Copper industry struggles with overcapacity

Prepared for:
ICSG meeting, Lisbon, October 2015

Prepared by:
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## Structure of Presentation

1. **Market balance**: *Cutbacks will help rebalance the market*

2. **Supply**: *Overcapacity in smelting and refining to persist*

3. **Demand**: *Adjusting to China’s new norm*

4. **Conclusions**
Market heading for disaster - saved by production cuts

LME cash price and global supply/demand balance

- Balance before cutbacks
- Price

Data: LME, CRU: Balances after accounting for SRB buying
Production cuts will rebalance the market, stem price decline

LME cash price and global supply/demand balance before and after cutbacks, 2014-2019

Data: LME, CRU; Balances after accounting for SRB buying
Cutbacks so far have mostly been at SXEW operations or integrated smelter/refineries

Major announced price induced production cuts

<table>
<thead>
<tr>
<th>Mine</th>
<th>Majority Owner</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miami SXEW</td>
<td>Freeport McMoRan</td>
<td>Closed until end 2017.</td>
</tr>
<tr>
<td>Tyrone SXEW</td>
<td>Freeport McMoRan</td>
<td>50% cut in output</td>
</tr>
<tr>
<td>El Abra SXEW</td>
<td>Codelco/Freeport JV</td>
<td>25% cut in output</td>
</tr>
<tr>
<td>Ray SXEW &amp; concs</td>
<td>Asarco</td>
<td>50% cut in output with indefinite closure of one concentrator</td>
</tr>
<tr>
<td>Katanga SXEW</td>
<td>Glencore</td>
<td>18 month suspension of operations</td>
</tr>
<tr>
<td>Mopani mines and smelter</td>
<td>Glencore</td>
<td></td>
</tr>
<tr>
<td>Small Chilean mines</td>
<td>Various</td>
<td>Closure of over 200 small mines</td>
</tr>
</tbody>
</table>

Data: CRU, company reports
Mine and refinery cutbacks will bring refined production growth closer to demand in the short term

Refined production growth before and after cutbacks (y-o-y change)

Data: CRU, company reports

Refined copper demand growth (y-o-y change)

Data: CRU, company reports
Structure of Presentation

1. Market balance: cutbacks will rebalance the market
2. Supply: overcapacity in smelting and refining to persist
3. Demand: adjusting to China’s new norm
4. Conclusions
Chinese drive for self sufficiency has resulted in global excess smelter and refinery capacity

China’s cathode output and self sufficiency

Global refinery capacity requirement & actual and planned capacity

- existing operations*
- firm projects
- uncommitted projects
- required capacity

China’s cathode output and self-sufficiency rate

- 2010
- 2011
- 2012
- 2013
- 2014
- 2015
- 2016
- 2017
- 2018
- 2019

60%
65%
70%
75%
80%
85%
90%

0
1
2
3
4
5
6
7
8
9
10
2013
2014
2015
2016
2017
2018
2019

20
22
24
26
28

China's cathode output and self-sufficiency rate
...but large concentrate deficits will curb refined copper supply

Copper concentrate balance; 000t Cu contained

- Blister production cutback
- Concentrate stock draw-down
- Concentrate stock build

Yet mine supply still sufficient to meet primary copper demand

Data: CRU
Potential production from new projects for the medium term has declined sharply, while exploration activity has also fallen.
Project pipeline has thinned from a year ago

Projects due to start-up with capacity of >100,000t/y, ’000t

Data: CRU, company reports, media
Project pipeline has thinned from a year ago… one year on

Projects due to start-up with capacity of >100,000t/y, ’000t

Data: CRU, company reports, media
Supply gap will open up – uncommitted projects will be needed
Total potential copper mine production from operating mines and projects before any adjustments; Mt Cu

Supply gap = 47% of probable and possible projects in 2026
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China’s copper demand growth to slow as economy decelerates

Chinese Gross Domestic Product growth %

Global consumption growth

China consumption growth

Absolute consumption growth in period, Mt

Data: CRU
Global growth hit hard on weak first half of the year
Refined copper demand change in 2015 (y-o-y%)

- World: +1.0%
  - Europe: -15.0%
  - Asia: +2.4%
  - West Europe: +1.4%
  - North America: +1.4%
  - India: +5.3%
  - China: +2.5%
  - Japan: -1.9%
  - Taiwan: -0.7%
  - South & Central America: -3.3%
  - ROK: -0.4%

Data: CRU
Chinese wirerod capacity increased hugely following the financial crisis and China’s 2009/10 stimulus

Wirerod production growth
New non-integrated capacity
New capacity integrated upstream

Data: CRU, various media, ICSG first-use fabricators database
While production and capacity utilisation has plummeted ex-China
China’s tube industry has moved towards consolidation, capacity in the flat-rolled industry is still growing quickly

- The industry is concentrated in the hands of 6-7 producers who produce more than half of all tube in China.
- Some consolidation took place in 2009 with small ~10,000t/y players closing. However the industry is still very competitive
- Nevertheless, capacity utilisation in the tube and flat rolled sectors is around 70%, higher than in the rest of the world

Data: CRU, ICSG first-use fabricators database, various media
Tube still sees major overcapacity in mature markets...

**Tube industry in Europe ex-Russia**

- Capacity utilisation, rhs
- Europe ex-Russia copper and alloy tube production

**Tube industry in NE Asia**

- Capacity utilisation, rhs
- North East Asia copper and alloy tube production

**Capacity utilisation in the tube industry**

<table>
<thead>
<tr>
<th>Region</th>
<th>Capacity Utilisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe ex Russia</td>
<td>60%</td>
</tr>
<tr>
<td>NE Asia</td>
<td>50%</td>
</tr>
<tr>
<td>N America</td>
<td>40%</td>
</tr>
<tr>
<td>China</td>
<td>80%</td>
</tr>
</tbody>
</table>

**Tube industry in North America**

- Capacity utilisation, rhs
- North America copper and alloy tube production

Data: CRU, ICSG first-use fabricators database, company reports, media
… similar picture in flat rolled products

**Flat rolled industry in Europe ex-Russia**
- Capacity utilisation, rhs
- Europe ex-Russia flat rolled products production

**Flat rolled industry in NE Asia**
- Capacity utilisation, rhs
- North East Asia flat rolled products production

**Capacity utilisation in the flat rolled products industry**
- N.E. Asia
- Europe ex-Russia
- North America
- China

**Tube industry in North America**
- Capacity utilisation, rhs
- North America flat rolled products production

Data: CRU, GTIS, ICSG first-use fabricators database
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Concluding comments: cutbacks and project delays are curbing mine growth, but over capacity exists in refined and semis

- Before cutbacks, the copper market was heading for a major surplus and continued downward pressure on prices.
- Cutbacks have reduced the surplus and will bring forward the return to a deficit market
- Mine production growth will slow as projects have been delayed and exploration expenditures slashed
- However investment in smelting and refining and semis production capacity in China mean that the global market is suffering from over capacity in these sectors
- The slowdown in demand growth will exacerbate the situation, as investments have been made in the expectation of continued strong growth in Chinese demand, and driven by the desire for self sufficiency in refined copper production in China
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