Perspectives of the Commodities Market and its impact in Brazil

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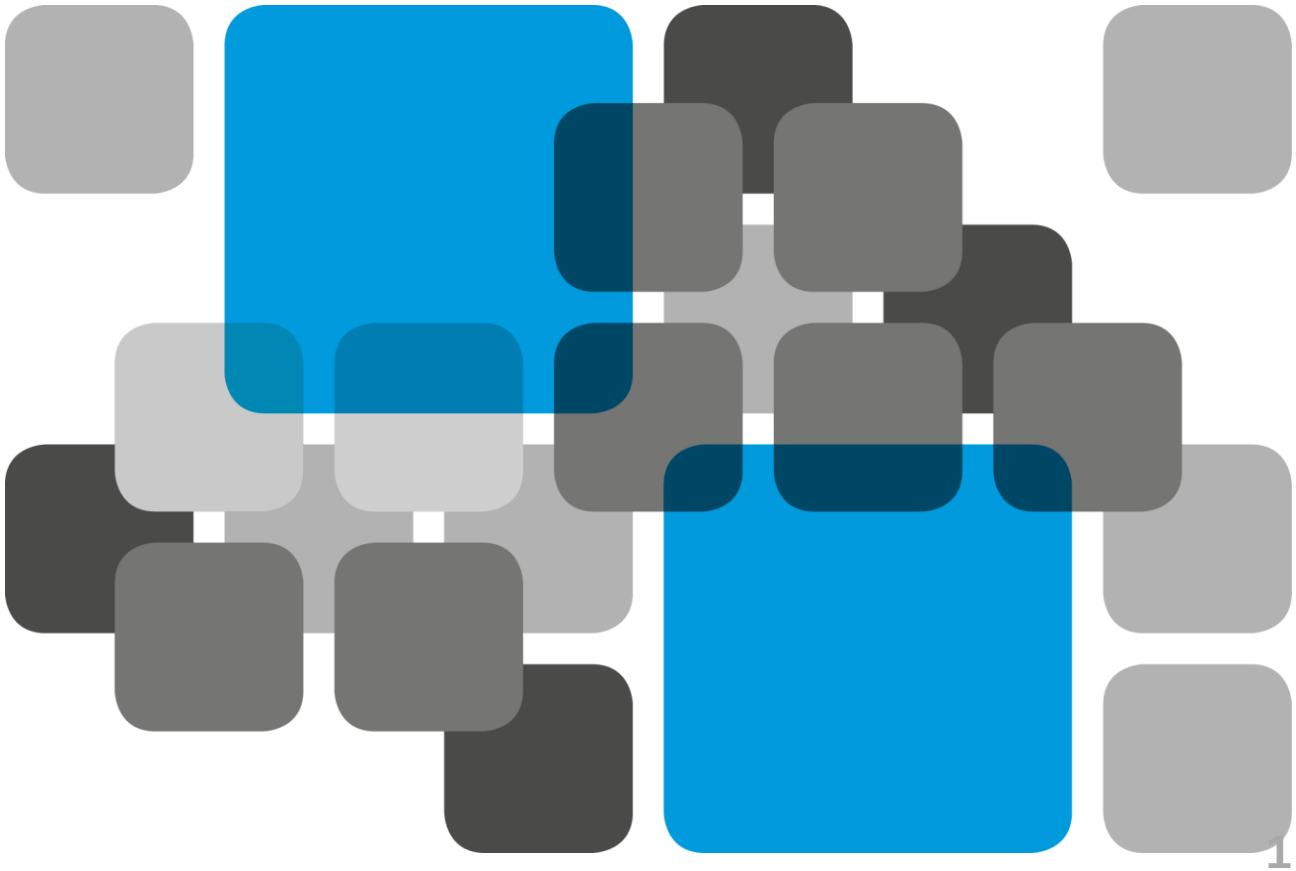
May 16th 2016

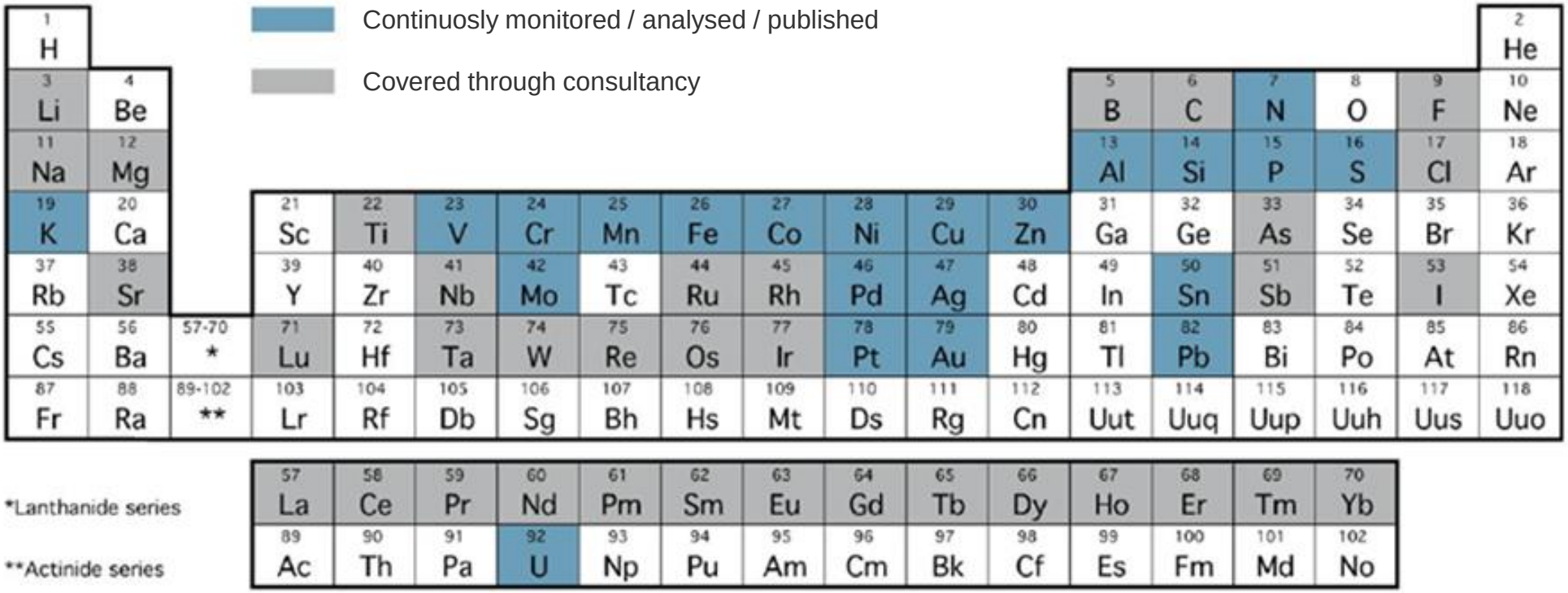


Who are we?

THE EXPERTS IN MINING, METALS AND FERTILIZERS

- Privately-owned company supporting our clients with market analysis, management consultancy and events concentrating solely on mining, metals, fertilizers
- Primary research and robust, transparent, methodologies built from the ground up, since our foundation in 1969
- Global team of analysts. Key to gaining a real understanding of critical markets
- Big enough to deliver a high quality service, small enough to care about all of our customers.

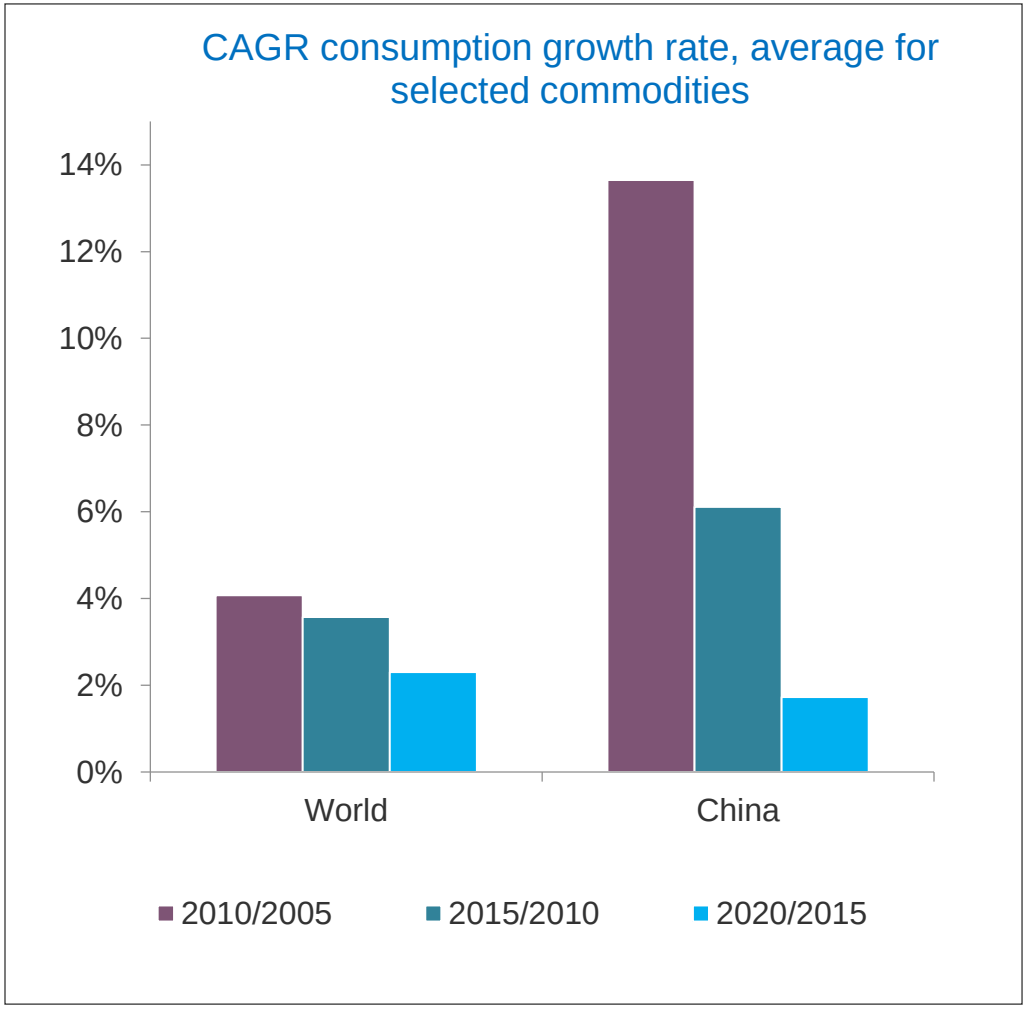
CRU has unrivalled coverage. We are specialist in our sector

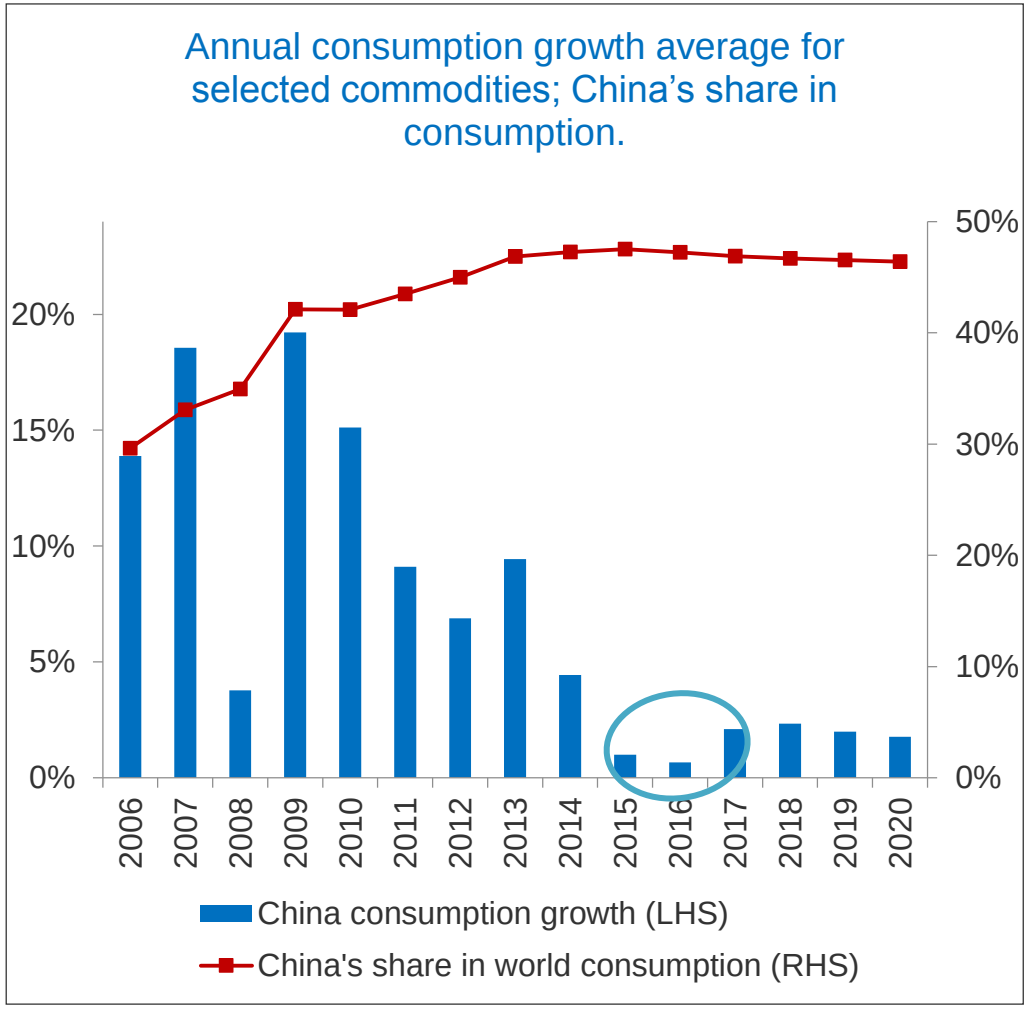


The fragile health of the global economy has been long looming over the commodity spectrum

Global demand prospects changed abruptly affecting commodities market

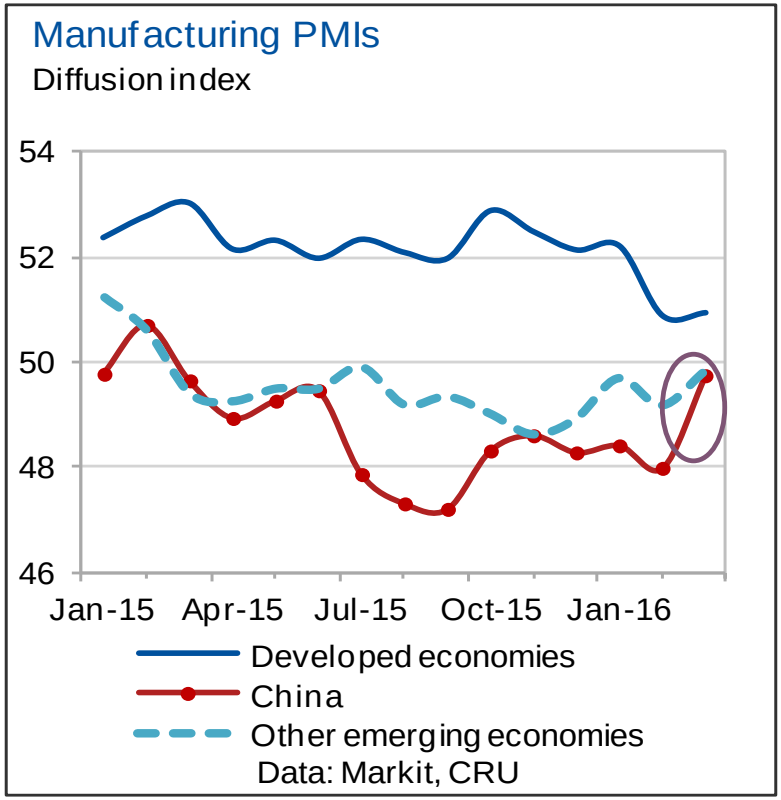
CAGR consumption growth, simple average for selected commodities*

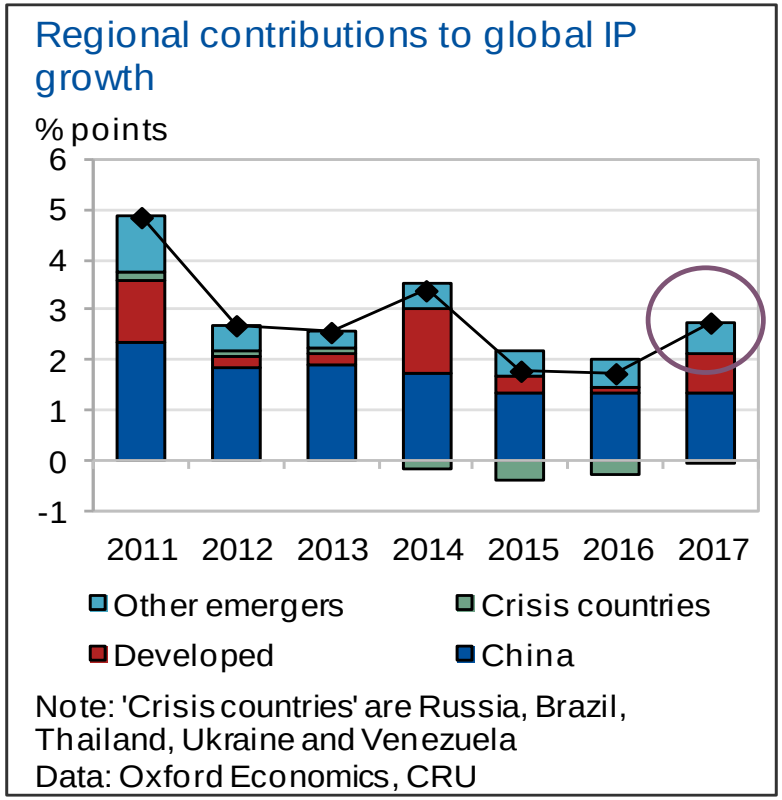




Data: CRU Note: *Average annual consumption for crude steel, coking coal, aluminium, copper, fertilizer, stainless steel, nickel, lead, and zinc.

2016: Global IP growth in heavily reliant on China
2017: Pick up dependent on developed economies





- Lousy start to 2016 in developed economies and global IP growth now forecast to be no better than 2015
- China contributes three quarters of global IP growth this year …and manufacturing PMI picked up strongly in March
- Manufacturing PMIs for other emergers have also firmed

Longer term, China's transition remains the biggest risk

A disorderly evolution in China would have significant impact investment & IP

China concerns have eased, but have not gone away and could quickly return:

- Dampener for market sentiment
- Recipe for volatility (daily turnover on the nation's futures markets has jumped by $183 bn)

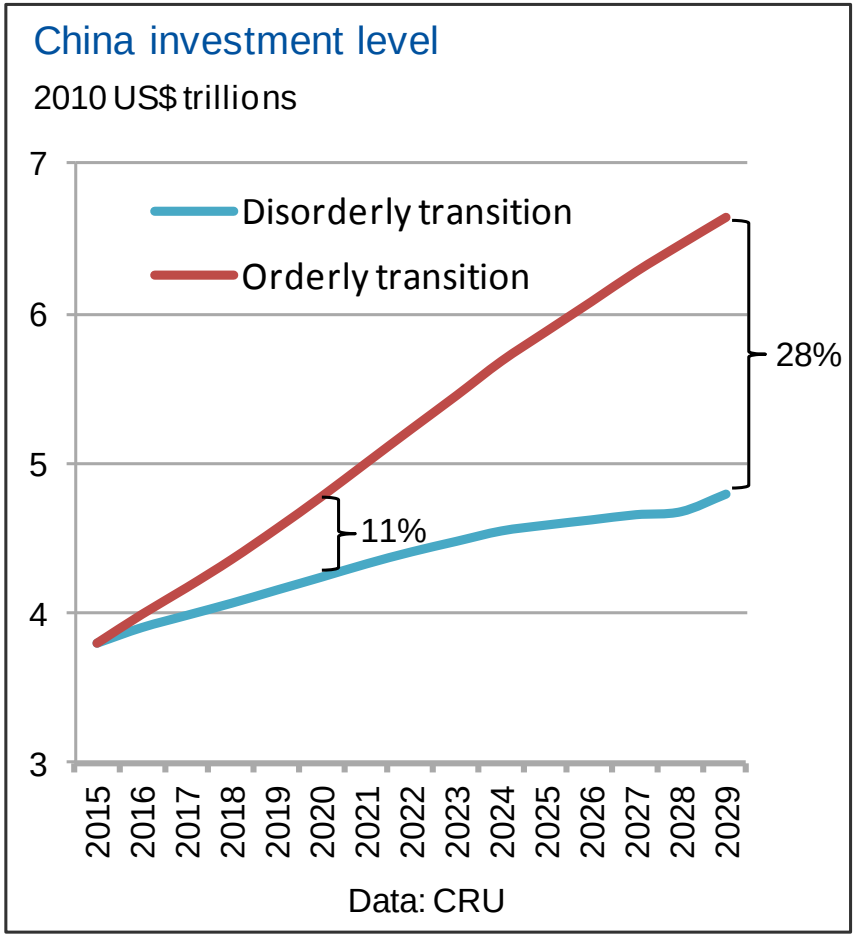
An orderly economic transition in China is CRU's base case (probability ≈ 55%)

A disorderly transition would be focused on investment

- Bulks and base metals have greatest exposure

The probability of a disorderly transition is high (≈ 35%)

- Need for scenarios and sensitivity analysis
- Need for contingency plan



Despite common trends...

...commodities are a mixed bag

Cold front hovers over commodities. 2016 prices down 15% y-o-y*

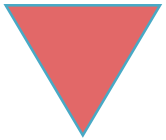
CRU basket of 36 mining, metals & fertilizer price forecasts | 2016 over 2015

Source: CRU *2016 annual average price forecast over 2015 actual prices (6th May, 2016)

In the medium term we favour base metals over bulks…

Bulk Commodities

- Sector in structural oversupply
- Many, new, low cost, mine development opportunities
- Significant, sustainable & cyclical cost reductions
- Opportunistic M&A – calling the bottom?
- Price upside capped by distressed or mothballed assets
- Supply is sustainable if 1st Quartile remains profitable
- Easy to identify the right assets

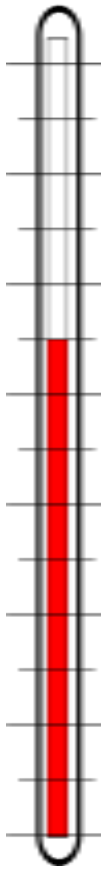


Base Metals

- Sector has limited oversupply
- Limited appetite to invest in, high risk, new mines
- Limited sustainable & cyclical cost savings to date
- M&A opportunities delaying new mine investment discussion
- Price upside capped by stocks and distressed consumers
- New projects will not enter in the 1st Quartile
- Difficult to identify the right assets

Warmer outlook for commodities to 2020*: prices to increase by 14%

CRU basket of 36 mining, metals & fertilizer price forecasts | 2020 over 2015

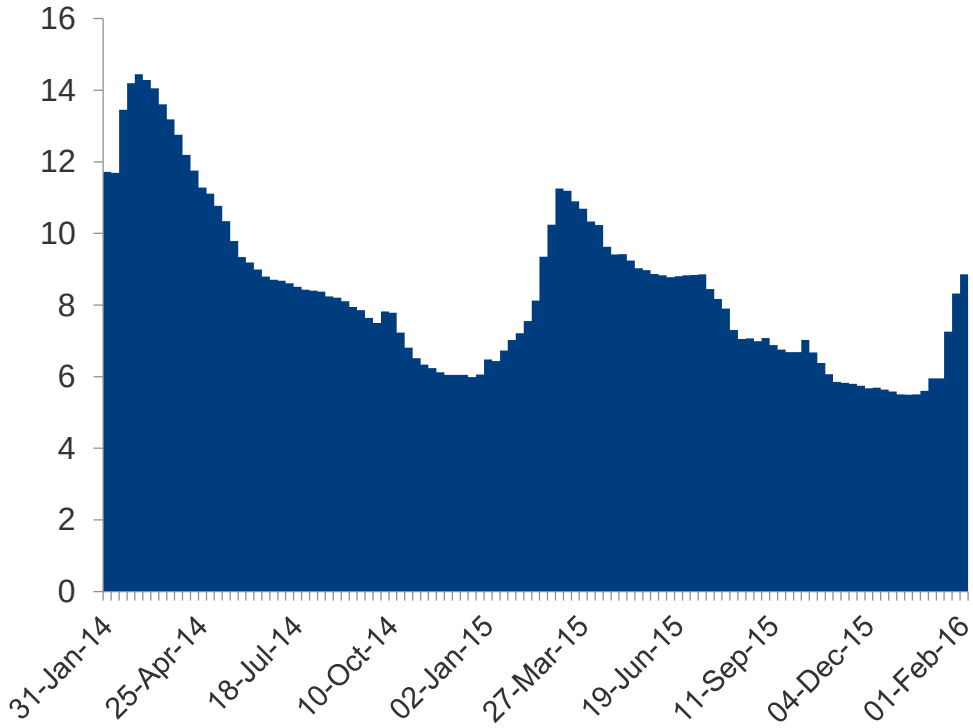


Hot **> 15%**	Zinc | Tin Thermal Coal | **Nickel** | Brent Crude | Met Coal Platinum | Lead | Siliomanganese | Uranium | Cobalt | Coal Tar | Met Coke Steel HRC | **Iron Ore** | Palladium
Warm **5% to 15%**	Aluminium | Molybdenum | Bauxite | Manganese Ore | Alumina
Mild **0% to 5%**	**Copper** | Steel Scrap | Gold | Silicon
Cool **-5% to 0%**	Ferrochrome | Phos Rock | Ammonia
Cold **-15% to -5%**	Urea | Sulphuric Acid
Freezing **< -15%**	Phosphate DAP | Chrome Ore | Potash KCl Silver | Sulphur

Source: CRU *2016 annual average price forecast over 2015 actual prices (6th May, 2016)

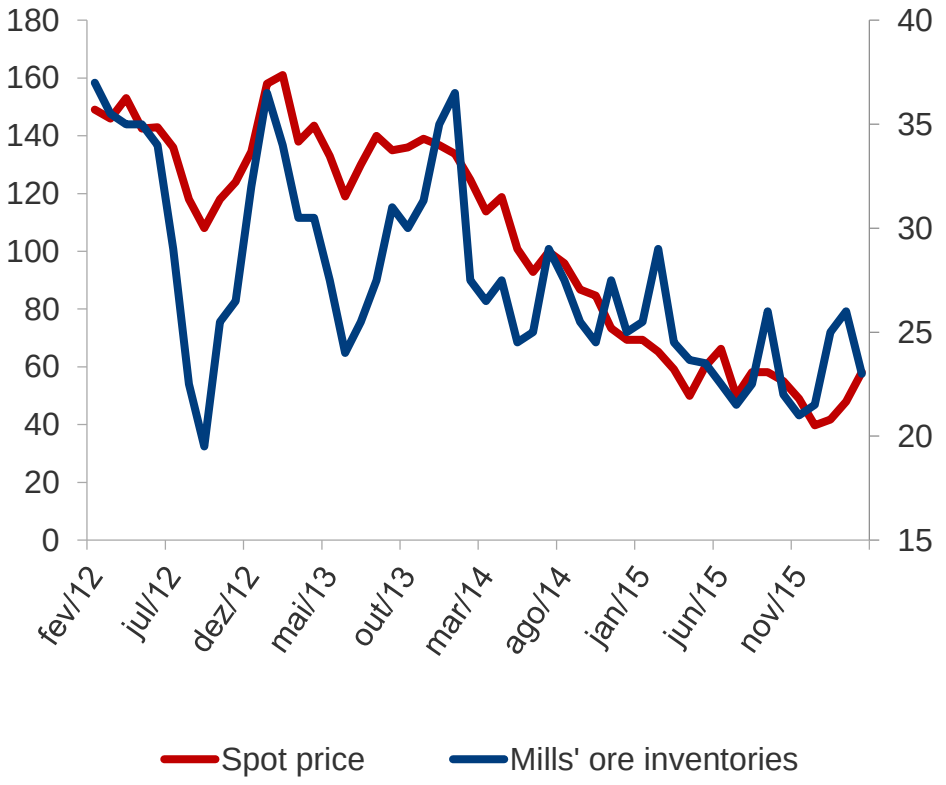
Iron Ore: The turnaround in real estate took mills and traders by surprise. Inventories of ore and steel are low in China…

Inventories of finished steel products in China's 26 major cities, Mt



LHS: benchmark iron ore price, $/t

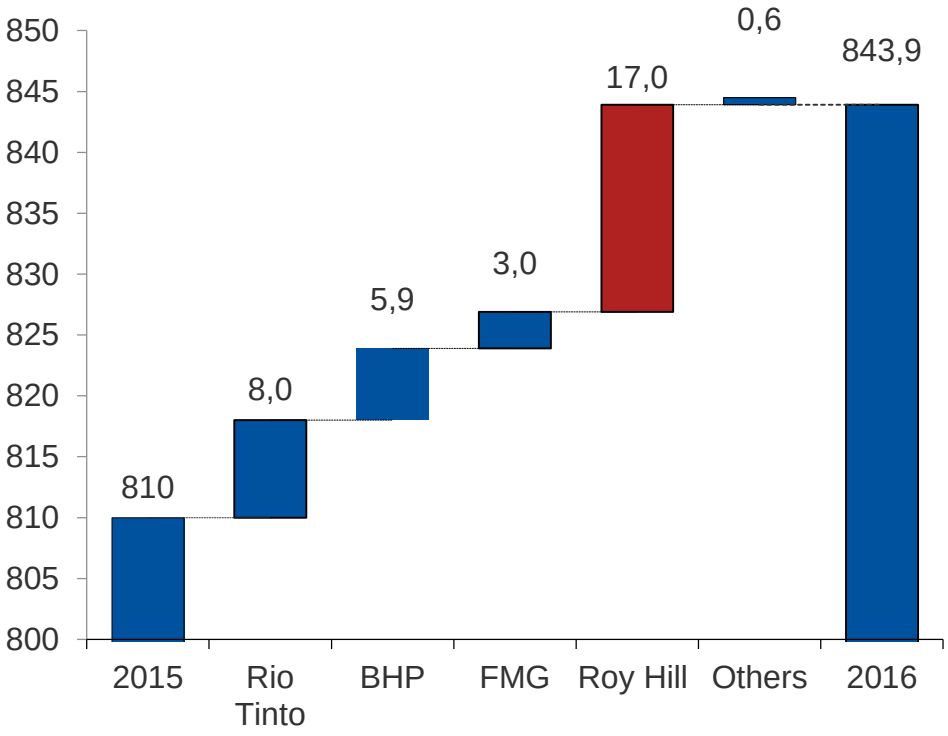
RHS: Chinese mills' iron ore inventories, days



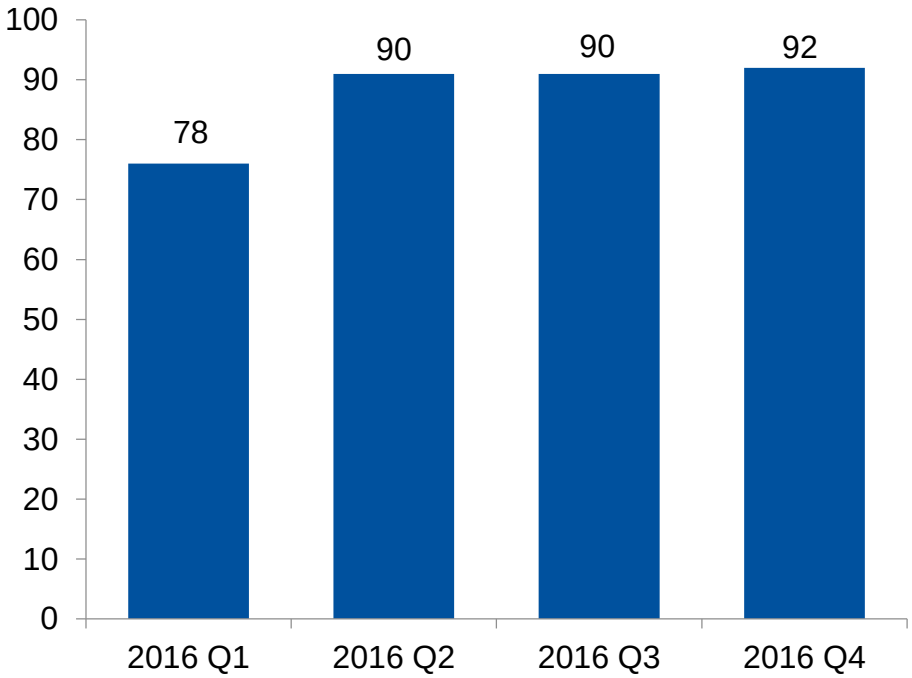
Source: CRU, UMetal, MySteel.

… but supply weakness is temporary. A weak Q1 increases the chances of a stronger H2, as the majors play catch-up and Roy Hill ramps up

Breakdown of Australian supply growth, Mt



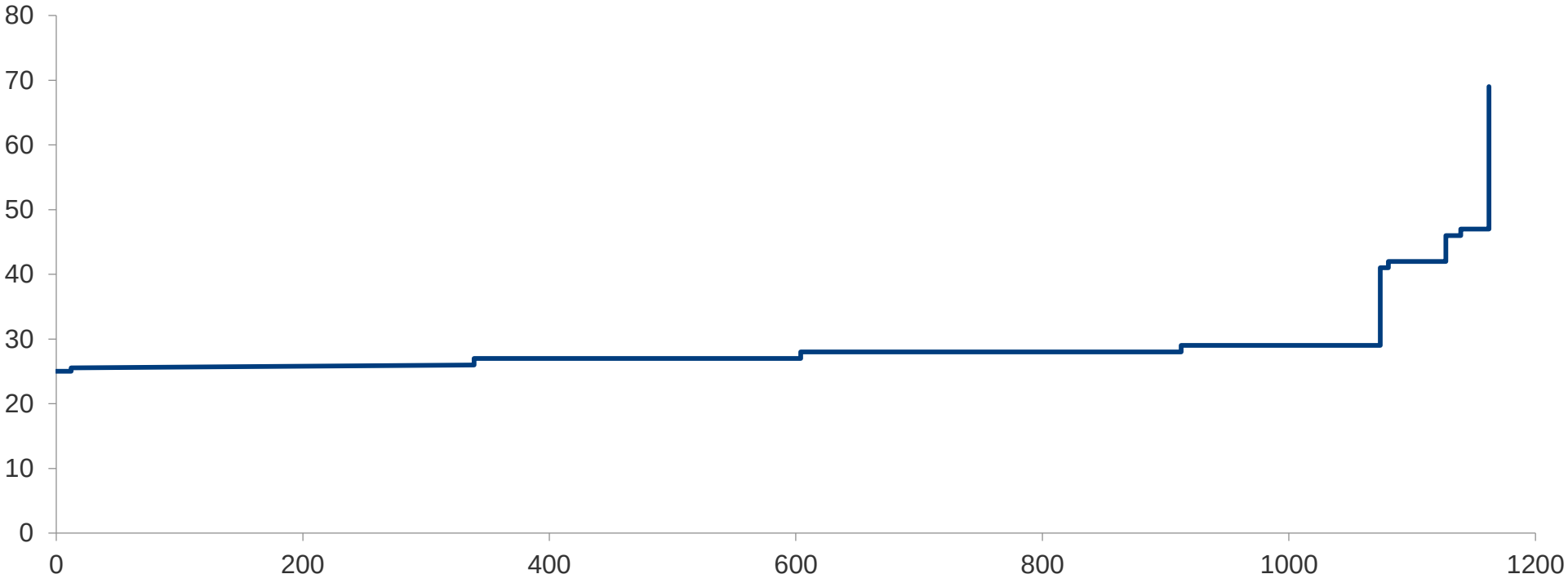
Vale's production required to meet guidance , Mt



Source: CRU. N.B: assumes BHP will hit 265 Mt in sales from Australia in 2016 CY

At $55 /t, the vast majority of the seaborne market is cash positive, including most Australian mid-caps, the marginal players in the market

Breakeven benchmark price of major seaborne producers in 2016 Q1



Source: CRU

In summary… a bear market rally

A massive annualised decline of 130 Mt/y in seaborne supply in Q1 is, in our view, the major contributor of the unexpected rally in price. A weak Q1 increases the chances of a stronger push on volumes later this year, as the majors strive to meet targets.

Second main driver: strong real estate data from China. It does not look sustainable and we maintain our view that the Chinese housing sector will, eventually, have to go through an adjustment cycle.

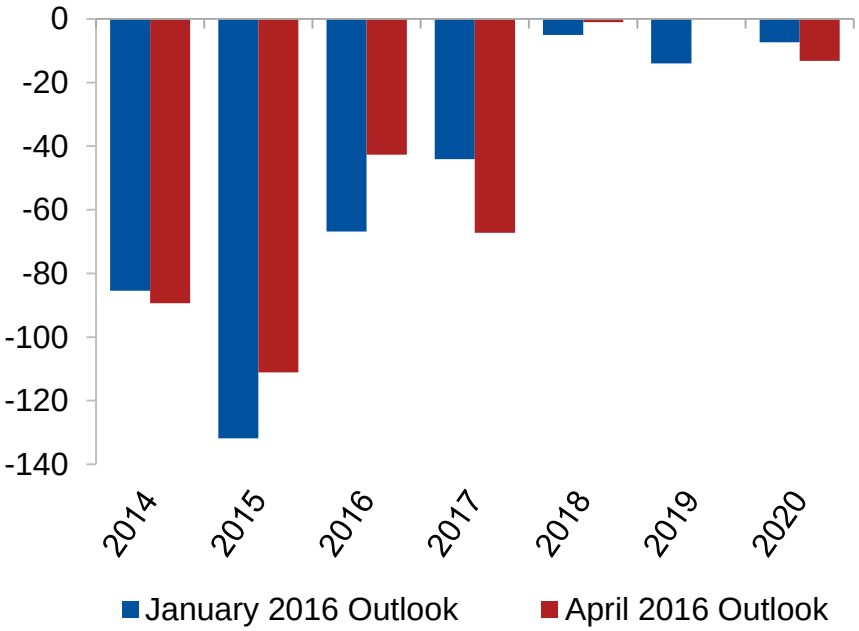
We conclude that the recent price rise is a 'bear market rally' that should correct itself by year-end.

5-year forecast: As marginal costs rise and displacement requirement shrink, we expect prices to increase but only after 2018

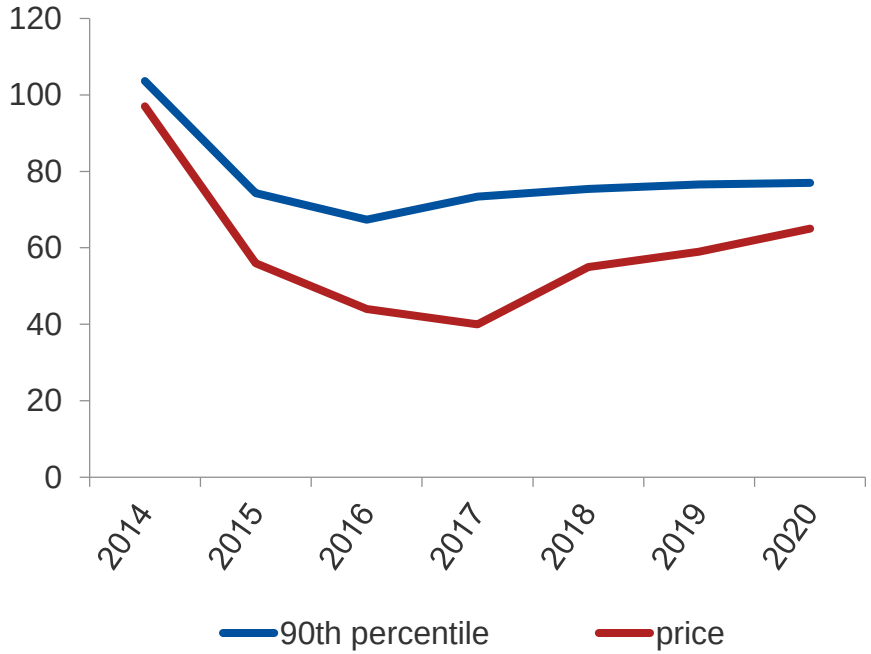
In our view full equilibrium state is unlikely to be achieved by 2020:

- Given the typical lag to any supply-side response and the extent of the required re-structuring
- By 2020 prices would hit 80th percentile of the cost curve

Displacement requirement, Mt

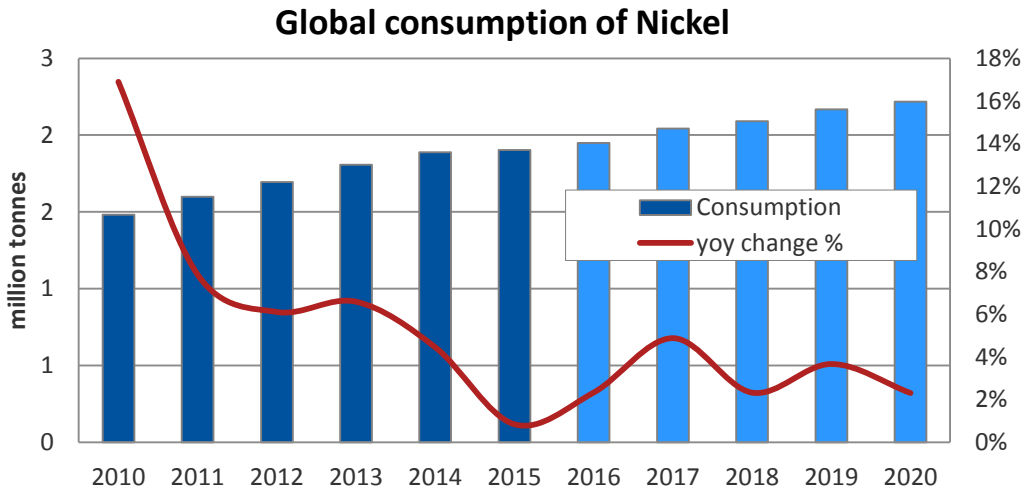


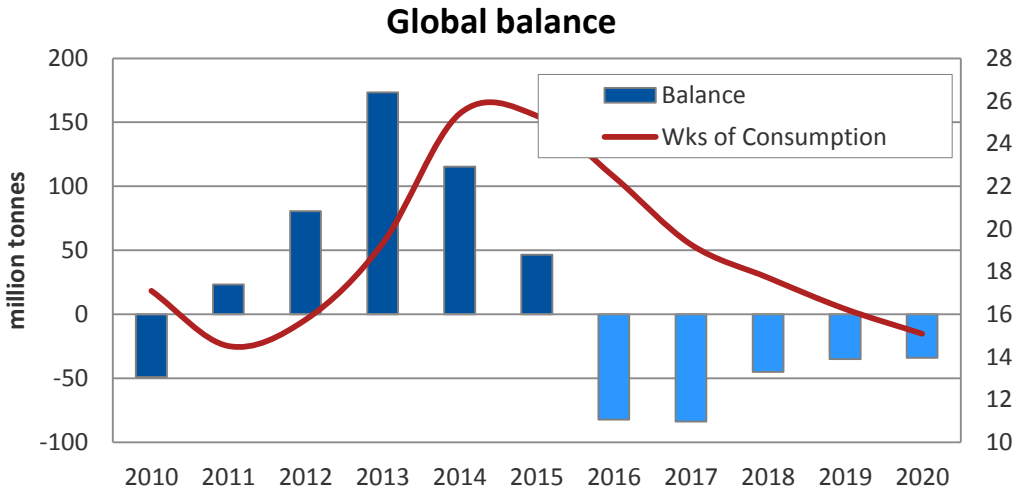
Iron ore price and marginal cost, $ /t



Source: CRU. Outlook based on two key assumptions: flat Chinese crude steel production and slowing supply growth

Nickel: Long-awaited deficit will arrive in 2016

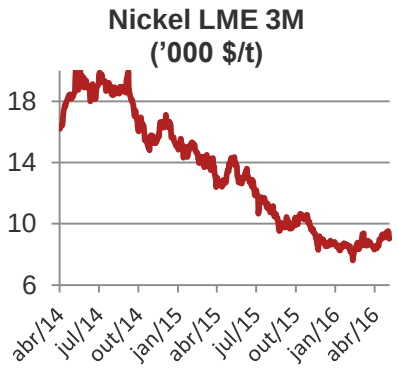




2016 price forecast: up by 0.3% from $9,356/t to $9,387/t

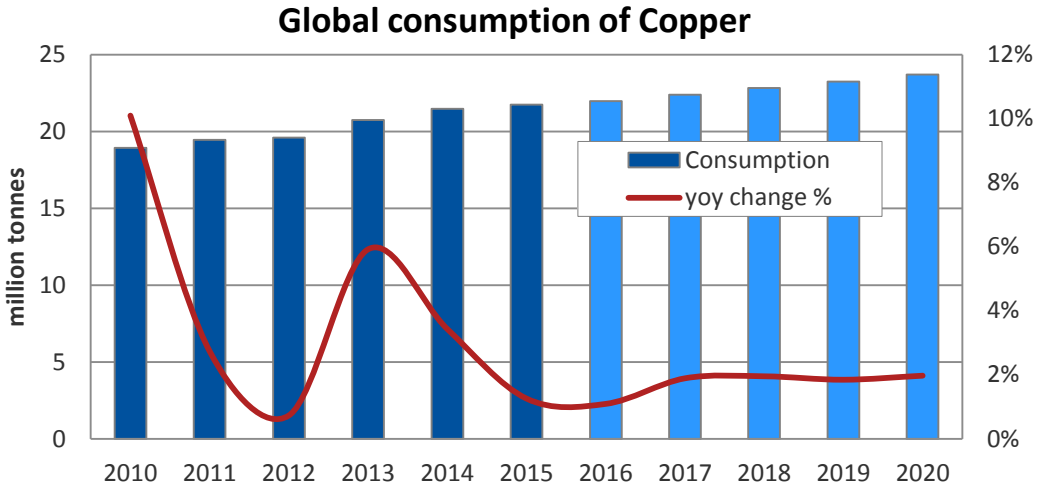
$18	**Market Value (bn)**
2	2016 Total Production (mt)
2	2016 Total Consumption (mt)
28%	% of Chinese Production in 2016
51%	% of Chinese Consumption in 2016

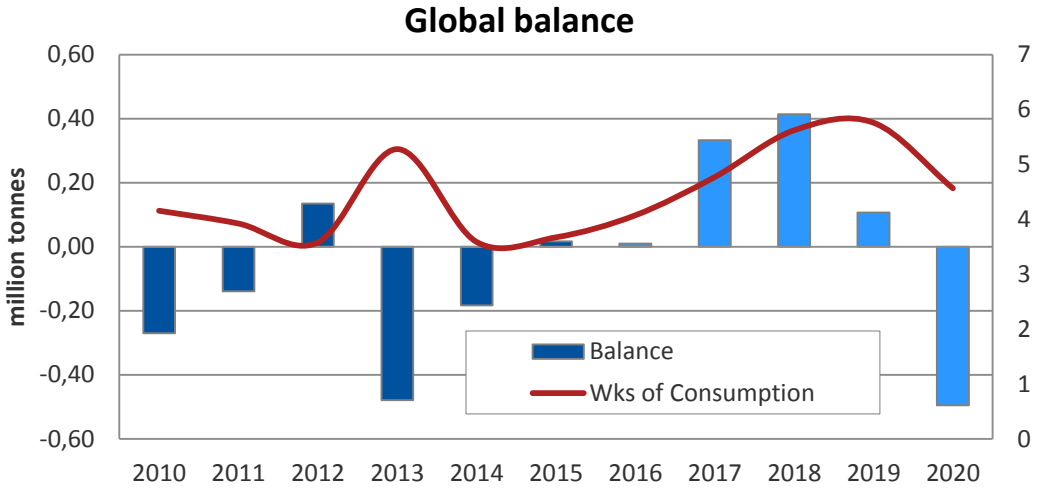
- Additional production curtailments have resulted in larger deficits in the short-term than previously expected, resulting in **prices bottoming out**. The large deficit hinges on global demand growing by 2.3% this year, which still carries a number of risks.
- More than **two-thirds of producing assets appear to be lossmaking with LME prices above $9,000 and there remains a risk of further cuts** if prices continue to languish at low levels.
- **Even with the larger deficits, industry stocks levels will still be around 19.3 weeks of consumption by the end of 2017** from an estimated 25 weeks currently.



Source: CRU Nickel Market Outlook April 2016

Copper: Sentiment improves but challenges remain

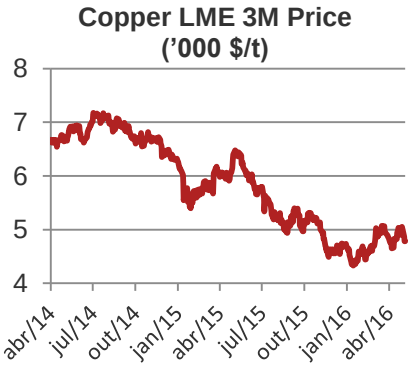




2016 price forecast: up by 3% from $4,608/t to $4,746/t

$105	**Market Value (bn)**
22	2016 Total Production (mt)
22	2016 Total Consumption (mt)
35%	% of Chinese Production in 2016
46%	% of Chinese Consumption in 2016

- Copper prices have trended upwards, despite setbacks, since the beginning of the year. The **main price driver has been an improvement in macroeconomic data stemming from China**.
- **Prospects for copper in 2016 have improved**. Monetary easing has temporarily boosted Chinese demand, sentiment is less bearish and cost cutting improved producer cash flow.
- **Our concerns are now focussed on 2017/18 supply. We now expect the copper market to see sizeable surpluses in 2017 and 2018, while we expect a market deficit in 2020** the price recovery is projected to be slower than previously envisaged

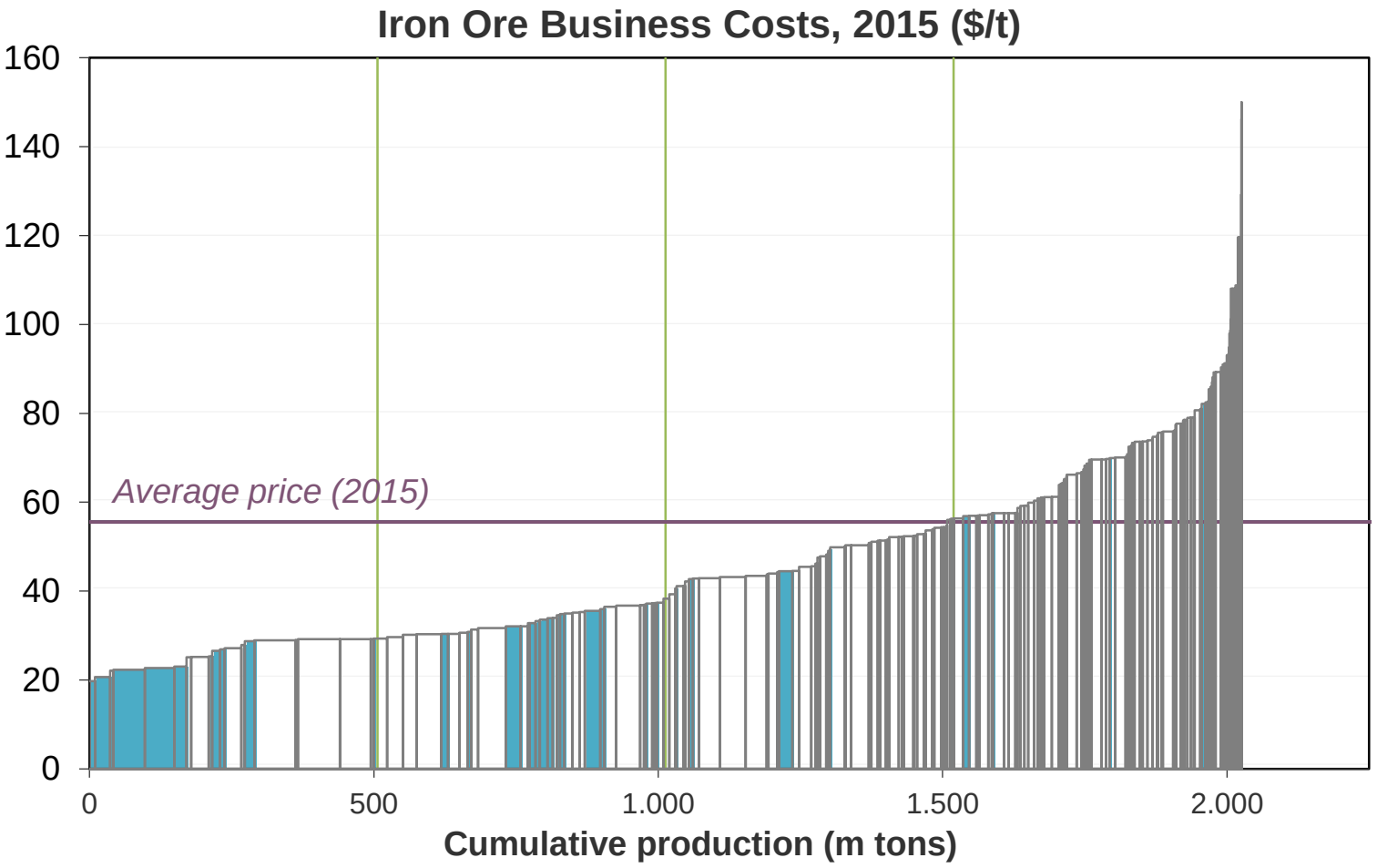


Source: CRU Copper Market Outlook April 2016

Brazil has been affected...

...but it is in a good position to capitalize mid-term recovery

Iron Ore. Brazil's recent gains in cost are main non-controllable



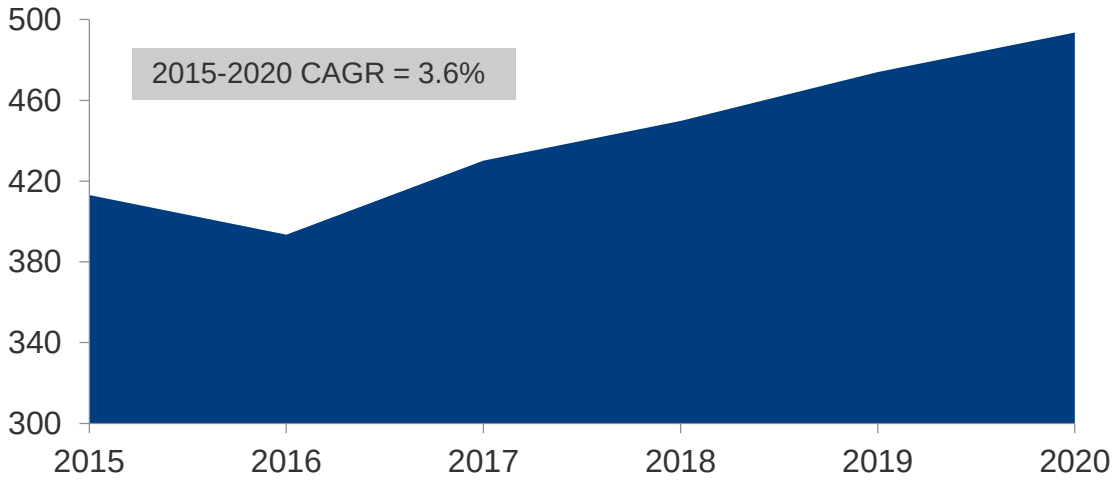
- World average business costs went down 29% from 2014 to 2015
- Brazilian average business costs went down 26% from 2014 to 2015
- A substantial part of cash cost reductions in Brazil are due to the weaker real (non-controllable)
- ~80% of Brazil production remains in 1st and 2nd quartiles

Source: CRU

Vale's strategy is a key factor to watch in the iron ore industry

Brazil to grow its market share in global production to 22% by 2020

Brazil's mined iron ore production, m tons



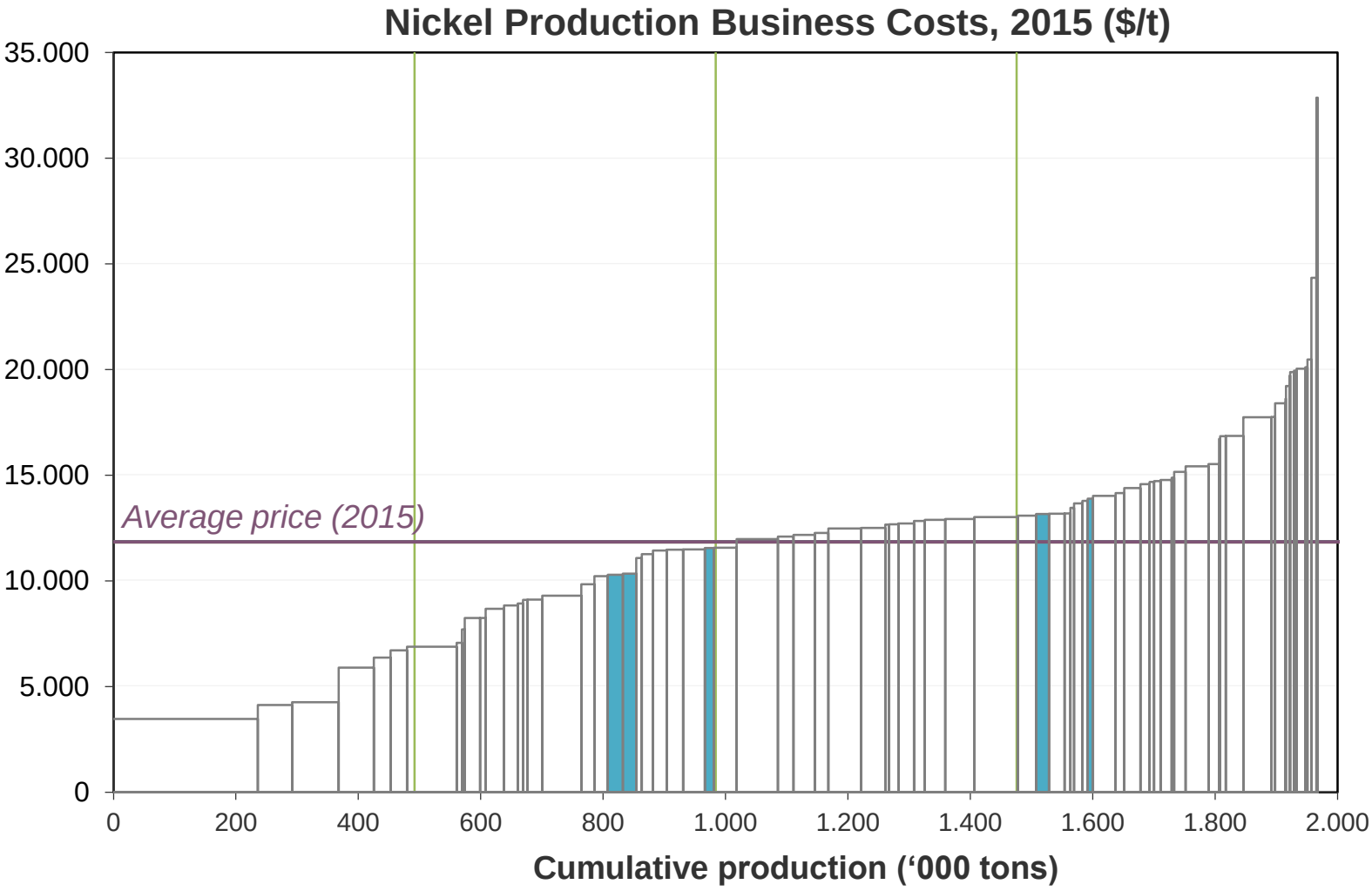
- Higher cost exits and output cuts in 2016 will be offset in the medium-term by S11D ramping up
- Brazil is expected to grow at a slightly higher CAGR than Australia from 2015 till 2020. Rio Tinto, BHP and FMG are all expected to operate close to full capacity by 2018

Vale's weighted avg Business Costs, 2017

[$/t]	Cash cost, FOB	Freight	Cash cost, CFR	Business Costs
Northern system	14	13	27	25
SE system	21	13	34	36
Southern system	19	13	32	34

Source: CRU

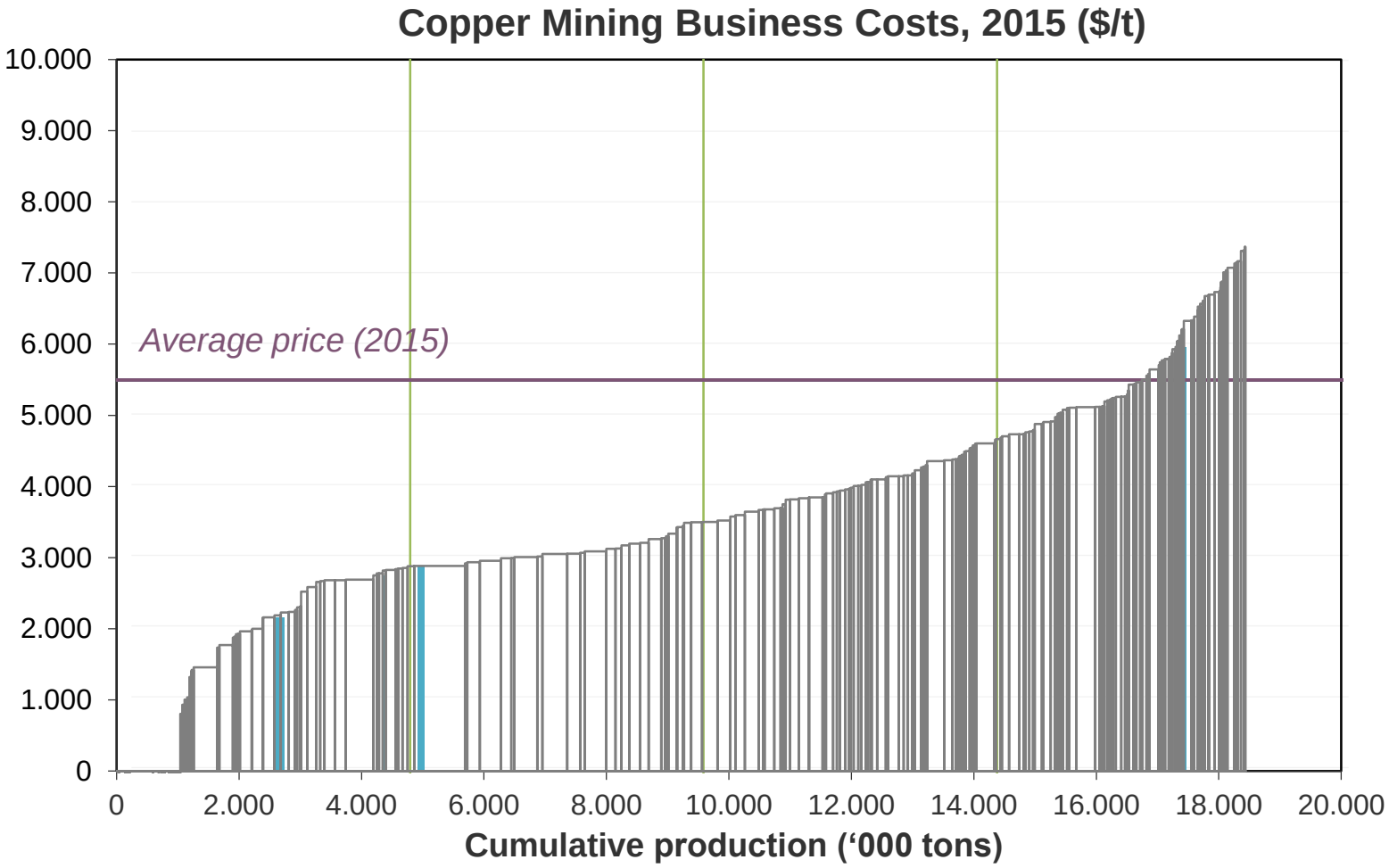
Nickel. An industry in lousy shape; bottom should have been reached



- World average business costs went down 17% from 2014 to 2015, helped by a stronger US dollar
- Brazilian average business costs went down 22% from 2014 to 2015
- Three of the country's largest mines are in the 2nd quartile

Source: CRU

Copper. Cost cutting measures have lowered the price floor



- World average business costs went down 8% from 2014 to 2015.
- Brazilian average business costs went down 30% from 2014 to 2015.
- Brazil has 90% of its production within 1st & 2nd quartile
- Prices would need to fall to below $4000/t on a sustained basis for supply to respond

Source: CRU

Takeaway

- Global economy still looks fragile. China's transition is a key factor medium term. Orderly / disorderly?
- Base metals look more promising than bulk commodities. No 1st quartile projects coming in, less convincing cost reduction.
- Iron ore market will not reach full equilibrium by 2020. Large displacements of high cost prod. expected to be finished by 2018.
- Copper to enter large surplus in 2017/2018 with deficit looming by 2020. Price to recover only by end of decade.
- Nickel. Bottom has been reached? 2/3 of the industry are not profitable. Large inventories weight on future recovery.
- Brazil: good position in cost curves. Cost reduction mainly due to weak real.

Thank you

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