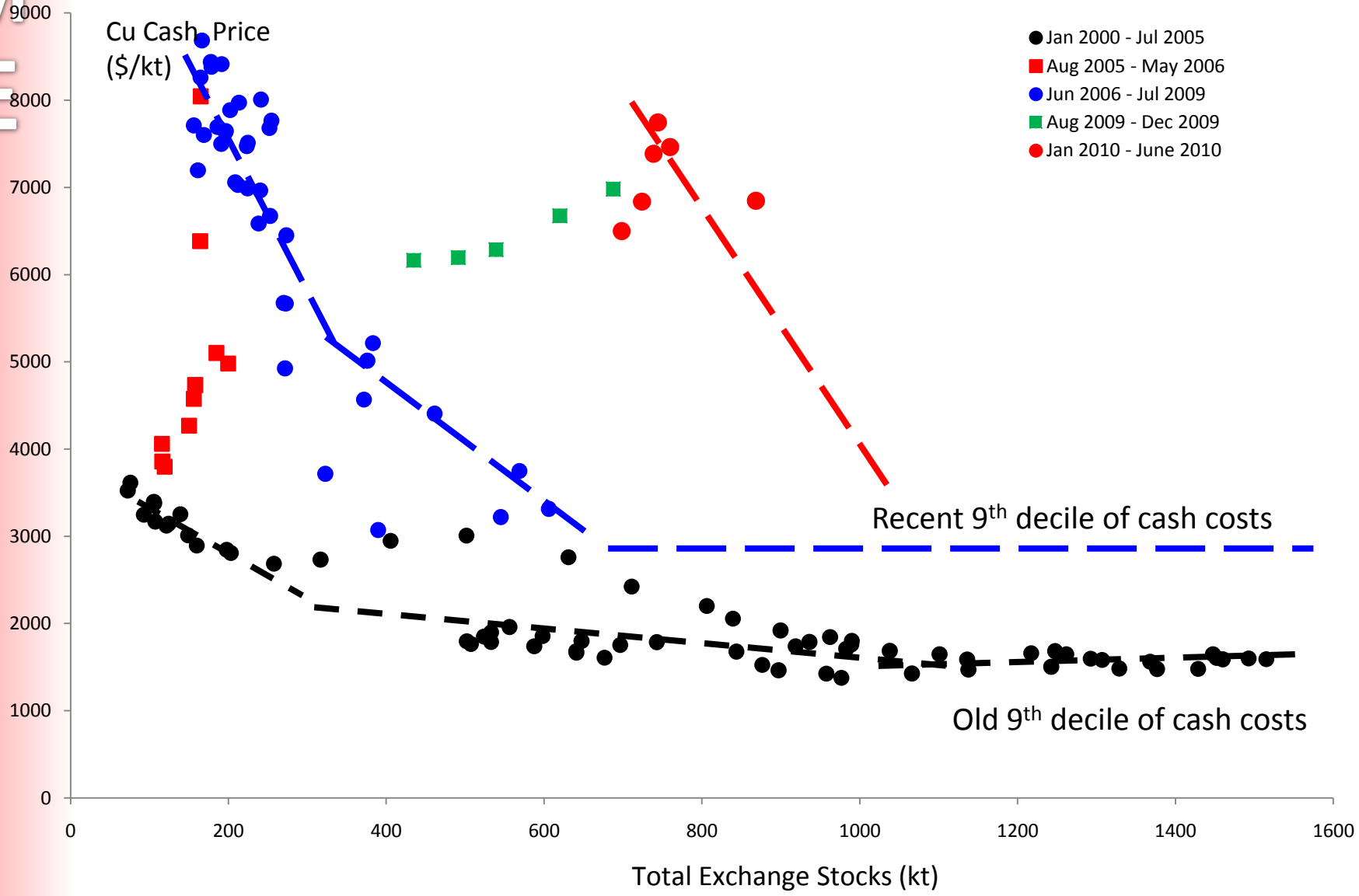
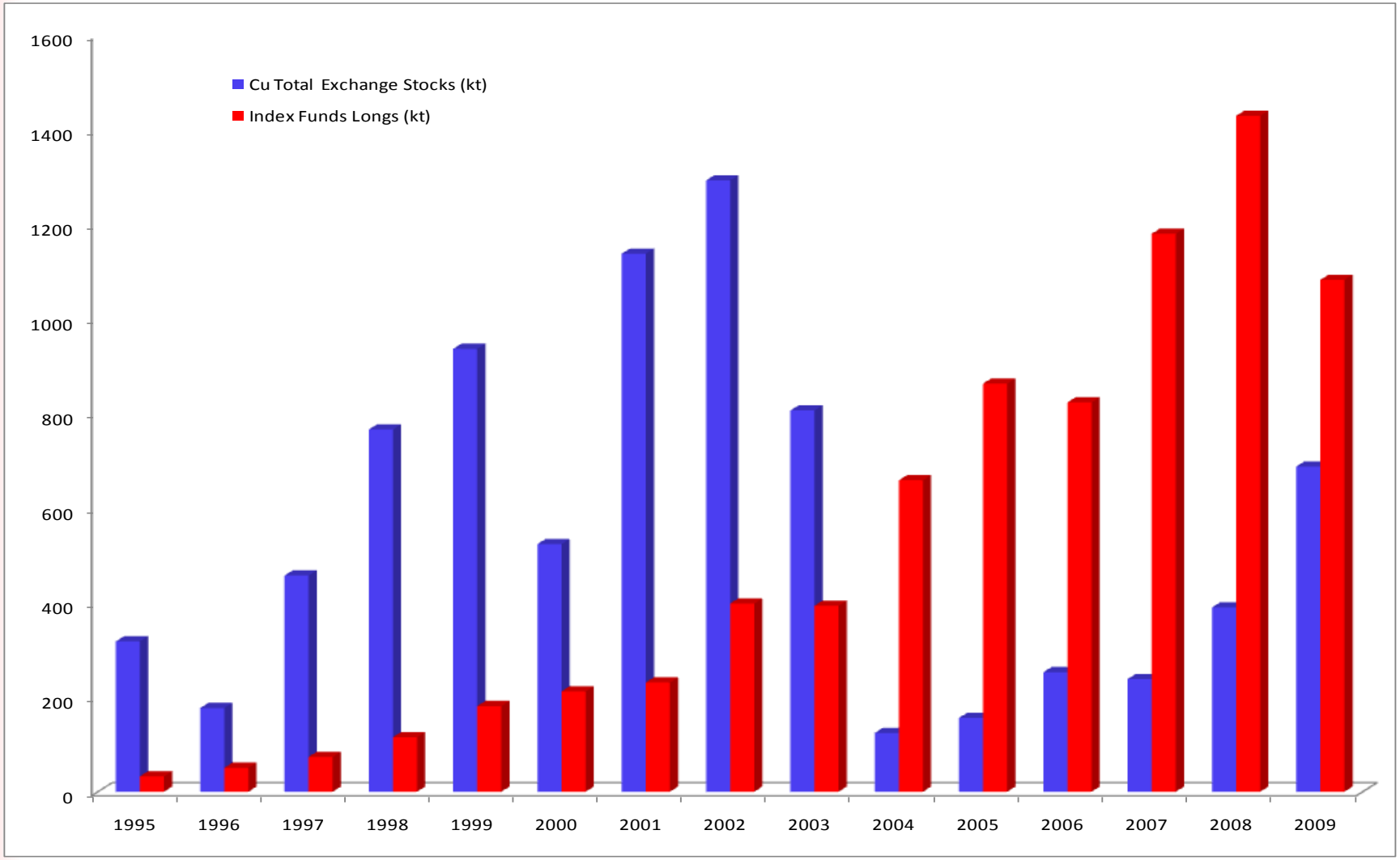
BME believes that the shift in price to stock relationships occurred because investors' long positions (currently ~1 Mt) in the nearby futures market offset the bearish impact of stock holders' hedge shorts (~0.6 Mt)



Perhaps the best way to think about investors is to consider who their counter-parties are

- Until mid-2005, investment long positions in copper were under 500 kt and readily found sufficient counter-parties, as producer hedge shorts exceeded consumer hedge longs.
- After mid-2005, producer hedge shorts fell drastically in volume, whilst investor longs were rapidly swelling to the 750 kt level. New counter-parties were needed and in the near term the only ones available were speculative shorts. And they only entered the market at higher prices.
- Higher prices boosted supply and suppressed consumption, creating a surplus, creating higher stocks and a shift into contango. That prompted contango-earning hedge selling by exchange stock owners (~0.6 Mt), creating extra counter-parties for investors' long positions (~1 Mt).

Since 2004, the balance of investment longs versus any potential hedge sales by exchange stock owners has been positive for price

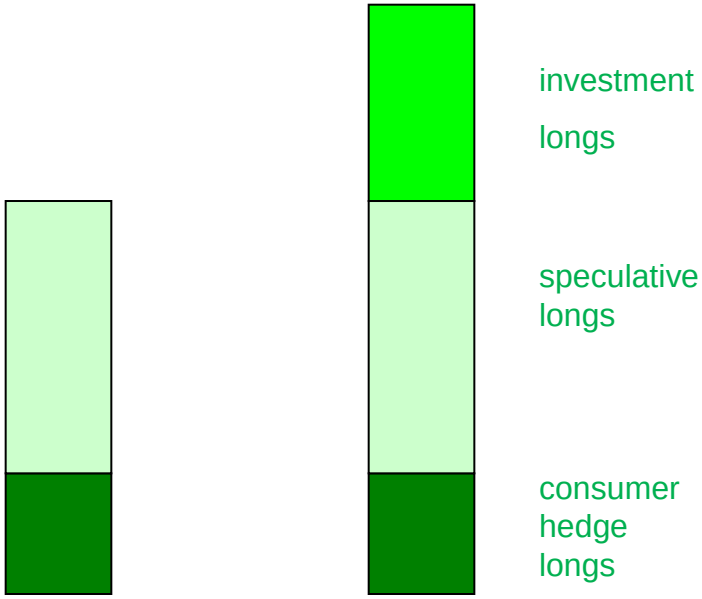


How price-insensitive index fund buying of futures changed the balance and raised stocks and prices (simplified!)

Longs

Before investment

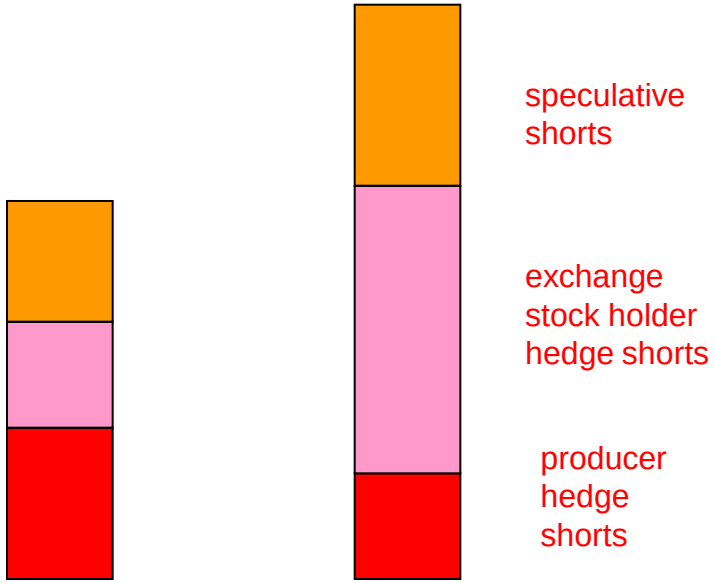
After investment



Shorts

Before investment

Responding to investment



Conclusion: the new system *tolerates* higher stocks and *requires* higher prices to bring in the speculative shorts needed fully to offset copper investment longs

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Part 2

BME concludes that, where once there was just one, now there are two key fundamental market balances:

- production versus consumption in the physical market;

- investment longs v. stock holders' hedge shorts in the nearby futures market

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There are now *two* fundamental market balances which inter-lock via changes in hedged exchange stocks *(the fourth quarter of 2010 used for illustration)*

- The physical balance between production (forecast at 4.75 Mt in Q4 2010) and consumption (forecast at 4.9 Mt) is still important, but at 0.15 Mt, the predicted deficit is small.
- In the nearby futures market (by which we mean one quarter ahead) however, investor longs, which are now over 1 Mt, exceed exchange stock owners' hedge shorts, which are under 0.6 Mt, by a larger margin, creating a nearby futures market deficit more than double the physical deficit.
- The two balances inter-lock via hedged exchange stocks. There is commercial equilibrium when growth in exchange stocks *and* in stockholders' hedge shorts equal growth in investment longs. *Whilst investment is growing, there is an equilibrium rate of stock increase.*

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Interlocking balances one quarter ahead (Q4 of 2010) in the physical and nearby futures markets for copper

Physical

Consumption **Production**

4.9 Mt **4.75 Mt**

Futures

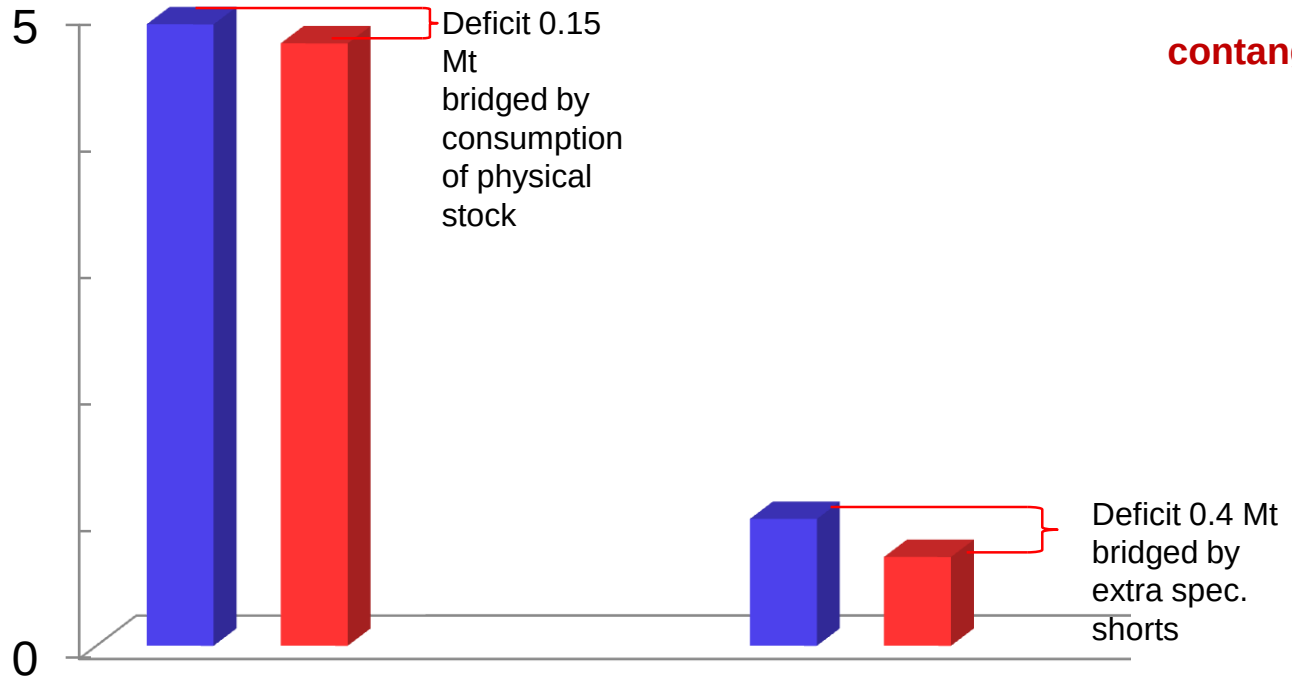
Investment **Stockholders'**

longs **hedge shorts**

1 Mt **0.6 Mt**

The Link

Level of exchange stocks and stock holders' hedge shorts (only seen in a contango market).



How BME reckons investment demand has changed the very nature of 'equilibrium' in metals markets

Old equilibrium

- Physical production = physical consumption
- Stock change = zero

New equilibrium

- Physical production = physical consumption + tonnages of futures bought by investors
- Stock increase = investment holdings increase

Consequences for price

- Higher prices are required to stimulate an equilibrium rate of stock increase. A contango is needed so that exchange stocks are hedged.

Commercial balances for three metals compared: how supply constraints in *copper* have kept growth in stocks less than growth in investment longs, unlike for *aluminium*, which tends towards surplus, or *nickel*, where very price responsive nickel pig iron preserves a near perfect commercial balance.

- Changes from end-2004 to end-2009

	Exchange stock change (a)	Index fund holdings change (b)	Commercial balance (a) – (b)
Aluminium	+4.1 Mt	+2.4 Mt	a>b = slack
Nickel	+0.1 Mt	+0.1 Mt	a=b neutral
Copper	+0.6 Mt	+1.0 Mt	a<b = firm

Copper: how investment demand has added 1% to physical demand and created a commercial deficit.

- Figures cumulative for 2004 – 2009

Copper production	+105	Mt
Copper consumption	-105	Mt
Physical balance	+0	Mt
Index fund demand	-1	Mt
Commercial balance	-1	Mt

Note: index fund demand is about 1% of the total; that would be negligible except that it sets the commercial balance

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Part 3

How one might forecast now that twin balances drive the price.

Or, put another way, how to treat investment longs as a simple extension of conventional fundamentals.

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Forecasting methods using a new concept of equilibrium

- While a meeting of the ICSG is not the right forum for price forecasting, it may be helpful to discuss how the new BME concept of equilibrium would affect forecasting *methods*.
- For as long as investment in copper futures continues, BME argues that there will be an equilibrium rate of stock increase, equal to the rate of growth in investment longs, which has been around 1% of physical demand, but which may be more if Exchange Traded Funds (ETFs) take off. BME considers an equilibrium price as one which will boost supply and suppress demand to create the necessary trend (1%+) gap between production and consumption.
- A forecaster will now need to think backwards and consider the level of prices needed to drive different rates of production and consumption growth.

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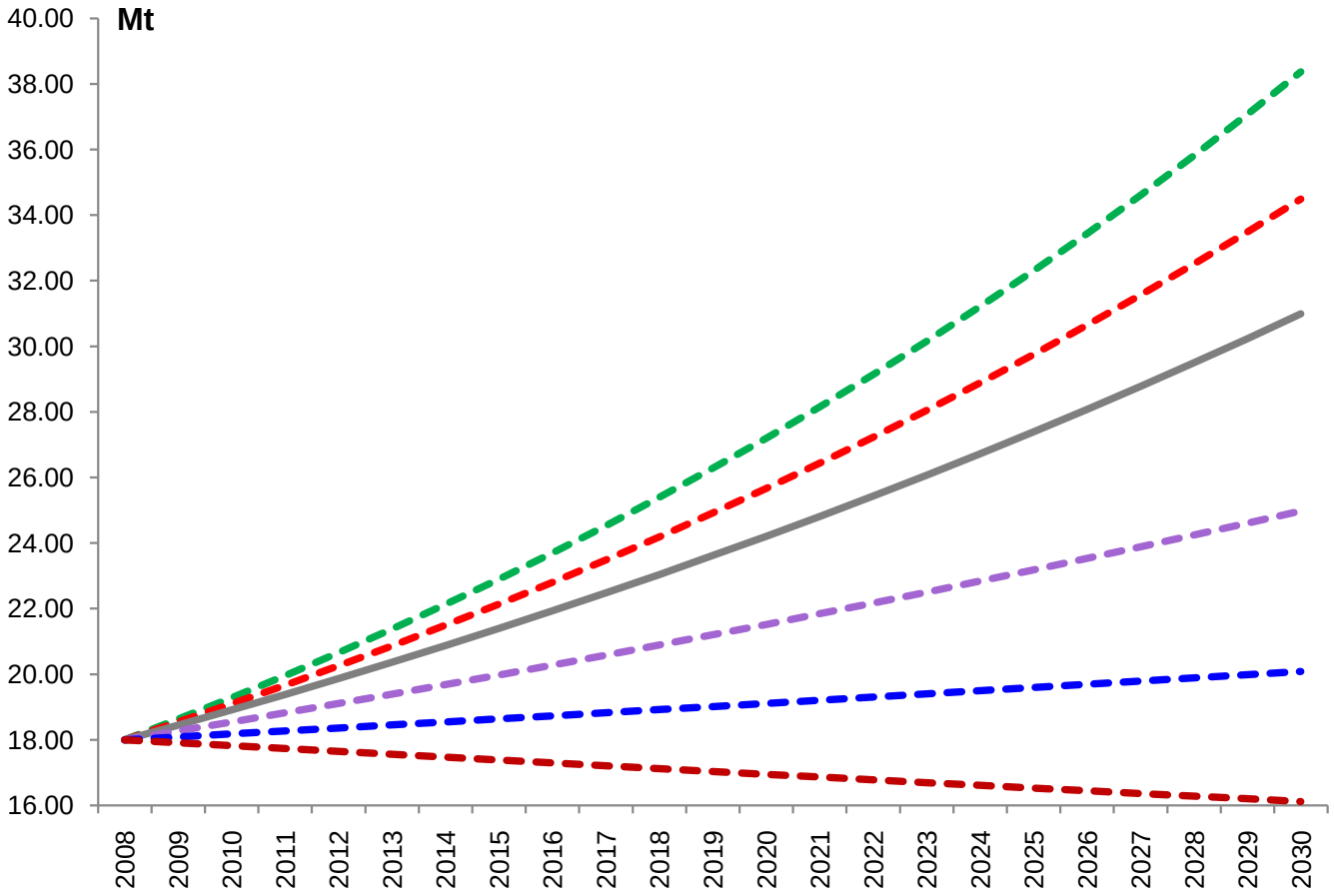
Price driven rates of demand and supply growth

- Recent years have seen played out a test of the rate to which progressively higher prices suppress consumption growth by encouraging thrifting and substitution.
- At the old (pre-2005) price level of $3,500 per tonne, trend demand growth was around 3.5% per annum. At a more recent average of $6,500 per tonne, that fell to 1.5% p.a. On the next slide we interpolate between those levels and give our own impression of what still higher prices might do.
- Elsewhere in BME's work, we have done the same calculation for supply growth, but do not set it out here, because we do not want in this forum to imply a figure for future equilibrium prices. The latter is set out elsewhere - in BME's Long Term Outlook study, for instance.

Consumption growth: how different assumed steady-state investment/disinvestment affected price levels might affect demand trends



$3500 gives 38.37 Mt In 2030 (+3.5% p.a.)

$4500 gives 34.39 Mt In 2030 (+3.0% p.a.)

$5500 gives 30.99 Mt In 2030 (+2.5% p.a.)

$6500 gives 24.98 Mt In 2030 (+1.5% p.a.)

$7500 gives 20.09 Mt In 2030 (+0.5% p.a.)

$8500 gives 16.12 Mt In 2030 (-0.5% p.a.)

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Investors' intentions become a new fundamental. How do investors expect to change their commodity exposure over the next three years?

- Remain un-invested: 1%
- Cut to zero: 2%
- Scale back: 5%
- Maintain at current level: 27%
- Initiate or increase: 65%

Source: Barclay's Capital conference, 2010

What do investors consider to be the optimum long-term weighting for commodities in a portfolio?

- Zero (weighting): 5% (of those surveyed)
- Between 1 – 5%: 16%

  note that around 1% is where we are now
- Between 6 – 10%: 50%
- Over 10%: 29%

Source: Barclay's Capital conference, 2010

Understanding and forecasting demand growth in an 'investment drives price drives fundamentals' world

- Growth in index fund longs has added about 1% per year to commercial demand growth; anticipating how this rate might change is a new aspect to forecasting.
- Exchange Traded Funds (ETFs) will either accumulate futures, in which case they will require more exchange stock owners' hedge shorts as counter-parties, or they will convert a mix of hedged and un-hedged stocks to un-hedged: either way acting as equivalents of consumption.
- If supply cannot match both investment demand and physical (possibly true only for copper) then prices will have to rise high enough to suppress consumption.

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BME matrix for understanding price feedback loop and equilibrium under different rates of investment

	2011	2012	2013
Investment-boosted price:	aaaa	aaaa	aaaa
Price-enhanced production:	bbbb	bbbb	bbbb
Price-suppressed consumption:	cccc	cccc	cccc
Price-influenced stock increase:	b - c	b - c	b – c

(b – c also equals traditional physical market balance)

Transfer to physical ETF stocks:	dddd	dddd	dddd
Short-hedged stock increase:	b-c-d	b-c-d	b-c-d
Investor long (futures) increase:	fffff	fffff	fffff
Commercial balance:	b-c-d-f	b-c-d-f	b-c-d-f

(which is what nowadays moves the price)

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Conclusion: investment buying is real demand. Investment longs need counter-parties..... that need then drives prices... and prices then drive stocks.

- Index fund buying is not simply a weaker substitute for real consumption: it is on the contrary stronger. It does not return scrap. It does not fade away as prices rise.
- Index fund buying requires counter-parties. Initially, they were producer hedge shorts. But the latter largely went out of fashion in 2005, just as index funds really took off. Then the new counter-parties were speculative shorts and higher prices were needed to tempt those extra shorts into the market. Higher prices created a physical surplus and extra contango earning hedge shorts from exchange stock owners became additional counter-parties to investment longs.
- Index funds *first* created higher prices *then* higher stocks. ETFs may potentially repeat that sequence.

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Part 4: Postscript

Not everyone accepts BME's simple explanation that investment longs have been offsetting stock holders' hedge shorts in the nearby futures market and have thus affected stock to price relationships.

Counter-arguments and alternative interpretations exist.

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Counter-argument number 1 (from early 2006): that index funds will not take physical delivery

- BME first proposed that commodity index funds' investment long positions were somehow offsetting the bearish effect of physical stocks as long ago as end-2005.
- Many accepted this idea readily, but some soon countered with the proposition that, as index funds would never take physical delivery, they could not affect the price.
- BME's response was to remind us all that academic research and market participants' experience both showed that LME prices equilibrate first at the three months quote, then get arbitraged to cash and to further forward dates.
- Against this background, index fund longs two-one months out are exactly the sort of thing to move prices: more directly so than physical demand in fact.

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Counter-argument 2 (from late 2007) : that academic work has shown that *speculation* does not drive prices

- A much more recent counter-argument (dating from the start of political interest in the effects on energy and grain prices) has been along the lines that "academic studies have shown that *speculation* does not drive base metals prices".
- BME remains unclear whether this confusion between *investment* and *speculation* is accidental or is mischievous.
- Speculative positions are normally leveraged, they are easily stopped out if the price moves against them and they are thus normally very weak forces in the market.
- Investment long positions (especially index funds) are unleveraged and not stopped out when the price moves against them. They are as a result a much stronger force in the market than is speculation.

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Counter argument 3: that price shifts were anticipatory – only a partial truth, BME believes

- The next counter argument was that the same forces as before were determining price, but behaviour was becoming more successfully anticipatory.
- That is a tricky concept to work with as just about anything can supposedly be justified if called 'anticipatory'.
- In the cases both of copper and aluminium however, stocks subsequently trended generally upwards, so if the late 2005 shift in current price to stock relationships were anticipatory of deficit, then it was a false anticipation.
- BME does accept that the first big upwards price move relative to stock was *in part* anticipatory – albeit wrongly so – but BME argues that having proved wrong, it could not have kept prices up for long.

Counter argument 4: that the role of prices had changed – another partial truth, BME believes

- Another alternative explanation of higher price levels soon emerged: that prices had changed function. Previously, the function of prices had mainly been to adjust supply. With supply constraints and booming Chinese demand in 2005, the new function of price was to “suppress demand”.
- If high prices were needed to suppress demand, in the old days, it would only happen after stocks had fallen to very low levels, so behaviour had anyway changed drastically.
- BME considers that a role change was at best a partial truth in the case of copper; it was false for aluminium (where the same phenomenon had occurred), and was irrelevant to gold, whose price behaviour also changed in 2005.

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Further information on BME price models and whole industry models can be obtained from Robert Goldstein: rbg@bloomsburyminerals.com

The Interactive Copper Price Model is available on a multi-client basis for a license fee of £10,000 per annum. A single-client sponsorship opportunity is still available for a proposed Copper Whole Industry Model (including feedback loops): price on application.

BME's 16-page monthly Copper Briefing Service is also available, price £1,850 per annum for a single user.

See also our website: www.bloomsburyminerals.com