Physical vs. Financial Markets

- **The Physical realities**
  Our recent analysis of global demand shows how we have underestimated some of its secular attributes; we introduce the impact of what we have termed the 'Next Billion' group of countries as a key, quantified component, which must be combined with more conventional BRIC analysis.

- **The Financial fears**
  US-centric growth worries have been compounded by financially-related fears such as sub-prime, liquidity and the carry trade. While we acknowledge the difficulty of quantifying these issues, particularly as they relate to commodities markets, we believe the risks that these elements represent may be over-estimated.

- **Strong momentum could fade into summer season**
  We envisage strong commodity price performance in Q2, with a high probability of upgrades in consensus commodity price estimates for industrial-related materials and energy. Tight markets in energy are likely to keep pricing resilient for the balance of the year, in our view, while industrial-related commodities could lose momentum into the summer period.

- **The return of passive money?**
  Finally, we expect that with further confidence in the health of the world economy, passive index money may become a more significant inflationary component over the balance of the year. Our preferred commodities include: Oil, thermal coal, copper, aluminium, platinum and potash.
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Summary and Investment Case

What a difference three months makes. In January, there were multiple factors putting pressure on commodity markets:

- End-of-year adjustments to index weightings
- Short-term inventory increases creating negative volatility
- US-centric financial worries; sub-prime, liquidity and the carry trade
- Funds building short positions as negative momentum built

We saw much of the correction in commodities markets as driven by short-term catalysts, with volatility augmented by fund activity reacting to these events. The broad-based recovery in commodity prices (agricultural being the noticeable laggard) has been largely a function of the resumption of the effects of an overall healthy global consumption environment. **Physical demand for commodities remains very strong outside the US.**

Chart 1: Benchmark performance from each major commodity subgroup rebased -1Yr

![Chart 1: Benchmark performance from each major commodity subgroup rebased](source)

We see little new data to change our view that longer-term prospects for commodity price levels are likely to remain positive. Nevertheless, we are cognisant of the seasonal aspects to some markets; is there validity to the ‘sell in May and go away’ mantra? While we believe that there is a high probability that the appreciation witnessed over the past three months is likely to decelerate meaningfully over the next quarter **there are growing risks that some key benchmark commodities (oil, copper and gold particularly) could continue to strengthen as supply fundamentals squeeze markets in the context of a weak US dollar and inflationary concerns which could drive new investment flows, directly and via index products, into the asset class.**
Demand – The ‘Next Billion’

Our past research has developed the thesis that the world is becoming more materials-intensive in its growth, mainly due to the rising influence of the materials-intensive economy of China. We have also projected that rising materials consumption of other so-called BRIC countries (Brazil, Russia, India and China) are similarly adding to materials use per capita with rising GDP.

Our analysis suggests that there is yet another block of countries, often casually included in the ‘Other’ or ‘Rest of World’ line in traditional supply-demand analysis, that in fact could be resulting in even further underestimation of materials demand growth. We believe that this group of countries, which we have collected under the label of the ‘Next Billion’ may in fact be more influential on materials demand growth than the combined demand of India, Russia and Brazil. The countries that comprise the Next Billion are an aggregate of oil-rich economies and the dynamic economies of developing ASEAN, Eastern Europe, Latam, Africa and Turkey, whose populations comprise more than one billion people. The commodity-rich economies have seen a significant wealth transfer in recent years that has been preferentially directed to infrastructure development, which, in turn, has stimulated above-average consumption in steel and other materials.

Because of their size and a lack of readily available statistics, the countries of the Next Billion have tended to be overlooked in most modelling of materials demand, including our own. Prior to this analysis, the Next Billion was subsumed into the RoW category, a grouping that received only a cursory estimate. For instance, in our steel model we had RoW steel consumption growing at 5% average from 2002 to 2006; our more detailed analysis of the Next Billion countries, (which make up 70% of the RoW) shows in fact they were 30% stronger than that, with an average steel demand growth of 8% per year over that period.

The key takeaway from this analysis is that the market is still likely underestimating the magnitude of materials intensity in the global economy, and overestimating the impact of US-driven cyclicality. A further, detailed analysis of the Next Billion is in the Analyst Guide section of this document.

Supply – controlling action by producer nations

There has been considerable activity by various supplier nations over the past four-five months suggesting that the intrinsic value of domestic raw materials and resources is being re-thought and re-valued. This is a rather new element to the supply-side dynamic (as differentiated from political risk), and has the potential to meaningfully tighten particular markets. The manner in which this is being expressed is for government agencies to apply export duties or quotas to specific materials or a wide range of products. China imposed higher duties (or removed rebates) on a wide range of commodities in December; interestingly, a number of other countries have followed suit, moving to encourage the domestic usage of valuable resources. The following table outlines a select overview of recently impacted markets.
We see the potential for other countries to move in the same direction. There have been some indications from Indonesia, for example, that exports of bauxite and nickel ores may face restrictions or export hurdles going forward.

We have materially adjusted our market balance forecasts over the past quarter to account for the impact of this phenomenon on many of these markets, in particular: Iron ore, Thermal coal, Aluminium and Molybdenum.

**Fund money – to return?**

With positive momentum returning to commodities markets after several quarters, we believe that pressure on fund managers to allocate capital to this asset class could grow. This is not only a function of its compelling secular characteristics, but also a reflection of return expectations for competing asset classes. Investors are asking questions such as: Does inflation remain a threat? Will the US dollar continue to weaken? What impact does globalisation have on corporate profitability? What are the implications of a lack of corporate spending? The answers to these questions will dictate how investors revise their views on competing asset classes such as equities, fixed income, real estate, etc.

In the current investment environment we believe that fund managers will likely continue to look to commodities as a compelling alternative.

**Commodity-linked proliferation**

Finally, we point to the proliferation of various commodity-linked products and vehicles which allow investors easier and more efficient ways to take increasingly sophisticated views in commodity markets. Examples include:

- UBS Bloomberg Constant Maturity Commodity Index: A next-generation index allowing access to multiple tenors in a constant-maturity framework.

- Sprott Molybdenum Participation Corp: An exchange-traded fund (ETF) vehicle allowing investors access to molybdenum equities and physical molybdenum.

- Platinum/Palladium ETF: Two are planned – one for London, one for Zurich.

- NYMEX UxC Uranium futures contract: To begin trading 7 May.
Asset allocation
Chart 2: Commodity asset allocation weighting by sub-index

With the exception of platinum, where we believe there is a good chance that the launch of the ETFs will trigger short-term gains, we would not add to any long precious metals positions, but would rather look to rein in risk.

We like zinc from a fundamental and positioning perspective, and recommend buying longer-dated aluminium. We would take profits on long copper and nickel positions.

Forecasts: UBS vs. Consensus

UBS generally maintains a positive stance with respect to commodities.

- Commodities where we are differentiated from the market and have highest conviction would include: Thermal coal, aluminium, copper and platinum.

- We would also highlight that we see upside risks for price forecasts for oil.

Table 2: UBS estimates vs. consensus for selected commodities (2007E)

<table>
<thead>
<tr>
<th>Commodity</th>
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<th>Consensus</th>
<th>UBS vs.</th>
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<td>US$/bbl 61</td>
<td>61</td>
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<tr>
<td>US nat gas</td>
<td>US$/MMBtu 7.0</td>
<td>7.9</td>
<td>-11%</td>
</tr>
<tr>
<td>Thermal coal (contract)</td>
<td>US$/t 58</td>
<td>50</td>
<td>16%</td>
</tr>
<tr>
<td>Aluminium</td>
<td>USc/lb. 130</td>
<td>117</td>
<td>11%</td>
</tr>
<tr>
<td>Copper</td>
<td>USc/lb. 300</td>
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<td>11%</td>
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<tr>
<td>Nickel</td>
<td>USc/lb. 1744</td>
<td>1330</td>
<td>31%</td>
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<td>Zinc</td>
<td>USc/lb. 155</td>
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<td>US$/oz 700</td>
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<td>Silver</td>
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<td>1,166</td>
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<td>Iron Ore (contract)</td>
<td>USc/LTU 113</td>
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Source: Bloomberg, UBS estimates
## Table 3: Summary commodity forecasts

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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Com</td>
<td>US$/bushel</td>
<td>3.12</td>
<td>2.25</td>
<td>2.32</td>
<td>2.42</td>
<td>2.06</td>
<td>1.99</td>
<td>3.20</td>
<td>3.30</td>
<td>NA</td>
</tr>
<tr>
<td>Sugar</td>
<td>US$/c/b.</td>
<td>12.24</td>
<td>9.36</td>
<td>7.49</td>
<td>8.64</td>
<td>11.37</td>
<td>15.50</td>
<td>11.00</td>
<td>9.50</td>
<td>NA</td>
</tr>
<tr>
<td>Phosphate (DAP contract)</td>
<td>US$/t</td>
<td>216</td>
<td>216</td>
<td>178</td>
<td>222</td>
<td>247</td>
<td>260</td>
<td>450</td>
<td>380</td>
<td>350</td>
</tr>
<tr>
<td>Potash</td>
<td>US$/t</td>
<td>175</td>
<td>175</td>
<td>87</td>
<td>102</td>
<td>141</td>
<td>174</td>
<td>180</td>
<td>200</td>
<td>210</td>
</tr>
</tbody>
</table>

Source: UBS estimates
After a weak start to the quarter commodity prices, especially in industrial metals and energy, have rallied significantly. On a 12-month view, materials and energy equities continue to outperform the underlying commodity index with most of the outperformance coming after September 2006.

As the charts below show energy has been a relative laggard over the last year, only starting to outperform agriculture and precious metals (although still underperforming industrial metals) in the first quarter of this year. This contrasts with the longer term view where political risks, rising marginal costs and supply constraints have resulted in a considerable outperformance of energy over the past decade. We expect energy values to remain strong for the balance of 2007. Industrial metals are likely to remain strong although performance could decelerate going into the summer slow-down (a seasonally weak period).
The charts below show the return augmentation/erosion which impacts commodity index returns, a function of the shape of the forward curve. In markets characterised by contango (long-dated contracts are higher in value than near-dated) negative roll yield (sometimes significant as in the oil market) is experienced which reduces actual returns. In markets characterised by backwardation (long-dated contracts are lower in value than near-dated) positive roll yield (sometimes significant as in nickel markets) is experienced which augments actual returns.

The effects of roll-yield can be viewed in the charts below. Both the energy and agricultural sub-sectors, where contango curves have on the whole predominated over the past year, continue to show erosion in returns. This contrasts with the industrial metals sub-group where backwardation has in fact augmented returns to investors.

Chart 7: UBS CMCI Energy (Horizon) – Excess vs. spot

Chart 8: CMCI Ind. Metals (Horizon) – Excess vs. spot

Chart 9: UBS CMCI Prec. Metals (Horizon) – Excess vs. spot

Chart 10: UBS CMCI – Agricultural (Horizon) – Excess vs. spot

Source: Bloomberg, UBS
Relative index performance

The charts below outline show the performance pattern from key selected commodity indices. We have included the recently introduced UBS Bloomberg Constant Maturity Commodity Index (CMCI) given the unique investment qualities that this particular index offers investors apart from that offered by more conventional products.

Both charts show out-performance by the CMCI. We note that the more diversified indices (DJ AIG, RICI and CMCI) have performed reasonably well on a 12-month horizon; the large energy component in the GSCI has resulted in meaningful underperformance. As discussed previously, a key component of investor returns is the effect of the roll yield. The higher maturity (tenor) of the CMCI index allows investors to mitigate the effects of negative roll yield (particularly noticeable in the oil market) thus the out-performance of this index.

On a year-to-date basis, performance between indices has been more aligned. In fact the GSCI has performed quite well. We expect that this is a function of the strong performance of the energy sub-group over this time frame, and more importantly strong performance of near-dated oil futures.

Chart 11: Key Composite Commodity Indices (-12m)  Chart 12: Key Composite Commodity Indices (YTD)

Going forward:

- **Near-term** we expect that oil markets and industrial metals are likely to remain tight; the consequence being that performance of the near-end of futures curves may exceed that of longer-dated contracts effectively offsetting the difference in roll yield. This would tend to align performance between indices over the next quarter in our view; we would expect that differentiation in performance may effectively come through from agriculture, where longer-dated contracts may in fact outperform.

- **Longer-term** we expect that diversification in commodity exposure (balance between energy, metals, agriculture, etc.) and in tenor (balance along the futures curve) is likely to result in out-performance. Furthermore this performance is likely to also be associated with lower volatility.
Investment flows

There is an additional potential source of diversification flows into commodities which has not, we believe, played a substantial role to date and that is from central banks – or more broadly the official sector. Between 2001 and 2007 global central bank foreign exchange reserves more than doubled from US$2trn in 2001 to over US$5trn and this embarrassment of riches is prompting action by central banks, many of which have considerably greater reserves than are needed to cover trade flows or external liabilities.

Governments in Asia have started to allocate some of their excess reserves away from central bank reserve managers to newly formed independent asset managers. The long standing models are Singapore's Government Investment Corporation (GIC) and the Abu Dhabi Investment Authority.

More recently Korea has set up the Korean Investment Corporation (KIC) to start managing some of the Bank of Korea's reserves although the KIC is relatively small at the moment. But China is planning to set up a separate investment authority as well: with about US$1.2 trillion dollars in reserves this move is likely to be substantial. Other media reports – later denied – have suggested that Japan is considering a similar move to boost returns on its US$909bn foreign exchange reserves. The Financial Times story that suggested Japan might make such a move also suggested that the investment guidelines of the US$1.3 trillion state pension fund might change to reduce its concentration on Japanese government bonds. At the moment, the state pension fund is unable to invest in alternative assets (i.e. commodities, hedge funds, etc).

Governments may aim to increase the returns from their foreign reserves while increasing the range of assets that can be invested in, either through the use of in-house portfolio or external managers. If portfolio managers are granted wide mandates then commodities may form part of these investments – either through passive (or active) commodity index products, or through equity or strategic stakes in resource companies.
UBS Bloomberg Constant Maturity Commodity Index

*** LAUNCHED 29 January 2007 ***

- 28 commodities
- Weighting: ¼ Inflation (CPI/PPI), ¼ global consumption value, ½ liquidity weighted
- Monthly rebalancing
- No predefined sector caps/limits
- No minimum weighting

Chart 13: UBS Bloomberg CMCI

Source: UBS

Table 4: UBS Bloomberg CMCI – performance review (excess return)

<table>
<thead>
<tr>
<th>UBS CMCI Index</th>
<th>Q1 return</th>
<th>YTD</th>
<th>last 5 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMCI Composite Index</td>
<td>9.1%</td>
<td>9.0%</td>
<td>185.2%</td>
</tr>
<tr>
<td>CMCI Energy Index</td>
<td>16.7%</td>
<td>11.1%</td>
<td>179.8%</td>
</tr>
<tr>
<td>CMCI Ind. Metals Index</td>
<td>9.0%</td>
<td>17.5%</td>
<td>261.8%</td>
</tr>
<tr>
<td>CMCI Prec. Metals Index</td>
<td>6.0%</td>
<td>10.0%</td>
<td>148.5%</td>
</tr>
<tr>
<td>CMCI Agricultural Index</td>
<td>0.8%</td>
<td>0.1%</td>
<td>85.6%</td>
</tr>
<tr>
<td>CMCI Livestock Index</td>
<td>6.4%</td>
<td>5.3%</td>
<td>54.2%</td>
</tr>
</tbody>
</table>

Source: Bloomberg, UBS
Goldman Sachs Commodity Index

- 1991 inception (backfilled to 1970)
- 24 commodities
- Supply focus: 100% production weighted
- Annual rebalancing
- No predefined sector caps/limits; large $\frac{2}{3}$ energy exposure
- No minimum weighting

Chart 14: Goldman Sachs Commodity Index

Source: Goldman Sachs, UBS

Table 5: Goldman Sachs Commodity Index – performance review (excess return)

<table>
<thead>
<tr>
<th>Goldman Sachs Commodity Index</th>
<th>Q1 return</th>
<th>YTD</th>
<th>last 5 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>GS Composite Index</td>
<td>8.0%</td>
<td>7.4%</td>
<td>82.8%</td>
</tr>
<tr>
<td>GS Energy Index</td>
<td>10.5%</td>
<td>8.0%</td>
<td>95.1%</td>
</tr>
<tr>
<td>GS Ind Metals Index</td>
<td>10.3%</td>
<td>21.7%</td>
<td>295.6%</td>
</tr>
<tr>
<td>GS Prec Metals Index</td>
<td>4.3%</td>
<td>8.3%</td>
<td>120.9%</td>
</tr>
<tr>
<td>GS Agricultural Index</td>
<td>-5.0%</td>
<td>-5.5%</td>
<td>2.7%</td>
</tr>
<tr>
<td>GS Livestock Index</td>
<td>3.8%</td>
<td>3.4%</td>
<td>24.9%</td>
</tr>
<tr>
<td>GS Grains Index</td>
<td>-3.4%</td>
<td>-2.3%</td>
<td>6.2%</td>
</tr>
<tr>
<td>GS NonEnergy Index</td>
<td>2.3%</td>
<td>6.2%</td>
<td>67.1%</td>
</tr>
<tr>
<td>GS Reduced Energy Index</td>
<td>6.6%</td>
<td>7.1%</td>
<td>NA</td>
</tr>
<tr>
<td>GS Light Energy Index</td>
<td>5.2%</td>
<td>6.8%</td>
<td>73.2%</td>
</tr>
<tr>
<td>GS Ultra Light Energy Index</td>
<td>4.1%</td>
<td>6.6%</td>
<td>70.3%</td>
</tr>
<tr>
<td>GS Crude Oil Index</td>
<td>-3.4%</td>
<td>1.9%</td>
<td>140.3%</td>
</tr>
</tbody>
</table>

Source: Bloomberg, UBS
Dow Jones-AIG Commodity Index

- 1998 inception (backfilled to 1991)
- 19 commodities
- Liquidity focussed: ⅔ liquidity weight, ⅓ production weight
- Annual rebalancing
- Diversification rules limit exposure to a single commodity; maximum 15% to a single commodity, maximum 33% to a commodity sector
- 2% minimum allocation to any commodity

Chart 15: Dow Jones – AIG Commodity Index

![Chart showing the composition of the Dow Jones-AIG Commodity Index. Energy represents 33% of the index, Metals 28%, and Agriculture 39%.]

Source: DJ-AIG, UBS

Table 6: Dow Jones – AIG Commodity Index – performance review (excess return)

<table>
<thead>
<tr>
<th>Dow Jones - AIG Commodity Index</th>
<th>Q1 return</th>
<th>YTD</th>
<th>last 5 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>DJ-AIG Composite Index</td>
<td>6.7%</td>
<td>7.6%</td>
<td>96.5%</td>
</tr>
<tr>
<td>DJ-AIG Energy Index</td>
<td>13.8%</td>
<td>11.8%</td>
<td>53.4%</td>
</tr>
<tr>
<td>DJ-AIG Ind Metals Index</td>
<td>9.5%</td>
<td>20.6%</td>
<td>264.1%</td>
</tr>
<tr>
<td>DJ-AIG Prec Metals Index</td>
<td>4.5%</td>
<td>8.6%</td>
<td>101.9%</td>
</tr>
<tr>
<td>DJ-AIG Agricultural Index</td>
<td>-1.7%</td>
<td>-4.1%</td>
<td>11.4%</td>
</tr>
<tr>
<td>DJ-AIG Grain Index</td>
<td>0.6%</td>
<td>-0.9%</td>
<td>8.8%</td>
</tr>
<tr>
<td>DJ-AIG Livestock Index</td>
<td>3.3%</td>
<td>2.7%</td>
<td>1.0%</td>
</tr>
<tr>
<td>DJ-AIG Soft Index</td>
<td>-10.5%</td>
<td>-15.2%</td>
<td>-13.8%</td>
</tr>
<tr>
<td>DJ-AIG Grain Index</td>
<td>0.6%</td>
<td>-0.9%</td>
<td>8.8%</td>
</tr>
<tr>
<td>DJ-AIG Ex-Energy Index</td>
<td>2.8%</td>
<td>5.2%</td>
<td>71.0%</td>
</tr>
<tr>
<td>DJ-AIG Petroleum Index</td>
<td>11.5%</td>
<td>9.9%</td>
<td>142.6%</td>
</tr>
</tbody>
</table>

Source: Bloomberg, UBS
Rogers International Commodity Index

- 1998 inception
- 35 commodities
- Demand focus: 100% weighted by international trading volumes
- Monthly rebalancing
- No predefined sector caps/limits
- No minimum weighting

Chart 16: Rogers International Commodity Index

Source: Rogers International, UBS

Table 7: Rogers International Commodity Index – performance review (excess return):

<table>
<thead>
<tr>
<th>Rogers Int'l Commodity Index</th>
<th>Q1 return</th>
<th>YTD</th>
<th>last 5 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rogers Int'l Composite Index</td>
<td>5.3%</td>
<td>6.1%</td>
<td>136.6%</td>
</tr>
<tr>
<td>Rogers Energy Index</td>
<td>11.1%</td>
<td>10.1%</td>
<td>177.2%</td>
</tr>
<tr>
<td>Rogers Metals Index</td>
<td>7.1%</td>
<td>15.2%</td>
<td>255.7%</td>
</tr>
<tr>
<td>Rogers Ind Metals Index</td>
<td>7.6%</td>
<td>17.3%</td>
<td>321.4%</td>
</tr>
<tr>
<td>Rogers Prec Metals Index</td>
<td>5.8%</td>
<td>10.8%</td>
<td>151.3%</td>
</tr>
<tr>
<td>Rogers Agricultural Index</td>
<td>-3.1%</td>
<td>-4.3%</td>
<td>30.3%</td>
</tr>
<tr>
<td>Rogers Non-Energy Index</td>
<td>0.7%</td>
<td>2.8%</td>
<td>NA</td>
</tr>
</tbody>
</table>

Source: Bloomberg, UBS
Investors looking for exposure to commodities as an asset class are mostly limited to the futures markets, since the cash or physical market poses large delivery and storage costs. As a consequence, long-term commodities investors experience a ‘roll’, when expiring futures contracts are exchanged for further-dated ones, so physical delivery of the underlying commodity is avoided. Therefore, returns on a commodity investment have two main components:

- **Price return.** Driven by moves in the underlying prices of the commodity.

- **Roll return.** Driven by the shape, or slope, of the commodities futures curves.

Since roll returns can pose a significant offset to price returns, the percentage returns from commodities investments can often diverge from the percentage changes in physical commodities prices. It is the roll return we focus on in this article, looking at how big an impact roll return has been on total returns, and how some of the ‘roll’ impact can be mitigated.

Chart 17 shows the breakdown of commodity returns since 1998, using the UBS Bloomberg Constant Maturity Commodity Index (CMCI). Price return is the dominant component of returns, but ‘roll’ is not an insignificant factor, at times adding or detracting more than 5 percentage points to annual performance. Importantly, roll returns and price returns do not necessarily move in the same direction. Moreover, roll returns are not constant through time—Chart 18 illustrates how the roll return has largely been a negative factor for commodity investors in the last few years, having significantly added to returns 2003-2004.

**Behind roll returns**

For purposes of illustration, we begin with a generic example of positive and negative roll returns. A negative roll return effect is shown in Chart 19, for a futures curve in contango (positively sloped). The investor invests in the
contract at point (a) on the futures curve, and as the month passes the contract ‘rolls’ down the curve towards point (b) and nearer expiry. At point (b), just before expiry, the investor ‘rolls’ back up the curve (c), by selling the original contract and purchasing the next unexpired futures contract. Because of the upward sloping forward curve, the new contract will cost more than the current contract, meaning fewer contracts can be bought, and resulting in a negative return. Hence, a ‘negative roll’. The opposite is true for a futures curve in backwardation (negatively sloped), which has a positive roll return.

**Chart 19: Roll return**

The roll return depends on the shape of the futures curve.

How the shape of these curves can change over time and the effect of these changes on the returns can be better illustrated using specific examples.

**Oil’s not well**

Chart 20 shows that for most of the last decade there has been a positive roll return in the oil markets, augmenting physical commodity price returns. Alongside substantially higher oil prices, the backwardated (negatively sloped) futures curve provided significant roll returns from 1999-2004.

**Chart 20: CMCI 3 month Oil returns**

‘Roll’ has significantly impacted oil returns as the futures curve shifted into steep contango.

**Chart 21: The Oil futures curve**
This changed in 2005 when the oil futures market underwent a transformation from backwardation into steep contango (Chart 21). At this point, the roll yield became a significant negative factor for oil investors. In 2005, the negative effect of the roll yield seemed small in comparison to the oil price gain of over 40%. However, losses incurred by negative roll were clearly illustrated in 2006, when oil prices were unchanged but investors lost more than 10% in futures.

**Roll of copper**

Copper futures have experienced an opposite situation to that of oil markets. The futures curve shifted from contango in 2002, to backwardation by 2005 (Chart 23). The impact of such a significant change in the shape of the curve is borne out in the commodity’s returns—the roll return went from having a small negative impact on returns between 1998-2003, to being a significant contributor to total returns in the past few years (Chart 22).

**Gold watch**

Not all commodity futures curves have shifted so drastically in the past few years. Gold futures curves have been persistently in contango (Chart 25) during the last decade.
The contango has caused a consistent negative roll return for gold investors (Chart 24). Yet, physical gold prices have risen so dramatically in the past few years that the negative roll returns appear small in comparison.

**What determines positive or negative roll?**

Since roll returns can be significant, the important question remains: What causes commodity futures curves to shift and invert? Available explanations are not wholly satisfactory and difficult to ascertain exactly. Traditionally, the shape of a commodities futures curve reflects the premium (or discount) which buyers ascribe to future consumption of that commodity, versus consumption today. A higher premium is set when investors anticipate increased future demand (and/or less supply), leading to an upward sloping curve (contango). Thus, the forward curve may simply be a reflection of investor views of future market balances.

Yet, increasing interest in commodities as an asset class, leading to record fund inflows, has muddied the waters. Other technicalities now need to be considered too. Among them, varying liquidities of futures contracts have probably resulted in a liquidly premium. Liquidity can vary greatly along the futures curve of each commodity, distorting the shape of the curve. Another related factor is the large bearing which commodity indexes, a preferred instrument for investors, now plays in creating demand especially for the front-month contracts.

Whichever of these factors is largely responsible for the shape forward curves, and in turn the roll return, predicting how these curves may shift in the future is very difficult. One solution is to lessen the role of roll returns—positive or negative—so that the returns of commodity investments are more closely aligned to underlying commodity prices.

**Constant maturity commodity indexes**

The UBS Bloomberg CMCI mitigates a significant portion of roll returns, particularly when compared to other popular commodity indexes like the Goldman Sachs Commodity Index (GSCI).

This roll mitigation is achieved, in the first instance, by ‘rolling’ futures contracts daily, rather than monthly; and second, by having a more evenly-
weighted basket of commodities. The effects can be seen in Chart 26, which shows that CMCI roll returns are indeed dampened relative to the GSCI.

One of the reasons for the GSCI’s wider range of roll returns is its heavy weighting (around 70%) towards energy commodities compared to the CMCI’s 33%. Indeed, without the energy sector, roll returns are drastically reduced (Chart 27).

**Conclusions**

- Commodity returns have two main components, a price return driven by the underlying price of the commodities and a roll return which is driven by the shape of the commodity futures curve. Price returns tend to dominate but roll return is not an insignificant component.

- This roll return can be a positive or negative driver of returns depending on whether the commodity futures curves are upward (contango) or downward sloping (backwardation).

- The shape of commodity futures curves is increasingly difficult to explain due to distortions in the market attributed to the commodity indices heavily trading the front month contracts. Investors may be better off trying to mitigate the roll return and in the process more closely align their returns to the underlying price movements of the commodity.

- The UBS Bloomberg Constant Maturity Commodity Index is one such instrument that reduces the roll return by rolling contracts daily rather than just once a month.
**Analyst Guide**

The following constitutes a summary of the 27th April, Q-Series report *Next Billion & Basic Materials*, by Peter Hickson.

Our past research has developed the thesis that the world is becoming more materials intensive in its growth, mainly due to the rising influence of materials intensive economy of China. We have also projected that rising materials consumption of other so-called BRIC countries (Brazil, Russia, India and China) are similarly adding to materials use per capita with rising GDP.

The chart below illustrates the argument in the case of steel. In the 1960s the amount steel per unit of global GDP was 30% higher than the levels experienced in the 1990s. Since 2000 the intensity of use of materials has risen 15% to 2006. Our projections suggest that intensity of use of steel per unit of global GDP will continue to rise to a level that will eclipse the materials intensity of the 1960s.

*Chart 28: Steel intensity of use per unit of global GDP*

We suggest that there is yet another block of countries, often casually included in the ‘Other’ or ‘Rest of World’ line in traditional supply-demand analysis that in fact could be resulting in even further underestimation of materials demand growth. We believe that this group of countries we have collected under the label of the Next Billion may in fact be more influential on materials demand growth than the aggregate demand of India, Russia and Brazil. The countries that comprise the Next Billion are an aggregate of oil rich economies and the dynamic economies of developing ASEAN, Eastern Europe, LATAM, Africa and Turkey whose populations comprise more than one billion people. The materials consumption growth of the Next Billion appears to be driven by easy global liquidity as well as by the dramatic rise in commodity prices. The commodity rich economies have seen a significant wealth transfer in recent years that has been preferentially directed to infrastructure development that in turn has stimulated above average steel and other materials consumption.
Because of their size and lack of readily available statistics the countries of the Next Billion have tended to be overlooked in most modelling of materials demand, including our own. Prior to this analysis the Next Billion was subsumed into the RoW category that was given a cursory estimate. For instance in our steel model we had RoW steel consumption growing at 5% average from 2002 to 2006; our more detailed analysis of the Next Billion, that made up 70% of the RoW, shows in fact they were 30% stronger than that with an average steel demand growth of 8% per year over that period.

The following charts illustrate the analysis of consumption per capita versus GDP per capita for some of the key materials, steel, cement, oil and paper. These charts compare the performance of the Next Billion to key marker economies, the Japanese experience from 1952 to 1972, Korea from 1970 to 1990 and China from 1990 to 2007E. The Next Billion is quoted from 2000 to 2009E with indicative arrows to 2012E growth. These charts illustrate the differing consumption profile across materials and highlight the construction-led nature of growth and the differential support for steel and cement.

Source: IISI, Chinese Customs, IMF, UBS

Source: USGS, Chinese Customs, IMF, UN, UBS estimates

Source: BP Statistical Review, Chinese Customs, IMF, UN, UBS estimates

Source: RISI, FAO, Chinese Customs, IMF, UN, UBS estimates
All of the GDP data except for China was quoted in real terms, China quoted in PPP terms because GDP on PPP tended to explain better China’s steel and cement consumption, it is less useful for oil and paper.

The anomalous oil consumption patterns in the Next Billion reflect both the subsidised nature of oil pricing in oil producing countries and the relative strength of its oil processing industries. The strength in paper consumption trends confirms the broader impact that the Next Billion could have on materials.

Table 8: Material consumption projections (mt and %) for +5 and +15 years from 07E

<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Next Billion</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steel</td>
<td>111</td>
<td>168</td>
<td>264</td>
<td>591</td>
<td>9%</td>
<td>11%</td>
<td>8%</td>
</tr>
<tr>
<td>Cement</td>
<td>269</td>
<td>354</td>
<td>430</td>
<td>579</td>
<td>6%</td>
<td>4%</td>
<td>3%</td>
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<tr>
<td>Copper</td>
<td>2.0</td>
<td>2.5</td>
<td>3.7</td>
<td>6.6</td>
<td>5%</td>
<td>8%</td>
<td>6%</td>
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<tr>
<td>Aluminium</td>
<td>2.0</td>
<td>3.3</td>
<td>5.1</td>
<td>8.2</td>
<td>11%</td>
<td>9%</td>
<td>5%</td>
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<tr>
<td>Crude Oil</td>
<td>550</td>
<td>655</td>
<td>759</td>
<td>925</td>
<td>4%</td>
<td>3%</td>
<td>2%</td>
</tr>
<tr>
<td>Paper &amp; Board</td>
<td>47</td>
<td>64</td>
<td>80</td>
<td>126</td>
<td>6%</td>
<td>5%</td>
<td>5%</td>
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<td><strong>China</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Steel</td>
<td>186</td>
<td>440</td>
<td>647</td>
<td>957</td>
<td>19%</td>
<td>8%</td>
<td>4%</td>
</tr>
<tr>
<td>Cement</td>
<td>719</td>
<td>1115</td>
<td>1356</td>
<td>1823</td>
<td>9%</td>
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<tr>
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<td>Copper</td>
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<td>441</td>
<td>576</td>
<td>3%</td>
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Source: UBS

Projecting growth rates in line with the above trends out to 2012E and to 2022E highlights the significant potential of the Next Billion in terms of global consumption of materials. The table also illustrates the combined effect of BRIC and the Next Billion on total world consumption.
Chart 33 and Chart 34 show the relative consumption share projected for the Next Billion and the combined impact of BRIC and the Next Billion. While on average the Next Billion moves from 13% share in 2002 to 20% in 2022E, the combined impact of BRIC and the Next Billion moves from 40% to near 70% over the same period, based on our current estimates.

This is a dramatic growth profile indeed and one which suggests to us that global materials consumption continues to be underestimated by the broader market. Yet looking towards the longer term horizon this growth profile raises the key question: Will all this be possible given the emerging constraints of natural resource base and environmental conditions, including carbon emissions and water constraints?

The combined impact of BRIC and the Next Billion has significant repercussions for future materials demand

Risks however include environmental limitations such as water and emissions issues
Trader Guide

Technical outlook

Summary
The broad up-trend in commodities is expected to continue over the coming months. Crude oil is poised to clear the 68.00 level for extended gains beyond the 70-handle, while base metals also remain constructive, despite some signs of waning upside momentum in the near-term. Elsewhere, precious metals are likely to retain their lustre, with silver and platinum expected to out-perform gold, which is entrenched in a broad 543.50 – 730.25 range and likely to be increasingly vulnerable as it heads into the upper extremes of that range.

Energy: WTI Oil

Crude oil remains in a long-term bull trend, with the decline from 78.40 to 49.90 most likely a correction. It stopped almost precisely at the intersection point of the bull channel’s bottom boundary, a support that must continue to hold to keep the trend intact. Rising weekly momentum indicators suggest that the bull trend has already resumed. A sustained move above resistance in the 67 to 68 region would clear the way for a run at the 78.40 trend high.

Chart 35: Crude oil (WTI)

Source: Trademade Workstation

Industrial metals:

Aluminium

Weekly momentum in aluminium has been neutral since June of last year, but the up-trend pattern of higher lows and higher highs remains intact, and we expect extended gains beyond 2,966, the 61.8% retracement of the 3,315 to 2,405 decline en route to 3,099, the 76.4% retracement and ultimately a re-test of 3,315, trend high from May 2006. Weakness below 2,660 would be necessary to threaten our bullish view targeting new highs, but only a loss of 2,550 would undermine it.

Analysts:
Jason Perl
Taso Anastasiou
James Chorek
Tow Keong Su
+44 207 567 2447

Long-term uptrend intact - looking for a rise above 68 and a test of 78.40 trend high
Copper

Copper remains in a long-term bull trend, as the May, with the February correction holding above trend-line support in the 5,000 region. This correction and support better maintain the broader trend, which will likely see an eventual new trend high above the May 8,800 extreme. Momentum conditions have turned healthy again, recently bottoming in negative territory and with plenty of upside potential. A rising long-term moving average keeps the wind at the bull trend’s back.

Nickel

Nickel is firmly entrenched within the multi-months bull trend and the underlying momentum remains strong for further gains ahead, in our view. The recent pullback from 50,350, April 10 trend high is perceived as corrective as long as 44,700 April 2 corrective low stays intact. Bullish moving averages
suggest an imminent return towards 50,350 ahead of further gains to 52,000. Beyond there, should set up further gains towards 54,832, representing equality of 41,268 to 50,350, projected from 45,750.

**Chart 38: Nickel (LME)**

Zinc

Zinc is testing the 3,778.80, 50% of 4,585 to 2,972.5. A clear break of this level would expose the 61.8% level at 3,969. Weekly momentum conditions continue to provide a bearish backdrop however which suggests gains are unsustainable. Furthermore, a threatening head and shoulders reversal pattern appears to be developing – a break below the neckline at 3,031 would confirm the pattern and a reversal. 3,969 is key resistance, key support is 2,972.50, February 2007 low.

**Chart 39: Zinc (LME)**
Precious metals

Gold

Gold has established a broad range with the parameters at 730.25, May 8 2006 high and 543.50, June 12, 2006 low. The immediate focus is on a move beyond 700.00 towards the range high however with momentum still in overbought territory, 730.25 is likely to remain intact and a broad range to continue to dominate over the next few months. We would expect gold to become a better medium-term sell as it approaches 730.

Chart 40: Gold bullion

Entrenched in a broad $543.50 - 730.25$ range

Silver

Upside momentum has been far from stellar since June of last year, but the bullish pattern of higher lows and higher highs remains intact. Furthermore, silver is holding trend-line support originating from August 2005 and has dense Ichimoku support relative to price over the coming months. For choice, we favour further upside beyond trend-line resistance stemming from early May, which should pave the way for a fresh assault on May’s 15.240 multi-year trend high. Support cuts in at 13.070 ahead of 12.420, but a loss of 12.078 would be necessary to undermine the multi-week advance from the August 2005 low.
Platinum

Platinum is set to head higher in the medium term on the back of its multi-year bull trend, in our view. Buoyed by rising MACD, the immediate focus is on a sustained move beyond the 76.4% Fibonacci retracement level at 1,330.30. Underpinned by its rising moving average, expect further up-move towards November 21’s, 2006 high at 1,402.5 which may cap its advance for the time being. Support is located at 1,233.0, April 2 low, but only a loss of 1,161, March 5 low would undermine the broad up-trend.
Catalysts and near-term trading view

Precious metals

After the weakness seen in precious metals in early January, the first four months of 2007 proved to be a good time to be long precious metals. At the time of writing, all five precious metals are at, or approaching the highs of the quarter as a combination of specific metals market factors and external drivers have combined to lift precious metals prices higher. Returning speculative and investment demand lifted metal prices as oil and the broader commodity complex posted a strong performance. Metal prices were also supported by strong consumer demand in the case of gold, platinum, rhodium and silver. But metal prices did see a period of substantial corrections, when concerns about US sub-prime lending triggered de-leveraging across a wide range of assets and precious metals did not escape unscathed. But as quickly as sub-prime fears had become the only topic of conversation, signs that the US banking system would weather the difficulties saw the subject disappear from investors radar screens and markets recovered strongly over the past six weeks.

Consumer demand for gold remained an important theme this year. Although gold has traded higher over the past few months, strong Indian jewellery demand – and reasonable buying from other important gold consuming centres – has been seen when gold has traded towards the lower end of the then current range. Although in itself physical demand is not sufficiently large to stand in the way of heavy speculative selling, it is an important signal to investors and speculators. One of the simple rules of the past two years in the gold market has been to invest in gold when physical demand is strong and investors appear to have learnt that lesson well. The other factor that has helped gold sentiment is a growing realisation that central banks are selling less gold on a net basis – with less selling and more evidence of buying. Two central banks – Russia and Qatar have disclosed that they have bought small quantities of gold and this too is helping sentiment towards precious metals.

Platinum remained an exciting metal over the past few months, with the move higher accelerating towards the end of April following news that two platinum exchange traded funds (ETFs) will be launched in the next few weeks, one in Switzerland and one in London. At least part of the reason for the spike in platinum in November 2006 was on speculation of a Platinum ETF: now we have had news that two will shortly be upon the market. Two palladium ETFs will also be launched and although we are less impressed with palladium’s fundamentals there is a good chance that investment demand will drive palladium higher.

Current environment

In contrast to what we wrote in the January edition of Commodity Connections, speculative positioning is far from absent the precious metals. Futures market investors and speculators have rebuilt their long positions near to the level that they held at the end of February – and in the case of platinum and especially palladium now have MUCH larger net long positions that have been seen recently. ETF investors in gold and silver have also added to their positions,
although the ‘buy and hold’ nature of these investors makes their holdings less threatening from a positioning perspective.

But we do not believe that over the counter investors (OTC) have large positions based on conversations with hedge funds and private investors in Europe and North America. This view is partly confirmed by London Bullion Market Association (LBMA) clearing statistics, our only measure of OTC activity in gold and silver (and a very imprecise one at that). OTC investors, largely very well disposed towards precious metals are lightly invested and looking for a correction to add to positions. Their failure to do so during the recent corrections may mean that any dips in gold down towards $630-640 may prove short lived.

In addition to the ETF news on platinum and palladium, supply issues continue to hit the availability of platinum and rhodium: although Lonmin’s smelter issues and Norilsk’s licence problems are both temporary, we are unsure when normal supply will be resumed.

**Outlook**

While we continue to like precious metals, following the last few months’ strong performance we now like them less than we did when we wrote the January edition of Commodity Connections.

**With the exception of platinum,** where we believe there is a good chance that the launch of the ETFs will see further short term gains, we would not add to any long precious metals positions and would rather look to rein in risk. But if we saw a correction that took gold down to $630-640/oz with much smaller speculative positions and strong physical demand we would very probably recommend adding to precious metals long positions.

Precious metals interest rate trades may be a safer way of playing the metals at the moment. Platinum interest rates have moved higher a percent or two but we have yet to see a repeat of the sharp tightening we saw in November. At that time one month platinum deposit rates traded to a high of about 90% per annum. We do not expect such a tightening in the near term, but we do expect rates to tighten in anticipation of – and following the launch of – the two platinum ETFs.

**Consider borrowing platinum in tenors of three months or more.**

Silver interest rates remain relatively low despite the increases in investment in the ETF. We continue to expect the ETF to cause a physical tightening in the silver market at some point in 2007 and this makes us think that **12-24m silver looks attractive to borrow.** We do not recommend buying silver due to the risk of a sharp correction.

**Investors who want to add to gold positions could consider selling put options or put spreads.** This is a less risky way of taking advantage of a positive view on gold, although investors should be prepared to buy gold on dips as their short puts may be exercised if the price dips sharply.
Base Metals

Review

The base metals complex performed impressively over the past four months with a combination of specific metals market factors and external drivers accounting for the differing gains. Nickel headed the rankings with a gain of 47% followed by copper with 23%, and then lead and tin, each rising by 20%. Both aluminium and zinc proved to be laggards though, increasing by only 2% and falling by 10% respectively. Supply-side factors were the common denominator for each metal against a background of healthy demand growth. Nickel, lead and tin soared to fresh highs on concerns over supply, which in the case of nickel reached chronic levels amid almost a dearth of stocks in LME warehouses. Supply concerns also buoyed copper most recently. By contrast, aluminium supply was more than adequate while zinc was undermined by strong increases in Chinese production reflected in high metal exports, although these concerns have receded somewhat. Copper fell to a low of nearly US$5,300/t (USc240/lb) in early February but traded at a recent high of US$8,100/t (USc367/lb), a rise of over 50%. Copper’s blistering rally being attributed to declining visible inventories and recovering Chinese demand, with substantial short covering fuelling gains.

Base metals started 2007 under pressure on concerns about slowing global growth particularly in the US and weakness in the important housing sector dragged copper, zinc and to a lesser extent, aluminium, lower. Consumer destocking saw exchange inventories increase which pressured prices further as speculative players went short; zinc additionally coming under selling pressure from the re-weighting/re-balancing of the DJ-AIG Commodity Index. The other metals were immune to the headwinds of slower US growth as any concerns of weaker demand growth were more than offset by critically low stocks (nickel) and actual supply disruptions affecting lead and tin. Ahead of the onset of the peak demand season in Q2-07 the omens looked good: rising physical premiums pointed to a pick up in demand, stocks were mostly low and falling, while constraints on supply remained very much to the fore. The resurgence in copper prices taking them close to their all-time highs confirmed that sentiment had turned bullish.

With copper and zinc out of favour early in the year focus switched to the rest of the base metals complex. Speculative players turned their attention to nickel, lead and tin attracted by their tighter supply/demand fundamentals, notably low and falling stocks plus the potential for production shortfalls. With the peak demand season yet to get underway consumer restocking and widening nearby backwardations would underpin price strength leading to new all-time highs. Even aluminium, a market widely acknowledged not to be as tight as the other base metals and where stocks were rising, also rallied in sympathy as dominant positions in futures and options held by speculative players discouraged selling.

Current environment

Constraints on supply remain very much in place and with supply/demand fundamentals already very tight, supply disruptions actual and perceived, feed straight through to prices. This has certainly been the case for both the lead and
tin markets. Lead production has been affected by problems at mines in Australia; the Northfleet refinery in the UK has declared force majeure on deliveries of refined metal and shipments from the Magellan mine have been temporarily suspended. The tin market remains seriously under-supplied as independent smelters in Indonesia remain suspended although some have received an export permit. Finally, supply disruptions and threats have underpinned copper prices; production and shipments had been affected in Zambia and Argentina due to flooding while labour unrest has resurfaced at mines in South America and at Grasberg in Indonesia.

Positioning has changed substantially during the quarter. We wrote in the January edition of Commodity Connections that copper was most vulnerable to a short covering rally and this has occurred. We no longer believe there is a large net speculative short in the copper market. COTR data on the COMEX copper market showed that over half of the net speculative short position, which totalled 304kt at the end of December, had been covered. We believe, however, that there are large short positions in zinc and that the full extent of the zinc short covering rally has yet to be seen. In aluminium we believe that futures positioning is relatively neutral although there is large open interest for upside LME June options which could precipitate a quick move higher closer to that expiry (June 6th).

**Outlook**

Although we expect base metals to post a good performance in 2007 as supply and demand fundamentals remain supportive, base metals have already rallied strongly and some caution is now warranted, we believe. Furthermore, the slow summer months lie ahead which usually heralds lower prices but still strong supply and demand fundamentals, notably low stocks, should see the downside restricted. With these thoughts in mind we offer the following recommendations:

- If you followed our recommendation to buy **copper** at $5,200/t then you should probably take profits. We are happy to recommend buying copper after a correction and see value in the range $6,000-7,000/t.

- The supply/demand fundamentals of zinc are strong and short positions are known to exist. We are comfortable recommending **long positions in zinc**.

- Aluminium remains our favoured pick over the medium and long-term. It’s the only metal where forward prices are trading near their long-term incentive price and investors should consider **buying long-dated aluminium**.

- As far as **nickel** is concerned, we wrote in the January edition of Commodity Connections that we believe there is better value down the curve and recommend buying long-dated nickel. It’s hard to trade the front-end outright as we believe that it’s far too risky to buy or to sell and we no longer believe that think nickel offers value anywhere along the curve.
Commodity Connections - Q2 07    30 April 2007

Chart 49: LME aluminium forward curve

Source: Bloomberg

Chart 50: LME lead forward curve

Source: Bloomberg

Chart 51: LME tin forward curve

Source: Bloomberg

Chart 52: LME copper forward curve

Source: Bloomberg

Chart 53: LME nickel forward curve

Source: Bloomberg

Chart 54: LME zinc forward curve

Source: Bloomberg
Chart 55: WTI crude, Nymex

Source: Bloomberg

Chart 56: Comex gold

Source: Bloomberg

Chart 57: Nymex heating oil

Source: Bloomberg

Chart 58: Sugar No. 11, NYBOT

Source: Bloomberg

Chart 59: Comex silver

Source: Bloomberg

Chart 60: Nymex natural gas

Source: Bloomberg
**Energy**

- Demand growth, supply constraints and at times producers’ supply management have conspired to turn around the apparent melt-down of energy-commodity price rallies. Indeed, we find that at the end of April price risk has migrated to the upside of our forecast range – especially for oil: Oil and to a lesser degree, natural gas and other energy market-fundamentals took surprisingly little time to regain price-ground lost in December/January. And now seasonal trends are beginning to add to those bullish risks of, for instance, rising refiner demand in the case of oil, or the seasonal risk of supply disruptions in the case of natural gas production in the Gulf of Mexico hurricane season. **After a fashion, this year its simple old-fashioned fundamental strength fuelling a slow-burning price rally, which may, before too long again be fanned by financial flows as well.**

Briefly, however, let us reiterate some of the longer term trends we see playing out across most energy commodities: Global trends, including growing populations, trade and real GDP as well as globalization ‘pull’ demand for energy of all kinds just about everywhere. Our analysis of the “Next Billion” illustrates that that growth does not come solely from North America, the “BRIC economies”; Europe and industrialized Asia.

It’s also still the case that on the supply side we see real constraints on how fast new production of coal, natural gas and oil (and even uranium) can be developed and/or brought to market. In addition, as both oil and coal markets have shown, there is the at times very considerable risk of producers banding together and constraining supplies of lower cost resources, effectively forcing up costs and floor, or “normalized” longer term prices still higher. Note in this context our recent 4 April Q-series report on normalized oil prices, *Oil Prices: What’s Normal.*

In the next few sections we spell out how we see shorter term and at times commodity specific trends play out against this longer term canvass in the cases of oil; select oil products; natural gas in North America; and natural gas in Europe; as well as for coal and uranium.

In the oil world, fundamentals have tightened materially in Q1. Contributors were: intensely cold-weather in North America; ongoing demand growth for transport-fuels even in the OECD; strength in China as well as across a wider swath of developing economies and still underestimated growth in the Middle East. From the supply side the story is simply that there was no meaningful growth – contrary to consensus expectations. So conventional wisdom at the turn of the year has already turned on its head as a) demand growth did persist and b) supply growth failed to materialize. Inventory surpluses, so evident only three months ago, have all but disappeared.

Looking ahead then, we expect crude oil prices to strengthen further, and reach peaks not until the third quarter, for its then that refiner demand for crude oil plateaus seasonally in the Americas, across Europe and in the Far East.
simultaneously. Trading in that timeframe commences in earnest in May-June, which is one explanation for why crude oil prices traditionally appreciate in Q2.

- Oil markets should profit further from the still painfully tight capacity in the refining sector. Masked to a degree earlier this winter, refiners new found difficulty in integrating new units and delivering the newly mandated ultra-low sulphur road-transport fuels around the Atlantic Basin has already produced far wider than expected product margins, concentrated for now across North America, but probably soon to spread across global market once surplus middle distillate stocks are worked off in Europe and the Far East.

- Natural gas markets in the US appear well under way to establishing a relatively high price floor longer term, while shorter-term supplies are struggling to keep up with demand, the more so since one key source of recent import growth, Canada, is likely to shrink its exports this year. LNG is not expected to provide meaningful relief yet. As for the US upstream, still rising rig-rates are still not adding significant new supplies. Of some solace may be the historically relatively high post-winter storage levels. However, weather should play critical role again this summer.

- Europe’s gas market contrasts in as much as shorter term rising imports could put further pressure on markets. It’s longer-term that steep declines in Europe’s indigenous production will again tighten markets structurally, and doubly fast if any of the risks underneath Russia’s exports materialize. Europe’s natural gas demand, meanwhile, is also highly weather dependent, except that there appears to be greater room for growing power-sector demand.

The prospects for both thermal coal and uranium markets remain very strong and we believe that upside risks exist on price forecasts for both materials.

- Thermal coal: We have been expecting a decline in the availability of Chinese thermal coal in the seaborne market for over a year, as evidenced by a decline in net export levels. This trend appears to be occurring much faster than anticipated with Chinese trade statistics showing net imports of thermal coal in January, and balanced trade in February. This export inflection combined with continued supply problems (infrastructure, etc.) for key exporters such as Australia and recent evidence that other exporters, such as Vietnam are looking to potentially cap future exports through quotas, and the outlook over the next several years looks very promising in our view.

- Uranium: As with thermal coal, there is a strong case for elevated long-term demand growth. This is particularly true given uranium's position as a relatively 'clean' source of power, given that it produces zero greenhouse gas emissions. While we expect that supply growth will rise meaningfully over the next several years (from regions such as Kazakhstan, Australia and the US), market balances are likely to remain tight over our forecast period (to 2009). We also note that Nymex will shortly be introducing a uranium futures contract which will allow capital inflows from investors, this might provide further inflationary pressure.
Crude Oil

Oil prices have risen by about a third since they hit bottom in late January. Brent oil futures in particular are once again flirting with the high US$60s per barrel. And that is before global oil demand growth picks up the pace and before supply risks grow this summer. On balance, risks to our oil price forecast for this year are migrating to the upside, so long as the global economy stays relatively healthy.

Q1 fundamentals and the near-term outlook strengthen our confidence in the profile of average quarterly prices in our forecast. We see the highest 07 prices in Q3. By year, we expect WTI oil prices to average US$61/bbl in 07; US$64 in 08, and US$62 in 09.

Table 9: Global oil supply/demand balance, OECD inventories and prices

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<td>1.0</td>
<td>2.2</td>
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<tr>
<td>Other Supply*</td>
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<td>53.5</td>
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<td>51.4</td>
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<td>Avg WTI Crude Oil Price</td>
<td>US$/Bbl</td>
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<td>41.37</td>
<td>56.60</td>
<td>66.00</td>
<td>60.80</td>
<td>64.00</td>
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</table>

* Opec non-crude oil and refiner processing gains. Source: IEA, DoE, OPEC; national energy statistics agencies including OMV, AFP, UP, ANP, PTT, CERI; national oil companies, including PEMEX, international oil companies including BP and its Statistical Review of World Energy; Reuters, Bloomberg; and UBS estimates and forecasts.

Consensus forecasts for the oil market still see oil prices collapse next year or at least the year after. We do not see that. Instead we recently raised even our long-term, theoretical, mid-cycle or “normalized” oil price outlook. We now believe that long-term oil prices will cycle around US$50/bbl Brent. We outline our cost-driven assessment of this price in a report from 4 April, 2007, Oil Prices, What’s Normal? Costs push our normalised oil price to US$50.

Our key conclusion is that we cannot find enough meaningful supply growth at prices below US$50/bbl (WTI), because it’s only at that level or higher that operators can generate a sufficient return from increasingly costly deep-water developments and at or above that price-level that several key sovereign oil producers can sustain government spending. What’s more, alternative supplies (e.g. oil sands, gas-to-liquids; coal-to-liquids) are far costlier, requiring higher prices than US$50/bbl to generate acceptable returns. And even “low-cost
sovereign producers” face economic, social, political and population trends driving demands on government budgets higher, not lower.

**Shorter term: demand growth absent supply drives stocks down**

We think that for the first time since the 2003-'04 time-frame, good-old simple strong demand/supply/inventory fundamentals are emerging again. Here’s why: Inventories fell fast in Q1: There were significant inventory draws across the OECD oil consuming economies in January and February. Europe featured one of the bigger crude oil declines in January, while draws on oil product stocks were larger than normal in North America in February. And already in April our assessment of early March numbers show that stocks fell further still. Big, market depressing surpluses in OECD oil inventories are gone.

As for oil demand, weather-depressed, sluggish growth in Q1 should give way to underlying trends. Data confirm a story that has not changed: Namely, that barring a recession, easy year-to-year comparatives across North America; solid, high growth in China; broader based expansion across emerging all contribute to accelerating oil demand growth globally in Q2 and Q3:

The supply story is short: There was no production growth of consequence in the first quarter. A wave of non-Opec production growth is failing to materialize. And Opec supplies were low. Opec (read Saudi Arabia), probably wants North American crude oil stocks down more.

**Not just crude oil markets, but broader based strength in 2007**

On balance, OECD stocks of 2.55 billion barrels at end March were 2% below last year’s mark. They also cover slightly less demand than is normal, as their total surplus to the five year average was cut by three fourths to +25 million barrels (mmbls). Global oil demand growth should accelerate to near 2% later this year, because winter weather will play less of a role; transport fuel demand keeps on growing (even in the OECD); and year-over-year comparisons get easier. We expect that there will be room in Q2 and Q3 for Opec members excluding Saudi Arabia to return to full production. We see the pace of already disappointing non-Opec production growth slowing down further, especially when excluding gains from Angola.

Given the current state of fundamentals and looming tightening of supply and demand for crude oil in the summer months, we think the emergence of a backtransformed Brent futures market could now be just a matter of time.

**News-flow to watch for**

- Politics/unrest in producing countries (e.g. Iraq; Nigeria; Iran)
- Data on supply in mature provinces and hurricanes this summer
- Global, macro economic indicators
- Signs of a turn-around in upstream/infrastructure costs

OECD oil use should rebound, despite a slowing US economy, while emerging market growth will probably be broader based. In 2007, we see price risk biased to the upside.

The supply story is short: There was no production growth of consequence in the first quarter.

For a more in-depth read through fundamentals see our recent UBS report: ‘Oil prices, what’s normal?’

Economist: Jan Stuart +1 212 713-1074
Chart 61: China's Oil Demand Growth (y/y %)

Source: Chinese Customs Statistics, UBS

Chart 62: Global Oil Demand Growth (y/y %, by month)

Source: IEA, DoE, OPEC; national energy statistics

Chart 63: OECD Inventory Cover of Oil Demand

Source: International Energy Agency, UBS

Chart 64: Oil Product Stock Cover of Demand: N America

Source: International Energy Agency, UBS

Chart 65: Oil Product Stocks Cover of Demand: Europe

Source: International Energy Agency, UBS

Chart 66: Oil Product Stocks Cover of Demand: Asia-Pac

Source: International Energy Agency, UBS
Chart 67: Non-Opec Oil Production Growth (y/y, by qtr)

Source: IEA, DoE, OPEC; national energy statistics

Chart 68: Global Oil Supply Growth is Marginal (y/y, mthly)

Source: IEA, DoE, OPEC; national energy statistics

Chart 69: Oil Prices, Spot Futures Contracts Settle (Daily)

Source: Nymex

Chart 70: Non Opec Winners and Losers 2005,'06E'07E'08E

Source: IEA, DoE, OPEC; national energy statistics

Chart 71: ...as Opec Oil Came off the Market

Source: IEA, DoE, OPEC; national energy statistics

Chart 72: Two Year Forward WTI Futures (Daily Close)

Source: Nymex
Select Oil Products

The story for refined oil product margins this year has already changed dramatically: Margins are fat and likely to stay rich this quarter and next. That turn-around from an environment in which margins were going to be squeezed by high inventories and ample supplies from refurbished refineries came from both sides of the equation. On the one hand, inventories were drained quite effectively by severe winter weather in the US and Canada in Q1, as well as steadily growing demand for transport fuels. On the other hand, supplies have been constrained by wide-spread and persistent refiner downtime in the US. In addition, other refining centers have not added to supplies in North America by as much as might have been expected for a number of reasons. Consequently, the outlook for margins of gasoline and middle distillates is bullish: stocks are low and supply is constrained.

Table 10: Global oil products supply/demand balance, OECD inventories and prices

<table>
<thead>
<tr>
<th></th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007E*</th>
<th>2008</th>
<th>2009E</th>
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<td>Gasoline Demand N.A.</td>
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<td></td>
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<td></td>
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<tr>
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<td>0.9</td>
<td>1.4</td>
<td>1.3</td>
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<td>Days</td>
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<td>Inventory Dem Cover (end-Dec)</td>
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<td>0.3</td>
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<td>0.4</td>
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<td>Nymex Heating Oil Margins</td>
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<td>8.17</td>
<td>11.61</td>
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*2006 Margins are ytd margin on Nymex. **2007 margins are average of last 30-trading days of Nymex 6mths forward crack. * Source: International Energy Agency, Nymex and UBS estimates and forecasts.

Oil product demand growth survives winter, poised to accelerate

We focus our discussion of oil products on the three for which there are the largest, most liquid futures markets. Gasoline and middle distillates (heating oil, kerosene (including jet fuel) and diesel) stand out. These contracts are gasoline and heating oil on the New York Mercantile Exchange (Nymex), and gasoil on the Intercontinental Exchange (ICE). Though these futures markets are also affected by global trends and product markets far away from those around the northern Atlantic Ocean, it is inventory and demand/supply trends in North America and Europe that have the more direct impact.

Gasoline is the biggest selling oil product in North America (including Mexico and Canada). Far and away the biggest single oil product market in the world is The U.S. gasoline market is the world’s biggest oil product market (accounting for 11% of all global oil consumption). It’s also still growing (10-yr trend through 2005 = +1.7% y/y) 2006 US gasoline consumption rose +1.1%, despite high prices; Q1 2007 gasoline use is up +2% in North America.
the U.S. gasoline market (at 9.3 million barrels a day and counting, U.S. gasoline demand accounts for 11% of global oil consumption). Take North America as a single refiner market and its size is 10.67mmb/d equivalent to 13% of global oil demand. US gasoline demand features 10 year trend growth through 2005 of +1.7%. In 2006 gasoline demand grew +1.1% and 2007 is of to a good start with +2% higher use in North America as a whole, despite high prices and a slowing US economy.

We expect demand growth for gasoline and the wider group of transport fuels to slow down in response to a slowing US economy. But that growth remains positive and has proved surprisingly resilient to high prices. The bigger impact on total oil product demand in Q2 and Q3 of this year should come from the absence of big declines in the “things we burn” category.

The “things we burn” group includes fuel oil, LPGs, heating oil (a sub-category of middle distillates) and kerosene in Asia, as well as the so-called “other products.” It was steep declines in the use of these fuels that have dragged down OECD oil demand and held back global growth rates from Q4’05 through Q1’07. Last year OECD oil demand slipped -0.9% to 49.20mmb/d (58% of global oil demand), because of a 4%, or 840,000 barrel a day (kbd) plunge in the use of oil products in the “burn” category, which was driven by warm weather in Q1’06 and a late start to the 2006/’07 winter. The contraction was helped along by relatively low prices for natural gas which took out demand for nearly a fifth of the 4.5mmb/d market for OECD residual fuel oil.

**Supply side: the trouble with refineries**

Refiners around the Atlantic Basin in general and in the US in particular are having a tough winter. Downtime across many units has been more widespread and more extended than foreseen by a wide margin. Industry colour is blaming the general trends of far more complex processes and flows in plants that are run closer to the margin with less room for error. One and all have been exacerbated by more stringent product specifications, especially the still ongoing drive toward exceedingly sharp reductions in fuel content. Things go wrong more frequently, and when they do more of the refinery is affected, also because there is no longer much of a market for product that is even slightly “off-spec”. Moreover, when something goes wrong it’s more difficult than in the past to remedy and fix as engineering firms and contractors are stretched thin already.

The supply side looks like it won’t get fixed in a hurry, inventories are low and demand growth appears resilient.

**News items to be on the look out for**

- Watch out for when the US refining system begins to turn at full-speed, for if more refiners can sort out their operational issues then yields and output can rise substantially, and fast

- In the run-up to the “driving season” (May 31 through August 31) look out for inventory and import levels

- Lastly, macro economic shifts about the US and global economy

Though OECD oil demand was dragged down this winter by a significant decline in demand for the “things we burn” category ... growth for oil products of the “things we drive” variety, accelerated in H2’06 and Q1’07

Still resilient demand for transport fuels should begin to turn the total OECD oil product demand positive. OECD oil demand growth was negative in 2006 (first time since the early 1980s) and the -0.4%, y/y, Q1’07 decline was the sixth consecutive quarterly decline.

For further oil market analysis see UBS report: ‘Global Oil fundamentals Got Tight: It's been a while, but oil market strength is emerging, price risk shifts to the upside...’ 23 April 2007

Economist: Jan Stuart +1 212 713-1074
Chart 73: All N.A. Oil Product Stocks, Demand Cover

Source: International Energy Agency and UBS

Chart 74: All OECD Europe Oil Prod. Stocks, Demand Cover

Source: International Energy Agency and UBS

Chart 75: All OECD Asia Pac. Oil Prod. Stks Dem-Cover

Source: International Energy Agency and UBS

Chart 76: Atlantic Basin Middle Distillate* Demand Cover

Source: International Energy Agency and UBS. * Diesel + Heating Oil + Kerosine

Chart 77: Atlantic Basin Gasoline Demand Cover

Source: International Energy Agency and UBS

Chart 78: Why poor ’06 OECD demand should not repeat:

Source: IEA and UBS. *Qtrly and Annual Avg growth in kbd, yr/yr
Chart 79: Nymex Heating Oil Futures Margin Over WTI

Source: Bloomberg and Nymex

Chart 80: Nymex Gasoline Futures Margin Over WTI

Source: Bloomberg and Nymex

Chart 81: Nymex 3:2:1 Crack Spread*

Source: Bloomberg and Nymex. *1WTI : (2/3rd mogas+1/3rd heating oil)

Chart 82: US Gasoline Yields (Share of Gross Refiner Input)

Source: International Energy Agency and UBS. *By quarter, % y/y

Chart 83: US Diesel Yields (Share of Gross Refiner Input)

Source: International Energy Agency and UBS

Chart 84: Global Refiner Utilization Rates: Lower in '07

Source: BP Statistical Review of World Energy and UBS
US Natural Gas

- We recently increased our normalized NYMEX natural gas price to US$6.75 per million British thermal units (MMBtu) from US$6.15/MMBtu, due to: 1) rising cost; 2) analysis that indicates the market is at equilibrium at US$7/MMBtu; and 3) given the historical 7.3:1 oil:gas trading relationship, our higher oil forecast is supportive of our increased normalized natural gas price forecast. We are maintaining our 2007E, 2008E, and 2009E NYMEX forecasts of US$7.25/MMBtu, US$8.25/MMBtu, and US$8.25/MMBtu, as well as our long-term normalized price forecast of US$6.00/MMBtu. We also introduced our 2009 forecast of US$8.00/MMBtu.

Table 11: US Natural gas supply/demand balance

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<tr>
<th></th>
<th>2002</th>
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<th>2006</th>
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<td>U.S. Dry Gas Prod. (EIA Estimate)</td>
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<td>Canadian Imports</td>
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<td>U.S. Net Imports</td>
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<td><strong>Total Supply</strong></td>
<td>Bcf/d</td>
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<td><strong>Composite spot nat gas price</strong></td>
<td>US$/MMBtu</td>
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<td><strong>Nymex HH nat gas futures</strong></td>
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Source: Energy Information Administration (EIA), UBS estimates

Rising costs mandate higher long-term price outlook

Over the past 7 years, we have raised our “normalized” natural gas price forecast on several occasions to match the price necessary for an average E&P company to earn a competitive return on capital of 10%. Pre-tax per-unit costs have climbed 12% per annum over the last five years. Based on the sector’s average 2007E pre-tax per-unit cost structure of US$4.40/Mcfe, we believe the average US E&P company requires natural gas prices of US$6.75/MMBtu to earn a targeted ROCE of 10%, marginally above cost of capital. While the sector can earn returns well above and below WACC for short periods of time, we believe the market gravitates toward valuing the sector at a level reflecting the price necessary to earn its cost of capital. And while the gas industry struggles to grow North American supply to meet a growing economy, we expect the sector...
to earn better returns but market valuations to be limited to a level that reflects longer term returns equal to WACC.

We believe our cost analysis is conservative. The single most important cost line is finding and development costs (F&D), which is expressed as DD&A rate on E&P income statements. Our analysis assumes a DD&A rate of US$2.00/Mcfe as opposed to 2006 finding and development costs which were closer to US$2.80/Mcfe. Our view is costs are both structurally and cyclically higher and we expect F&D costs to moderate with declining onshore rig rates, and steel costs, potential overcapacity in pressure pumping, and increased efficiencies from the expansion/modernization of the onshore rig fleet.

The natural gas market appears balanced with natural gas prices approaching US$7.00/MMBtu

During the 2006 refill period, the weather-adjusted S/D balance was 2.0 Bcfd tighter than average whenever gas prices were below US$7/MMBtu. Whenever prices exceeded US$7/MMBtu (January-March 2006 and again in December 2006), the market appeared to be oversupplied, and the inventory surplus increased. On several occasions, (spring 2006, Nov 2006 and this past March), the market has appeared to be balanced relative to the five year average when the bid week price was near US$7/MMBtu. (Note: this analysis uses storage data and adjusts the impact of weather to compare seasonal injection and withdrawal rates vs the five year average – during which time overall supply and demand have been relatively flat – to calculated movements in the S/D balance).


Our higher normalized oil price forecast is supportive for increased long-term natural gas prices

Natural gas prices have historically been highly correlated to crude oil prices – 71% since 2000. The primary reason for the high correlation is that natural gas competed with residual oil (when gas prices are weak) and heating oil (when gas prices are strong to capture industrial and electric utility demand. Since 2000, the crude oil:natural gas trading relationship has been about 7.3:1. Based on this
ratio, our new US$51/Bbl normalized forecast is supportive of longer-term gas prices in the US$7/MMBtu range.

**Highlights of our natural gas supply demand forecast include:**

- Demand growth of 3.2% this year (due to easy weather comparisons) followed by a decline of 0.7% in 2008.

- US production growth of 0.4% in 2007 and flat YoY production in 2008.

- A decline in Canadian imports of 0.7 Bcf/d this year and another 0.3 Bcf/d in 2008 as the bite of reduced drilling activity takes effect while oil sands demand for gas grows.

- Net LNG imports increasing 0.8 Bcf/d in 2007 and an incremental 0.5 Bcf/d in 2008 to 2.2 Bcf/d and 2.7 Bcf/d, respectively.

**Newsflow**

- The weekly EIA storage report is generally released every Thursday at 10:30am. The report can be accessed from the EIA website, www.eia.doe.gov.

**Analyst:** William Featherston

+1 212 713 9701
Chart 86: Oil:Natural Gas Ratio, 2000-2009E

<table>
<thead>
<tr>
<th>Year</th>
<th>NYMEX Front Month WTI ($/Bbl)</th>
<th>NYMEX Front Month Natural Gas ($MMBtu)</th>
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<tr>
<td>2000 Avg</td>
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<td>2001 Avg</td>
<td>25.92</td>
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<td>2002 Avg</td>
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<td>2003 Avg</td>
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<td>2004 Avg</td>
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<td>9.02</td>
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<td>2006</td>
<td>66.09</td>
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<td>2001-2006 Avg</td>
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Normalized 51.00 6.75 7.6

Source: Bloomberg and UBS estimates

Chart 87: Rising NatGas Rig Count Unable to Boost Prod’n

Source: Energy Information Administration, Baker Hughes, and UBS estimates

Chart 88: Volatile Fuel Switching Impacts Natural Gas Pricing

Source: Energy Information Administration and UBS estimates

Chart 89: “Weather-Normalized” S/D Curve as Price Indicator

Source: Energy Information Administration, Bloomberg, and UBS estimates

Chart 90: Canadian Imports No Longer Source of Growth

Source: Energy Information Administration and UBS estimates

Chart 91: U.S. Natural Gas Storage Still Above Normal

Source: Energy Information Administration and UBS estimates
**European gas**

Recent price development, particularly in the UK, has been weak as warm weather and declining oil prices have forced spot and oil-linked contracted prices lower. In addition, the expansion of new supply, particularly via pipeline, has put medium-term prices under some pressure, and further LNG capacity is forecast to come on stream in the UK in early 2008. However, despite the current weakness, we believe the European gas market is approaching a critical period in its development. We believe Russian supply risks are rising, due to the lack of investment in new developments, which could lead to a shortage of pipeline gas and more reliance on LNG imports. Our 2% pa demand growth forecast for European gas has some risk to the upside due to the expected rise in CCGT power demand as Europe faces the prospect of tightening reserve margins for power at the end of the decade.

Table 12: European gas supply-demand

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<tr>
<td><strong>Demand summary</strong> (bcm)</td>
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<tr>
<td>Norway</td>
<td>73.4</td>
<td>78.5</td>
<td>85.0</td>
<td>87.3</td>
<td>97.6</td>
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<td>Netherlands</td>
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<td>83.8</td>
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<td>Elsewhere</td>
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<td>46.1</td>
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<td><strong>Indigenous supply</strong> (bcm)</td>
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<td>Russian pipeline imports</td>
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<td>147.9</td>
<td>151.1</td>
<td>149.3</td>
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<td>32.0</td>
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<td>41.5</td>
<td>41.5</td>
<td>45.5</td>
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<tr>
<td>Other pipeline imports</td>
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<td>4.6</td>
<td>10.3</td>
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<td><strong>Total pipeline</strong> (bcm)</td>
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<td>195.1</td>
<td>200.9</td>
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<td>LNG imports</td>
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<td>54.3</td>
<td>54.3</td>
<td>59.1</td>
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<tr>
<td><strong>Total supply</strong> (bcm)</td>
<td>502.9</td>
<td>510.2</td>
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<td>545.7</td>
<td>556.8</td>
<td>567.8</td>
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<td>Import dependency (%)</td>
<td>41.0</td>
<td>44.0</td>
<td>47.0</td>
<td>47.0</td>
<td>47.0</td>
<td>47.0</td>
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<tr>
<td>Russia market share (%)</td>
<td>26.0</td>
<td>29.0</td>
<td>29.0</td>
<td>28.0</td>
<td>28.0</td>
<td>27.0</td>
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<tr>
<td>Russia import market share (%)</td>
<td>64.0</td>
<td>66.0</td>
<td>62.0</td>
<td>59.0</td>
<td>59.0</td>
<td>57.0</td>
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<td>European contract US$/mmBtu</td>
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<td>4.6</td>
<td>6.1</td>
<td>8.0</td>
<td>7.7</td>
<td>7.6</td>
<td>7.7</td>
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<td>UK spot p/therm</td>
<td>19.9</td>
<td>24.1</td>
<td>40.4</td>
<td>43.4</td>
<td>25.7</td>
<td>35.0</td>
<td>35.0</td>
</tr>
</tbody>
</table>

Source: Industry sources, UBS estimates

**Demand**

Our updated supply-demand model above leads us to conclude that under our base case oil prices assumption gas demand will grow at a little over 2% pa, significantly lower than consensus expectations of 3%. In a high oil price scenario, where prices remain over US$60/bbl, we see this falling to 1%.

The critical swing factor for gas demand growth in Europe is power generation, both for economic growth and to replace ageing coal and nuclear stations. Although high gas prices stemming from the contractual link between oil and gas prices have eroded some of gas’ economic advantages over coal, despite the environmental pressures to reduce emissions, the emergence of a potential power deficit in Europe seems probable unless a new generation of CCGTs is
rapidly installed, as coal and nuclear face regulatory and carbon pricing risks. Hence we believe the gas market may tighten in Europe at the end of the decade more significantly than we had assumed in previous analysis should this lead to another ‘dash for gas’.

**Supply**

Gas supply to Europe remains dominated by Russia, which has recently taken a much more aggressive line than in the past. The wielding of the ‘gas weapon’ against Ukraine in the 2005/6, and the apparent difficulty Russia had in meeting commitments during that very cold winter, has introduced a new level of uncertainty into long-term supply forecasts. Despite indigenous production declining fast in key markets, we see Europe as being relatively well supplied to the end of the decade, as several new infrastructure projects for LNG and pipeline gas are completed.

The nature of new gas infrastructure build, which adds large ‘lumps’ of new capacity to a balanced market, could add significant volatility. Indeed, we believe certain markets, such as the UK, could see a sustained period of oversupply, with excess gas landed in northern Europe, which could also ease supply concerns in those markets. The growth in LNG supply destined for Europe also appears adequate to 2010.

Beyond the end of the decade, however, we believe the situation will change once more. Indigenous supply begins to drop off swiftly, which leads to further requirements for imports, either from LNG, Russia or other long-haul pipelines. We see the LNG market as becoming very tight over this period, with little room for manoeuvre unless new infrastructure projects are swiftly matured, and recent evidence is that new projects are being delayed by cost and regulatory issues. At this point, further growth in Russian supply becomes necessary, after several years when we believe its European export volumes could be relatively flat.

**Russian demand and supply**

We forecast total Russian domestic demand to grow by 2.5% pa to 2015. This is expected to be driven by strong economic expansion, power generation additions and increased gasification activities. Moreover, the forecast has the risk to the upside, in our view, as future GDP growth is likely to be more investment-led, rather than recovery-based, creating a larger need for energy. In the FSU, which has traditionally relied upon Russia for supply, we believe diversification and higher prices will constrain demand growth for Russian gas to a very small additional amount.

On supply, we estimate that Gazprom’s production profile will essentially remain flat over the next ten years. Although we expect the company’s output to gradually increase from 547 bcm in 2005 to its target of 560 bcm in 2010, production thereafter will show no growth (and perhaps even some annual declines) through 2015. In order to organically grow its volumes in the timeframe required, it would need to be investing now in its large undeveloped fields in west Siberia, and it has only recently begun to focus on these resources. However, we believe that there will be substantial growth in independent gas producers in Russia, such as Novatek, and oil companies, such as Lukoil and...
TNK-BP. We also believe that imports from Central Asia, predominantly Turkmenistan, will increase significantly. This would allow overall growth of 1.9% pa to 2015 in Russian gas supply (including Central Asia), although we think there is a risk that some of the non-Gazprom volumes may not materialise.

These risks raise the likelihood that there may be a shortage of gas in Europe at some time in the next decade. In order to mitigate this risk, we believe Europe has to swiftly diversify its supply sources to ensure that it has access to several new sources of gas. We believe this would be most easily achieved via new LNG supply projects, as Europe is currently building significant LNG regasification capacity, although it seems clear that new ‘long-haul’ pipelines would also be necessary to move gas from the peripheral supply countries to central Europe.

**Impact on European gas prices**

Under our base-case demand scenario, we believe that the oil-price link will be retained for the majority of the continental supply contracts, as it remains a well understood and accepted pricing mechanism by both suppliers and consumers. In that case, we see European gas prices falling from the present level of US$8.7/mmbtu to around US$7.0/mmbtu by the end of the decade as our recently-updated oil price forecast declines to US$50/bbl (Brent) in 2010.

However, if oil prices remain at very high levels, there may be pressure from some European customers to either drop the link or rebase the level of parity, as gas would then be effectively pricing itself out of certain industrial and power generation markets, where there are acceptable substitutes, such as clean coal.

In liberalised markets, such as the UK, the price volatility may be much more extreme. As we depict in our quarterly forecasts in the chart below, we have reduced our UK spot price forecast for 2007 given the very warm 06/07 winter to date. We have also cut our 2008 forecast to incorporate the impact of the additional supply sources, which are principally additional LNG regasification plants which are due for completion at end 2007, which could lead to a temporary over-supply in the market until the end of the decade.

In the longer term, however, we see upside to our price forecasts, particularly for LNG, should the risks on Russian gas supply materialize. We believe that, without further significant and swift new infrastructure build, Europe would be very exposed to an unplanned reduction in supplies from Russia. In that case, it would be faced with the requirement for bidding for LNG in what appears likely to be a tight market, in competition with the US and Asia, which would most likely see LNG prices reach new highs.

**News-flow to watch for**

- BG 4Q results – Friday 4th May
- Eni 4Q results – Friday 11th May
- Statoil 4Q results – Wednesday 30th May

We believe the risk of a gas shortage to be high – and requires an urgent diversification of supply sources

In the medium term, we believe the oil-price link will be maintained

At current levels, oil-linked gas is pricing itself out of certain markets

We have downgraded our 2007/08 UK spot price forecasts due to the current warm weather and over-supply concerns

Longer term we see upside risks to our price forecasts from any supply disappointments

Analyst: Iain Reid
+44 207 568 4434
**Thermal Coal**

The inability of the world’s largest thermal coal consumers, China and the US, to supply requirements from domestics sources is expected to keep markets tight over the next several years. Indian import growth is a further consideration. *We maintain our positive stance on seaborne thermal coal.*

Table 13: Global seaborne thermal coal market supply/demand balance

<table>
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<td><strong>Global Power Generation</strong></td>
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<td>TWhr</td>
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<td>16,528</td>
<td>17,195</td>
<td>17,881</td>
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<tr>
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<td>US$/t</td>
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<td>55.5</td>
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Source: AME, EIA, IAE, McCloskey’s, UBS estimates

We believe that consensus forecasts for thermal coal reside at about US$55/t for the 2008E contract.

Spot prices for thermal coal in both the Australian and South African markets have been largely range-bound over the past quarter, trading between US$50-55/t. The change in Chinese net export status (discussed below), greater involvement of Indian buying and constrained availability of Russian material is being balanced against increased Indonesian exports.

In late February the benchmark thermal coal price for the seaborne market was settled at US$55.50/t up US$3.00/t from 2006 levels this was generally in-line with our estimate of US$55/t and higher than consensus which we believe was forecasting a roll-over. The majority of Japanese Power Utilities (JPU) have now settled their contracts in line with this benchmark.

An interesting development however is the status/availability of Chinese contract material in the seaborne market. Chinese producers are reportedly asking for more than US$65/t from JPUs and threatening non-delivery if an agreement is not reached.

---

Our 07E forecast remains higher than consensus

Chinese producers have been asking for US$65/t

↑ ↑ Near-term strength followed longer-term strength is expected for this market
**China dynamics**

We have been expecting a decline in the availability of Chinese thermal coal in the seaborne market for over a year, as evidenced by a decline in net export levels. This trend appears to be occurring much faster than anticipated with Chinese trade statistics showing net imports of thermal coal in January, and balanced trade in February.

Structurally, the demand environment for thermal coal continues to look very strong. China is expected to build another 300GW of power capacity over the balance of the decade, the bulk of this coal-fired. Of further consideration of course is the sizeable component of demand from industrial applications – i.e. cement production (which is quite energy intensive). Growth in cement production in China is estimated at 13% for 2006 (CAGR of about 9% over the past 10 years). Industrial applications represent about 36% of total thermal coal demand in China.

The Chinese government has implemented a number of measures to discourage exports (duties), limit domestic overinvestment in domestic coal mines and has also allowed a measure of deregulation of the power market, which allows coal suppliers and utilities to freely negotiate pricing. This has resulted in more attractive pricing for thermal coal domestically vs. the seaborne market.

The entrance of Indian utilities in the seaborne market is a further consideration; we expect imports to grow by about 20% in 2007.

**Supply environment**

Vietnam’s Ministry of Industry recently outlined “a major development plan for the coal industry for the 2006-2010 period, indicating a roadmap to gradually reduce Vietnam’s coal exports”. Vietnam has seen significant increases in thermal coal exports over the past three years (up about 4x). Most of this material is destined for China. The country plans to limit coal exports to only 12mt by 2010 (the country is estimated to have exported 23mt in 2006).

One of the key questions for 2007 supply will be how strong supply growth from Indonesia will be. We believe that Indonesia exported nearly 170mt of coal in 2006 and forecast that output should rise to 180mt in 2007, there is a risk that this could be exceeded.

The infrastructure problems at Australian ports continue, both Newcastle and Dalrymple Bay have experienced disappointing output levels although this is expected to improve over the course of 2007. We anticipate that the vessel cue at Newcastle, which reached over 70, should improve. Nevertheless we expect that bottlenecks of this kind are likely to be an ongoing theme, whether it is in Australia or China or India.

**News-flow to watch for**

- China – late May, April. trade statistics (imports, domestic production)

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**Chinese net exports have collapsed**

**Demand for power and cement are key drivers for thermal coal consumption in China**

**Indonesian supply growth has surprised**

**Infrastructure constraints may be a global issue**

**Analyst: Daniel Brebner, CFA**

+44 207 568 3451
Chart 98: Long-term contract thermal coal price trend

US$/t


UBS forecast

Source: McCloskey’s, UBS forecasts

Chart 99: Qinhuangdao port, thermal coal stocks

Thermal coal stocks - Qinhuangdao port (kt)

Jun-05 Sep-05 Dec-05 Mar-06 Jun-06 Sep-06 Dec-06 Mar-07

Source: McCloskey’s, UBS

Chart 100: China power production, split by source

Nuclear/ Other
Hydro 3% 16% 0%
Thermal 81%

Source: Chinese Customs Statistics, UBS

Chart 101: Spot thermal coal price trend

Spot coal price - Newcastle
Spot coal price - Richards Bay

Source: globalCoal, UBS

Chart 102: China thermal coal production and consumption

China thermal coal production (mt)
China thermal coal consumption (mt)

Source: Chinese Customs Statistics, McCloskey’s, UBS estimates

Chart 103: China net import and US import trends

China import/(export) trend (mt)
US import/(export) trend (mt)

Source: AME, McCloskey’s, UBS estimates
Chart 104: Coal-fired capacity and efficiency

Chart 105: Thermal coal requirements US and Europe

Chart 106: Thermal coal supply by region, 2006

Chart 107: Indonesia/Vietnam thermal coal exports

Chart 108: Thermal coal demand by region, 2006

Chart 109: Top thermal coal exporters, 2006

Source: China Customs Statistics, AME, EIA, McCloskey’s, UBS estimates

Source: AME, UBS estimates

Source: AME, UBS estimates

Source: AME, UBS estimates

Source: AME, company documents, UBS estimates
**Uranium**

Despite sharp growth in the Uranium spot price over Q1 (up 56%) we remain confident that the uranium spot market will continue to strengthen over the next several years. Strong long-term global energy values and mounting environmental pressures will continue to drive the market forward.

**Table 14: Global uranium supply/demand balance**

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td><strong>Global nuclear capacity (GW)</strong></td>
<td>361.0</td>
<td>366.9</td>
<td>370.7</td>
<td>375.9</td>
<td>380.5</td>
<td>383.2</td>
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<tr>
<td><strong>utilisation rate (%)</strong></td>
<td>87</td>
<td>87</td>
<td>88</td>
<td>88</td>
<td>88</td>
<td>89</td>
</tr>
<tr>
<td><strong>burnup (GWd/t)</strong></td>
<td>43</td>
<td>43</td>
<td>43</td>
<td>44</td>
<td>44</td>
<td>44</td>
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<tr>
<td><strong>enrichment (%)</strong></td>
<td>3.9</td>
<td>4.1</td>
<td>4.1</td>
<td>4.1</td>
<td>4.1</td>
<td>4.0</td>
</tr>
<tr>
<td><strong>Uranium demand (kt)</strong></td>
<td>66.3</td>
<td>66.3</td>
<td>68.0</td>
<td>69.6</td>
<td>73.5</td>
<td>74.5</td>
</tr>
<tr>
<td><strong>growth in demand (%)</strong></td>
<td>-4.9</td>
<td>0.0</td>
<td>2.6</td>
<td>2.3</td>
<td>5.6</td>
<td>1.4</td>
</tr>
<tr>
<td><strong>Mine production (kt)</strong></td>
<td>40.3</td>
<td>43.3</td>
<td>44.5</td>
<td>47.9</td>
<td>50.6</td>
<td>60.4</td>
</tr>
<tr>
<td><strong>growth in mine supply (%)</strong></td>
<td>-2.3</td>
<td>7.7</td>
<td>2.6</td>
<td>7.8</td>
<td>5.6</td>
<td>19.3</td>
</tr>
<tr>
<td><strong>Russian HEU supply (kt)</strong></td>
<td>9.0</td>
<td>9.0</td>
<td>9.0</td>
<td>9.0</td>
<td>9.0</td>
<td>9.0</td>
</tr>
<tr>
<td><strong>Recycling (kt)</strong></td>
<td>0.0</td>
<td>2.8</td>
<td>2.8</td>
<td>2.1</td>
<td>1.9</td>
<td>2.5</td>
</tr>
<tr>
<td><strong>Tails re-enrichment (kt)</strong></td>
<td>3.0</td>
<td>3.0</td>
<td>3.0</td>
<td>3.0</td>
<td>3.0</td>
<td>3.0</td>
</tr>
<tr>
<td><strong>Russia LEU exports (kt)</strong></td>
<td>0.0</td>
<td>4.5</td>
<td>4.0</td>
<td>3.5</td>
<td>3.0</td>
<td>2.5</td>
</tr>
<tr>
<td><strong>DOE sales (kt)</strong></td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>1.5</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td><strong>Total supply (kt)</strong></td>
<td>57.3</td>
<td>62.7</td>
<td>63.2</td>
<td>67.0</td>
<td>69.6</td>
<td>79.4</td>
</tr>
<tr>
<td><strong>growth in supply (%)</strong></td>
<td>14.0</td>
<td>9.4</td>
<td>1.0</td>
<td>6.0</td>
<td>3.8</td>
<td>14.1</td>
</tr>
<tr>
<td><strong>Inventory adjustment (kt)</strong></td>
<td>9.0</td>
<td>4.0</td>
<td>3.0</td>
<td>2.0</td>
<td>1.0</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Notional balance (kt)</strong></td>
<td>-0.1</td>
<td>0.3</td>
<td>-1.8</td>
<td>-0.6</td>
<td>-2.9</td>
<td>4.8</td>
</tr>
<tr>
<td><strong>Restricted Ux U3O8 price (US$/lb.)</strong></td>
<td>18.0</td>
<td>27.9</td>
<td>47.3</td>
<td>95.0</td>
<td>110.0</td>
<td>120.0</td>
</tr>
</tbody>
</table>

Source: WNA, Ux Consulting Company, UBS estimates

It has been a record-breaking quarter. The Uranium spot price has risen significantly from US$72/lb. to its current level of US$113/lb., a rise of 56%. The price increase from US$75/lb to US$85/lb on February 28 itself represented both the biggest single move in uranium prices since they were first published in 1968 and also the highest recorded price (in nominal terms). This was however, then eclipsed by the 19% rise to US$113/lb in early April, a level some 139% above the average 2006 spot price.

The New York Mercantile Exchange is to launch a uranium futures contract in May. Contracts will be provided under a ten year agreement with Ux Consulting Co., who currently publish uranium prices.

**Demand environment**

Global nuclear electricity generation rose to nearly 2.87 million GWh, rising from 2.75 million GWh in 2005. The US, France and Japan accounted for 55% of this generation. 2006 saw the addition of two new reactors, one in India and one in China, which were successfully connected to respective grids last year. Construction began on four new reactors, one in South Korea, one in Russia, and two in China, during 2006.
China and Japan agreed in early April to cooperate to build additional nuclear power capacity. China represents perhaps the largest potential uranium market and currently plans to spend in excess of US$50 billion on some 30 nuclear reactors before 2020.

Global nuclear generating capacity will increase some 30% by 2030, growing by 114 GW, with some 110 GW accounted for by new plants in Asia, according to a report by the Institute of Energy Economics, Japan (IEE Japan). The capacity of the world's nuclear power plants is forecast to grow from the current 385 GW to 499 GW in 2030, while Asia's would grow from 82 GW to 199 GW. Broken down by country, China would see a sevenfold increase to 50 GW, while India would experience a tenfold increase to 32 GW. South Korea's capacity, meanwhile, would grow 70% to 30 GW, while Japan's would increase 40% to 66 GW.

Nuclear energy is increasingly being debated in the western world as energy values remain highly rated and environmental pressures grow. Governments in the UK, US, Russia, South Africa and even Australia are all revisiting or cementing plans to build nuclear capacity. Nuclear attractiveness is being stressed in an environment of supply uncertainty for conventional fossil fuels, price volatility and CO₂ emissions concerns.

The French government recently approved the construction of the country’s first European Pressurized Reactor (ERP) at Electricité de France’s Flamanville nuclear station in Normandy. Building is expected by year end with first operation in 2012, an overall capital outlay of US$4.53 billion, and expected capacity of 1.6 GW.

**Supply environment**

Following their late October 2006 announcement, Cameco announced recently that production at the Cigar Lake uranium mine is now scheduled for start-up in 2010, if remediation activities proceed as planned. Production had originally been expected in 2008.

Russia has declared its willingness to enter into joint ventures with Namibian companies in order to speed-up the development of Namibia’s uranium resources. Namibia already hosts Rio Tinto’s Rossing mine as well as Langer Heinrich, owned by Paladin resources.

The US government (US Department of Energy) owns one of the worlds largest stockpiles of uranium, approximately 61kt (from nuclear energy programs and weapons-grade material). In August last year, the DOE proposed selling as much as 2.5kt/year (about 12% of US demand) into the market. The department indicated that it did not believe that the sales would have an adverse material impact on the domestic uranium mining industry.

**News-flow and events to watch for**

- Cameco – 20 April, 1st Quarter Results
- First trading of new Nymex uranium futures contract – May 7

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**Global nuclear generating capacity to increase some 30% by 2030**

**France to begin work on a new 1.6 GW reactor**

**Production from Cameco’s Cigar Lake mine has been delayed until 2010**

**The US DOE has proposed selling down its uranium stockpile**

Analyst: Daniel Brebner, CFA
+44 207 568 3451
**Chart 110: Long-term uranium price trend (US$/lb)**

- **Average Uranium price (real)**
- **UBS forecast**

Source: Ux Consulting Company, UBS forecasts

**Chart 111: UxC annual spot uranium volume**


**Chart 112: China power production by source 2005E**

- Nuclear/Other: 3%
- Hydro: 16%
- Thermal: 81%

Source: Chinese Customs Statistics, UBS

**Chart 113: Spot uranium and WTI oil price trend**

- Uranium (US$/lb.)
- WTI Oil (spot) US$/bbl

Source: Thomson Financial Datastream, UBS

**Chart 114: UxC annual term uranium volume**


**Chart 115: China power production by source 2020E**

- Nuclear: 4%
- Wind/other: 4%
- Natural gas: 5%
- Hydro: 23%
- Thermal: 64%

Source: AME, McCloskey’s, UBS estimates
Chart 116: New entry cost comparison – Europe (€/MWh)

Source: UBS estimates

Chart 117: Nuclear capacity by region

Source: WNA, UBS estimates

Chart 118: Uranium supply by region, 2006E

Source: WNA, UBS estimates

Chart 119: EU ETS CO₂ spot price series

Source: Bloomberg

Chart 120: Uranium demand by region, 2006E

Source: WNA, UBS estimates

Chart 121: Top uranium producer, 2006E

Source: WNA, company documents, UBS estimates
Industrial Metals

After considerable divergence in performance in Q4 06, industrial metals have been strengthening in tandem for much of the past quarter. Copper has recovered sharply after being sold off early in the year as Chinese consumers have emerged as strong buyers. This was expected after what was a very weak 2006 in consumption terms. Nickel continues to make new highs and while there are continuing questions with respect to how sustainable these price levels are, supply remains problematic, stocks remain almost critically low, and demand surprisingly inelastic. Aluminium is a preferred metal.

In the latest European Economic Monitor, UBS economists raised German industrial production (IP) forecasts by 132% and 69% to 5.8% and 5.9% for 2007 and 2008 respectively. From a global commodities and mining equity perspective this is quite important as Germany represents a key element of western materials consumption, given the large industrial component of its economy.

German context

Germany is a relatively large consumer of metals, consisting of about 29% of western European demand. The country has a strong industrial base, and with surging export growth complimented by firm domestic demand we expect that Germany’s share of demand could rise modestly over the next several years.

Despite this relatively high intensity, we note that from a global perspective Germany is declining in importance, with its share of total global demand falling from 7-8% in the 1980’s-90’s to below 6% currently. As the Asian economies (China, India, etc.) develop we expect that Germany’s impact will continue to fall, in a similar fashion to the rest of the western world.

Chart 122: Relative market share – aggregate industrial metals market
Examining metal consumption statistics we find that Germany’s share of European copper consumption has been growing as opposed to its share of zinc consumption which has been falling. Simplistically, we view this as a trend in Germany towards higher-end industrial products which utilise more advanced alloys, wiring, etc. This would favour metals such as copper and nickel. The unification of Germany may also have had a modest impact in metals consumption.

**Economic sensitivity**

In the charts below we examine the sensitivity of metal consumption growth with IP growth. IP is usually strongly correlated with materials consumption over time, although re-stocking/de-stocking phases can create offsets/lags and volatility which may lead to a sizeable standard error. Historic patterns suggest that in general metal consumption is more leveraged to German economic activity as compared to western world sensitivities. This is true for all four of the principal industrial metals (aluminium, copper, nickel and zinc); copper is highlighted below as an illustration.
UBS economists recently increased their 2007E German IP growth forecast to 5.8%; according to our sensitivity model this could correspond to a 9% increase in copper consumption, this would represent approximately 150kt of additional copper consumption.

The table below outlines our expectations for IP growth from selected regions.

**Table 15: IP growth, selected regions**

<table>
<thead>
<tr>
<th></th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007E</th>
<th>2008E</th>
</tr>
</thead>
<tbody>
<tr>
<td>German IP</td>
<td>0.1</td>
<td>2.6</td>
<td>2.8</td>
<td>5.6</td>
<td>5.8</td>
<td>5.9</td>
</tr>
<tr>
<td>United States</td>
<td>1.1</td>
<td>2.5</td>
<td>3.2</td>
<td>4.0</td>
<td>2.2</td>
<td>2.8</td>
</tr>
<tr>
<td>Western Europe</td>
<td>0.3</td>
<td>2.0</td>
<td>1.3</td>
<td>3.7</td>
<td>1.9</td>
<td>2.4</td>
</tr>
<tr>
<td>OECD</td>
<td>0.9</td>
<td>3.5</td>
<td>1.9</td>
<td>4.0</td>
<td>2.8</td>
<td>3.1</td>
</tr>
<tr>
<td>Asia (ex-Japan)</td>
<td>11.1</td>
<td>11.6</td>
<td>10.7</td>
<td>11.5</td>
<td>10.4</td>
<td>10.7</td>
</tr>
<tr>
<td>World</td>
<td>3.6</td>
<td>5.9</td>
<td>4.5</td>
<td>6.1</td>
<td>4.9</td>
<td>5.2</td>
</tr>
</tbody>
</table>

Source: UBS estimates

**Physical availability status**

A further consideration of materials demand analysis is to determine the status of physical availability of materials in a region. In this way we can assess the repercussions of a surprise in demand and potentially, how quickly this could impact markets. For example, if physical availability is high (high exchange and producer/consumer stocks), then an increase in demand may only be felt modestly in pricing terms as inventories may absorb the additional demand. As the charts below show aggregate German LME stocks (Hamburg and Bremen), dominated by Aluminium, have fallen precipitously since early 2004. This is in line with declining LME stocks generally but is also indicative of the positive consumption environment for metals within the German economy, despite the negative cyclical headwinds emanating out of the US.

*Exchange stocks are very low in Germany*

*Source: Reuters, UBS estimates*
An assessment of physical liquidity however is not complete without an examination of premiums (additional fee paid by consumers for physical product) within the region. The chart below shows copper cathode premiums.

**Chart 128: Western European copper premia 2003 - present (US$/t)**

The recent lows in premiums suggest that, despite low exchange inventories, physical availability has not been a problem for consumers. One interpretation may be that while stocks at the exchange level are low, levels at consumers are reasonably high. Nevertheless, interestingly, the latest data suggest that premiums may be rising. In our view this would indicate that metals markets could tighten quickly.
Aluminium

- Aluminium has been a laggard, meaningfully underperforming the price appreciation witnessed in the other base metals. We expect that inflationary pressures from both power and bauxite (availability issues near-term) are likely to increase marginal costs within the industry; this combined with strong global consumption growth is likely to see pricing remain well supported and upwardly biased over the next few years in our view.

Table 16: Global aluminium market supply/demand balance

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<tr>
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</thead>
<tbody>
<tr>
<td>Global IP growth %</td>
<td>3.6</td>
<td>5.9</td>
<td>4.5</td>
<td>6.0</td>
<td>4.8</td>
<td>5.1</td>
<td>3.6</td>
</tr>
<tr>
<td>ratio of demand growth/IP x</td>
<td>2.46</td>
<td>1.54</td>
<td>1.20</td>
<td>1.13</td>
<td>1.25</td>
<td>1.25</td>
<td>1.39</td>
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<tr>
<td>growth in aluminium demand %</td>
<td>8.9</td>
<td>9.1</td>
<td>5.4</td>
<td>6.9</td>
<td>6.0</td>
<td>6.4</td>
<td>5.0</td>
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<tr>
<td>Total demand mt</td>
<td>27.8</td>
<td>30.3</td>
<td>32.0</td>
<td>34.2</td>
<td>36.2</td>
<td>38.5</td>
<td>40.5</td>
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<tr>
<td>Smelter capacity mt</td>
<td>30.5</td>
<td>33.1</td>
<td>33.8</td>
<td>37.6</td>
<td>40.5</td>
<td>41.6</td>
<td>44.5</td>
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<tr>
<td>utilisation rate %</td>
<td>92</td>
<td>90</td>
<td>94</td>
<td>90</td>
<td>90</td>
<td>92</td>
<td>92</td>
</tr>
<tr>
<td>Smelter production mt</td>
<td>28.0</td>
<td>29.9</td>
<td>31.9</td>
<td>33.8</td>
<td>36.5</td>
<td>38.3</td>
<td>41.0</td>
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<td>growth in smelter production %</td>
<td>7.6</td>
<td>6.6</td>
<td>6.7</td>
<td>6.1</td>
<td>7.8</td>
<td>5.1</td>
<td>7.0</td>
</tr>
<tr>
<td>Market balance mt</td>
<td>0.2</td>
<td>-0.4</td>
<td>-0.1</td>
<td>-0.3</td>
<td>0.2</td>
<td>-0.2</td>
<td>0.5</td>
</tr>
<tr>
<td>opening ww stock mt</td>
<td>4.7</td>
<td>4.9</td>
<td>4.5</td>
<td>4.4</td>
<td>4.1</td>
<td>4.3</td>
<td>4.1</td>
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<tr>
<td>closing ww stock mt</td>
<td>4.9</td>
<td>4.5</td>
<td>4.4</td>
<td>4.1</td>
<td>4.3</td>
<td>4.1</td>
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<td>Stock consumption ratio wks</td>
<td>9.2</td>
<td>7.7</td>
<td>7.2</td>
<td>6.2</td>
<td>6.2</td>
<td>5.5</td>
<td>5.9</td>
</tr>
<tr>
<td>LME stock mt</td>
<td>1.42</td>
<td>0.69</td>
<td>0.65</td>
<td>0.65</td>
<td>0.77</td>
<td>0.53</td>
<td>1.05</td>
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<td>LME/Total Stocks %</td>
<td>29</td>
<td>15</td>
<td>15</td>
<td>16</td>
<td>18</td>
<td>13</td>
<td>23</td>
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<tr>
<td>LME price average US$/lb</td>
<td>65</td>
<td>78</td>
<td>86</td>
<td>116</td>
<td>130</td>
<td>140</td>
<td>105</td>
</tr>
<tr>
<td>LME price change y/y %</td>
<td>6.0</td>
<td>20.0</td>
<td>10.5</td>
<td>35.3</td>
<td>11.6</td>
<td>7.7</td>
<td>-25.0</td>
</tr>
<tr>
<td>Alumina spot price average US$/t</td>
<td>274</td>
<td>404</td>
<td>448</td>
<td>444</td>
<td>325</td>
<td>325</td>
<td>350</td>
</tr>
<tr>
<td>Alumina price change y/y %</td>
<td>84.2</td>
<td>47.1</td>
<td>10.9</td>
<td>-0.9</td>
<td>-26.8</td>
<td>0.0</td>
<td>7.7</td>
</tr>
</tbody>
</table>

Source: Brook Hunt, CRU, Thompson Financial Datastream, UBS estimates

UBS aluminium forecasts for 2007E and 2008E are considerably above consensus. Furthermore, we expect stronger prices into 2008 as opposed to consensus which forecasts lower prices. We see the emergence of Chinese marginal capacity (cost push) and strong global consumption (comparable commodities such as steel have surprised positively) as highly supportive of our anti-consensus view.

Performance

Price performance during Q1 07 was essentially flat with the market confined to a USc121-134/lb band which reflected a reasonable balance between supply and demand. This meant that prices were left to the mercy of the other metals although gains were limited due to rising stocks and lack of market tightness. However, this did not deter some players from attempting to engineer price strength through holding large positions in futures and options contracts on the LME, though this has proved unsuccessful so far.
**Demand environment**

Global demand has remained robust with flat consumption growth in North America offset by stronger growth elsewhere, particularly in China.

In North America, a strong aerospace sector underpinned by a five-year order backlog at Boeing has been more than offset by weakness in the housing and autos sectors. The Aluminum Association reported North American semis orders were down 12% y/y in the first two months of the year. We expect that the worst has passed and that demand levels should pick up over the course of the year bolstered by strong growth in the packaging market.

European growth remained strong with healthy domestic demand reinforcing good export growth, industrial production in Germany accelerated at a faster rate than expected. Packaging, construction and aerospace sectors should underpin consumption this year, with weak car sales and production being the only negative factor.

Chinese industrial production growth remained very strong in the opening few months of the year, which has meant that aluminium demand has been maintained at a very high level. This was highlighted by Chinese semis consumption data available for the first two months of this year which showed 46% y/y growth to 1.27Mt.

**Supply environment**

Spot alumina prices have risen from trough levels of US$205/t to the current level of US$360/t. The price recovery has been attributed to price increases by Chalco and the impact of a strike/political turmoil in Guinea, the world’s largest exporter of bauxite. We believe that despite the significant increase in alumina capacity being built in China, alumina prices will be well supported. This is a function of China’s growing dependency on imported bauxite.

Data from the International Aluminium Institute showed that in the first two months of the year primary production soared by 12.1% y/y to 5.8Mt, with Chinese output up a staggering 40%. The Chinese government has reiterated its concerns over capacity expansions and has asked local authorities to close those that do not meet state requirements. Further action on export rebates and taxes, particularly on aluminium products, is under consideration and moves are expected before the end of the summer.

Energy remains a key issue despite the recent decline in oil prices. We believe that over the next several years it could be a challenge for new smelter construction to keep pace with demand growth.

**News-flow to watch for**

- China – late May, April trade statistics
- Monthly production and inventory statistics from International Aluminium Institute
**Chart 129: Long-term aluminium price trend**

Source: USGS, LME, UBS forecasts

**Chart 130: Spot alumina price trend**

Source: Metal Bulletin, UBS

**Chart 131: Aluminium price and supply/demand balance**

Source: Brook Hunt, UBS estimates

**Chart 132: Spot aluminium price trend**

Source: LME, UBS

**Chart 133: LME inventories vs. aluminium price (from 1970)**

Source: LME, UBS estimates

**Chart 134: Global IP and aluminium consumption growth**

Source: Brook Hunt, UBS estimates
**Chart 135: Chinese aluminium net import/export profile (mt)**

![Graph showing Chinese aluminium net import/export profile (mt) from 2001 to 2007E.](image)

Source: Chinese Customs Statistics, UBS estimates

**Chart 136: Aluminium demand by end-use, 2006E**

![Graph showing aluminium demand by end-use for 2006E.](image)

Source: AME, UBS estimates

**Chart 137: Aluminium supply by region, 2006E**

![Graph showing aluminium supply by region for 2006E.](image)

Source: AME, Brook Hunt, UBS estimates

**Chart 138: China aluminium consumption – projection**

![Graph showing China aluminium consumption projection based on western world per capita trends (mt).](image)

Source: UN, UBS estimates

**Chart 139: Aluminium demand by region, 2006E**

![Graph showing aluminium demand by region for 2006E.](image)

Source: AME, Brook Hunt, UBS estimates

**Chart 140: Top aluminium smelters, 2006E**

![Graph showing top aluminium smelters for 2006E.](image)

Source: AME, Brook Hunt, UBS estimates
Copper

This important benchmark metal remains highly prospective despite the appearance of some slack in western markets; fundamentals are supported by secular demand trends from high-growth emerging markets, especially China and India. Supply growth for copper remains problematic as the resource quality of existing operations declines and operational risks/costs grow. We believe copper price levels will remain resilient well into 2007E despite an emerging market surplus with a forecast of US$3.00/lb.

Table 17: Global copper market supply/demand balance

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<tr>
<td>Global IP growth</td>
<td>%</td>
<td></td>
<td></td>
<td></td>
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<td>x</td>
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<td>0.10</td>
<td>0.74</td>
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<td>9.1</td>
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<td>mt</td>
<td>15.5</td>
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<td>4.5</td>
<td>4.3</td>
<td>4.6</td>
<td>5.6</td>
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<td>167</td>
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<td>300</td>
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<td>%</td>
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<td>61.2</td>
<td>28.4</td>
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<td>Copper Smelter TC/RC</td>
<td>US$/t</td>
<td>57/5.7</td>
<td>115/11.5</td>
<td>100/10</td>
<td>60/6</td>
<td>55/5.5</td>
<td>50/5</td>
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</table>

Source: Brook Hunt, CRU, Thompson Financial Datastream, UBS estimates

UBS copper price forecasts are above consensus by 12% and 19% for 2007E and 2008E respectively. Given the recent, sharp rebound in pricing, we suspect that consensus will quickly re-adjust upwards over the next several months. The current strength in price is expected to be sustained over the current quarter; however there are some risks as the summer-slowdown period approaches.

Performance

Copper prices bottomed out in early February around USc237/lb and rallied steadily thereafter towards the USc361/lb level on falling LME stocks and Chinese buying ahead of the peak demand season during Q2 07. Falling visible stocks and Chinese buying reflected in strong refined imports laid the foundation for the impressive price rally. More recently, supply disruptions and threats have resurfaced at a time of declining concentrate stocks which has helped to tighten the market, as evidenced by widening nearby backwardations. Short covering by speculators/funds was a primary factor behind the surge in prices, with over half of the outstanding net short position on Comex now covered.
Demand environment

Copper demand has picked up as Q1 07 progressed highlighted by declining LME inventories in Europe and the US reinforcing the ongoing decline seen in Asia. In the European Union, which accounted for 22% of global copper demand in 2006, the business climate has improved. US copper demand was poor in Q4 06 and destocking took place. Q1 07 has seen some stabilization but at lower rates of consumption than in Q1 06, as the housing sector appeared close to bottoming out.

China’s refined imports of copper have rebounded strongly, Q1 07 imports were more than double year-ago levels. This was in response to continued buoyant economic growth, higher physical premiums, falling LME stocks and a favourable SHFE/LME arbitrage.

Demand destruction remains very limited. High prices across the board have resulted in less substitution by other materials in copper’s major end-use markets than was first feared, according to the International Wrought Copper Council. Power cables continued to represent a growth market, as did optical fibres used in communications, magnet wiring in motors and wiring harnesses used in the auto industry. Copper tube had been the most affected with substitution by plastics.

Supply environment

There are growing indications that the copper concentrate market is very tight and likely to get tighter in 2007. We expect that this tightness will ultimately flow through to the cathode market. Supply disruptions caused by flooding lead to lower production in Zambia and Argentina. Additionally, labour unrest has emerged in Chile and at the Grasberg mine.

We believe that the copper market was in slight deficit for 2006. Consumption growth was considerably stronger y/y largely due to weak consumption in 2005 which had been impacted by de-stocking in the western world. Balances in 2006 were also affected by continued supply difficulties, particularly impacting output in mined copper concentrates. During Q1 07 the market was balanced.

2007 forecasts account for the expected slowdown in demand in the western world and the potential for modest production difficulties, which we note are continuing. We expect the copper market to be in surplus by about 200kt in 2007, nevertheless we would suggest that inventory adjustments in Asia could push this closer to balance. The stock: consumption ratio should remain low, below five weeks, thereby supportive of continued high pricing.

News-flow to watch for

- Phelps Dodge – 27th July, Q2 results
- China – late May, April trade statistics (imports, domestic production)
**Chart 141: Long-term copper price trend (USc/lb.)**

- Copper price (real)
- Copper price forecast

Source: USGS, LME, UBS forecasts

**Chart 142: Short-term LME stock movements – copper**

- LME copper stocks (tonnes)

Source: LME, UBS

**Chart 143: Copper price and supply/demand balance**

- Market balance (LHS)
- LME price average (RHS)

Source: Brook Hunt, ICSG, UBS estimates

**Chart 144: Spot copper price trend (USc/lb.)**

- LME copper price (USc/lb.)

Source: LME, UBS

**Chart 145: LME inventories vs. LME copper price (from 1970)**

- LME price vs. inventory - Copper

Source: LME, UBS estimates

**Chart 146: Global IP growth and copper consumption growth**

- growth in copper demand
- global IP growth

Source: Brook Hunt, ICSG, UBS estimates
Chart 147: Chinese copper concentrate import profile (USc/lb)

Source: Chinese Customs Statistics, UBS estimates

Chart 148: Copper demand by end-use, 2006E

Source: AME., UBS estimates

Chart 149: Copper supply (mine) by region, 2006E

Source: AME, Brook Hunt, UBS estimates

Chart 150: China copper consumption – projection

Source: UN, UBS estimates

Chart 151: Copper demand (refined) by region, 2006E

Source: AME, Brook Hunt, UBS estimates

Chart 152: Top Copper miners, 2006E

Source: AME, Brook Hunt, UBS estimates
Lead

Stronger demand growth will counter additional mine production expected in 2007 and a balanced market is expected as a result following a small deficit in 2006. Surpluses are forecast for 2008 and 2009 as supply growth outpaces demand growth. Chinese refined exports remain the ‘wild card.’ Although prices are forecast to remain above historical average levels we see a weaker price trend going forward.

Table 18: Global lead market supply/demand balance

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<tr>
<td>Gold IP growth</td>
<td>%</td>
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<td>demand</td>
<td>mt</td>
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<td>84</td>
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<td>Primary smelter</td>
<td>%</td>
<td>-1.4</td>
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<td>14.3</td>
<td>5.0</td>
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<td>production</td>
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<td>production</td>
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<tr>
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<td>mt</td>
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<td>6.9</td>
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<td>55</td>
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<td>71.6</td>
<td>10.4</td>
<td>30.9</td>
<td>34.5</td>
<td>-29.5</td>
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</table>

Source: Brook Hunt, CRU, Thompson Financial Datastream, UBS estimates

UBS lead forecasts for both 2007E and 2008E are higher than consensus (by 24% and 20% respectively).

Performance

Lead prices performed strongly during Q1 rising from lows of US$1,590/t (USc72/lb) to a recent peak of US$2,030/t (USc92/lb) on supply disruptions, low stocks and steady consumption levels. As was the case last year speculative activity remained at a high level with buyers attracted to tight supply/demand fundamentals and the vulnerability of the LME contract to being squeezed due to illiquidity considerations. Sharply lower Chinese exports of lead in the year to date have also tightened the market.

Demand environment

Refined lead consumption grew 12.5% y/y to 1.44Mt in the first two months of the year, according to the ILZSG. However, demand growth has been weaker than expected and this is reflected in softening physical premia in the major consuming regions. Nevertheless, consumer restocking prior to the summer replacement battery demand season together with robust industrial battery demand is expected to underpin consumption growth in the short-term.
While lead consumption remains steady but unspectacular in the US, Europe and Japan largely due to flat car and light vehicle production, stronger growth is occurring in the developing world. Battery manufacturers in India expect lead consumption to increase by 15% to 250kt in 2007 because of rising car sales which are anticipated to reach 2 million units by 2010. Annual car sales are currently 1.4 million units. Mexican consumption will be underpinned by the relocation of battery manufacturing facilities from the US. Meanwhile, China has become the world’s second largest automotive market and robust increases in battery production should continue to drive lead demand growth.

LME lead stocks year to date are unchanged but this is not the full picture. Stocks started the year at around 40kt dipped to lows of about 30kt following supply problems and are currently just above 40kt. Global inventories remain very low, standing at 2.6 weeks worth of consumption at the end of February compared to 3 weeks worth of consumption at the end of 2006.

**Supply environment**

Although healthy increases are expected this year for both mine and refined production growth it is currently supply problems that have grabbed the headlines. Shipments from Ivernia West’s Magellan mine in Australia have been suspended pending further investigations in bird deaths around the port of Esperance. Magellan produced 63kt of lead contained in concentrate in 2006 and was expected to produce 84kt this year. The mine is on care and maintenance for 3-4 months and the shortfall will be between 21kt and 28kt of lead. At Xstrata’s Northfleet refinery in the UK force majeure on refined deliveries was invoked in early February. This resulted from a decline in raw material feedstock to the refinery which stemmed from lower grade ores at a mine in Australia.

In the January edition of Commodity Connections our supply and demand projections called for a balanced market in 2007. Following disruptions to mine and refined supply and the consequent production shortfalls we now expect the market to remain in deficit to the tune of 70kt. We expect to see a return to a surplus in 2008 as production growth outpaces demand growth.

Another reason for believing that the market will remain in deficit this year is our expectation of lower net exports of refined metal from China following the imposition of an export tax at the end of last year. In Q12007 China’s exports of refined lead reached 43kt, a decrease of 72% year-on-year. Last year, net exports reached 504kt and the trend so far suggests that full year 2007 levels should be significantly down.

**News-flow to watch for**

- China – late May, April trade/production statistics (imports, exports, domestic production)
- Monthly production, consumption and stocks data from the ILZSG

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**Developing world growth driven by automotive battery production**

**LME stocks unchanged year to date as global inventories remain very low**

**Supply disruptions see production shortfall**

**Lead market to remain in deficit this year**

**Export tax prompts lower Chinese net exports of refined metal**

**Analyst: Robin Bhar / Daniel Brebner**

+44 207 567 7850 / +44 207 568 3451
Chart 153: Longer-term lead price trend

- Lead price (real)
- Lead price forecast

Source: LME, UBS

Chart 154: Short-term LME stock movements - lead

- LME lead stocks (tonnes)

Source: LME, UBS

Chart 155: Lead price and supply/demand balance

- Market balance (LHS)
- LME price average (RHS)

Source: Brook Hunt, UBS estimates

Chart 156: Spot lead price trend

- LME lead (US¢/lb.)

Source: Mysteel.com, UBS

Chart 157: LME inventories vs. LME lead price

- LME price vs. inventory - lead

Source: LME, UBS estimates

Chart 158: Global IP growth and lead consumption growth

- Growth in lead demand
- Global IP growth

Source: Brook Hunt, UBS estimates
Chart 159: Chinese lead export profile

Source: UBS estimates

Chart 160: Lead demand by end-use, 2006E

Source: AME, UBS estimates

Chart 161: Lead mine supply by region, 2006E

Source: AME, UBS estimates

Chart 162: China lead consumption - projection

Source: UBS estimates

Chart 163: Lead demand by region, 2006E

Source: AME, UBS estimates

Chart 164: Top lead miners, 2006E

Source: AME, UBS estimates
Nickel

Strong stainless steel and alloy demand in both the western world and emerging economies, combined with reasonably constricted supply growth is expected to keep nickel prices well supported over the longer-term despite the possibility of some demand destruction due to substitution. While we expect the nickel price could retrace from recent highs as stainless de-stocking may occur in the west, we expect prices to remain relatively high.

Table 19: Global nickel market supply/demand balance

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<td>4.5</td>
<td>5.7</td>
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<td>x</td>
<td>2.4</td>
<td>1.4</td>
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<td>Total demand for nickel</td>
<td>kt</td>
<td>1,242</td>
<td>1,288</td>
<td>1,277</td>
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<td>%</td>
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<td>3.7</td>
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<td>1,280</td>
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<td>-9</td>
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<td>LME price average</td>
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<td>669</td>
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<td>1744</td>
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<td>%</td>
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<td>64.4</td>
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</table>

Source: Brook Hunt, CRU, LME, UBS estimates

The UBS 2007E nickel price forecast is higher than consensus by 31%, but in-line with consensus for 2008E.

Performance

The strong price performance seen in 2006 continued into 2007 with the market increasing by a further 50% and a new all-time peak of US$52,375/t (US¢2376/lb) was recorded recently. Strong demand from stainless/non-stainless steel sectors coupled with a lack of new supply has seen prices maintained at extraordinary levels. With supply/demand remaining very tight indeed, global inventories have remained very low. Highly visible LME stocks have not moved away from what are acknowledged to be critically low levels and attest to the tight supply/demand fundamentals of the market which we expect to remain in place during 2007.

Our 2007E nickel price forecast is higher than consensus

Nickel market has started 2007 where it had left off in 2006...

...resulting in new record high in early 2007
Demand environment

Strong nickel consumption growth is forecast over the next two years due to robust growth in global output of stainless steel and sustained strength in demand from the superalloys sectors. Some demand moderation is expected in 2009.

A strong turnaround in the global stainless steel market during 2006 was responsible for the resurgence in nickel prices. Stainless steel production rose by 16.7% to 28.4Mt in 2006, according to the International Stainless Steel Forum (ISSF). This compared to a decline of 1.1% in 2005 as all major regions contributed to this strong growth. Crude stainless steel production in Asia grew by 20.6% to 15.1Mt and now produces more than half of all stainless steel in the world. The driving force remained China with production of 5.3Mt of stainless steel, a growth rate of 68% compared to 2005. The strong increase in production was based on new capacity which came on-stream during 2006, with further capacity increases scheduled for this year. Stainless production this year is expected to reach 7.3Mt.

Anecdotal reports of demand destruction due to very high prices have emerged over the past few months. These have been related to switching to ferritic from austenitic grades and the production of 200/400-series stainless steels which use less or no nickel. How much primary demand has been displaced in this way is difficult to quantify but only 15-20% of total nickel demand was price elastic, according to the Nickel Institute.

Supply environment

With little spare capacity available and no new major supply on the immediate horizon it could be argued that prices have to remain high in order to ration demand. New nickel production at Ravensthorpe in Australia and Goro in New Caledonia has been delayed, with commissioning now expected in 2008 or 2009. This will only partly be countered by the start up of smaller operations at Caldag (Turkey), Avebury (Australia) in 2007 and Munali (Zambia) in 2008. Adverse weather conditions may also affect nickel production in Cuba and Indonesia resulting in lower than planned output. China though is importing low-grade laterite ore to process into pig iron containing between 2-4% nickel. This displaced 30kt of refined nickel demand in China in 2006 and is likely to displace another 50-60kt this year.

A tight nickel market is in prospect over the forecast period due to the delays at Ravensthorpe and Goro with little relief seen until 2009, but even then supply and demand is likely to be roughly balanced. Prices are expected to peak in 2007 and some moderation is anticipated from 2008 onwards on demand destruction and slower growth from the aerospace industry.

News-flow to watch for

- China – late May, April trade/production statistics (imports, exports, domestic production).

Stainless and non-stainless sectors are buoyant

Stainless steel production grew 16.7% in 2006 driven by China

Only 15-20% of total nickel demand price elastic

No major supply increase on immediate horizon

Tight nickel market in 2007-2008

Analyst: Robin Bhar / Daniel Brebner
+44 207 567 7850 / +44 207 568 3451
Chart 165: Long-term nickel price trend

Source: USGS, UBS estimates

Chart 166: Short-term LME stock movements - nickel

Source: LME, UBS

Chart 167: Nickel price and supply/demand balance

Source: Brook Hunt, UBS estimates

Chart 168: Spot nickel price trend

Source: LME, UBS

Chart 169: LME inventories vs. LME nickel price

Source: LME, UBS estimates

Chart 170: Global IP growth and nickel consumption growth

Source: Brook Hunt, UBS estimates
Chart 171: China net nickel import trend

Source: China customs statistics, UBS estimates

Chart 172: Demand composition of nickel market

Source: AME, UBS estimates

Chart 173: Nickel mine supply by region, 2006E

Source: AME, UBS estimates

Chart 174: China nickel consumption/production profile

Source: China customs statistics, UBS estimates

Chart 175: Refined nickel demand by region, 2006E

Source: AME, UBS estimates

Chart 176: Top nickel miners, 2006E

Source: AME, UBS estimates
**Tin**

- Production growth was forecast to remain fairly modest even before the clampdown on production in Indonesia. Coupled with robust consumption growth resulting in a further fall in the stocks ratio we expect the market to remain in deficit in 2007-08; a small surplus emerging in 2009. **We expect prices to peak in 2008 and to decline in 2009 but remain above historical average levels.**

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**Table 20: Global tin market supply/demand balance**

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>World IP growth</td>
<td>%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>ratio of growth: demand/IP</td>
<td>x</td>
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<td></td>
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<td></td>
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<tr>
<td>growth in tin demand</td>
<td>%</td>
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<tr>
<td>Refined tin demand</td>
<td>kt</td>
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<td>385.0</td>
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<td>kt</td>
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<td>%</td>
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<td></td>
<td></td>
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<td>Smelter capacity</td>
<td>kt</td>
<td>300.0</td>
<td>350.0</td>
<td>380.0</td>
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<td>377.0</td>
<td>370.0</td>
<td>372.0</td>
<td>410.0</td>
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<td>DLA Sales</td>
<td>kt</td>
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<td>9.0</td>
<td>9.0</td>
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<td>354.0</td>
<td>386.0</td>
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<td>382.0</td>
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<td>%</td>
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<td>9.0</td>
<td>-1.6</td>
<td>0.5</td>
<td>8.6</td>
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<td>kt</td>
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<td>46.0</td>
<td>-5.0</td>
<td>-20.0</td>
<td>0.0</td>
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<tr>
<td>Stock consumption ratio</td>
<td>wks</td>
<td>6.5</td>
<td>4.4</td>
<td>5.5</td>
<td>4.2</td>
<td>1.4</td>
<td>1.4</td>
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<tr>
<td>LME stocks</td>
<td>kt</td>
<td>15.0</td>
<td>8.0</td>
<td>17.0</td>
<td>13.0</td>
<td>6.0</td>
<td>5.0</td>
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<td>LME price average</td>
<td>US$/lb</td>
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<td>386</td>
<td>335</td>
<td>397</td>
<td>475</td>
<td>475</td>
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<td>LME price change y/y</td>
<td>%</td>
<td>20.7</td>
<td>73.9</td>
<td>-13.2</td>
<td>18.5</td>
<td>13.4</td>
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</table>

Source: Brook Hunt, CRU, Thompson Financial Datastream, UBS estimates

We believe we are above consensus forecasts for the tin market in 2006-2008.

**Performance**

After an impressive performance in 2006 the tin market has performed strongly so far in 2007. Prices have risen 50% from lows of US$10,100/t (USc454/lb) at the start of the year to hit a recent high above US$15,000/t (USc680/lb). Supply concerns were behind the price strength for much of the quarter and when these started to recede in the last few weeks; tin prices have come under renewed pressure again. Privately-owned Indonesian smelters have not yet started to resume production but one of the largest smelters, PT Koba Tin, has recently received an export permit and is expected to resume operations soon.

**Demand environment**

World tin consumption is expected to increase by more than 13% in 2006, to reach a new record level of 385kt, or more than 1kt per day, according to the International Tin Research Institute (ITRI). During 1H06 year-on-year growth reached almost 19%, driven by robust global economic growth, growth in the Asian electronics industry and rapid increases in sales of lead-free solder in most key markets.
However, there are growing indications that high prices are prompting some demand destruction. Global tin demand was 58.1kt in the first two months of the year compared to 59.6kt a year ago, a fall of 2.5% according to the World Bureau of Metal Statistics. The International Tin Research Institute warned that record high tin prices could hurt the metal’s chances of finding new applications and markets.

Despite weaker demand trends LME stocks have declined in the year to date. Having started the year at 13kt stocks have steadily fallen to just below 9kt and we attribute this to consumer restocking amid concerns over supply.

**Supply environment**

Indonesian tin production has been sharply reduced since last October by government efforts to regulate small-scale mining and independent smelters. Each smelter has to apply for an export permit in order to resume operations and shipments of metal but the process has proved to be very slow and the situation could best be described as confused. To date, a total of nine smelters have received export permits but it is unknown when production will commence. Included in the nine is PT Koba Tin, the country’s second largest producer. The Indonesian government has said it would make every effort to maintain refined output this year of 90kt, but this would represent a sharp drop from the 125kt produced in 2006.

China’s net exports of tin have been falling as a result of strong domestic consumption growth. Last year was the first year that the country was a net importer of refined metal, to the tune of 8kt. In Q12007, China returned to being a small net exporter of refined tin but we are doubtful that this trend can be maintained for the whole of 2007.

Although the situation in Indonesia remains unclear as to the status of the various independent smelters, one thing appears more certain, production is unlikely to return to the levels seen last year. A production shortfall of at least 20kt seems probable in 2007 and it is likely to take until well into late 2007/early 2008 for the situation to be completely resolved. As a result, we expect the market to record a bigger deficit than we had in the January edition of Commodity Connections. This year we see the market in a deficit to the tune of 20kt and remaining roughly balanced over the forecast period. The implication of this is that the stocks ratio will remain very low and will support firm prices in 2007 and 2008.

**News-flow to watch for**

- China – late May, April trade/production statistics (imports, exports, domestic production)

---

...but demand destruction caused by high prices

LME stocks falling but above critical levels

Indonesian smelters receive export permits

Chinese tin exports declining; a return to being a net importer

Market to remain in deficit in 2007; roughly balanced in 2008-09

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Analyst: Robin Bhar / Daniel Brebner

+44 207 567 7850 / +44 207 568 3451
Chart 177: Longer-term tin price trend

Source: LME, UBS

Chart 178: Short-term LME stock movements - tin

Source: LME, UBS

Chart 179: Tin price and supply/demand balance

Source: WBMS, UBS estimates

Chart 180: Spot tin price trend

Source: LME, UBS

Chart 181: LME inventories vs. LME tin price

Source: LME, UBS estimates

Chart 182: Global IP growth and tin consumption growth

Source: WBMS, UBS estimates
Chart 183: Chinese tin export profile

Source: WBMS, UBS estimates

Chart 184: Tin demand by end-use (2006E)

Source: WBMS, UBS estimates

Chart 185: Tin mine supply by region, 2006E

Source: WBMS, UBS estimates

Chart 186: China tin consumption - projection

Source: WBMS, UBS estimates

Chart 187: Tin demand by region, 2006E

Source: WBMS, UBS estimates

Chart 188: Top tin miners, 2006E

Source: WBMS, UBS estimates
Zinc

- Our view on zinc fundamentals has moderated significantly over the past quarter. While we believe that China will remain a positive driver for zinc fundamentals in 2007 this is likely to be more than offset by the emergence of western mine production, resulting in nearly 10% growth in supply. While we expect prices to remain strong, we believe that the fundamentals which resulted in the strong price performance in 2006 have largely run their course.

Table 21: Global zinc market supply/demand balance

<table>
<thead>
<tr>
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<td>World IP growth</td>
<td>%</td>
<td>3.6</td>
<td>5.9</td>
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<td>mt</td>
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<td>Secondary (prompt)</td>
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<td>11.9</td>
<td>12.8</td>
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<td>0.1</td>
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<td>1.7</td>
<td>1.9</td>
<td>3.5</td>
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<td>LME price average</td>
<td>US¢/lb</td>
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<td>48</td>
<td>63</td>
<td>148</td>
<td>155</td>
<td>150</td>
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<td>%</td>
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<td>25.4</td>
<td>31.7</td>
<td>136.4</td>
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<td>-3.2</td>
</tr>
</tbody>
</table>

Source: Brook Hunt, CRU, Thompson Financial Datastream, UBS estimates

UBS forecasts for zinc are about 7% lower than consensus for 2007E, and about 11% higher than consensus for 2008.

**Performance**

Price performance during Q1 07 has been poor with zinc a laggard amid slower demand growth (particularly in the US) and continued high exports of metal from China. At the start of the year prices were comfortably trading above the US$4,000/t (USc181/lb) level falling to a low of around US$3,000/t (USc136/lb) – a function of index re-weighting at the beginning of the year – and then trading sideways thereafter. More recently, prices have moved higher in response to the rise in LME stocks having ended and global inventories still low at 3.6 weeks worth of consumption going into the Q2 07 peak demand season.

**Demand environment**

Despite considerable cyclical headwinds from the US, we expect that zinc consumption growth should remain at relatively high levels. In general we believe that investors have a tendency to overestimate the effects of the US slowdown and understand the resilient nature of industrialisation/
urbanisation trends which are impacting a large segment of the world’s population (China, India, Russia, the ‘Next Billion’, etc).

Demand growth is expected to fall from 6.4% to 4.1% y/y in 2007 as global industrial production weakens. Total zinc demand in 2007 is anticipated to be roughly 11.8Mt in total, an increase of 500kt, of which nearly half is expected to be demand from China. We expect Chinese consumption of about 3.3mt in 2007, an 8% increase on 2006. The key driver to this number is galvanised steel production (used in the construction and, to a small but increasing extent, automotive industries). We expect China’s galvanised steel sheet output to increase nearly 28% in 2007 as compared to 68% in 2006 and 87% in 2005. Assuming Chinese produced galvanised sheet contains about 4% zinc and considering stocking implications from increased production, we estimate that nearly 760kt of zinc could be used in the galvanised steel sheet production in 2007, an additional 140kt over 2006 levels.

**Supply environment**

We expect that about 15 new mine projects will come on line in 2007 and coupled with mine expansions will contribute to nearly 1.2mt of mine production. There will likely be delays, nevertheless, supply is responding and will help to balance the market this year. Global mine supply growth is expected to easily exceed 10% in 2007, up from about 7.5% in 2006. We note that Chinese production of refined metal is increasingly reliant on imported zinc concentrate. Chinese zinc concentrate imports are likely to continue to grow into 2007 and could reach about 650kt an increase of 56% on 2006 levels.

A surge in refined zinc output in China coupled with changes to import/export taxes saw strong exports of metal at the end of last year. We expect that the recent surge in zinc metal exports is likely to be short lived as we are unconvinced that there are substantial inventories of zinc (concentrate or metal) sitting in China and given the current tightness in concentrate markets. This means the increase in zinc metal output is unlikely to exceed the increase in concentrate input.

In 2007 we expect that the zinc market could show a small surplus in the first half of the year before tightening as global economic activity recovers into 2008; the end result being a largely balanced market in 2007. We expect a modest surplus in 2008 as supply growth continues to exceed that of demand.

While we expect zinc prices to average US$1.55/lb (US$3,417/t), we are increasingly wary of the supply response globally and see prices declining to US$1.50/lb in 2008 and US$1.00/lb in 2009.

**News-flow to watch for**

- China – late May, April trade/production statistics (imports, exports, domestic production)

- Early May – ILZSG global data on production, demand and stocks
Chart 189: Long-term zinc price trend

Source: USGS, LME, UBS estimates

Chart 190: Short-term LME stock movements – zinc

Source: LME, UBS

Chart 191: Zinc price and supply/demand balance

Source: Brook Hunt, UBS estimates

Chart 192: Spot zinc price trend

Source: LME, UBS

Chart 193: LME inventories vs. LME zinc price (from 1988)

Source: LME, UBS

Chart 194: Global IP growth and zinc consumption growth

Source: Brook Hunt, UBS estimates
Chart 195: China zinc import/export trends

-1.0  -0.5  0.0  0.5  1.0  1.5  2.0

China zinc concentrate imports (mt)  China zinc metal imports (mt)

Source: China customs statistics, UBS estimates

Chart 196: Demand composition of zinc market

0%  20%  40%  60%  80%  100%

World China

Galvanising  Alloys  Brass  Semis  Chemicals  Others

Source: AME, UBS estimates

Chart 197: Zinc mine supply by region, 2006E

Other Asia  25%  N. America  15%  W. Europe  7%  MidEast  1%

GEM  25%  Japan  0%  China  27%

Source: AME, UBS estimates

Chart 198: China zinc consumption/production profile


China zinc slab consumption (mt)  China domestic zinc metal production (mt)

Source: China customs statistics, UBS estimates

Chart 199: Refined zinc demand by region, 2006E

N. America  13%  W. Europe  22%  Other Asia  22%

MidEast  1%  China  25%  Japan  6%  GEM  11%

Source: AME, UBS estimates

Chart 200: Top zinc miners, 2006E

Teck  7%  Zinifex  6%  Falconbridge  5%

Cominco  6%  Boliden  3%  Xstrata  4%

Others  61%  Next 5  14%

Source: AME, company documents, UBS estimates
Precious Metals

Volatile start to 2007

After a rocky start to January, precious metals traded higher in the first four months of 2007 and are mostly ending April near their best levels for the year. The following chart shows the performance of the five precious metals over the past six months.

Chart 201: Precious metals prices re-indexed from January 2007

![Chart showing precious metals prices re-indexed from January 2007]

Source: Bloomberg, UBS calculations

A number of common factors have played a role in driving the precious metals over the past few months.

Ample financial market liquidity

When UBS cross-sector market strategists were asked what is the largest risk to their forecasts in January, all came up with sector specific factors that could lead to below forecast outcomes for their asset classes, but the one common theme that concerned them was a withdrawal of financial market liquidity. This hard-to-define measure refers to the willingness of investors to borrow money to invest in a wide range of asset classes including perhaps the best know example the carry trade, where borrowing is undertaken in currencies with low yielding interest rates (Japanese yen, Swiss francs, Taiwanese dollars) and invested in high yielding assets (Brazilian Real, Turkish lira, Australian dollar, etc): another visible barometer of financial market liquidity is the ability of private equity companies to finance seemingly ever larger leveraged buy outs. But financial market leverage is at the heart of most risk asset markets from equities, fixed income, to emerging market investments, commodities and real estate. One consequence of this is that when sector specific concerns reach a certain critical mass, such as when rising default rates rattled the US sub-prime mortgage market in February and March, asset prices fell across the world as investors “took profits” or perhaps more correctly described “reduced risk” or “De-leverage”. Precious metals were not immune from this sell off and saw rapid and quite deep corrections although with the exception of silver all five precious metals have recovered their recent losses and gone onto trade higher – in some cases materially higher.
We expect the current conditions of ample financial market liquidity to persist in 2007 and, with the support of still-strong economic growth, precious metals should trade higher this year. But we do not expect plain sailing throughout the year: the past twelve months has seen three deep commodity market corrections (May/June 06, September 06 and February/March 07) due to factors mostly external to the commodity markets that triggered a temporary withdrawal in liquidity. We expect further such events this year: it was interesting to note that following the rebound in metals, equities, etc in late March / early April this year, markets have turned jittery again. We suspect investors are looking for a reason to lock in gains and are hunting for something to trigger the next sell-off, hence the focus on too-strong Chinese Q1 economic growth in the week ending April 20th.

Cautious investors might wish to trade the markets in a contrary fashion, using measure of risk appetite / risk aversion as their guide. Since we expect further corrections this year, when risk appetite is strong (as shown on the UBS FX Risk Index on the chart above) and prices high, we believe positions should be reduced. In the midst of a correction when investors show no interest in holding risky assets, investors should consider rebuilding long positions. With metal prices again at elevated levels and risk appetite high, some profit taking at current levels should be now considered by investors following such a strategy.

Still strong global economic growth

As is noted elsewhere in this report, global economic growth remains strong, if at a slightly less rapid pace than in 2006 as the US economy slows. But the Chinese economy has not seen the expected slow-down with Q1 GDP at 11.1% y/y so strong that financial markets took brief flight in mid April as investors worried that the Chinese authorities would take new steps to slow burgeoning economic and export growth. European economic growth continues to surprise on the upside and our economists have recently sharply upgraded their IP forecasts for 2007, while Bhanu Baweja, an FX strategy colleague, has just returned from Asia singing the praises of domestic demand in most countries. Visible signs of strong demand have helped metals and energy perform well
during the first quarter and this broad based commodity strength has helped precious metals trade higher.

**Investor interest in precious metals**

Precious metals were heavily sold in early January as the dollar strengthened following a much stronger than expected US December employment report (aka non-farm payrolls). But some investors used this opportunity to buy precious metals at what would prove to be bargain levels and speculators and investors on the US futures markets quickly returned to buy precious metals, pausing only to reduce and then rebuild positions as market fears about the US mortgage market waxed and waned in February and March. Graphs of the COTR reports are shown in the individual metals write-ups below. ETF investors in gold and silver continued to build their positions although their activities were much less volatile than futures market investors, steadily buying and only occasionally reducing positions illustrated by the chart of gold ETF holdings below.

**Chart 203: ETF Holdings of the main six gold ETFs**

![Chart showing ETF holdings of the main six gold ETFs](chart.png)

Source: Exchange Traded Gold.com; Barclays iShares; ZKB, UBS

But over the counter (OTC) investor flows have been noticeable by their absence in the first few months of 2007, in stark contrast to what was seen in the first few months of 2006 when OTC players were very active in the precious metals markets. Based on extensive marketing to these investors – both hedge funds and private banks – many OTC investors are positively disposed towards precious metals but have yet to see a deep enough correction to be comfortable in building the positions they want to have, especially in gold.

**Dollar weakness**

Although early January saw the US dollar quickly strengthen, this proved to be a brief respite for the greenback, which has slid lower since largely due to one-off central bank repatriation flows according to Mansoor Mohi-Uddin, head of FX Strategy at UBS. To the extent that dollar weakness has provided support for metals – and precious metals are generally strongly negatively correlated to moves in the US dollar – this may be less of a theme in the remainder of 2007 although UBS does not forecast a return to sustained and broad based dollar strengthening.
Platinum boosted by rare confluence of events

Aside from the general factors that are playing a role in driving precious metals, platinum’s strong – if volatile – performance over the past six months is due to an unusually positive combination of events:

- Demand fundamentals remain strong with positive news flow on: European diesel vehicle penetrations; catalysed soot filter early adoption in Germany; pressure on CO2 emissions in Europe; signs that US government action to cut oil imports; and greater American acknowledgement of global warming will prompt greater diesel uptake in US markets over time.

- The platinum supply response remains unremarkable at mid single digit percentages, providing only just enough output growth to prevent the platinum market from seizing up. Short term supply disruptions as a result of Lonmin’s Dec-06 smelter explosion and Norilsk’s inability to export platinum (and rhodium, ruthenium, iridium) due to bureaucratic delays has kept the market starved of enough new metal supply. Prices have not spiralled out of control, though, due to relative abundance of platinum in the Zurich clearing system allowing the mining companies to borrow their requirements. Low stocks in Zurich in Q4-06 led to the spike in prices and interest rates. But the spike resulted in a rush to ship metal to Zurich to take advantage of higher deposit rates and this has left Zurich stocks unusually high, although these are beginning to slowly fall.

- News that two physically backed platinum ETFs will be launched has seen platinum bought and borrowed in anticipation of a repeat of the spike in price and interest rates seen in November. The background to the platinum spike and ongoing vulnerability to a repeat of such an event was discussed in a UBS Metals Perspectives titled: “Platinum: It could happen again” 27 November 2006. Similarly, the implications of the impending launch of ETFs on platinum were described in another Metals Perspectives document “ETFs to lift platinum and palladium prices higher”, 17 April 2007.

The only change made to our precious metals forecasts since the January release of commodity connections was to lift platinum price forecasts for 2008 and 2009, although these changes were made before the news of the ETF launch. Time permitting; we will undertake a thorough review of the outlook for the platinum and the other PGMs after Platinum Week meetings in London in May.

Summary of views

Three of the five precious metals we cover – platinum, rhodium and palladium – are trading above our forecast averages for the year; silver is trading at our average forecast for the year and gold at $692/oz – is within one good push of this level. With speculative positions on US futures markets at quite high levels and investors’ risk appetite returning to enthusiasm if not (quite) euphoria, we like precious metals less now than we did when we released the previous edition of Commodity Connections at the end of January 2007: after all, prices were then a lot lower than they are now. This does not mean that we do not expect prices to trade higher from current levels: in all cases we do see further short term gains. But the risk / reward ratio does not, in our opinion, favour

Platinum has a number of specific positive drivers this year

Platinum has had a number of specific positive drivers this year

The only forecast change since the last commodity connections was to raise 2008 and 2009 platinum price forecasts

Prices are near, at, or above our forecast averages for 2007
adding to long positions in gold, silver and rhodium at the moment. We would rather wait for an inevitable correction and then re-assess and potentially act.

Table 22: Precious Metals Forecasts

<table>
<thead>
<tr>
<th>Annual Averages</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gold US/oz</td>
<td>700</td>
<td>650</td>
<td>550</td>
</tr>
<tr>
<td>Silver US/oz</td>
<td>14.00</td>
<td>13.00</td>
<td>11.00</td>
</tr>
<tr>
<td>Platinum US/oz</td>
<td>1225</td>
<td>1200</td>
<td>1100</td>
</tr>
<tr>
<td>Palladium US/oz</td>
<td>350</td>
<td>320</td>
<td>280</td>
</tr>
<tr>
<td>Rhodium US/oz</td>
<td>5500</td>
<td>4500</td>
<td>3000</td>
</tr>
</tbody>
</table>

Source: UBS Forecasts

Summary of views

In order of preference:

- **We like platinum’s fundamentals the most out of all five precious metals despite nearing an all-time high. Stocks are low, investment positions relatively small, we believe, and demand driven by a mixture of Chinese jewellery appetite and particularly autocatalyst demand for predominantly diesel powered vehicles. Supply is very concentrated amongst a small number of South African and Russian producers and the risks of this concentration have been demonstrated by a series of accidents at smelters over the past few years. The extraordinary volatility seen in November 2006 is a demonstration of the risks to the upside in platinum and we would not be surprised by repeat performances in 2007 and beyond.**

- **We expect that gold will trade higher over the next 12 months, although we are approaching the average level we forecast for 2007. Due to relatively large positioning in the US futures market we are not advising investors to add aggressively at current levels but rather suggest waiting for an expected (but unforecastable) correction to build large long positions. Only when futures market long liquidation has occurred and physical demand is strong and steady we will feel confident in recommending additional investment in gold.**

- **Silver is an investment metal, like gold (and palladium), rather than a supply and demand driven industrial metal. It has tended to act as a high beta version of gold with the additional allure of a potential squeeze on silver stocks from the steadily growing IShares Silver ETF. But since precious metals corrected in Q1-07, silver alone out of the precious metals is yet to regain the highs of this year. On the one hand, this may be an opportunity to buy silver while it is relatively cheap although on the other hand it may be a sign of growing disillusionment with silver’s asymmetrical risk – it normally rises somewhat faster than rising gold prices but falls much faster and further during corrections. Investors positive about gold should rather buy gold and/or borrow silver rather than buying silver due to this downside risk.**
Rhodium has performed very well in 2007, breaking through the 2006 high of $6270/oz and trading to $6500/oz on a mixture of strong demand and restricted supply (Lonmin and Norilsk). Although this has the potential to drive metal prices higher in the short term, metal supply should soon return to normal, we believe. But we have heard that three years of high prices and tight metal supply has triggered a reaction from catalyst manufacturing companies who have reportedly developed “low rhodium” or even “zero rhodium” catalysts. The introduction of these products in coming years should see super-high rhodium prices decline. As ever, the opaque and illiquid nature of the rhodium market makes this a low conviction call.

Although we believe that palladium’s fundamentals have improved due to growth in the jewellery sector over the past two years, the metal remains in surplus after Russian stock sales. Indeed following the release of Johnson Matthey’s Platinum 2006 interim review in November we have taken a new, more bearish stance towards palladium and have accordingly downgraded our forecasts for 2007-2009. While the metal looks inexpensive compared to its long term incentive price, we suspect this will remain the case for at least the next three years. In our view, only if the two soon-to-be-launched ETFs substantially exceed our expectations will palladium trade sustainably higher.
Gold

Gold has performed well in the first few months of 2007 and is approaching our 2007 average forecast target of US$700/oz. Jewellery demand has underpinned the move and futures market speculators have lifted the metal higher. We do see gold trading higher on occasions during the balance of the year although the market does look rather vulnerable to a correction due to US futures market positioning. We still see gold higher in 2007, expecting an average of US$700/oz helped by a weaker dollar and still-firm commodity prices.

Table 23: Global gold supply/demand balance

<table>
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</thead>
<tbody>
<tr>
<td>Mine Production</td>
<td>2,620</td>
<td>2,492</td>
<td>2,550</td>
<td>2,471</td>
<td>2,520</td>
<td>2,500</td>
<td>2,500</td>
</tr>
<tr>
<td>Old Gold Scrap</td>
<td>944</td>
<td>849</td>
<td>886</td>
<td>1,108</td>
<td>1,120</td>
<td>900</td>
<td>700</td>
</tr>
<tr>
<td>Hedging</td>
<td>-255</td>
<td>-422</td>
<td>-86</td>
<td>-373</td>
<td>-200</td>
<td>-200</td>
<td>-100</td>
</tr>
<tr>
<td>Net Official Sales</td>
<td>617</td>
<td>469</td>
<td>674</td>
<td>328</td>
<td>300</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>Total Supply</td>
<td>3,926</td>
<td>3,388</td>
<td>4,024</td>
<td>3,534</td>
<td>3,740</td>
<td>3,500</td>
<td>3,400</td>
</tr>
<tr>
<td>Supply Growth</td>
<td>9.4</td>
<td>-13.7</td>
<td>18.8</td>
<td>-12.2</td>
<td>5.8</td>
<td>-6.4</td>
<td>-2.9</td>
</tr>
<tr>
<td>Jewellery Demand</td>
<td>2,482</td>
<td>2,614</td>
<td>2,707</td>
<td>2,280</td>
<td>2,180</td>
<td>2,280</td>
<td>2,580</td>
</tr>
<tr>
<td>Identified Bar Hoarding</td>
<td>180</td>
<td>257</td>
<td>263</td>
<td>226</td>
<td>226</td>
<td>226</td>
<td>226</td>
</tr>
<tr>
<td>Total Demand</td>
<td>3,175</td>
<td>3,423</td>
<td>3,545</td>
<td>3,145</td>
<td>3,094</td>
<td>3,246</td>
<td>3,603</td>
</tr>
<tr>
<td>Demand Growth</td>
<td>-6.7</td>
<td>7.8</td>
<td>3.6</td>
<td>-11.3</td>
<td>-1.6</td>
<td>4.9</td>
<td>11.0</td>
</tr>
<tr>
<td>Market Balance</td>
<td>751</td>
<td>-55</td>
<td>479</td>
<td>389</td>
<td>646</td>
<td>254</td>
<td>-203</td>
</tr>
<tr>
<td>Average Gold Price</td>
<td>US$/oz</td>
<td>363</td>
<td>409</td>
<td>444</td>
<td>604</td>
<td>700</td>
<td>650</td>
</tr>
</tbody>
</table>

Source: GFMS, UBS for estimates

The most recent consensus forecast is for gold to average US$652.38/oz in 2007.

Performance

Over the past three months gold has traded higher as broader commodity market strength, dollar weakness and returning investment demand has lifted the metal to the best levels since May 2006. A challenge of US$700/oz seems likely in the next week or so although Futures market positioning is at quite high levels. Should gold succumb to a correction, as was seen in late February / early March we expect solid support from both investors and consumers. Gold is currently trading at US$692/oz.

Demand environment

GFMS, the most highly respected consultants on gold supply and demand, reported that fabrication demand fell sharply in 2006 as high prices hit jewellery demand. Although we agree with this statement, we believe that jewellery demand has seen a considerable improvement since September 2006 with solid demand noted from our sales colleagues in September and October 2006, January and February 2007 and on any dips in price over the past two months. Non jewellery fabrication demand – although a much smaller component of overall demand – continues to grow as electronics demand remains firm.

We see gold trading higher over the next 12 months followed by a decline towards our estimated incentive price.

Our 2007 forecast comfortably exceeds consensus

Gold traded generally higher in the fourth quarter as the dollar weakness helped the metal before succumbing to late-year profit taking

Jewellery demand fell sharply in 2006 although has recovered somewhat in late 2006 and early 2007
ETF investment in gold has continued in 2007 with the holdings of the six most important ETFs that we track up to 21.7 million ounces (697 tonnes), an increase of 1.6 million ounces since the start of the year. This is a slower pace of growth than the 8Moz increase noted in 2006. The launch of a number of Indian gold ETFs has resulted in only very modest purchases of gold due to a relatively high cost structure and the limited access of Indian citizens to financial markets. A new gold ETF will be launched in London in late April although this is not expected to see a marked acceleration of investor demand.

Futures market investors and speculators on US markets hold comparatively large positions at present although we believe OTC investment is rather subdued.

**Supply environment**

Newly mined gold supply fell by 3% in 2006 according to GFMS due to a lack of newly commissioned mines and some specific declines at a small number of large mines including Yanacocha in Peru and Grasberg in Indonesia. Increased exploration expenditure over the past few years has had limited success in finding new deposits and we expect only limited supply growth over the next few years.

High prices saw the sale of scrap gold to the market top 1000 tonnes in 2006, a far larger component of supply than central bank selling. We see signs of somewhat slower scrap sales in the first quarter of 2007 although if the gold price continues to rise this may become again a more important component of supply.

Gold mine de-hedging continued at a rapid pace in 2006 and we no longer expect to see sharp slowing following news already this year of large producer buy backs from Gold Fields, Buenaventura and Lihir. Remaining producer hedging is increasingly concentrated at a small number of producers and large buybacks from these companies will be required if the pace of producer de-hedging is to be maintained into 2008.

GFMS report that net central bank gold sales halved to 330 tons in 2006 due to fewer sales from the Central Bank Gold Agreement members and some central bank buying according to GFMS. One Middle Eastern bank – Qatar – has confirmed small purchases and reserve statistics indicate that Russia has bought small quantities of gold for its reserves.

**News-flow to watch for**

- The quarterly results of the gold miners with hedgebooks – including AngloGoldAshanti, Barrick, Newmont and Newcrest – for signs of further de-hedging.
- Weekly COTR data from the CFTC and daily open interest figures from TOCOM are useful measures of visible speculative positioning.
- Quarterly supply and demand reports from the World Gold Council.
Chart 204: Gold price 1996-2007

Source: Bloomberg

Chart 205: Gold Exchange Traded Funds 2003-2007

Source: Exchange Traded Gold; iShares; ZKB; UBS

Chart 206: Mine supply 1987-2009E

Source: GFMS, UBS forecasts

Chart 207: Comex COTR report for gold 2001-2007

Source: CFTC, UBS

Chart 208: Weekly change in gold ETFs

Source: Exchange Traded Gold; iShares; ZKB; UBS

Chart 209: Scrap gold supply 1990-2009E

Source: GFMS, UBS forecasts
Chart 210: Central Bank Gold Sales 1990-2009E

Source: GFMS, UBS forecasts

Chart 211: Jewellery Demand 1987-2009E

Source: GFMS, UBS forecasts

Chart 212: Gold market balance 1992-2009E

Source: GFMS, UBS forecasts

Chart 213: Aggregate Producer Hedging 1987-2009E

Source: GFMS, UBS forecasts

Chart 214: Electronics demand 1990-2009E

Source: GFMS, UBS forecasts

Chart 215: Gold from 1996-2010E

Source: Bloomberg, UBS for Forecasts
Silver

Silver, like gold, is largely a play on investment and speculative demand rather than a pure commodity supply and demand story. Last year’s launch of a silver ETF has withdrawn about a quarter of available physical silver bullion from the market and should this growth continue a squeeze and spike in silver may result. We forecast that silver will average US$14/oz in 2007 and US$13/oz in 2008.

Table 24: Global silver supply/demand balance

<table>
<thead>
<tr>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mine Production</td>
<td>Moz</td>
<td>601</td>
<td>620</td>
<td>642</td>
<td>667</td>
<td>694</td>
<td>722</td>
</tr>
<tr>
<td>Net Official Sector Sales</td>
<td>Moz</td>
<td>91</td>
<td>67</td>
<td>68</td>
<td>30</td>
<td>30</td>
<td>31</td>
</tr>
<tr>
<td>Old Silver Scrap</td>
<td>Moz</td>
<td>184</td>
<td>181</td>
<td>187</td>
<td>206</td>
<td>198</td>
<td>190</td>
</tr>
<tr>
<td>Producer Hedging</td>
<td>Moz</td>
<td>-21</td>
<td>10</td>
<td>15</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total Supply</td>
<td>Moz</td>
<td>854</td>
<td>878</td>
<td>912</td>
<td>903</td>
<td>922</td>
<td>943</td>
</tr>
<tr>
<td>Industrial Applications</td>
<td>Moz</td>
<td>351</td>
<td>368</td>
<td>409</td>
<td>417</td>
<td>426</td>
<td>434</td>
</tr>
<tr>
<td>Photography</td>
<td>Moz</td>
<td>193</td>
<td>181</td>
<td>165</td>
<td>148</td>
<td>133</td>
<td>120</td>
</tr>
<tr>
<td>Jewellery and Silverware</td>
<td>Moz</td>
<td>274</td>
<td>248</td>
<td>250</td>
<td>237</td>
<td>225</td>
<td>214</td>
</tr>
<tr>
<td>Coins and Medals</td>
<td>Moz</td>
<td>36</td>
<td>42</td>
<td>41</td>
<td>41</td>
<td>41</td>
<td>41</td>
</tr>
<tr>
<td>Total Demand</td>
<td>Moz</td>
<td>853</td>
<td>839</td>
<td>864</td>
<td>844</td>
<td>825</td>
<td>809</td>
</tr>
<tr>
<td>Balance</td>
<td>Moz</td>
<td>1</td>
<td>39</td>
<td>48</td>
<td>60</td>
<td>97</td>
<td>133</td>
</tr>
<tr>
<td>Average Price</td>
<td>US$/oz</td>
<td>4.90</td>
<td>6.70</td>
<td>7.31</td>
<td>11.54</td>
<td>14.00</td>
<td>13.00</td>
</tr>
</tbody>
</table>

Source: GFMS, UBS estimates

The most recent consensus forecast is for silver to average US$12.57/oz in 2007.

Performance

Silver’s asymmetrical volatility was aptly demonstrated in the first quarter of 2007 as the metal first traded sharply higher, out-performing gold, and hitting highs above US$14.70/oz in late February before falling sharply in early March to hit a low of below US$12.60/oz. Speculative buying on Comex, and to a lesser extent the Chicago Board of Trade (CBOT), was the trigger for the move higher; and Comex long liquidation was the reason for the sharp decline.

Perhaps the most interesting development has been silver’s relatively poor performance since. True, silver has recovered some of its lost gains but remains, unlike gold, below the highs seen earlier this year. We are unsure why silver’s performance has lagged: certainly few longs have been accumulated on the US futures market, but this does not explain why. We suspect that investors have learned to be more wary of silver’s propensity to fall very sharply when metals correct. This could limit the upside in silver unless the iShares silver ETF triggers a physical squeeze in he silver market.

Our 2007E forecast remains considerably higher than consensus

Silver remains the most volatile precious metal rising sharply in January and early February before then falling sharply

Silver has not recovered at the same pace as was the case in previous recoveries

↑↔ We see silver trading higher over the next 12 months followed by a decline towards our estimated incentive price.
Demand environment

- Photographic & Imaging demand, now only 19% of total demand, is in structural decline as applications are switching to digital technologies. We forecast declines of 10% per annum in coming years.

- Jewellery and silverware demand constituted 29% of demand in 2005 and grew by 1% that year. This category is price elastic although partly offset by substitution from more pricey precious metals. We forecast a 5% decline per year in demand from this sector in 2006-2008.

- Industrial fabrication accounted for 47% of total demand and grew by 10% in 2005 driven by silver’s unique properties including conduction, reflectivity and increasingly anti-bacterial properties. In the longer term we believe that anti-bacterial applications could potentially serve as a replacement for losses from photography, although not within our forecast horizon.

- US Futures market speculators have returned to the buy-side in silver but as noted above to a lesser extent than in previous recoveries. The IShares silver ETF continues to see steady but slow growth. Since the start of 2007 investors have bought securities equivalent to 14.7 million ounces of silver. We believe that silver ETFs (and two new ones will be listed in April in London and May in Switzerland) could squeeze the physical market at some point, although silver interest rates are lower now than at the start of 2007.

Supply environment

Most silver is produced as a by-product of other metals – lead-zinc, copper and gold mines with primary production of silver only about 30% of the total. In 2005 total production increased by 3% driven by strong primary and base metals growth but gold-related silver production fell 5%. Newly mined silver should grow strongly over the next few years due to the commissioning of a number of large primary silver mines in Latin America and growth in Chinese production.

Silver scrap supply is not particularly price elastic. Although some scrapping of jewellery and silverware does take place when prices are increasing rapidly, photographic silver recycling is an important element; the structural decline in this application has placed a brake on silver scrap growth in recent years and we expect this to continue.

The Official Sector has contributed to large sales of silver over the past decade but remaining stocks – largely held by China – are now believed to be much smaller. We expect 30Moz of official sector silver sales each year between 2006-08.

News-flow to watch for

- The final approval of Barrick Gold Corporation’s Pascua Lama silver-gold project in Latin America should be forthcoming by year end. This will contribute about 30Moz of new silver supply from 2009 onwards.
Chart 216: Silver price 1996-2007

Source: Bloomberg

Chart 217: Correlation of copper and silver 1990-2007

Source: Bloomberg, UBS

Chart 218: Silver scrap 1996-2009E

Source: GFMS, UBS forecast

Chart 219: Comex COTR report for silver 2001-2007

Source: CFTC, UBS

Chart 220: Silver mine supply 1996-2009E

Source: GFMS, UBS forecast

Chart 221: Official sector silver sales 1994-2009E

Source: GFMS, UBS forecast
Chart 222: Silver demand 2005

Source: GFMS

Chart 223: Producer hedging of silver 1994-2009E

Source: GFMS, UBS forecasts

Chart 224: Silver market balance 1996-2009E

Source: GFMS, UBS forecasts

Chart 225: Photographic demand 1992-2009E

Source: GFMS, UBS forecasts

Chart 226: Silver bullions stocks 1996-2006

Source: GFMS

Chart 227: Silver from 1996-2009E

Source: GFMS, UBS forecasts
Platinum

Compared to the extraordinary volatility in the fourth quarter of 2006, platinum has traded much more calmly over the first four months of 2007. But the metal has traded higher in April following news that two Platinum ETFs will be launched in the near future. We forecast that platinum will average US$1225/oz in 2007 and US$1100/oz in 2008 although it is seems clear that risks are firmly biased towards the upside in the short term.

Table 25: Global platinum supply/demand balance

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</thead>
<tbody>
<tr>
<td>South African Supply 000 oz</td>
<td>4,630</td>
<td>5,010</td>
<td>5,115</td>
<td>5,430</td>
<td>5,605</td>
<td>6,171</td>
<td>6,393</td>
</tr>
<tr>
<td>Russian Sales 000 oz</td>
<td>1,050</td>
<td>845</td>
<td>890</td>
<td>895</td>
<td>850</td>
<td>850</td>
<td>850</td>
</tr>
<tr>
<td>Other Production 000 oz</td>
<td>520</td>
<td>635</td>
<td>645</td>
<td>675</td>
<td>725</td>
<td>794</td>
<td>866</td>
</tr>
<tr>
<td>Secondary Supply (Autocats) 000 oz</td>
<td>665</td>
<td>690</td>
<td>770</td>
<td>830</td>
<td>907</td>
<td>1,034</td>
<td>1,219</td>
</tr>
<tr>
<td>Total Supply 000 oz</td>
<td>6,865</td>
<td>7,180</td>
<td>7,420</td>
<td>7,830</td>
<td>8,087</td>
<td>8,849</td>
<td>9,328</td>
</tr>
<tr>
<td>Supply growth %</td>
<td>4.3%</td>
<td>4.6%</td>
<td>3.3%</td>
<td>5.5%</td>
<td>3.3%</td>
<td>9.4%</td>
<td>5.4%</td>
</tr>
<tr>
<td>Autocats (excluding recycling) 000 oz</td>
<td>3,190</td>
<td>3,490</td>
<td>3,820</td>
<td>4,380</td>
<td>4,801</td>
<td>5,335</td>
<td>5,818</td>
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<tr>
<td>Jewellery 000 oz</td>
<td>2,510</td>
<td>2,160</td>
<td>1,960</td>
<td>1,740</td>
<td>1,618</td>
<td>1,579</td>
<td>1,695</td>
</tr>
<tr>
<td>Investment 000 oz</td>
<td>15</td>
<td>45</td>
<td>15</td>
<td>-30</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other Industrial 000 oz</td>
<td>1,380</td>
<td>1,535</td>
<td>1,675</td>
<td>1,760</td>
<td>1,867</td>
<td>1,953</td>
<td>2,051</td>
</tr>
<tr>
<td>Total Demand 000 oz</td>
<td>7,095</td>
<td>7,230</td>
<td>7,470</td>
<td>7,850</td>
<td>8,286</td>
<td>8,867</td>
<td>9,565</td>
</tr>
<tr>
<td>Demand growth %</td>
<td>1.8%</td>
<td>0.9%</td>
<td>3.3%</td>
<td>5.1%</td>
<td>5.6%</td>
<td>7.0%</td>
<td>7.9%</td>
</tr>
<tr>
<td>Price Average Annual (US$/oz)</td>
<td>US$/oz</td>
<td>688</td>
<td>846</td>
<td>897</td>
<td>1,141</td>
<td>1,225</td>
<td>1,200</td>
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</tbody>
</table>

Source: Johnson Matthey, UBS estimates

The most recent consensus price forecasts are for platinum to average US$1,173/oz in 2007.

Performance

Apart from a brief correction in late February, platinum has traded steadily higher in the first four months of 2007, accelerating higher in the second half of April following news that Zurich Cantonal Bank (ZKB) and ETF Securities will list Exchange Traded Fund (ETFs) in Zurich and London in late April and early March respectively. Platinum is currently trading above US$1300/oz. We wrote in detail about the potential impact of the Zurich listed ETF following the announcement and concluded that this is an important development in what are illiquid markets for platinum (and palladium). We calculate that each 100koz of investment will add US$40/oz to platinum and we expect hedge funds and private investors to buy good quantities of platinum and we lifted our short term forecasts for platinum as a consequence. So far there have been no major moves in platinum interest rates, with both borrowing and lending seen in the interbank market. If the two platinum ETFs secure more than 500k oz of investment then a sustained increase in prices and interest rates may result. We will write a detailed report on platinum before the publication of the next edition of Commodity Connections.

Our 2007 forecast is moderately higher than consensus

The launch of platinum ETFs in Zurich and London may result in sustainably high prices and platinum interest rates

Platinum has the best supply and demand fundamentals of all the major precious metals and is vulnerable to further squeezes
Demand environment

According to Johnson Matthey, autocatalyst demand was 54% of total demand in 2005 and we expect further growth: platinum is the only solution to tightening emission controls on diesel vehicles, principally in Europe. The move towards greater use of platinum – and reportedly gold – in diesel catalysts is making slow but steady progress. There is more talk of increased use of diesel for light vehicles in the US and Asian markets but little short term impact from these developments, although we believe there are longer term opportunities for demand growth from these countries. Some substitution may take place in catalysts for petrol engines although we suspect most of this has already occurred.

High platinum prices have hit jewellery demand across most major markets with light-weighting and some substitution into white gold and palladium. Other industrial demand accounts for the remaining 26% of demand for platinum with the glass, electrical, chemical and petroleum sectors all important. Other industrial demand grows faster than global industrial production. Anecdotally demand from hi-tech glass plants appears stronger than the numbers reported by JM although we hear this demand may have peaked in 2006.

Supply environment

Current platinum supply is restricted due to problems with two major producers. In South Africa, Lonmin, the third largest producer, suffered a smelter explosion in December and while this is being rebuilt Lonmin is unable to produce its full production. In Russia Norilsk, the fourth largest producer of platinum is unable to export platinum ingots or sponge until it has received a licence from the State. Both of these delays should be temporary although we expect ongoing production interruptions from smelter accidents and industrial action: the largest two South African platinum miners will start wage negotiations soon and strikes are possible.

Long term platinum supply growth depends on South African production expansions. For the balance of this decade we expect mid single digit percentage growth rates although potentially this growth rate could accelerate sharply after 2009. Improved political and economic stability would see faster supply growth from Zimbabwe but a rapid resolution to this country’s problems seems unlikely.

Recovery of platinum from spent autocatalysts contributes about 10% of platinum supply. We anticipate further growth from this source 2006-09.

News-flow to watch for

■ Implied stocks of platinum can be derived from Swiss customs statistics.

■ Daily SGE turnover is a good proxy for Chinese jewellery demand. Weekly COTR data on speculative positions on the NYMEX futures market and daily changes of TOCOM platinum open interest data.

■ Johnson Matthey releases its review of the PGM sector in May.
**Chart 228: Platinum price 1996-2007**

Source: Bloomberg

**Chart 229: Platinum demand 2006**

Source: Johnson Matthey

**Chart 230: Platinum jewellery demand 1994-2009E**

Source: Johnson Matthey, UBS forecast

**Chart 231: Platinum supply 2006E**

Source: Johnson Matthey

**Chart 232: South African platinum production 1994-2009E**

Source: Johnson Matthey, UBS

**Chart 233: Chinese platinum demand 1998-2007**

Source: Swiss Customs Data, SGE, Bloomberg
Chart 234: SGE Platinum turnover 2005-2006

Source: SGE, Bloomberg

Chart 235: PGM recycling 1996-2009E

Source: Johnson Matthey, UBS forecasts

Chart 236: Platinum market balance 1993-2009E

Source: Johnson Matthey, UBS forecasts

Chart 237: PGM usage in autocatalysts 1990-2009E

Source: Johnson Matthey, UBS forecasts

Chart 238: Implied Swiss platinum stocks 1998-2007

Source: Swiss Customs Service, UBS

Chart 239: Platinum price 1997-2009E

Source: Bloomberg, UBS forecasts
Palladium's supply and demand fundamentals remain unimpressive but the outlook for the metal has been boosted by news that two Palladium ETFs will shortly be listed. While palladium has none of the physical tightness of platinum, its optically attractive price – about a third of its all-time high – could attract substantial investment. **We have made no changes to our palladium forecasts and see the metal averaging US$350/oz in 2007 and US$320/oz in 2008. But there are clear near term risks to the upside depending on the success of the two ETFs which will be launched soon.**

Table 26: Palladium supply/demand balance

<table>
<thead>
<tr>
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<th></th>
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<tbody>
<tr>
<td>WW Mine Supply</td>
<td>000 oz</td>
<td>3,500</td>
<td>3,780</td>
<td>3,790</td>
<td>4,110</td>
<td>4,508</td>
<td>4,968</td>
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<tr>
<td>Russian Sales</td>
<td>000 oz</td>
<td>2,950</td>
<td>4,800</td>
<td>4,620</td>
<td>4,370</td>
<td>4,000</td>
<td>4,000</td>
</tr>
<tr>
<td>Secondary Supply (Autocats)</td>
<td>000 oz</td>
<td>710</td>
<td>525</td>
<td>630</td>
<td>805</td>
<td>993</td>
<td>1,156</td>
</tr>
<tr>
<td>Total Supply</td>
<td>000 oz</td>
<td>7,160</td>
<td>9,105</td>
<td>9,040</td>
<td>9,285</td>
<td>9,500</td>
<td>10,124</td>
</tr>
<tr>
<td>Supply Growth %</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Autocats</td>
<td>000 oz</td>
<td>3,460</td>
<td>3,790</td>
<td>3,870</td>
<td>4,140</td>
<td>4,467</td>
<td>4,854</td>
</tr>
<tr>
<td>Jewellery</td>
<td>000 oz</td>
<td>260</td>
<td>930</td>
<td>1,430</td>
<td>1,120</td>
<td>1,344</td>
<td>1,613</td>
</tr>
<tr>
<td>Electrical</td>
<td>000 oz</td>
<td>900</td>
<td>920</td>
<td>965</td>
<td>1,055</td>
<td>1,108</td>
<td>1,163</td>
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<tr>
<td>Dental</td>
<td>000 oz</td>
<td>825</td>
<td>850</td>
<td>815</td>
<td>815</td>
<td>856</td>
<td>899</td>
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<td>Chemical</td>
<td>000 oz</td>
<td>265</td>
<td>310</td>
<td>325</td>
<td>315</td>
<td>331</td>
<td>347</td>
</tr>
<tr>
<td>Other</td>
<td>000 oz</td>
<td>140</td>
<td>290</td>
<td>485</td>
<td>210</td>
<td>210</td>
<td>210</td>
</tr>
<tr>
<td>Total Demand</td>
<td>000 oz</td>
<td>5,850</td>
<td>7,090</td>
<td>7,890</td>
<td>7,655</td>
<td>8,315</td>
<td>9,086</td>
</tr>
<tr>
<td>Demand Growth %</td>
<td></td>
<td>12.3%</td>
<td>21.2%</td>
<td>11.3%</td>
<td>-3.0%</td>
<td>6.6%</td>
<td>9.3%</td>
</tr>
<tr>
<td>Balance</td>
<td>000 oz</td>
<td>1,310</td>
<td>2,015</td>
<td>1,150</td>
<td>1,630</td>
<td>1,185</td>
<td>1,038</td>
</tr>
<tr>
<td>Price Average Annual</td>
<td>US$/oz</td>
<td>201</td>
<td>230</td>
<td>202</td>
<td>320</td>
<td>350</td>
<td>320</td>
</tr>
</tbody>
</table>

Source: Johnson Matthey, UBS estimates

The most recent consensus forecast is for palladium to average US$347/oz in 2007.

**Performance**

Far from exhibiting its normal high-beta performance, palladium has traded very quietly over most of the past six months, grinding steadily and boringly higher – until the middle of April, when ETF news lifted the metal quickly towards US$380/oz. Although we are not certain why the metal has quietened, we suspect that an increase in options activity has served to take some of the historically high volatility from the metal. There has been evidence of solid buying at the lower end of the trading range around US$320/oz (and scale up from there) while high volumes of moderate delta, one and two month calls have been sold, capping quick moves to the upside. It took news that Zurich Cantonal Bank and ETF Securities would launch Exchange Traded Funds – ETFs – on palladium (amongst other metals) in Zurich and London in May and April respectively to see palladium move quickly higher; the metal is currently trading at about US$380/oz.
Demand environment

According to Johnson Matthey, autocatalyst demand accounted for 49% of total demand in 2005, down from highs of 60% seen in 1999-2000. Car companies have regained some confidence in palladium after the metal has settled materially lower than the US$1,095/oz reached in January 2001 although we do not believe autocatalyst usage will return to the 5.9 Moz levels seen in 1999 despite some substitution for platinum in diesel catalysts. We expect slower growth in palladium demand in autocatalysts than that of platinum.

Jewellery demand for palladium will fall in 2006, according to Johnson Matthey, due to lower purchases from China. Underlying retail demand remains strong, we believe, but the purchases in 2004 and 2005 were partly due to stock building. In the longer term we believe that palladium jewellery has a bright future especially if platinum trades sustainably higher. Other industrial uses of palladium total 30% of demand. Palladium’s use in dentistry and electronics fell sharply five years ago but has regained some ground on lower prices.

Even before the recent news of the ETF launches, speculators and investors had rebuilt their large net long positions on the Nymex futures market. But in the week encompassing the announcement of the launch of the ZKB ETF net long positions increased by 23% to an all-time high. For palladium to support this level of speculative positioning ETF hype has to be followed by genuine (or hedge fund) buying of the soon-to-be listed instruments.

Supply environment

Russian palladium sales made up 51% of palladium supply in 2005. Norilsk Nickel, the only Russian miner, produced just over three million ounces of palladium with the balance – approximately 1.6 Moz – supplied from stocks. Norilsk has now exhausted stockpiled palladium although the Russian state is believed to have stocks of between 5 and 10 Moz. We forecast 1Moz of Russian stock sales per annum, although this is difficult to assess.

South Africa produces 29% of palladium supply. Production expansions are occurring at a slower than expected rate as this metal is affected by the same delays discussed under platinum. North American mines produce about 10% of global supply with slow growth prospects.

Recovery of palladium from spent autocatalysts contributes about 7% of palladium supply but will grow rapidly between 2006 and 2008.

News-flow to watch for

- Monthly Swiss, Chinese and US customs statistics indicate jewellery appetitive from China and stock flows

- Week COTR reports from the CFTC show one measure of speculative positioning

- Johnson Matthey releases its annual survey of the PGM market in May.
Chart 240: Palladium price 1996-2006

Source: Bloomberg

Chart 241: Palladium demand 2006E

Source: Johnson Matthey


Source: CFTC, UBS

Chart 243: Principle suppliers 1990-2009E

Source: Johnson Matthey, UBS forecasts

Chart 244: Palladium supply 2006E

Source: Johnson Matthey

Chart 245: Palladium jewellery demand

Source: Johnson Matthey, UBS forecast
Chart 246: Russian palladium exports 1999-2006

Source: Swiss, US customs data, UBS

Chart 247: PGM recycling 1996-2008E

Source: Johnson Matthey, UBS forecasts

Chart 248: Palladium market balance 1995-2008E

Source: Johnson Matthey, UBS forecasts

Chart 249: PGM usage in autocatalysts 1990-2009E

Source: Johnson Matthey, UBS forecasts

Chart 250: Implied Swiss palladium stocks 1998-2006

Source: Swiss Customs Service, UBS

Chart 251: Palladium price 1996-2008E

Source: Bloomberg, UBS forecasts
Steel and Raw Materials

- We have raised our expectations of JFY08 iron ore prices with a rise of 10%, largely a function of the new Indian iron ore export tax and continuing strong consumption of steel globally. Steel prices have surprised in Q107 mainly due to the ongoing strength in demand outside the US. Rising commodity prices are fuelling expenditure in infrastructure and steel consumption.

Steel

Global steel sentiment remains buoyant, partly underpinned by China’s growth and activity in the first two months of 2007. In Jan-Feb China’s factory output was up 18.5% y/y; consumption was strong with retail sales growing 15% y/y, while its trade surplus rose to cUS$40bn, up 3 times y/y, to reach +US$230bn in 2007. China’s investment in railroads is to rise 4 times to USD200bn by 2010, adding demand for steel.

A key question for 2007 is whether changing China’s competitiveness will impact its steel production and consumption. With a rising trade surplus we expect the renminbi to appreciate by at least 6-7% against the US$ by the end Q1 2007. Tax and VAT changes are also adding to costs in steel; labour costs and availability are starting to impact while China’s central bank is “worried” about inflation. Environmental/energy constraints are also becoming an increasingly important factor.

Global scrap steel prices has been another surprise support for steel prices; scrap prices are up more than 50% since the beginning of the year. Scrap steel is often seen as a lead indicator of economic activity and industrial demand.

Chart 252: HRC steel prices and bulk freight rates

Chart 253: HRC steel prices and US scrap steel prices

Chart 252 and Chart 253 highlight the strong correlation between steel and scrap and steel and freight prices. In part it can be argued that rising scrap and freight prices drive steel prices. Certainly recent US steel price rises, announced by Nucor and others, were totally driven by tight scrap prices. Nucor noted that scrap prices rose US$77/t while it lowered its steel base price by US$17/t to...
effect a net US$60/t price rise from April to US$660/t (tonnes quoted are metric tonnes) resulting in a possible net margin squeeze.

Another key driver of the current positive price sentiment is the apparent global construction boom extending well beyond China. We are seeing unprecedented levels of growth in energy and infrastructure construction in Russia, Turkey, the Middle East, Africa, Asia and Europe that has the potential to be sustained for the medium to long term.

Nevertheless we expect overall steel demand to soften in 2007 to 5% after averaging 9% in the previous three years with lower world GDP, peaking energy-related construction and infrastructure expenditure.

**Iron ore**

On 28 February the Indian Government introduced an export duty of cUS$6.50/t on iron ore exports, effective immediately. We believe that this could result in a contraction of exports of nearly 25% in 2007; this is expected to meaningfully impact the spot market for iron ore and thus, more specifically, small and mid-tier Chinese steel producers. On the back of this event, combined with continued strength in steel production/demand, we expect that the seaborne market for iron ore will remain tight for the next two years at least.

Furthermore, we note that while supply growth in iron ore is reasonably strong, with an element of fragmentation emerging by the end of the decade as some smaller junior producers begin production from new operations, near-term constraints remain. Both Rio Tinto and BHP Billiton recently disappointed on first quarter production figures, a function of cyclones over the past quarter. We suspect that these volumes will be very difficult to make up as operations are already at capacity.

**Coking coal**

In March, Xstrata reached a settlement with Japanese Steel Mills (JSM) for 2007 contract prices for semi-soft coking coal (SSCC), a 10% increase or US$6/t to US$64/t. This was generally in-line with our expectations of US$65/t. Of note, negotiations between JSMs and Chinese suppliers remain problematic with the Chinese looking for significantly higher prices given the strong domestic market. According to AME, in 2006 contracted coking coal volumes fell by about 40%, furthermore Chinese producers now face higher costs due to lower rebates/higher duties on exports.

PCI was also settled in January at US$67.50, generally in-line with expectations.

Infrastructure bottlenecks continue to plague coking coal supply; this is particularly true in Australia where the port expansions face delays, and vessel queues build as a consequence. In February it emerged that Dalrymple Bay capacity will be nearly 6.5mt lower than previously expected (now about 51mt), while problems remain at Newcastle. The Hunter Valley Coal Chain recently raised its declared capacity to 90.4mt/yr, a function of improvements to port and rail infrastructure. Coal shipments thus far in 2007 are running at about 87mt/y.
**Molybdenum**

Molybdenum markets look well supported over the next several years as steel demand growth stretches the ability of supply to meet it. Global production continues to be impacted by Chinese production problems and export regulation.

The tight global balances are likely to support strong molybdenum prices over the next several years. We forecast a decline in prices from peak levels experienced in 2005; nevertheless we expect that prices are likely to remain well supported near current spot levels over the next couple of years. In the longer term we expect supply to catch up with demand and there is potential for large retracement of currently very high (relative to history) prices.
Carbon Steel

Prices have shown surprising resilience in Q107 due to apparent strong demand globally ex-US. A key driver for prices is a very strong construction sector, reflected in rising scrap price and long product prices. We have raised our benchmark HRC EU export price by 9% for 2007E and by 2% in 2008E. The key uncertainty remains China's export behaviour in light of falling international price premia relative to China and changing VAT rebate regimes within China.

Table 27: Global crude steel supply-demand model

<table>
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<tr>
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</thead>
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<tr>
<td>China steel production</td>
<td>219</td>
<td>271</td>
<td>354</td>
<td>422</td>
<td>475</td>
<td>517</td>
<td>559</td>
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<td>growth</td>
<td>%</td>
<td>22%</td>
<td>24%</td>
<td>31%</td>
<td>19%</td>
<td>13%</td>
<td>9%</td>
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<tr>
<td>Total world steel production</td>
<td>945</td>
<td>1,035</td>
<td>1,116</td>
<td>1,223</td>
<td>1,292</td>
<td>1,358</td>
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<tr>
<td>growth</td>
<td>%</td>
<td>7%</td>
<td>10%</td>
<td>8%</td>
<td>10%</td>
<td>6%</td>
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<td>World ex-China steel production</td>
<td>726</td>
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<td>763</td>
<td>801</td>
<td>817</td>
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<td>%</td>
<td>3%</td>
<td>5%</td>
<td>0%</td>
<td>5%</td>
<td>2%</td>
<td>3%</td>
</tr>
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<td>EU (15) steel consumption</td>
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<td>153</td>
<td>189</td>
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<td>US steel consumption</td>
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<td>116</td>
<td>135</td>
<td>131</td>
<td>132</td>
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<td>China steel consumption</td>
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<td>1,033</td>
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<td>7%</td>
<td>9%</td>
<td>8%</td>
<td>10%</td>
<td>5.6%</td>
<td>5.1%</td>
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<tr>
<td>World ex-China steel consumption</td>
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<td>838</td>
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<td>874</td>
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<td>%</td>
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<td>1.8%</td>
<td>10.1%</td>
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Price forecast – EU export HRC

US$/t

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<th>Q3 07E</th>
<th>Q4 07E</th>
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<th>Q3 08E</th>
<th>Q4 08E</th>
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<td>575</td>
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<td>510</td>
<td>547</td>
<td>490</td>
<td>500</td>
<td>505</td>
<td>505</td>
<td>500</td>
</tr>
<tr>
<td>US Domestic</td>
<td>578</td>
<td>627</td>
<td>605</td>
<td>577</td>
<td>596</td>
<td>550</td>
<td>550</td>
<td>550</td>
<td>550</td>
<td>550</td>
</tr>
</tbody>
</table>

Source: ISI, CRU, UBS estimates

Price expectations

Benchmark HRC prices broadly rose in Q107 up 3% in EU and 1% in US against our expectations. We are expecting further positive momentum in Q207 before a correction in H207 and into 2008 on the back of rising global inventories. Current price resilience is reflecting ongoing demand surprises in many environments outside the US. However regional price premia have dropped significantly relative to Chinese prices to the point that we expect a significant moderation in Chinese exports leading to increasing pressure on Chinese domestic prices and ultimately a re-emergence of international premia.

Table 28: UBS HRC benchmark steel price assumptions - quarterly (US$/t)

<table>
<thead>
<tr>
<th></th>
<th>Q1 07</th>
<th>Q2 07E</th>
<th>Q3 07E</th>
<th>Q4 07E</th>
<th>2007E</th>
<th>Q1 08E</th>
<th>Q2 08E</th>
<th>Q3 08E</th>
<th>Q4 08E</th>
<th>2008E</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU export</td>
<td>569</td>
<td>575</td>
<td>535</td>
<td>510</td>
<td>547</td>
<td>490</td>
<td>500</td>
<td>505</td>
<td>505</td>
<td>500</td>
</tr>
<tr>
<td>US Domestic</td>
<td>578</td>
<td>627</td>
<td>605</td>
<td>577</td>
<td>596</td>
<td>550</td>
<td>550</td>
<td>550</td>
<td>550</td>
<td>550</td>
</tr>
</tbody>
</table>

Source: UBS estimates; our base EU export prices now based on CRU data following the discontinuities in the Metal Bulletin price series; CRU price estimates were US$10-15/t lower than MB over the last 6 months.
Demand environment

Global demand generally remains positive outside the US which is experiencing a slowdown in manufacturing, auto and housing demand. US non-residential construction, however, remains positive, growing at 8% in 2007E, and is expected to support long product consumption over 2007. Annual US steel consumption growth rates are coloured by stocking and destocking conditions; 2004 and 2006 were restocking years and 2005 and 2007E destocking years.

Asia continues to enjoy demand strength in manufacturing, autos, shipping, energy sectors and construction. Japanese auto production remains at historic highs and plate and pipe markets are tight driven by demand for shipbuilding. China’s construction growth is expected to be c13% y/y in 2007. Other Emerging Markets including Latam, Russian, India, Middle East and South Africa are expected to continue their surprising strength, in part underpinned by petrodollar expenditure in infrastructure. Strengthening oil and commodity prices will further stoke rising demand in these environments.

Supply environment

Global supply growth, up 8.6% in Feb, continues to be dominated by China’s growing production and China’s net exports, annualising at 46mt in Q1 07. This remains the biggest threat to market balances in H2 07. We still expect a moderation in Chinese exports over the remainder of the year as international price premia relative to Chinese domestic prices remain subdued and as the April changes in China’s VAT regime bite; China’s HRC export rebate falls from 8% to 0% while CRC rebate falls from 8% to 5% from April 2007.

Chinese steel production, however, is showing no signs of slowing with Feb up 20% y/y. We remain sceptical about any real rationalisation of capacity despite the government’s insistence that it will cut 55mt/y in 2007E.

The world ex-China production remains too robust growing at 2.9% y/y in Feb; supply discipline has not been very strong in our view.

News-flow to watch for

- Chinese steel export data due c15 May/June should indicate some slowing in exports and possible rising inventories in China.
- Global scrap price is a key indicator of broad steel balances and prices, in our view; the Tex report provides the best commentary on their direction and needs to be monitored closely in the coming quarter.
- US employment data we believe is the key indicator of US consumer confidence and US interest rate directions; we believe these macro outcomes are becoming more important for global steel price sentiment.
Chart 254: Regional crude steel production growth

Source: IISI

Chart 255: China’s steel production and steel trade

Source: Chinese Customs Statistics, IISI

Chart 256: World steel production growth and steel price

Source: IISI, CRU

Chart 257: Steel production and OECD lead indicator

Source: IISI, MEPS

Chart 258: China’s net steel imports and price premia

Source: CRU, Chinese Customs Statistics, UBS

Chart 259: World-ex-China production growth and steel price

Source: IISI, CRU
Chart 260: US steel inventories and I/S ratios, 1991-Feb07

Source: Kozai club, SSCI, BDS, CRU

Chart 261: HRC steel prices by region, 1997-Mar07

Source: MEPS, Metal Bulletin, Japan Iron & Steel Federation

Chart 262: China steel import product prices, 2002-Mar07

Source: Metal Bulletin, Japan Iron & Steel Federation

Chart 263: Japan steel inventories and I/S ratios, 1997-Feb07

Source: Kozai club, SSCI, BDS, CRU

Chart 264: HRC steel price change y/y%, 2002-Mar07

Source: MEPS, Metal Bulletin, Japan Iron & Steel Federation

Chart 265: HRC steel price key regional premia, 2002-Mar07

Source: MEPS, Metal Bulletin, Japan Iron & Steel Federation
Iron Ore

Strong steel production growth from BRIC and the ‘Next Billion’ is expected to offset much of the cyclical headwinds from the OECD this year. A key question is the magnitude of Chinese iron ore production growth in 2007; we expect that lower quality resources and government regulation should constrain growth resulting in a meaningful deceleration in 2007. We are forecasting a 10% increase in contract prices in 2008 followed by a roll-over in 2009.

Table 29: Global seaborne iron ore market supply/demand balance

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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Global crude steel production mt</td>
<td>945</td>
<td>1,039</td>
<td>1,113</td>
<td>1,210</td>
<td>1,272</td>
<td>1,339</td>
<td>1,409</td>
</tr>
<tr>
<td>growth %</td>
<td>4.6</td>
<td>9.9</td>
<td>7.1</td>
<td>8.7</td>
<td>5.1</td>
<td>5.3</td>
<td>5.2</td>
</tr>
<tr>
<td>Total seaborne iron ore demand mt</td>
<td>517</td>
<td>579</td>
<td>637</td>
<td>693</td>
<td>740</td>
<td>800</td>
<td>861</td>
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<tr>
<td>demand growth %</td>
<td>11.0</td>
<td>12.1</td>
<td>9.9</td>
<td>8.8</td>
<td>6.8</td>
<td>8.1</td>
<td>7.6</td>
</tr>
<tr>
<td>China iron ore import requirements mt</td>
<td>148</td>
<td>208</td>
<td>276</td>
<td>325</td>
<td>379</td>
<td>440</td>
<td>496</td>
</tr>
<tr>
<td>China as % of seaborne market %</td>
<td>29</td>
<td>36</td>
<td>43</td>
<td>47</td>
<td>51</td>
<td>55</td>
<td>58</td>
</tr>
<tr>
<td>Total seaborne iron ore supply mt</td>
<td>517</td>
<td>579</td>
<td>637</td>
<td>693</td>
<td>725</td>
<td>798</td>
<td>862</td>
</tr>
<tr>
<td>supply growth %</td>
<td>11.0</td>
<td>12.1</td>
<td>9.9</td>
<td>8.8</td>
<td>4.7</td>
<td>10.1</td>
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<tr>
<td>Balance (notional) mt</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>-15</td>
<td>-2</td>
<td>1</td>
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</tbody>
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Exports

<p>| | | | | | | | |</p>
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</thead>
<tbody>
<tr>
<td>Australia mt</td>
<td>196</td>
<td>220</td>
<td>246</td>
<td>246</td>
<td>274</td>
<td>320</td>
<td>374</td>
</tr>
<tr>
<td>Brazil mt</td>
<td>184</td>
<td>205</td>
<td>213</td>
<td>259</td>
<td>291</td>
<td>323</td>
<td>336</td>
</tr>
<tr>
<td>India mt</td>
<td>49</td>
<td>69</td>
<td>87</td>
<td>82</td>
<td>62</td>
<td>46</td>
<td>31</td>
</tr>
</tbody>
</table>

Price JFY fines (JBM) US$/t

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<tr>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Price JFY fine (JBM) USc/dmtu</td>
<td>30.8</td>
<td>36.6</td>
<td>61.7</td>
<td>73.5</td>
<td>80.4</td>
<td>88.5</td>
<td>88.5</td>
</tr>
<tr>
<td>Price JFY lump (JBM) US$/t</td>
<td>24.3</td>
<td>28.8</td>
<td>49.4</td>
<td>58.8</td>
<td>64.4</td>
<td>70.8</td>
<td>70.8</td>
</tr>
<tr>
<td>lump/fine differential US$/t</td>
<td>5.3</td>
<td>6.2</td>
<td>10.7</td>
<td>12.7</td>
<td>14.0</td>
<td>15.3</td>
<td>15.3</td>
</tr>
<tr>
<td>Price change fines JFY %</td>
<td>6</td>
<td>19</td>
<td>72</td>
<td>19</td>
<td>10</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Price change lump JFY %</td>
<td>5</td>
<td>19</td>
<td>72</td>
<td>19</td>
<td>10</td>
<td>10</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: AME, CRU, TEX report, China Customs Statistics, UBS estimates

We believe that consensus forecasts for the iron ore market in 2008E are for a 10% increase in contract prices.

Spot iron ore prices (China ex-VAT) have been climbing steadily over the past quarter, up about 8% to US$61/t. This level represents a 22% increase on the same period last year.

Demand environment

China continues to be the primary driver of global steel consumption with its 388mt of equivalent crude steel consumption 32% of the world total in 2006. We estimated real consumption in 2006 at 15% after allowing for 5% destocking (17mt de-stocked in our estimate). We estimate further modest decline to real consumption growth of 13% in 2007E with some possible re-stocking. We estimate that this could represent an additional 80mt of iron ore requirements (64% iron content).
In February 2007 global steel production was up 8.6% y/y. The global increase continues to be driven by China’s output with its steel growth rate at 20% y/y in February; world-ex-China output was up 2.9% y/y in February. In 2006 global steel production was up also 9.6% with the world ex-China up 3.7%. The key issue is that this rate is well above the projected average 4.5% global growth in consumption for 2007 onwards.

We expect that domestic Chinese iron ore production is likely to decelerate meaningfully in 2007 after growing at +40% over the past two years. Thus, despite the forecast decline in steel production growth, iron ore imports are projected to grow by about 14%. The chart below illustrates the pattern of Chinese iron ore imports from January 2004.

**Chart 266: China iron ore import growth monthly y/y**

Source: CEIC, mysteel.com, UBS estimates

**Supply environment**

Rio Tinto’s March quarterly production numbers were disappointing. Hamersley shipments were down 15% q/q due to a 17 day planned maintenance outage at Tom Price. Robe River shipments were down 23% q/q as cyclones resulted in force majeure called on some sales contracts. Shipments increased 5% y/y as the company continues to increase its infrastructure capacity.

Cylcones also impacted emerging iron ore producer Fortescue Metals Group. The companies first shipment of iron ore is now not expected until mid-May 2008, losing about 5mt of volume for the year. The company indicated that its targeted 30mt of shipments in 2008 will not be met as a result.

Last but certainly not least, on 28 February the Indian Government introduced an export duty of cUS$6.50/t on iron ore exports, effective immediately. We believe that this could result in a contraction of exports of nearly 25% in 2007; this is expected to meaningfully impact the spot market for iron ore and thus, more specifically, small and mid-tier Chinese steel producers.

**News-flow to watch for**

- China – late May, April trade statistics (imports, domestic production)
Chart 273: Seaborne volume growth vs. iron ore price

Source: AME, UBS estimates

Chart 274: Demand composition of seaborne iron ore market

Source: AME, CRU, UBS estimates

Chart 275: Iron ore supply by region, 2006

Source: AME, UBS estimates

Chart 276: Price change comparison, steel and iron ore

Source: Thomson Financial Datastream, UBS

Chart 277: Iron ore demand by region, 2006

Source: AME, UBS estimates

Chart 278: Top iron ore exporters, 2006

Source: AME, company documents, UBS estimates
Coking Coal

- Strong steel production globally, but particularly in Brazil and India are the key long-term drivers for the coking coal industry. We expect that near-term pressure from western steel mills are likely to build as volumes weaken, putting pressure on high quality coking coals. Our 2008E contract forecast remains US$90/t.

Table 30: Global coking coal market supply/demand balance

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Global crude steel production mt</td>
<td>945</td>
<td>1,039</td>
<td>1,113</td>
<td>1,210</td>
<td>1,272</td>
<td>1,339</td>
<td>1,401</td>
</tr>
<tr>
<td>growth %</td>
<td>4.6</td>
<td>9.9</td>
<td>7.1</td>
<td>8.7</td>
<td>5.1</td>
<td>5.3</td>
<td>4.7</td>
</tr>
<tr>
<td>Total seaborne coking coal demand mt</td>
<td>172</td>
<td>189</td>
<td>198</td>
<td>189</td>
<td>206</td>
<td>216</td>
<td>223</td>
</tr>
<tr>
<td>demand growth %</td>
<td>5.5</td>
<td>10.0</td>
<td>4.7</td>
<td>4.5</td>
<td>8.8</td>
<td>5.0</td>
<td>3.3</td>
</tr>
<tr>
<td>India net import trend mt</td>
<td>14</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>17</td>
<td>24</td>
<td>26</td>
</tr>
<tr>
<td>growth %</td>
<td>9.4</td>
<td>11.4</td>
<td>1.9</td>
<td>3.0</td>
<td>6.3</td>
<td>34.9</td>
<td>12.2</td>
</tr>
<tr>
<td>Brazil net import trend mt</td>
<td>10</td>
<td>12</td>
<td>13</td>
<td>12</td>
<td>14</td>
<td>16</td>
<td>18</td>
</tr>
<tr>
<td>growth %</td>
<td>3.0</td>
<td>10.7</td>
<td>9.2</td>
<td>-8.6</td>
<td>20.7</td>
<td>12.3</td>
<td>8.1</td>
</tr>
<tr>
<td>Total seaborne coking coal supply mt</td>
<td>172</td>
<td>189</td>
<td>198</td>
<td>189</td>
<td>205</td>
<td>217</td>
<td>225</td>
</tr>
<tr>
<td>supply growth %</td>
<td>5.5</td>
<td>10.0</td>
<td>4.7</td>
<td>-4.5</td>
<td>8.5</td>
<td>5.8</td>
<td>3.8</td>
</tr>
<tr>
<td>Australia exports mt</td>
<td>92</td>
<td>97</td>
<td>106</td>
<td>103</td>
<td>110</td>
<td>115</td>
<td>121</td>
</tr>
<tr>
<td>Canada exports mt</td>
<td>24</td>
<td>24</td>
<td>26</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
</tr>
<tr>
<td>US exports mt</td>
<td>20</td>
<td>25</td>
<td>24</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>24</td>
</tr>
<tr>
<td>Balance (notional) mt</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-1</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

| Price Hard Coking Coal (JBM) US$/t | 46.0 | 58.0 | 125.0 | 113.0 | 95.0 | 90.0 | 70.0 |
| Price Semi-Soft Coking Coal (JBM) US$/t | 33.5 | 43.5 | 79.5 | 58.0 | 64.0 | 65.0 | 50.0 |
| premium HCC vs. SSCC % | 37.3 | 33.3 | 57.2 | 94.8 | 48.4 | 38.5 | 40.0 |
| Price Pulverised Coal Injection (JBM) US$/t | 37.7 | 48.2 | 100.0 | 66.0 | 67.5 | 70.0 | 56.0 |
| premium HCC vs. PCI % | 22.0 | 20.3 | 25.0 | 71.2 | 40.7 | 28.6 | 25.0 |

Source: AME, McCloskey’s, UBS estimates

Note: HCC = Hard Coking Coal; SSCC = Semi-Soft Coking Coal; PCI = Pulverised Coal Injection

We believe that the consensus forecast for hard coking coal resides near US$90/t for 2008E.

In March, Xstrata reached a settlement with Japanese Steel Mills (JSM) for 2007 contract prices for semi-soft coking coal (SSCC), a 10% increase or US$6/t to US$64/t. This was generally in-line with our expectations of US$65/t. Of note, negotiations between JSMs and Chinese suppliers remain problematic with the Chinese looking for significantly higher prices given the strong domestic market. According to AME, in 2006 contracted coking coal volumes fell by about 40%, furthermore Chinese producers now face higher costs due to lower rebates/higher duties on exports.

PCI was also settled in January at US$67.50, generally in-line with expectations.

We expect that pricing for SSCC and PCI products will remain well supported over the next several years, given strong demand and what appear to be chronic infrastructure problems, particularly in Australia.
Pricing for the 2007 Hard Coking Coal contract was settled in late December last year, with a blended value of about US$95/t.

**Demand environment**

On 1 November 2006 the Chinese government introduced export tax on coking coal and coke while reducing import duties for these same materials. Export tax rates for coking coal and coke are now fixed at 5% for 2007 while import duties have been fixed at 0%. We expect that these duties will have a very minor impact on trade coking coal trade flows in 2007. According to Chinese customs statistics, China posted net imports of 0.3mt in 2006 after importing nearly 2mt in 2005. We expect that China will be roughly balanced on trade for coking coal in 2007.

The outlook for SSCC and PCI coals remains quite positive as steel producers face somewhat softer markets and begin to migrate to lower cost coal alternatives. We expect that the differential between HCC and SSCC/PCI will narrow over the next year and then remain at more normalised levels thereafter.

**Supply environment**

Infrastructure bottlenecks continue to plague coal supply; this is particularly true in Australia where the port expansions face delays, and vessels queues build as a consequence. In February it emerged that Dalrymple Bay capacity will be nearly 6.5mt lower than previously expected (now about 51mt). While problems remain at Newcastle, the Hunter Valley Coal Chain recently raised its declared capacity to 90.4mt/yr, a function of improvements to port and rail infrastructure. Coal shipments thus far in 2007 are running at about 87mt/y.

Russia’s largest coking coal producer Yuzhkuzbassugol Coal Co. recently indicated that production would be negatively impacted in 2007 due to a recent explosion at its Ulanyovskaya mine (killing 108 people). The company produced about 13mt in 2006.

CVRD recently acquired AMCI Holdings of Australia (for about US$673m), building the company’s portfolio of coking coal assets.

BHP Billiton management has indicated that constraints on skilled labour, consultant/engineering time, is particularly acute. They contend that supply response could be slow and in many instances delayed (particularly those projects at the feasibility and pre-feasibility stage), and projects are likely to be more expensive. Pressure remains on mine quality, timing of project and costs.

**News-flow to watch for**

- China – late May, April trade statistics (imports, domestic production)

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**We expect China to be self-sufficient in coking coal in 2007**

**Infrastructure bottlenecks remain an issue – particularly in Australia**

**Analyst: Daniel Brebner, CFA**

+44 207 568 3451
Chart 285: Canadian/Australian export profile

Source: AME, UBS estimates

Chart 286: Japan vs. Brazil/India/China import trend

Source: AME, UBS estimates

Chart 287: Hard coking coal supply by region, 2006

Source: AME, UBS estimates

Chart 288: Export growth profiles, key regions

Source: AME, UBS estimates

Chart 289: Hard coking coal demand by region, 2006

Source: AME, UBS estimates

Chart 290: Top hard coking coal exporters, 2006

Source: AME, company documents, UBS estimates
Molybdenum

- Strong steel production globally combined with production constraint; (Chinese production problems and export regulation) are key factors which are likely to support strong molybdenum prices over the next several years. We forecast a decline in prices from peak levels experienced in 2005; nevertheless we expect that prices are likely to remain well supported near current spot levels over the next couple of years.

Table 31: Global molybdenum market supply/demand balance

<table>
<thead>
<tr>
<th>Molybdenum prices have strengthened beyond expectations</th>
<th>Resilient prices followed by some weakness longer-term is expected for this market</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global IP growth</td>
<td>%</td>
</tr>
<tr>
<td>ratio of growth: demand/IP</td>
<td>x</td>
</tr>
<tr>
<td>growth in moly demand</td>
<td>%</td>
</tr>
<tr>
<td>Total demand</td>
<td>mlbs</td>
</tr>
<tr>
<td>Mine production</td>
<td>mlbs</td>
</tr>
<tr>
<td>growth in mine production</td>
<td>%</td>
</tr>
<tr>
<td>Molybdic oxide production</td>
<td>mlbs</td>
</tr>
<tr>
<td>Recovery from catalysts</td>
<td>mlbs</td>
</tr>
<tr>
<td>Total supply</td>
<td>mlbs</td>
</tr>
<tr>
<td>growth in supply</td>
<td>%</td>
</tr>
<tr>
<td>Market balance</td>
<td>mlbs</td>
</tr>
<tr>
<td>EU price average (Molybdic oxide)</td>
<td>US$/lb</td>
</tr>
<tr>
<td>Price change y/y</td>
<td>%</td>
</tr>
</tbody>
</table>

Source: CRU, IMOA, WBMS, UBS estimates

Molybdenum is an important by-product metal for the copper mining industry. The metal is principally used as an alloy in stainless steels and as a catalyst in the oil/gas industry (for removing sulphur).

We don’t believe that the Molybdenum market is well analysed, thus there is no reliable market consensus forecast. Nevertheless we believe that our forecasts for 07E/08E are considerably higher than what market analysts use in modelling copper industry profitability.

After range-bound trading around US$25.5/lb. the price of Molybdenum spiked in early March to US$28-30/lb. Poor liquidity has characterised the market over the past quarter, nevertheless we suspect that poor visibility and uncertainty on supply from China was primarily responsible for the recent strength.

Molybdenum prices have strengthened beyond expectations in the first quarter. This is partially a function of the application of a 15% export duty on molybdenum sourced from China. This, combined with strong growth in stainless steel capacity, has resulted in poor availability of Chinese material in western markets. We recently raised our Molybdenum forecasts modestly to reflect improved fundamentals for both 2007 and 2008.
Demand environment

Demand growth for 2006 was very strong, largely a function of exceptional strength in stainless steel markets. CRU estimates that stainless output will likely be up about 14.2% y/y. We expect that a modest deceleration is bound to occur in 2007, and predict consumption growth of about 9% this year.

Chinese stainless capacity additions continue apace, we believe that production increased by roughly 45% y/y over the past quarter as producers such as Lianzhong Iron and Steel Co (LISCO) and Zhangjiangang Pohang Stainless Steel (ZPSS) commissioned new melt shops.

Notwithstanding strong secular fundamentals, there are some weaknesses emerging in the stainless steel market, particularly in Europe and the US. Stainless base prices in Europe have come off as supply-demand fundamentals weaken. The fall in base prices has, however, been faster than we anticipated (down €130/t to €1,615/t in March for type 304 material in Germany) and there are real signs that underlying end-use demand could now be slowing. The market for 316 stainless (the standard molybdenum bearing grade and second in importance to 304 among the austenitic stainless steels) is seeing similar weakness with base prices softening recently in Germany. We believe that production cuts may now be necessary to support prices.

According to CRU while there remains a shortage of near-term supply, traders are trying to decide whether the recent rise in price represents a new price level or temporary spike.

Finally, we note that investment or fund demand may become an additional factor influencing molybdenum pricing over the balance of the year. The Sprott Molybdenum Participation Corp. was launched in April with the purpose of investing in molybdenum assets, including physical metal.

Supply environment

Supply constraints on molybdenum concentrate output from mining operations is a key reason for why molybdenum prices are well supported at current levels. Output from one of the key global suppliers, Huludao in China’s Liaoning province, fell by about 20mlbs in 2005 as a consequence of tax/safety and other issues which have resulted in closure of operations. As a consequence, Chinese output of molybdenum in 2005 was 74mlbs. (a decline of 14-15mlbs. from 89mlbs. in 2004). Export statistics indicate that exports of molybdenum from China fell by 26% to about 37mlbs y/y in 2006.

News-flow to watch for

- Antofagasta – 3rd May, Q1 production results
Chart 291: Long-term molybdenum price trend

Source: Thomson Financial, UBS forecasts

Chart 292: Global capacity utilisation stainless (CRC)

Source: MEPS, CRU, UBS

Chart 293: Stainless steel capacity (CRC) kt, selected regions

Source: CRU, UBS estimates

Chart 294: Spot molybdenum price trend

Source: Thomson Financial, UBS

Chart 295: Change in global capacity (CRC)

Source: CRU, UBS estimates

Chart 296: China production trend (mlbs.)

Source: TEX report, UBS estimates
Chart 297: Molybdenum production by source type (2005)

- Primary: 37%
- By-product: 63%

Source: IMOA

Chart 300: Molybdenum roasting capacity (2005)

- South Am: 32%
- North Am: 26%
- Europe: 18%
- China: 24%

Source: IMOA, Teck Cominco

Chart 298: Molybdenum demand by end-use (2006E)

- Tool/speed steels: 20%
- Stainless steel: 40%
- Low alloy steel: 20%
- Lubricants: 10%
- Catalysts: 10%
- Others: 10%

Source: AME, UBS estimates

Chart 301: Molybdenum demand by region, (2006E)

- W. Europe: 33%
- USA: 19%
- Japan: 14%
- Other: 19%
- China: 13%

Source: CRU, UBS estimates

Chart 299: Molybdenum supply by region, (2006E)

- USA: 30%
- China: 17%
- Chile: 28%
- Peru: 9%
- Russia: 5%
- Canada: 5%
- Other: 6%

Source: WMBS, IMOA, UBS estimates

Chart 302: Top molybdenum producers, (2006E)

- Codelco: 19%
- Phelps Dodge: 16%
- Jinduicheng: 12%
- Thompson Creek: 6%
- Luanchaun: 3%
- G. Mex: 8%
- Other: 36%

Source: UBS estimates
Agriculture & Fertilisers

Agricultural commodities have witnessed significant price strength over the past several quarters, and although a modest correction has been experienced, long-term fundamentals appear positive and likely to support relatively high pricing in our view.

Chart 303: Selected agricultural price profiles (past 5 years)

Source: Thomson Financial, UBS

The energy link is a key, emerging driver for agricultural commodities, particularly sugar and corn which are used in ethanol production. The US and Brazil are the primary producers of ethanol. Demand for ethanol from both of these countries is expected to continue to increase dramatically.

Chart 304: Global ethanol production 2006E (% of 52bn litres)

Source: F.O. Licht, EIA

In the US, ethanol demand is increasing rapidly and significant ethanol capacity is expected to come on stream in 2007 (a 60% increase is anticipated). The chart below shows the trend over the past 12-months in US ethanol production, with the current run-rate at 5.9bn gallons (about 22bn litres).
Ethanol usage in Brazil is expected to double by 2013 from 2006 levels, based on the expansion of the domestic fleet of flex fuel cars (in 2006, nearly 1.4 million new flex fuel cars were sold in Brazil). We expect a 2% annual increase in the national fleet, that 80% of new cars will be flex fuel and that flex fuel cars will use ethanol 70% of the time. This would require sugarcane fields to expand by 50% or about 3 million hectares according to our current estimates.

In terms of supply, sugar cane production could increase by 10% in 2007 versus 2006. Ethanol production in Brazil could reach 20.5 billion litres this year and about 3.0-3.5 billion litres of exports are expected. Local demand should absorb about 15-16 billion litres. The remaining should result in increased inventories. We also expect the mandatory blend of ethanol into gasoline to increase to 25% from 23% in the middle of the year.
Traditional fundamentals remain key drivers

Global GDP growth, emerging market wealth (driving dietary changes), water availability and shrinking arable land are longer-running fundamentals that will continue to exercise a strong influence on agricultural markets. We believe that resources constraints, in the form of water and land availability may emerge as significant bottlenecks in supply and combined with the developing energy link for some commodities are likely to result in elevated pricing for an extended period of time.

Chart 307: Land availability per person 1970-2020E

As a consequence of these resource constraints, the ability to extract maximum yield per acre/hectare of land becomes of key importance. This is achieved by three key methods: 1) modern farming methods (equipment, irrigation, etc.), 2) bio-technology and 3) enhanced use of fertilisers.

Not surprisingly fertiliser consumption globally is increasing, with Asia being the fastest growing region.

Chart 309: Global growth in fertiliser consumption

Source: FAO, PPI, Potash Corporation

Source: USDA

Source: IFA
Corn 2007 outcomes uncertain

Corn prices may come under some pressure in 2007 if our production forecasts are achieved. This is a consequence of high plantings for the 2007 corn crop (USDA forecast of 90.5m acres, a 16% increase y/y) and our expectation for above trend-line yield of 160 bushels/acre. The yield in 2006 was about 149 bushels/acre. While we note that there may be some downside risk to plantings due to wet soil conditions in some US states (and potentially higher plantings of soybeans), there exists the potential for a larger than expected corn crop to cause an increase in inventories and a reduction in corn prices over the summer.

Chart 310: US corn and soybean planted acreage USDA estimates

In the US much of the corn price escalation has been driven by demand for ethanol as a biofuel. While politically expedient (demonstrating action against climate change) the realities of biofuel economics are such that low input costs and high oil prices are required to make it economically viable. Currently political drive and policy is driving ethanol demand rather than economics. A change in the political climate could pose a risk longer-term.

Political tension will make ethanol more viable as an oil alternative, and put further pressure on market balances. Unsurprisingly higher oil prices would enhance ethanol demand as its price is strongly correlated to oil prices.

Weather the unknown

Weather is a significant unknown. El Nino appears to have broken in February. However, according to the US climate prediction centre, conditions are now more favourable for La Nina which, in very general terms, means that those areas that normally experience dry weather will be drier, while those that experience wet weather will be wetter.
## Corn

- Over 2007/08, we believe corn supply / demand fundamentals will continue to drive declines in US and world inventories. There is considerable uncertainty about US production, both in terms of acres planted and yield, and US consumption in ethanol. We expect prices to remain above US$3/bushel in 2007-08.

Table 32: Global corn supply-demand model

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<td>191</td>
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<td>55</td>
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<td>99.7</td>
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<td>124</td>
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<td>102</td>
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<tr>
<td><strong>Change in world stocks</strong></td>
<td>% y/y</td>
<td>-15%</td>
<td>-6%</td>
<td>-19%</td>
<td>31%</td>
<td>-5%</td>
<td>-26%</td>
</tr>
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**Corn price**

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<tr>
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<th>US$/bushel</th>
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<td>2001/02</td>
<td>1.97</td>
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<tr>
<td>2002/03</td>
<td>2.32</td>
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<td>2003/04</td>
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<td>2004/05</td>
<td>2.06</td>
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<td>2005/06E</td>
<td>1.99</td>
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<tr>
<td>2006/07E</td>
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<tr>
<td>2007/08E</td>
<td>3.3</td>
</tr>
</tbody>
</table>

Source: USDA (April 2007), UBS estimates (* US analyst), note years refer to ending year of agricultural season

**Price expectations**

We expect prices to stabilize with steady world stocks (at 92mt at the end of 2007-08). The estimated 2007/08 US closing stock level of 30mt, driven by aggressive yield estimates of 160bushels per acre in the US. Corn prices on the CBOT are currently at US$3.64/bushel and the USDA in April forecast average farm prices for the 2006 crop at US$3.20. We are maintaining our forecast of US$3.30/bushel in 2007/08, down from US$3.5/bushel in our previous Commodity Connections in Q107.

**Demand environment**

In 2007/08, we expect global corn consumption to grow by 3%. The key US market is forecast to grow by 5%, driven by continuing acceleration in ethanol production consuming 81mt, up 47% y/y. Other US consumption of corn, the export and livestock (feed & residual) markets are expected to ease in line with subdued cattle prices and higher corn prices.

Acceleration in ethanol production in the US is the key growth driver in global corn demand; 97% of total US ethanol production comes from corn. It is expected that ethanol production will account for c26% of total US corn consumption in 2007/08E; one tonne of corn produces between 350-400 litres of
ethanol. Ethanol consumption is driven by its increased use in reformulated
gasoline and by the mandate of the Energy Act of 2005 to increase corn-based
ethanol usage to 7.5bn gallons by 2012. Governors Ethanol Coalition have urged
the US Federal Government to increase the 2010 mandated level from 7.5bn
gallons to 12.0bn gallons. US ethanol capacity is 4.8bn gallons across 101
plants. In addition, there are 58 new plants under construction with incremental
capacity of 4.0bn gallons. There are another 150 proposed plants that if all were
built US ethanol capacity would surpass 19bn gallons/year.

The USDA forecasts that 47% of the 2007 US total use of corn will be for ‘feed
and residual’. Demand for this corn feed is correlated with the price of the
finished product, notably cattle prices. We now expect corn used for feed will
decline by 3mt in 2007/08 from 2006/07 estimated levels, given both
uncertainly related to beef trade and the possibility of lower domestic production
given elevated grain prices. China is the other key to global balances. While
Chinese corn consumption has been steadily decelerating for over a decade, to a
current growth rate of 2%-4%, it still remains a major global corn consumer
capable of impacting balances.

Supply environment

Supply is currently the key issue in the corn market. Our current estimates for
US production of 322mt, up 20% y/y, are based on our US analyst’s estimate of
87m acres planted at a yield of 160 bushels per acre. Our acreage estimates are
lower than the USDA of 90.5m acres, as we believe there is potential of planting
difficulties due to weather and also some crop switching to soybeans. Our yield
estimates, however, are higher than the USDA estimate of 152.8 bushels per
acre and the 2006-07 actual of 149.1 bushel per acre. Our estimate may be
optimistic given that additional planted acres may be more marginal in
productivity; there is also a reported shortage of high yield seed. (Key US
conversion factors: 39.4 bushels/tonne; 2.5 acres/hectare; 3.785 litres/gallon).

Chinese corn production has edged up with greater than expected yields. Land
access and water resources are however suggesting limited growth in China’s
output; we are forecasting 1.4% growth in 2007/08. Over the longer term, we
believe that China’s fundamental supply and demand trends point to a rise in
agricultural imports. The rest of the world production is expected to grow by 2-
3% in 2007/08 in response to higher prices.

News-flow to watch for

- WASDE 2007 reports will be released on 11 May, 11 Jun, 12 Jul, 10 Aug, 12
  Sep, 12 Oct, 9 Nov and 11 Dec (http://usda.mannlib.cornell.edu/).
Chart 311: Corn prices (No2 yellow), 2004-2007, US$/bushel

Source: Reuters

Chart 312: US ethanol Production, 1980-Present

Source: Renewable Fuels Association (RFA) and UBS estimates

Chart 313: Total US Corn Consumption, bn bushels

Source: USDA and UBS estimates

Chart 314: US harvested corn acres to 2007/08

Source: USDA, UBS

Chart 315: Corn Used for US ethanol Production, 1980-2006E

Source: RFA, National Corn Growers' Association, USDA and UBS estimates

Chart 316: Primary Users of Corn, 2007E

Source: USDA and UBS estimates
Sugar

A sizeable market surplus is anticipated in the upcoming year (2006/07) as production growth from regions such as Brazil, India, Russia and Guatemala more than offset the decline in EU output. We believe the rapid pace of sugar expansion in Brazil will not be mopped up by the increased ethanol demand, which is much more controlled than in the USA. As such this should result in the World Sugar Price (WSP) trading lower than previously expected. We have downgraded our CY07 WSP from USc12.0/lb to USc10.0/lb.

Table 33: Global sugar market supply/demand balance

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<tr>
<td>mt</td>
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<td>bn litres</td>
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<td>Sugar price (NYBOT #11)</td>
<td>USc/lb.</td>
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<td>7.49</td>
<td>8.64</td>
<td>11.37</td>
<td>15.50</td>
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Source: F.O. Licht, LMC, USDA, UNICA, UBS estimates

Key drivers

- Rapid pace of harvest in Brazil: The most immediate effect behind the price weakness has been the rapid pace of the Brazil sugarcane harvest, where dry weather (what will the impact be on next year’s crop?) conditions have allowed the harvest to proceed at a rapid pace. We estimate the current harvest to be c20% higher than last year.

- Weak demand from major importers: Until recently, high sugar prices have deterred many importers from entering the market, most choosing to draw down stocks, or ramp up domestic production. An example is Russia, which has invested in beet, resulting in a withdrawal from the sugar import market for the first time in nearly a decade.

- Weaker ethanol prices: even though ethanol prices in Brazil have declined to USc36/l, and in the US to USc62/l, real prices remain exceptionally high by historic standards.

↓↔ Near-term weakness followed by stability is expected for this market
■ **EU reform:** The EU reform could result in the world sugar market coming into balance, as it is expected that this reform proposal would result in a 6mt decline in sugar production volumes. The net effect of this change is expected to be positive on the world sugar price, as illustrated by the rise in the world sugar price since June 2005, when the proposal paper on this piece of legislation was released.

■ **Link to Ethanol:** Brazil sugar producers are able to produce either Ethanol or Sugar, depending on where the best price is received. We expect the domestic demand for Ethanol to strengthen driven by:

- The recent decline in domestic Brazilian ethanol prices
- Industry’s continuous lobbying for higher blend ratios – from 20% to 25% – with government recently announcing an increase in the blend ratio to 23%.
- Sales of flex-fuel vehicles continue to grow rapidly, increasing the demand for ethanol

■ **Recent investment in new production capacity:** Today’s sugar price is expected to be a concern to Brazilian millers because they barely cover their costs of production, and certainly do not offer an attractive return for those who are investing in new milling capacity. Against this backdrop we suspect producers will be reluctant to price their sugar below current levels which could also lend support to the world sugar price.

**Brazil focus**

Ethanol capacity in Brazil is expected to expand at a CAGR% of 9.1%, from 16.8 billion litres (2006) to 36.8 billion litres (2015E), through the introduction of 89 new ethanol plants over the next seven years. UNICA expects this extra production to be absorbed by: (1) continued growth in the domestic flex fuel vehicle (FFV) market and growth within the ethanol export market, especially to Asia. Unlike the global maize market, which is in deficit, we believe the current surplus sugar market is sustainable and could even increase because of increased production from India, which we also expect to affect the sugar market. On the back of this surplus, we forecast global sugar prices to remain depressed over the medium term.

In Brazil, we expect an increase in ethanol returns due mainly to higher fuel prices (because of higher oil prices) and lower feedstock (sugar) prices. We therefore expect the current (2007E) gross profits (US¢15.0/l) to be maintained over our forecast period, up from the US¢11.0/l 2006 returns.

---

**Analysts:**

Renier Swanepoel +27 11 322 7327
Daniel Brebner, CFA +44 207 568 3451
Chart 323: Longer-term sugar price trend (USc/lb.)

Source: Bloomberg, UBS

Chart 324: Sugar pricing vs. inventory levels

Source: USDA, UBS estimates

Chart 325: China and India sugar consumption profile

Source: USDA, UBS estimates

Chart 326: Spot sugar price trend (USc/lb.)

Source: Datastream, UBS

Chart 327: Sugar production – selected regions (t)

Source: USDA, UBS estimates

Chart 328: Sugar and oil pricing patterns

Source: Datastream
Chart 329: Brazilian ethanol production (bn litres)

Source: F.O. Licht

Chart 330: Brazil – automotive sales by fuel type

Source: ANFAVEA

Chart 331: Sugar production by region, (06/07E)

Source: USDA, UBS estimates

Chart 332: Brazil – end market for domestic cane crop

Source: F.O. Licht

Chart 333: Sugar consumption by region (06/07E)

Source: USDA, UBS estimates

Chart 334: Key sugar exporters, (06/07E)

Source: USDA, UBS estimates
Fertilisers

We believe the fertiliser demand picture is buoyant both in the near and longer term. Biofuel demand momentum and supply constraints have escalated prices significantly in Q107. Some correction is likely but we believe long term upward momentum will remain due to bio-energy demand, Chinese, Indian and emerging market GDP growth & global population growth.

Table 34: Global fertiliser supply-demand model 2002 to 2009E

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<tr>
<td>Nitrogen consumption mt</td>
<td>86</td>
<td>87</td>
<td>90</td>
<td>91</td>
<td>93</td>
<td>94</td>
<td>96</td>
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<tr>
<td>Nitrogen capacity mt</td>
<td>132</td>
<td>133</td>
<td>135</td>
<td>139</td>
<td>144</td>
<td>149</td>
<td>152</td>
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<tr>
<td>Nitrogen operating rate %</td>
<td>65%</td>
<td>65%</td>
<td>67%</td>
<td>65%</td>
<td>65%</td>
<td>63%</td>
<td>63%</td>
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<tr>
<td>Ammonia price US$/t</td>
<td>203</td>
<td>253</td>
<td>285</td>
<td>287</td>
<td>304</td>
<td>340</td>
<td>340</td>
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<tr>
<td>Ammonia price change %</td>
<td>85%</td>
<td>25%</td>
<td>13%</td>
<td>1%</td>
<td>6%</td>
<td>12%</td>
<td>0%</td>
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<tr>
<td>Phosphate consumption P2O5 mt</td>
<td>34</td>
<td>35</td>
<td>38</td>
<td>38</td>
<td>41</td>
<td>43</td>
<td>43</td>
</tr>
<tr>
<td>Phosphate capacity P2O5 mt</td>
<td>44</td>
<td>44</td>
<td>46</td>
<td>45</td>
<td>47</td>
<td>48</td>
<td>46</td>
</tr>
<tr>
<td>Phosphate operating rate %</td>
<td>77%</td>
<td>80%</td>
<td>83%</td>
<td>84%</td>
<td>87%</td>
<td>90%</td>
<td>93%</td>
</tr>
<tr>
<td>DAP* price US$/t</td>
<td>178</td>
<td>222</td>
<td>247</td>
<td>260</td>
<td>450</td>
<td>380</td>
<td>350</td>
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<tr>
<td>DAP price change %</td>
<td>14%</td>
<td>25%</td>
<td>11%</td>
<td>5%</td>
<td>73%</td>
<td>-16%</td>
<td>-8%</td>
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<tr>
<td>Potash consumption mt</td>
<td>23.5</td>
<td>26</td>
<td>27</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>31</td>
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<tr>
<td>Potash capacity mt</td>
<td>40</td>
<td>40</td>
<td>41</td>
<td>42</td>
<td>43</td>
<td>45</td>
<td>45</td>
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<tr>
<td>Potash operating rate %</td>
<td>59%</td>
<td>65%</td>
<td>66%</td>
<td>62%</td>
<td>63%</td>
<td>62%</td>
<td>69%</td>
</tr>
<tr>
<td>Potash price US$/t</td>
<td>87</td>
<td>102</td>
<td>141</td>
<td>174</td>
<td>180</td>
<td>200</td>
<td>210</td>
</tr>
<tr>
<td>Potash price change %</td>
<td>1%</td>
<td>17%</td>
<td>38%</td>
<td>23%</td>
<td>3%</td>
<td>11%</td>
<td>5%</td>
</tr>
<tr>
<td>Total fertiliser consumption mt</td>
<td>143</td>
<td>148</td>
<td>155</td>
<td>155</td>
<td>161</td>
<td>165</td>
<td>170</td>
</tr>
<tr>
<td>Fertiliser consumption growth %</td>
<td>3%</td>
<td>3%</td>
<td>5%</td>
<td>0%</td>
<td>4%</td>
<td>2%</td>
<td>3%</td>
</tr>
</tbody>
</table>

Source: IFA, Thomson, SRI, IDFC, Yara, Fertiliser Week, UBS estimates; note year 2008E refers to 2007/08E

Price expectations

DAP prices have increased by 70% since the beginning of this year. Crop pricing and acreages planted in the US were un-anticipated in 2006 and Mosaic (World’s largest producer of phosphates) streamlined back significant capacity at the wrong time. We expect prices to maintain in 07 with some correction in 08. Urea and ammonia are expected to soften further from current prices due to forecast increases in year end US corn inventories. Ammonia prices are expected to move higher in 08 & 09 due to higher natural gas price expectations. Potash has seen some appreciation on Chinese contract prices and increased Brazilian demand is further expected to tighten 2007 supply.

Supply and demand picture

Bio-energy demand and aspirations have fuelled crop prices and this has led to positive fertiliser prices. Ethanol demand is set to increase by 60% in the US and 10% in Brazil in 2007, and this is expected to continue for at least three years. In addition to this, traditional fundamentals of emerging market wealth, GDP

1 Diammonium Phosphate
growth and population growth leading to increased demand for food will continue to support fertiliser demand.

We believe that US corn prices may correct in 2007 and there will be some switching to soybeans. This would in particular influence demand for nitrogen based fertilisers in the near term, but we are positive on nitrogen in the long term. La Nina weather patterns, if they are prevalent in 2007, are a risk to the volumes and types of crops that will be planted.

Due to bio-energy momentum, we now believe that energy is now a fundamental of crop prices globally and by extrapolation, of fertilisers. In the past twelve months the ammonia price has shifted from its traditional correlation to natural gas and has shown stronger correlation to corn prices.

There are several supply and demand similarities between hard commodities and mineral fertilisers and this implies that fertilisers are likely to follow similar trajectories if the energy fundamental remains.

Ammonia and urea are likely to have a degree of correction in 2007 due to the expected softening of corn prices, but we are positive in the long term.

We expect phosphate capacity to remain tight and some rotation into soybean is expected which will further improve its demand position as soybeans are “phosphate heavy”. Supply constraints are expected to ease in the long term, but will remain tight in the near term. Current prices are unlikely to stimulate Mosaic Corp. to reverse its capacity reductions until it is clear that they will be sustained. New build capacity has a 3-5 year lead time.

We see some opportunities for higher potash prices later in 2007 on the back of strong demand from China, Brazil and India. Brazilian demand pressure is already apparent in recently agreed potash prices.

In addition to bio-energy global fertiliser demand is driven by three interrelated factors: population growth, rising income, and declining amount of available arable land. BRIC (Brazil, Russia, India and China) economic growth is a fundamental influencer.

In the longer term, China’s strong economic growth, coupled with rapid population growth in the whole of Asia, are core drivers. We believe that Indian growth is likely to follow China’s trajectory with a 10-15 year time lag, implying extended demand prospects.

**News-flow to watch for**

- El Nino/La Nina weather progress NCEP (www.cpc.ncep.noaa.gov) & general weather reports
- IFA Annual Conference (Istanbul 21-23 May 2007)
Chart 335: Land availability per person 1970-2020E

Source: FAO, PPI, Potash Corporation

Chart 336: Total US fertiliser use by Crop

Source: Agrium

Chart 337: Cost structure of wheat production

Source: Yara (based on winter wheat production for a 100-200 ha arable farm)

Chart 338: Global fertiliser use

Source: International Fertilisers Association

Chart 339: Global fertiliser use by crop

Source: Potash Corporation

Chart 340: Fertiliser demand by region

Source: USDA and UBS estimates
Chart 341: Meat consumption and urban population

Source: United Nations, World Bank, UBS estimates

Chart 342: Supply/demand of global potash fertiliser

Source: IFA, IDFC, Fertiliser Week, UBS estimates

Chart 343: Supply/demand of global nitrogen fertiliser

Source: IFA, IDFC, Fertiliser Week, UBS estimates

Chart 344: Global grain production and consumption

Source: USDA

Chart 345: Global grain stocks, stock as % of consumption

Source: USDA

Chart 346: Supply/demand of global potash fertiliser

Source: IFA, IDFC, Fertiliser Week, UBS estimates
Other Materials

Market Pulp

On April 10 we raised our pulp price forecasts. We increased our 2007 softwood pulp (NBSK) price by 5.4% and our 2008 forecast by 7.2%. We also raised our estimates for eucalyptus (hardwood) pulp by about 5% in 2007 and 2008. We had expected early 2007 NBSK price recovery followed by a mid-year drop. But NBSK has remained tighter than expected due to wood-related downtime (especially in Europe), more gradual than expected switching to hardwood from softwood and the rise in wastepaper prices in the first quarter. Positive spring seasonality should further tighten softwood inventories leaving NBSK well positioned to withstand normal summer weakness. As such, we now expect softwood prices to hold until the end of the year. Hardwood pulp markets are not as firm and our forecast assumes some weakening in pricing towards the summer. We expect weaker hardwood to weigh on softwood, pressuring prices towards year end.

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<tbody>
<tr>
<td>Global market pulp shipments mt</td>
<td>39,463</td>
<td>41,792</td>
<td>42,892</td>
<td>44,565</td>
<td>45,590</td>
<td>46,730</td>
</tr>
<tr>
<td>growth %</td>
<td>4.4</td>
<td>5.9</td>
<td>2.6</td>
<td>3.9</td>
<td>2.3</td>
<td>2.5</td>
</tr>
<tr>
<td>Global market pulp capacity mt</td>
<td>42,680</td>
<td>43,700</td>
<td>45,770</td>
<td>46,835</td>
<td>48,900</td>
<td>51,510</td>
</tr>
<tr>
<td>Supply growth %</td>
<td>3.3</td>
<td>2.4</td>
<td>4.7</td>
<td>2.3</td>
<td>4.4</td>
<td>5.3</td>
</tr>
<tr>
<td>Operating Rate %</td>
<td>92.5</td>
<td>95.6</td>
<td>93.7</td>
<td>95.2</td>
<td>93.2</td>
<td>90.7</td>
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<tr>
<td>Price US$</td>
<td>553</td>
<td>634</td>
<td>648</td>
<td>721</td>
<td>800</td>
<td>708</td>
</tr>
<tr>
<td>change %</td>
<td>13.3</td>
<td>14.7</td>
<td>2.2</td>
<td>11.4</td>
<td>10.9</td>
<td>-11.6</td>
</tr>
</tbody>
</table>

Source: PPPC, AF&PA, RISI, industry sources, company reports and UBS estimates

Softwood holding up better than expected but still believe near-peak

Producers have announced a US$20 per tonne softwood price increase for April. This would lift U.S. prices to US$810 per tonne, remaining at the highest levels since early 1996. This is the second softwood price increase in 2007. Early indications are positive; we expect the April initiative to succeed. We expect this to reflect peak pricing. We believe prices will hold at these levels and start to turn down towards the end of the year. Previously, we had thought softwood would come under pressure towards the seasonally weak summer months.

Hardwood markets are not as tight as softwood. Prices have been stable so far in 2007 while softwood has risen. There have been scattered reports of pressure in some markets, especially Asia. Hardwood inventories are high at 39 days of supply versus only 25 days for softwood. The price gap is approaching US$100 per tonne. We believe hardwood prices could start to turn down towards the summer and expect this to eventually drag down softwood prices.

Key drivers

- Fibre issues – with a warm/wet winter in Europe, timber harvesting conditions have been poor. There have been reports of pulp mill downtime attributable to lack of wood/chip supply and cost. The situation could become more acute this spring as companies work through log decks that

Raised softwood (NBSK) price forecasts for 2007e/08e by 5% and 7% respectively

Positive momentum in softwood carrying into 2007 but hardwood appears to be stalling

There are many factors which could impact our somewhat cautious outlook, both positive and negative
were not replenished in the winter. European mills have also faced greater competition for wood due to growing interest from energy firms, raising the cost of logs. Recovery operations from a hurricane in Sweden have impacted the available mix of fibre (towards softwood). To a lesser extent, wood has also been an issue in North America, particularly in the Pacific Northwest/British Columbia. Wood-related pulp mill outages have helped contain softwood inventory builds during the typically weak winter months.

Grade switching—over time, we expect the industry to take advantage of the widening gap between hardwood and softwood pulp prices (buyers replacing softwood with hardwood and producers making more softwood than hardwood). However, this shift has been somewhat slower than we expected. We believe the easy switches have mainly been implemented and that some further swings will require time/modest capital to execute. We expect the price differential to continue to widen, reaching US$130 per tonne by early 2008, creating more incentive to change grades.

Wastepaper costs—wastepaper prices have risen sharply in early 2007 with prices of sorted office paper, a pulp substitute, up 68% year over year. While there is not significant ability to replace wastepaper with pulp, on the margins, we believe high wastepaper costs may have encouraged some substitution (pulp for wastepaper), supporting pulp markets.

Supply—despite near-term strength, we remain concerned about the pace of market pulp capacity expansion. We forecast about 5% average annual growth 2007-09, roughly double the historical average. Two mills which started in Chile in late 2006 continue to ramp up and in the second half of 2007 another two hardwood mills will start up, adding 2 million tonnes of capacity to the market. While these will likely have only a modest impact during 2007, we expect the new supply to weigh on the markets in 2008. Also, there is modest risk that a few of the North American pulp mills that shut 2005-06 could reopen.

Currency—the recent weakness of the U.S. dollar should be supportive of pulp pricing. The stronger euro would mitigate some of the impact of rising U.S. dollar pulp prices for European buyers (40% market). The weaker U.S. dollar also maintains some pressure on Canadian suppliers.

Current markets—the global pulp markets are entering the seasonally-stronger spring months in fairly good shape. World pulp inventories are 31 days of supply, generally in line with the 32 day level we view as normal. Softwood inventories are particularly tight at only 25 days, while hardwood inventories are high at 39 days. Inventories typically tighten during the spring. Shipments are a bit sluggish off 0.9% in the first quarter; but there was sign of pickup with about 2.1% year over year growth in March against a tough comparison. As with inventories, softwood shipments are a bit stronger than hardwood.
Chart 347: NBSK Pulp Price US$/Tonne, Delivered US

Source: RISI, industry sources, and UBS estimates

Chart 348: World Market Pulp Inventories, 000 tonnes

Source: PPPC and UBS estimates

Chart 349: World Market Pulp Shipments, Year/Year % Change

Source: PPPC

Chart 350: NBSK-Eucalyptus Pulp Price (US), US$/tonne

Source: RISI

Chart 351: World Market Pulp Inventories, Days of Supply

Source: PPPC

Chart 352: World Market Pulp Shipment to Inventory Ratio

Source: PPPC and UBS estimates
Chart 353: World Pulp Operating Rate

Source: PPPC, AF&PA, RISI, industry sources, and UBS estimates

Chart 354: NBSK Pulp Price in US & C$/Tonne, index

Source: RISI, Thomson Datastream and UBS

Chart 355: World Chemical Mkt Pulp Capacity by Region-kt

Source: RISI

Chart 356: World Pulp Capacity Growth

Source: PPPC, AF&PA, RISI, industry sources, and UBS estimates

Chart 357: NBSK Pulp Price in US$ & Euro/Tonne-index

Source: RISI, Thomson Datastream and UBS

Chart 358: World Chemical Market Pulp Demand by Region-kt

Source: RISI
Ethylene

■ Once again, ethylene demand and pricing continues to be volatile in the three major global regions. In early spring, ethylene hit US$1,300/MT in Asia, but has recently cooled to under US$900/MT on the impending start-up of the new Formosa cracker. European margins are very good with 2Q contract ethylene pricing of €890/MT. Margins are near US$500/MT and supply/demand is tight. In the U.S., ethylene prices are the lowest of any region. The bright spot is record exports averaging 300 million pounds per month in December and January. We have updated our strategic outlook for global ethylene supply and demand and we present our results in our “2007 Global Ethylene Analysis”, published April 17, 2007.

Table 36: Global ethylene supply/demand balance

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<tr>
<td>Capacity</td>
<td>Mt/y</td>
<td></td>
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<tr>
<td>Production</td>
<td>MTy</td>
<td>121,738</td>
<td>121,738</td>
<td>121,738</td>
<td>126,478</td>
<td>131,336</td>
<td>139,713</td>
</tr>
<tr>
<td>Operating Rate</td>
<td>%</td>
<td>90.3%</td>
<td>90.3%</td>
<td>90.3%</td>
<td>90.9%</td>
<td>91.4%</td>
<td>89.7%</td>
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<tr>
<td>Capacity Growth</td>
<td>% per yr</td>
<td>3.5%</td>
<td>3.5%</td>
<td>3.5%</td>
<td>3.9%</td>
<td>3.8%</td>
<td>6.4%</td>
</tr>
<tr>
<td>Production Growth</td>
<td>% per yr</td>
<td>4.1%</td>
<td>4.1%</td>
<td>4.1%</td>
<td>4.5%</td>
<td>4.5%</td>
<td>4.4%</td>
</tr>
<tr>
<td>GDP Growth</td>
<td>% per yr</td>
<td>4.6%</td>
<td>4.6%</td>
<td>4.6%</td>
<td>3.6%</td>
<td>3.8%</td>
<td>3.8%</td>
</tr>
<tr>
<td>Elasticity</td>
<td>Ratio</td>
<td>0.89</td>
<td>0.89</td>
<td>0.89</td>
<td>1.26</td>
<td>1.18</td>
<td>1.16</td>
</tr>
<tr>
<td>EBITDA - USGC</td>
<td>US$ per Mt</td>
<td>345</td>
<td>345</td>
<td>345</td>
<td>255</td>
<td>298</td>
<td>185</td>
</tr>
<tr>
<td>Cents/lb</td>
<td></td>
<td>8.7</td>
<td>13.2</td>
<td>15.7</td>
<td>11.6</td>
<td>12.8</td>
<td>8.4</td>
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Source: SRI, UBS estimates

Strategic outlook

Our detailed look at global supply and demand for ethylene suggests that operating rates during the years 2006 through 2008 should be 91% to 92%. Historically, margins have expanded as operating rates exceed 91%. Our benchmark U.S. Gulf Coast margins for ethylene are projected to be US$0.10/lb in 2007, US$0.12/lb in 2008 and US$0.07/lb in 2009. In 2010 and 2011, cumulative global capacity additions of near 14% should return ethylene to trough conditions.

Near-term pricing and market trends

US – The March contract price for U.S. ethylene was up US$0.015 per pound to US$0.40 per pound. This was the first increase in six months, during which time contract ethylene had fallen US$0.12/lb. Domestic demand for polyethylene is picking up and producers are running about 95% of effective capacity. This spring has seen numerous maintenance outages that have helped to tighten the market. These outages will taper off in May and demand will need to improve if margins are to maintain. Spot ethylene is now near US$0.38/lb on strong volumes.

Polyethylene prices had given up US$0.18/lb from August 2006 to January 2007. In February and March, producers were able to get through a US$0.06/lb increase. Domestic PE demand has lagged, but is now starting to improve.
Exports of ethylene derivatives have been very strong with a strong price arbitrage set up by high oil prices abroad.

**Europe** – The second quarter contract settlement has been settled at €890 per MT, up from €35/MT and approaching the record 4Q settlement of €900 per MT. The market is generally tight with several maintenance and outages and producers are running full out. Ethylene margins are very strong near $500/MT helped out by strong co-product pricing with 2Q propylene at €850/MT and butadiene at €890 in 2Q. Sport ethylene pricing is firm at a €50-60/MT premium to contract.

**Asia** – The Asian ethylene market has recently seen a collapse of ethylene pricing from a high of over $1,300/MT in March to currently near $800-750/MT. This is due to some extent to the anticipation of the new ethylene capacity associated with the Formosa, line-3 start-up. It could also be due to a pullback of buying by traders in order to cool an overheated market.

**Demand environment**

Our outlook is for global ethylene demand growth to average 4.4% per year for the years 2007-10. This is based on an assumed global GDP growth of 3.8% and an average elasticity of 1.2. In the near term, the UBS forecast calls for global GDP growth of 3.6% in 2007, increasing to 3.8% in 2008. Actual ethylene demand growth in 2006 was only 4.1% after a very poor fourth quarter. Our expectation for global ethylene demand growth in 2007 is 4.5% including some minor inventory re-building, especially in the U.S. Polymer inventories in the U.S. remain very low as customers continue to minimize their inventories to minimize working capital and to guard against inventory devaluation as happened in the second half of 2006.

**Supply environment**

For the next three years, global capacity additions will likely average 4.7%, slightly below our demand growth estimate of 4.4% per year. Thus, we see operating rates hovering around the 91% area that typically provides strong margins. Additions in 2009 will step up slightly to 6.4%. By 2010-11, excessive capacity will come on-line in China and in the Middle East. We look for a cumulative addition of 14% capacity in these two years that could drop global operating rates down to 85% or below. We expect cash margins for integrated polyethylene to be near break-even by this time.

**News-flow to watch for**

- Dow Chemical, the largest global ethylene producer will announce 1Q earnings on April 26th.
- The Iranian crackers NPC#9 (ArylSasol) and NPC#10 (Jam Petrochemical) have announced start-up timing of the third quarter. However, we believe that these crackers will be late.
- Nova Chemicals will announce results of the 1Q on April 25th.
- Lyondell will announce 1Q earnings on April 26th.
Chart 359: Regional Ethylene Prices ($/MT)

Source: Bloomberg, Platt’s and Chemical Data

Chart 360: USGC Cracker Margins (c/lb)

Source: UBS estimates

Chart 361: Global Ethylene Supply/Demand

Source: UBS estimates


Source: UBS

Chart 363: Global Supply/Demand Additions. 06-14E

Source: CNI, SRI, CMAI and UBS estimates

Chart 364: Heavy vs Light Cracker Margins in the U.S. (c/lb)

Source: UBS
Chart 365: Global Ethylene Operating Rate History

- Chart 366: Integrated Polyethylene Margins in the U.S.

- Chart 367: Integrated US Polystyrene Margins (c/lb)

- Chart 368: Global Operating Rates vs USGC Margins (c/lb)

- Chart 369: Ethylene Glycol EBITDA Margins in the US (c/lb)

- Chart 370: US Net Exports of Polyethylene

Source: SRI and UBS

Source: chemical Data and UBS estimates

Source: Chemical Data and UBS

Source: UBS

Source: SRI and UBS estimates

Source: Chemical Data
Statement of Risk

We point out to investors the potential risks inherent in commodities markets, including but not limited to, their volatile nature, which may differ materially from expectations. Furthermore, this asset class is exposed to political, financial, operational and liquidity risks, each of which have the potential to significantly impact returns.

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UBS Investment Research: Global Equity Ratings Definitions and Allocations

<table>
<thead>
<tr>
<th>UBS rating</th>
<th>Definition</th>
<th>UBS rating</th>
<th>Definition</th>
<th>Rating category</th>
<th>Coverage¹</th>
<th>IB services²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buy 1</td>
<td>FSR is &gt; 6% above the MRA, higher degree of predictability</td>
<td>Buy 2</td>
<td>FSR is &gt; 6% above the MRA, lower degree of predictability</td>
<td>Buy</td>
<td>47%</td>
<td>37%</td>
</tr>
<tr>
<td>Neutral 1</td>
<td>FSR is between -6% and 6% of the MRA, higher degree of predictability</td>
<td>Neutral 2</td>
<td>FSR is between -6% and 6% of the MRA, lower degree of predictability</td>
<td>Hold/Neutral</td>
<td>42%</td>
<td>36%</td>
</tr>
<tr>
<td>Reduce 1</td>
<td>FSR is &gt; 6% below the MRA, higher degree of predictability</td>
<td>Reduce 2</td>
<td>FSR is &gt; 6% below the MRA, lower degree of predictability</td>
<td>Sell</td>
<td>12%</td>
<td>28%</td>
</tr>
</tbody>
</table>

¹: Percentage of companies under coverage globally within this rating category.
²: Percentage of companies within this rating category for which investment banking (IB) services were provided within the past 12 months.

Source: UBS. Ratings allocations are as of 31 March 2007.

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Unless otherwise indicated, please refer to the Valuation and Risk sections within the body of this report.
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