



IHS Markit™

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Global Mineral Commodity Prices: Perspectives and Trends

When Will the Market Hit Deficit: Risks, Opportunities, China's
Changing Consumption Pattern, and Price Forecasts

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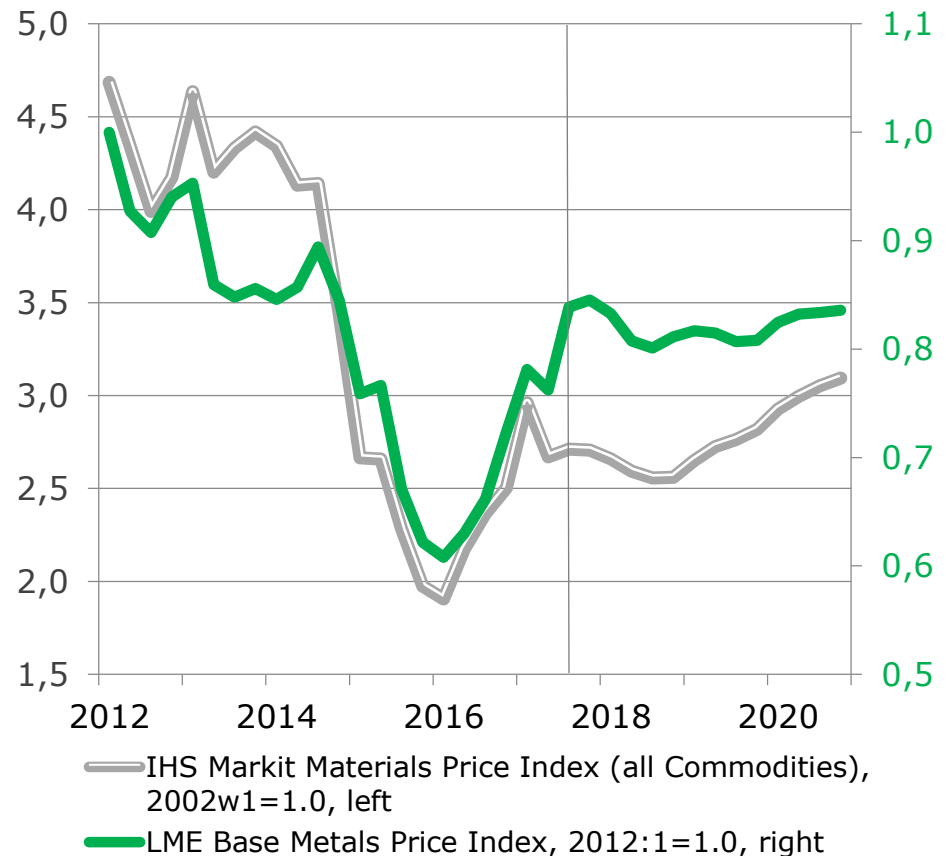
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Agenda

- Base metal markets
 - > Top line global GDP growth and metal demand
 - > A look at production growth
 - > Price forecasts
- Headwinds to a sustained price recovery
 - > Tightening financial markets
 - > The changing character of Chinese growth
- Data Supplement
 - > Forecasts of industrial production and fixed investment
 - > Snapshots of aluminum, copper, nickel and zinc markets

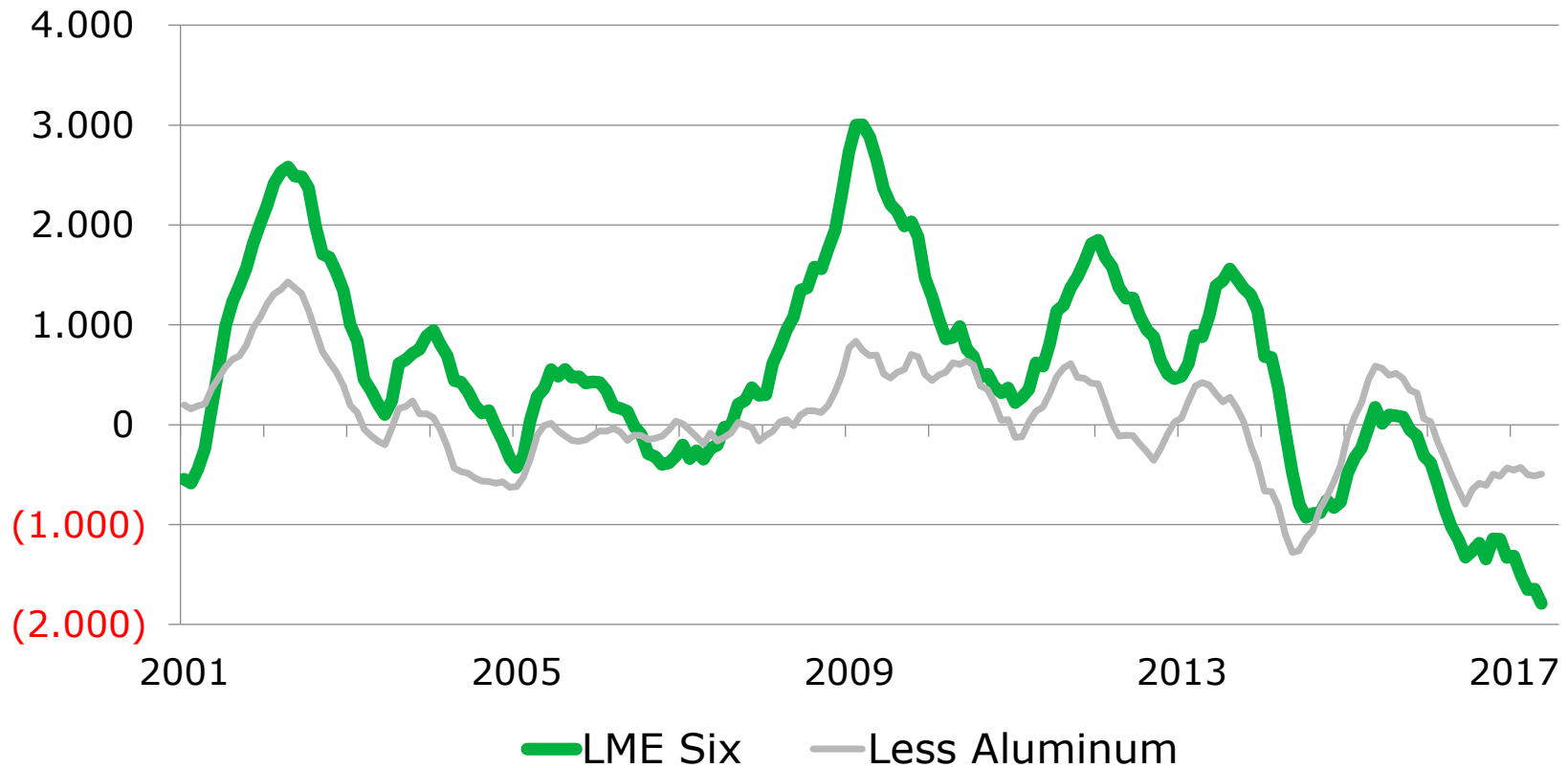
Signs of life in base metals

- Market has moved into deficit
 - > A synchronized global expansion signals healthy demand growth
 - > Plus years of underinvestment are tightening conditions from the supply-side
- But we see prices supported rather than a sustained rally
- Headwinds that will check a strong continuing rally
 - > Slower growth in China
 - > Normalization of financial markets
 - > Don't discount the influence of lower oil prices in 2018
- Prices advance modestly over near-term. Real (inflation adjusted) prices remain fairly flat over the long-term



When will the market hit deficit? It already has

Global base metal market balances, thousands of metric tons

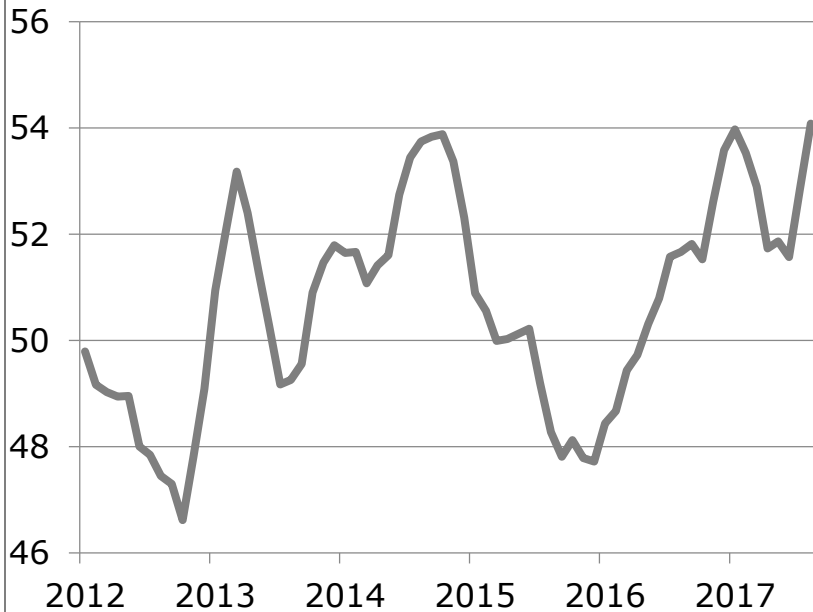


Sources: WBMS, ICSG, ILZSG

Metals demand looks good

Global new orders diffusion indexes (>50= expanding, 50< contracting)

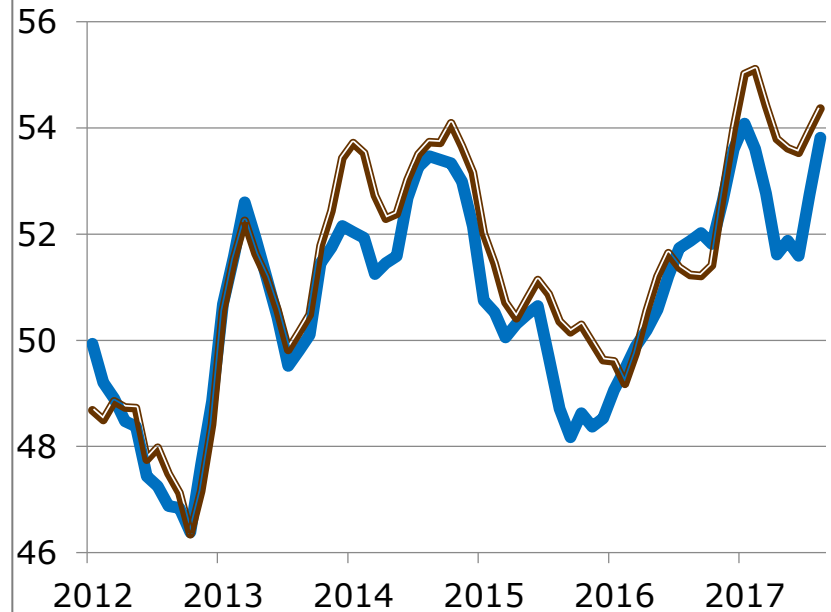
New orders index, steel consuming industries, 3 month moving average



Source: IHS Markit

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New orders index, aluminum and copper consuming industries, 3 month moving average



Source: IHS Markit

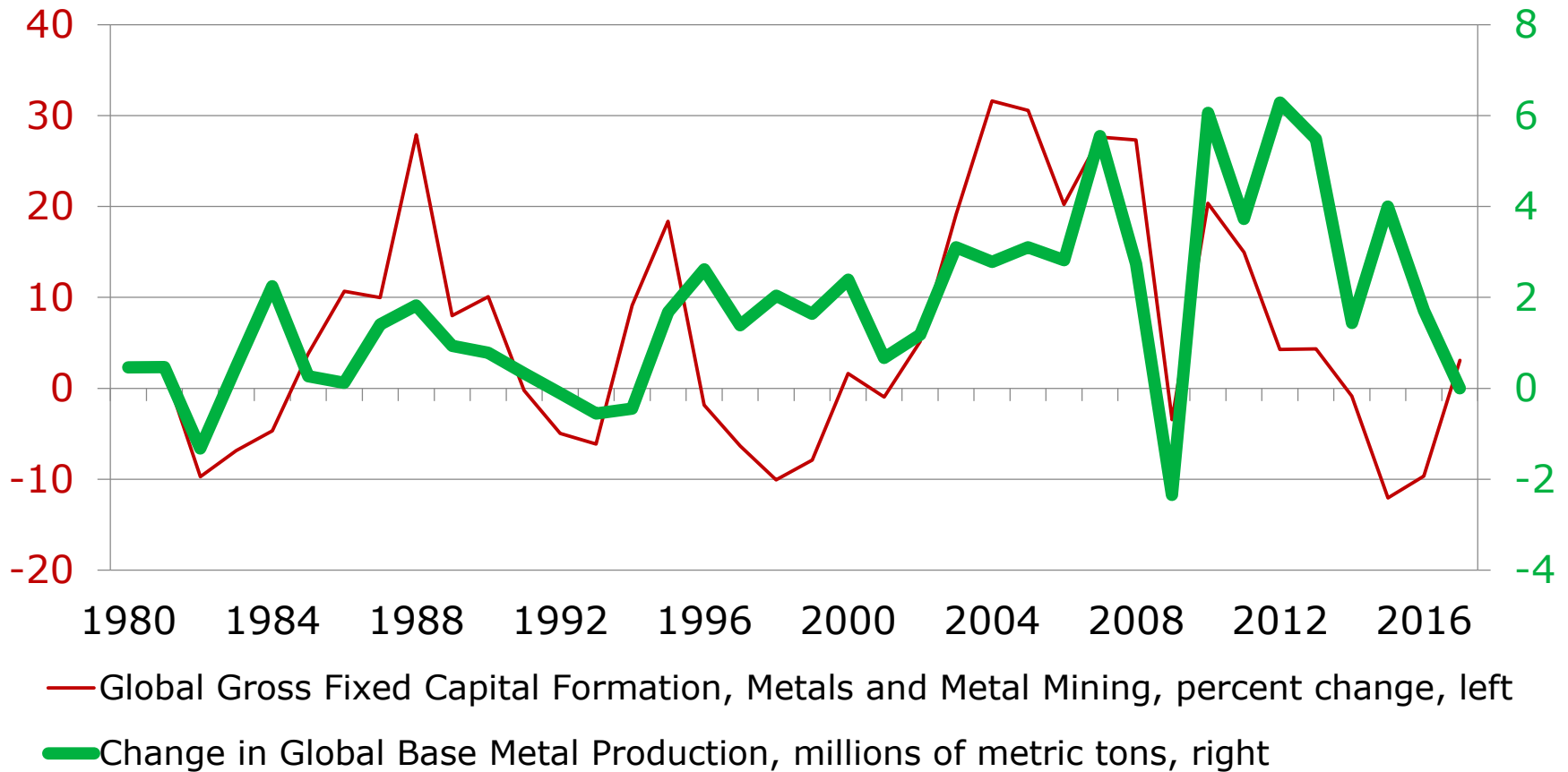
— Aluminum — Copper

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Global growth is healthy and is now synchronized

GDP (percent change)	2016	2017	2018	2019	2020	2021-2027
World	2.5	3.1	3.2	3.1	3.1	3.1
Argentina	-2.2	2.3	2.9	3.3	3.1	2.6
Brazil	-3.6	0.4	2.1	3.2	3.8	3.2
China	6.7	6.8	6.5	6.2	6.0	5.7
Eurozone	1.7	2.1	1.9	1.7	1.6	1.5
India	7.1	7.1	7.5	7.6	7.6	6.6
Japan	1.0	1.4	1.0	0.7	0.2	1.0
Mexico	2.0	2.1	2.2	2.5	2.5	2.8
Russia	-0.4	1.6	2.0	2.1	2.1	1.9
United States	1.5	2.1	2.7	2.4	2.1	1.9

Years of weak investment have slowed base metals production growth

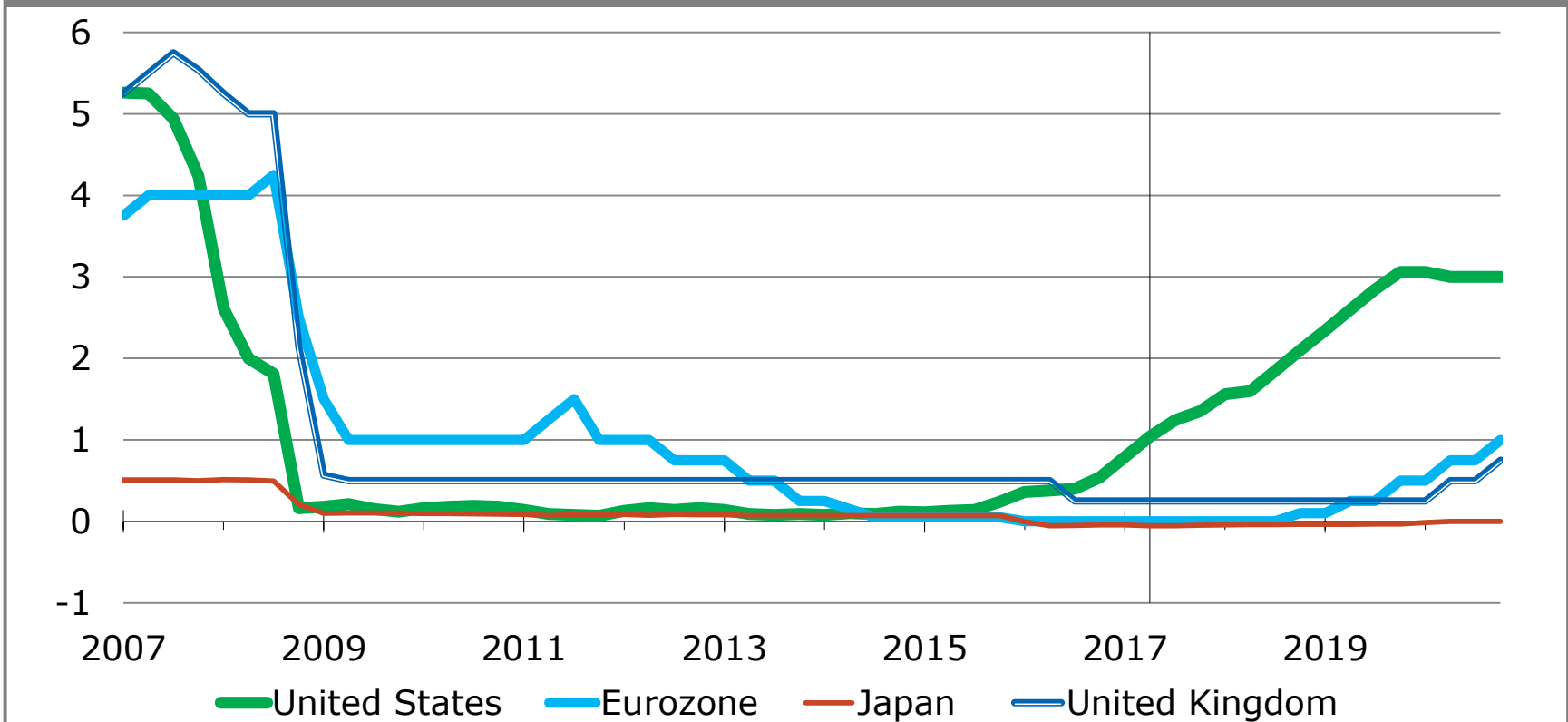


LME Price forecasts (US\$ per metric ton)

	Aluminum	Copper	Nickel	Lead	Tin	Zinc
2017Q2	1,910	5,663	9,248	2,164	19,967	2,598
2017Q3	2,005	6,385	10,323	2,315	20,412	2,938
2017Q4	2,118	6,459	11,350	2,260	20,523	2,823
2018Q1	2,111	6,337	11,998	2,239	20,721	2,733
2018Q2	2,026	6,151	11,841	2,204	20,530	2,622
2018Q3	2,047	6,078	12,156	2,177	20,699	2,555
2018Q4	2,108	6,130	12,677	2,184	20,750	2,566

Financial markets are “normalizing” in the developed economies

Policy interest rates, percent, end of quarter

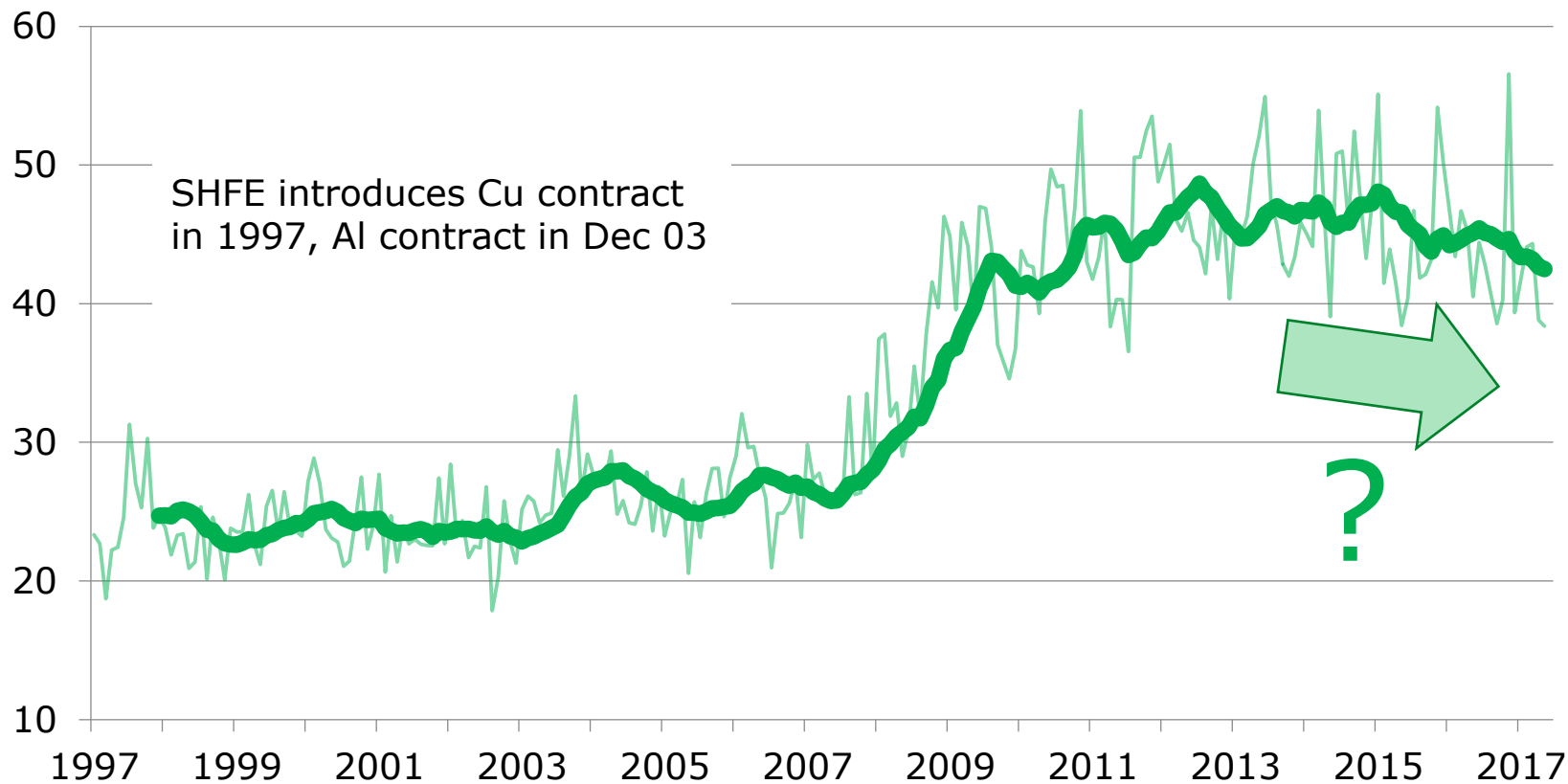


Source: IHS Markit

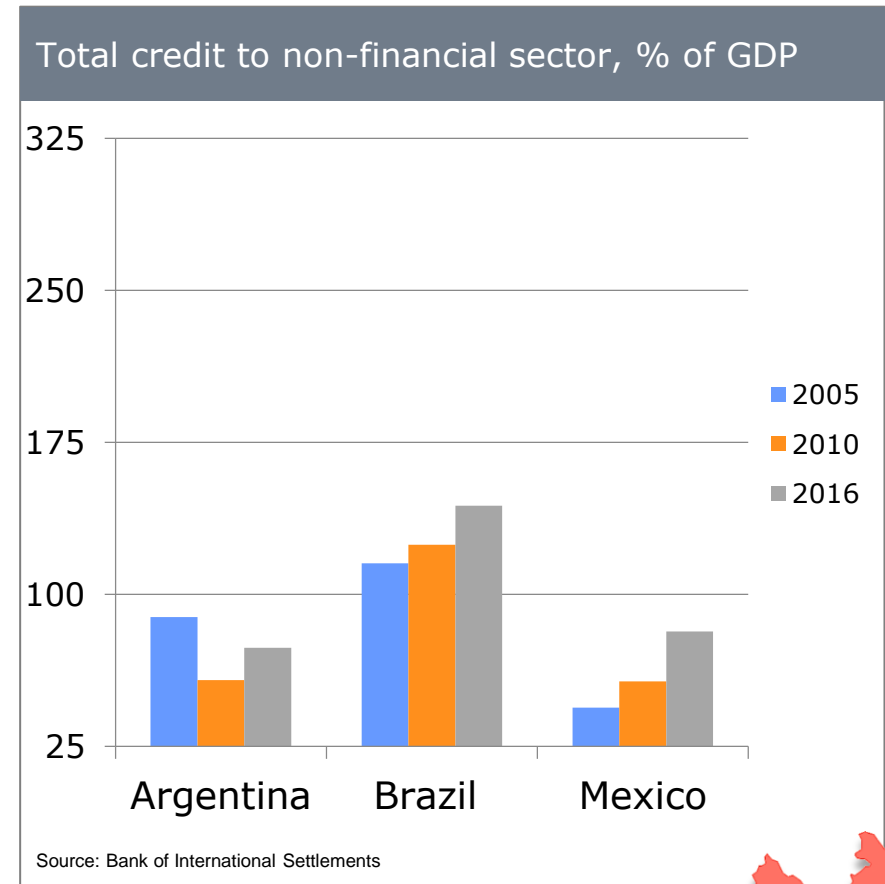
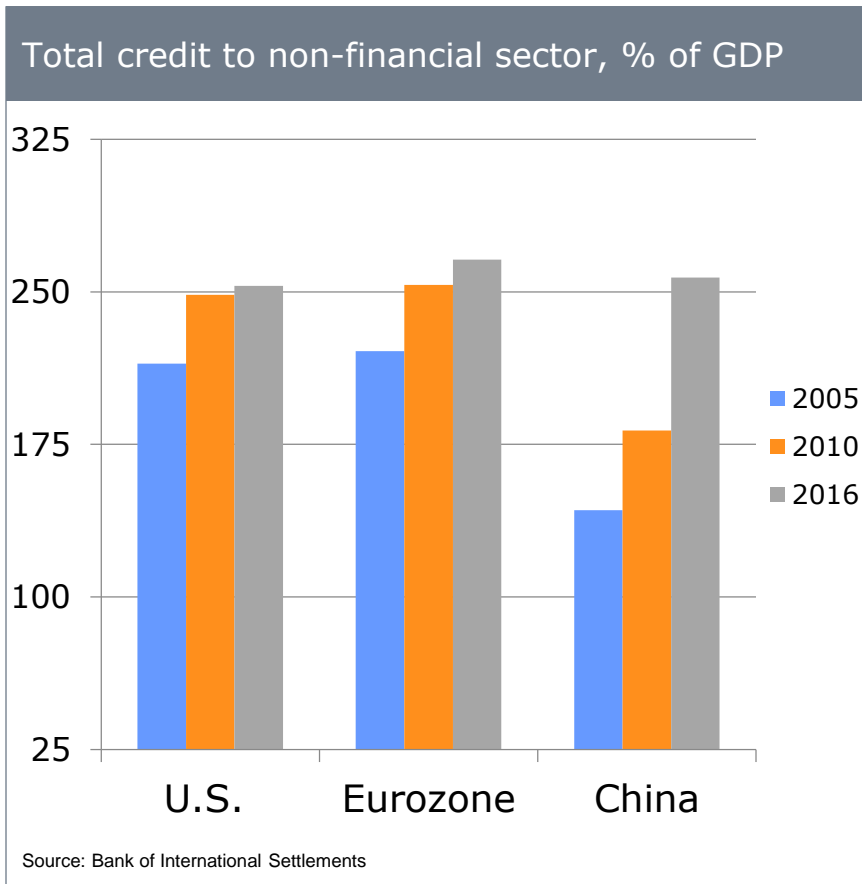
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The “financialization” of base metals: has it peaked? If so, is the change cyclical or structural?

LME, SHFE, CME Metals Trading Volume/Physical Consumption

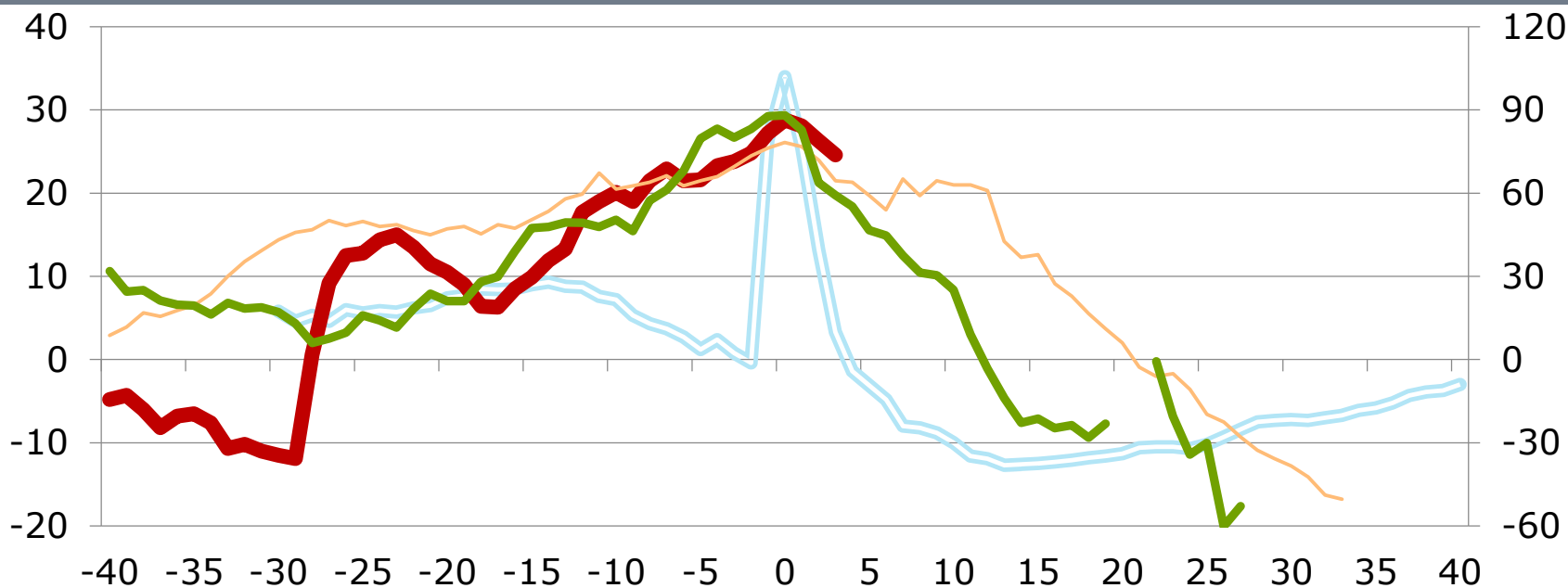


China's debt level does not resemble other middle income countries – and has grown alarmingly



Credit expansion in China is unsustainable and is a yellow flag even for near-term growth

Credit to GDP gaps, percent



Quarters before and after gap "peak"

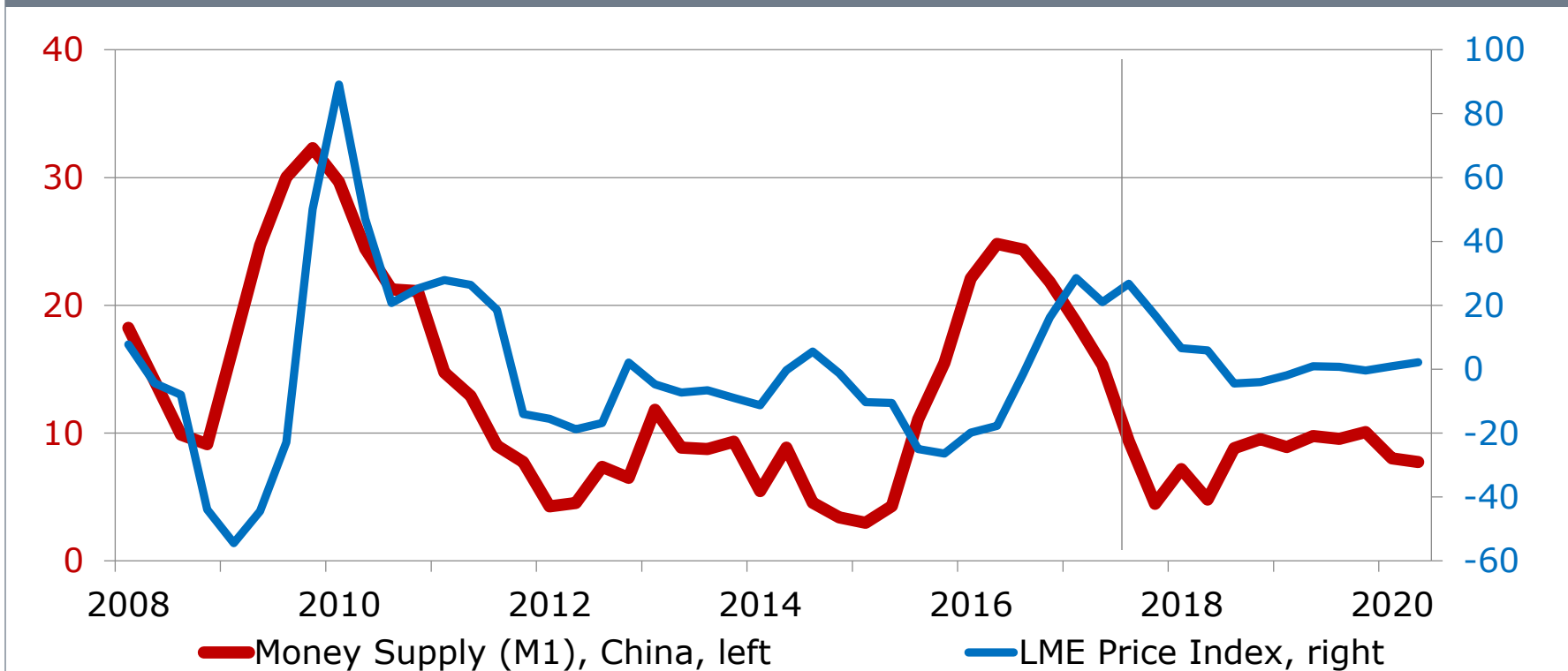
- Argentina 94Q4-12Q2
- Greece 98Q3-16Q4
- China 05Q1-16Q4
- Ireland 00Q1-16Q4, right

Source: Bank of International Settlements



The intriguing correlation between Chinese money supply growth and base metal prices

Year over year change

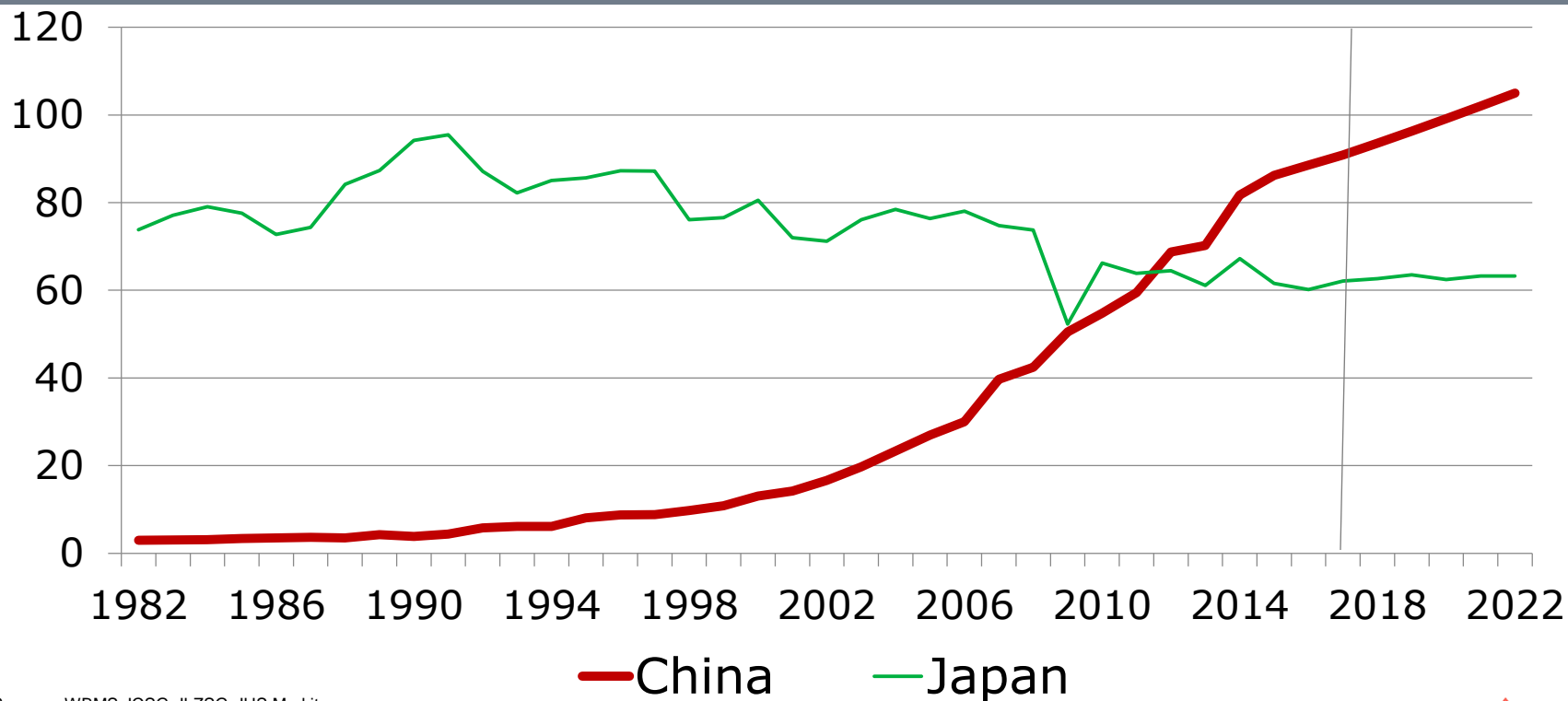


Source: IHS Markit



Imbalances in the Chinese economy also suggest that base metal consumption growth has hit an inflection point

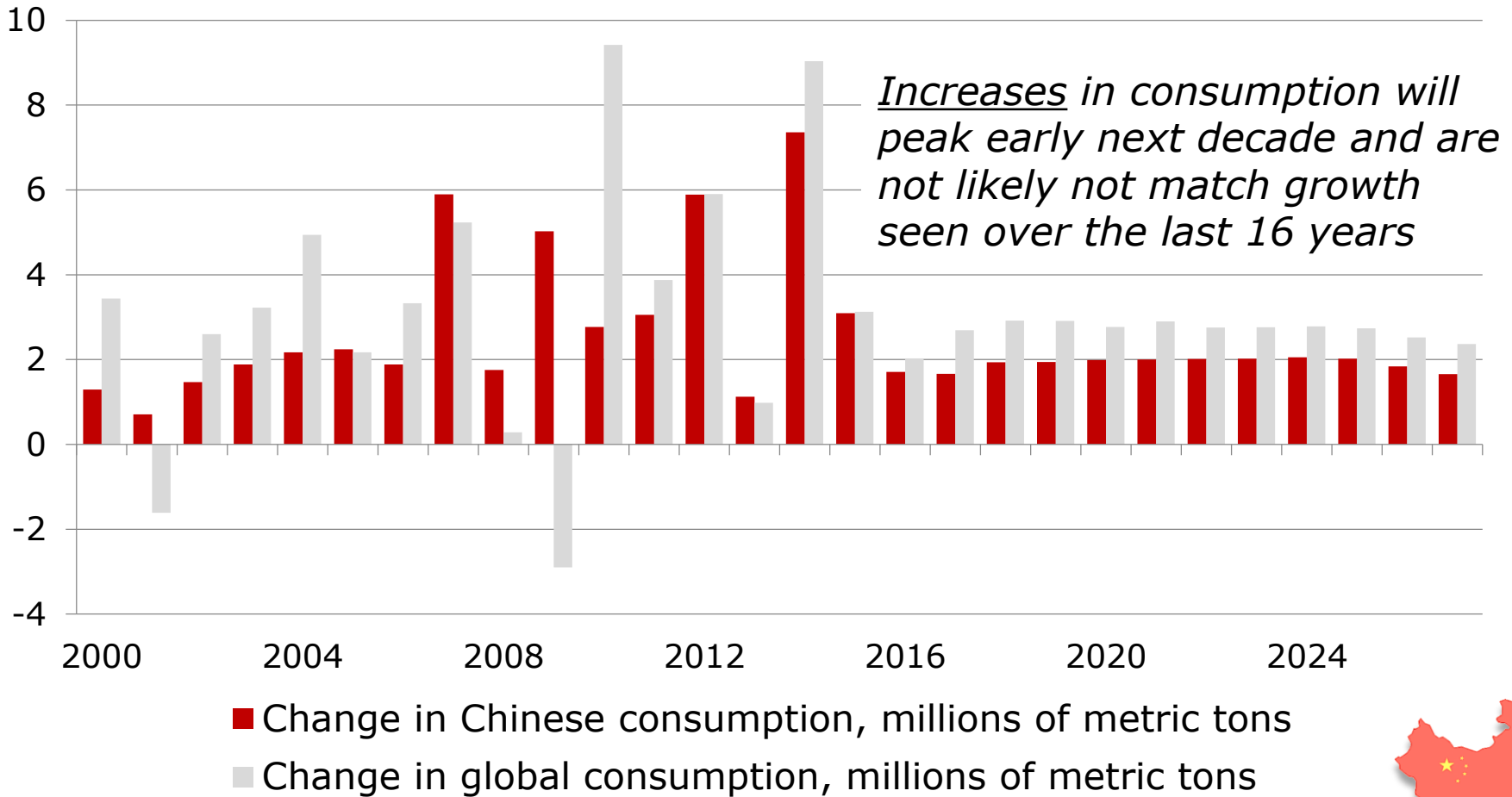
Per capita consumption of base metals, in pounds



Sources: WBMS, ICSG, ILZSG, IHS Markit



Which has implications for global long-term base metal demand growth



Thank you

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Supplemental Data and Forecasts

Forecasts of global industrial production and fixed investment

Snapshot views of individual metals

Policy environment -- Fraser Institute data

Industrial production

Industrial Production (percent change)	2016	2017	2018	2019	2020	2021- 2027
World	1.3	2.9	3.1	3.1	2.7	2.7
Argentina	-4.5	2.8	2.0	1.8	2.0	2.0
Brazil	-6.8	1.4	1.9	2.5	2.9	2.9
China	6.1	6.4	5.7	5.5	5.4	5.3
Eurozone	1.5	2.3	2.3	1.8	1.6	1.4
India	5.8	2.3	5.8	6.8	7.1	7.3
Japan	-0.2	4.2	2.0	2.2	-1.0	0.9
Mexico	-0.1	0.8	1.9	1.9	2.0	2.1
Russia	1.3	2.9	2.2	2.3	2.2	2.0
United States	-1.2	1.8	2.8	2.8	1.9	1.5

Real fixed investment

Real Fixed Investment (percent change)	2016	2017	2018	2019	2020	2021- 2027
World	1.7	3.2	3.8	4.2	3.7	3.3
Argentina	-5.0	10.7	3.6	4.8	3.3	3.4
Brazil	-10.3	-3.3	3.6	4.6	4.6	3.4
China	3.6	4.8	5.3	5.7	5.0	4.3
Eurozone	4.1	2.2	2.5	2.3	2.2	1.9
India	2.4	1.0	7.6	9.8	10.2	7.3
Japan	1.0	2.9	1.6	3.0	0.0	0.5
Mexico	0.1	-0.9	1.6	3.6	2.7	3.0
Russia	-2.5	1.2	2.9	3.9	3.4	2.6
United States	0.6	3.3	3.5	3.3	2.6	2.1

Aluminum: How disciplined are Chinese producers?

	2017Q4	2018Q4
PRICES	Higher	Flat
SUPPLY	Tighter on production cuts	Tighter
DEMAND	Slightly stronger	Stronger

Demand

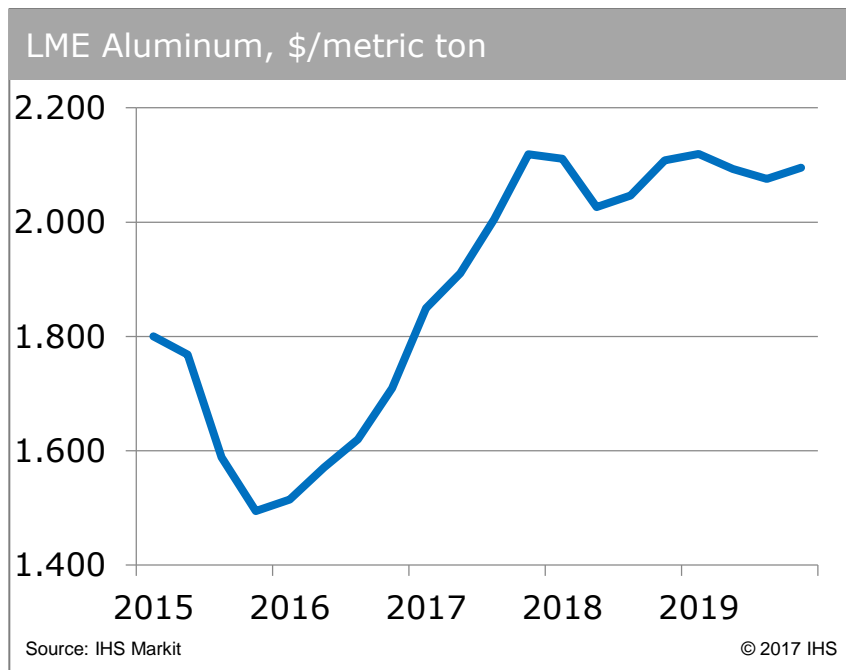
- > Global primary consumption will grow by more than 3.0% in 2017 and by 2.5% in 2018. Assuming discipline among producers, this growth should be enough to tighten the market over the next four quarters.

Supply

- > Capacity is ample with inventory still high. Chinese production (the root cause of the industry's problems) is being cut. How much 'illegal' capacity comes off-line – which isn't offset by new starts, will determine how high prices move. Prices above \$2,100/metric do incentivize production.

Prices

- > LME prices have pushed above \$2,000/metric ton on news that Chinese production is being cut. Prices will remain near or above \$2,100 per metric depending on how much Chinese production remains off-line and how much non-Chinese capacity comes back into production.



Copper: Feeding frenzy

	2017Q4	2018Q4
PRICES	Lower	Rising slowly
SUPPLY	Neutral	Neutral
DEMAND	Stronger	Slightly stronger

Demand

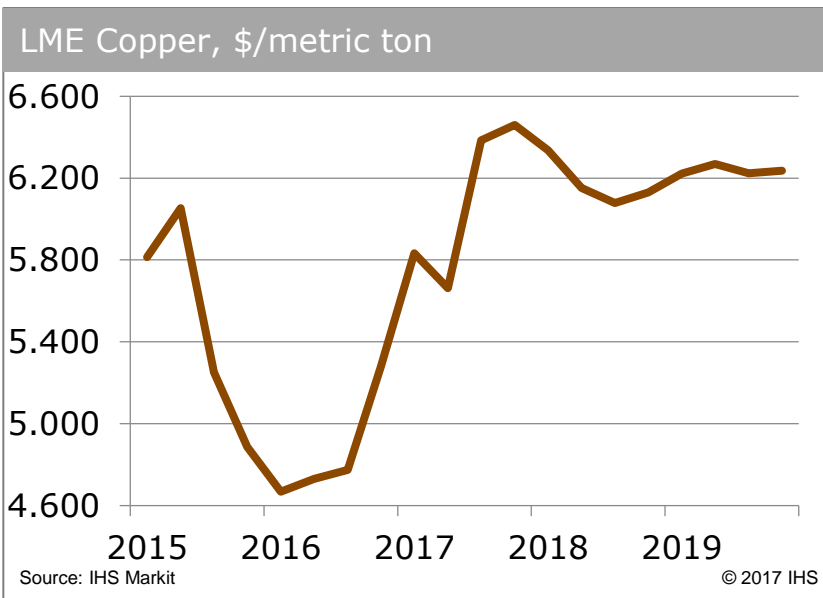
- > Consumption growth is forecast to be near 3% in both 2017 and 2018. We do not see an acceleration in Chinese consumption growth. We do have concerns about 2018 US consumption growth. Investors are clearly adding momentum now as is a softer US\$

Supply

- > Q1 disruptions have been resolved. Concerns over fresh disruptions seem over blown. Mine production growth will slow but not alarmingly. We still see a relatively balanced market in 2018

Prices

- > Prices have cleared \$6,900/mt though the market is looking overbought. Watch inventory and Chinese imports – they will tell the tale. We avoid buys at current prices and await a pull back. We see prices closer to \$6,200 rather than \$7,000/mt in 2018H2



Nickel: Prices need to move higher

	2017Q4	2018Q4
PRICES	Higher	Higher
SUPPLY	Ample	Tighter
DEMAND	Slightly Stronger	Slightly stronger

Demand

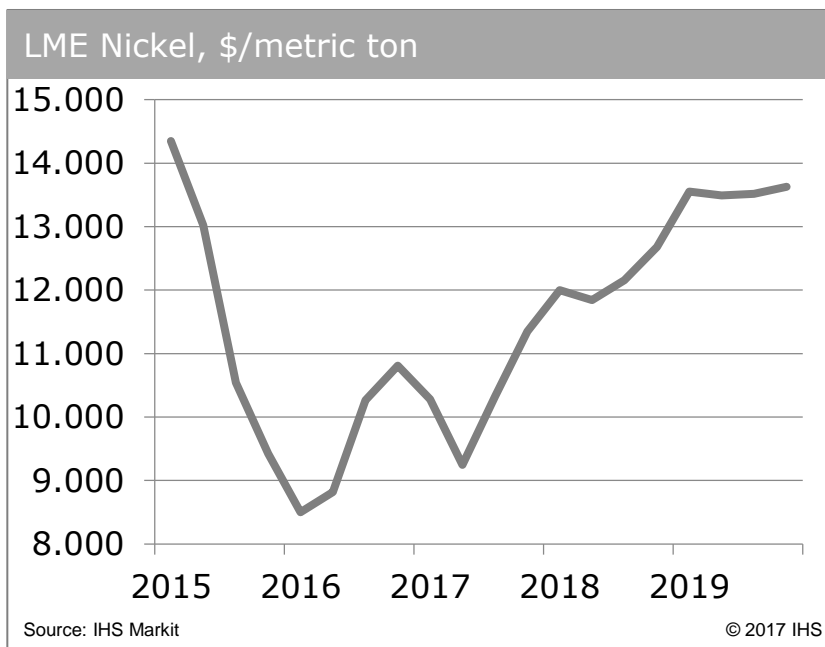
- > Chinese stainless production remains strong and holds the key to the forecast. Is it sustainable or will slowing stainless production growth undercut improving fundamentals that promise to lift prices?

Supply

- > Inventory remains high but mine production growth is (finally) beginning to slow with refined production now falling. The change should eventually work down inventory and support higher prices. Philippine exports are a wild card.

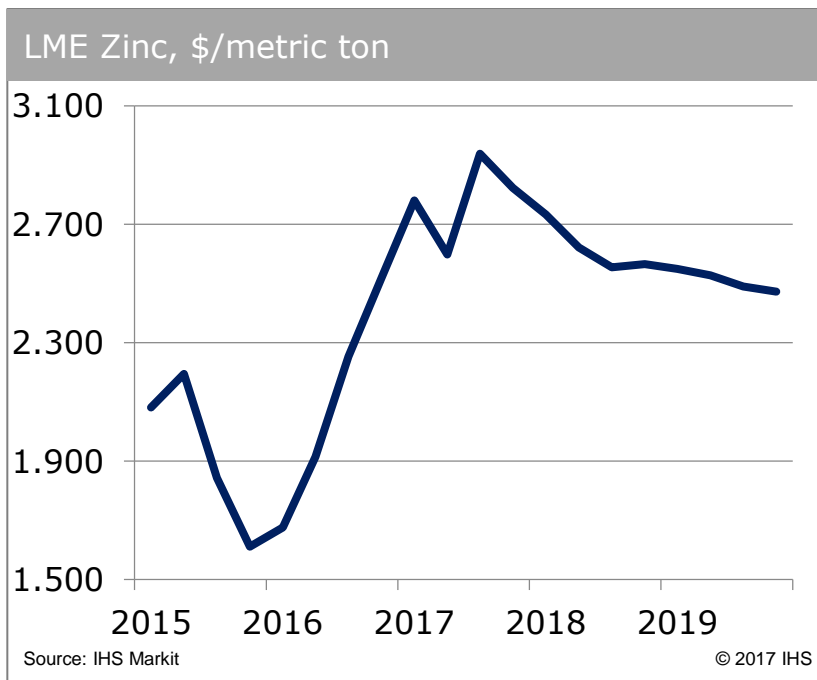
Prices

- > Market's shift into deficit and the threat to Philippine exports has lifted prices above \$12,000/mt. On a cost basis we believe prices need to move above \$13,000.



Zinc: Deficit closing

	2017Q4	2018Q4
PRICES	Slightly Lower	Lower
SUPPLY	Tight	Less Tight
DEMAND	Neutral	Slightly Stronger



Demand

- > Decelerating Chinese consumption growth remains a headwind to zinc prices. Chinese growth look weak thus far in 2017 and may remain flat for the year.
- > Global consumption ex-China grew by 1.4% year on year (y/y) in June and *may grow as much as 4.0% in 2017*. Global consumption growth looks to remain under 1.0%.
- > Global consumption growth looks better in 2018 with growth nearer 3.0%.

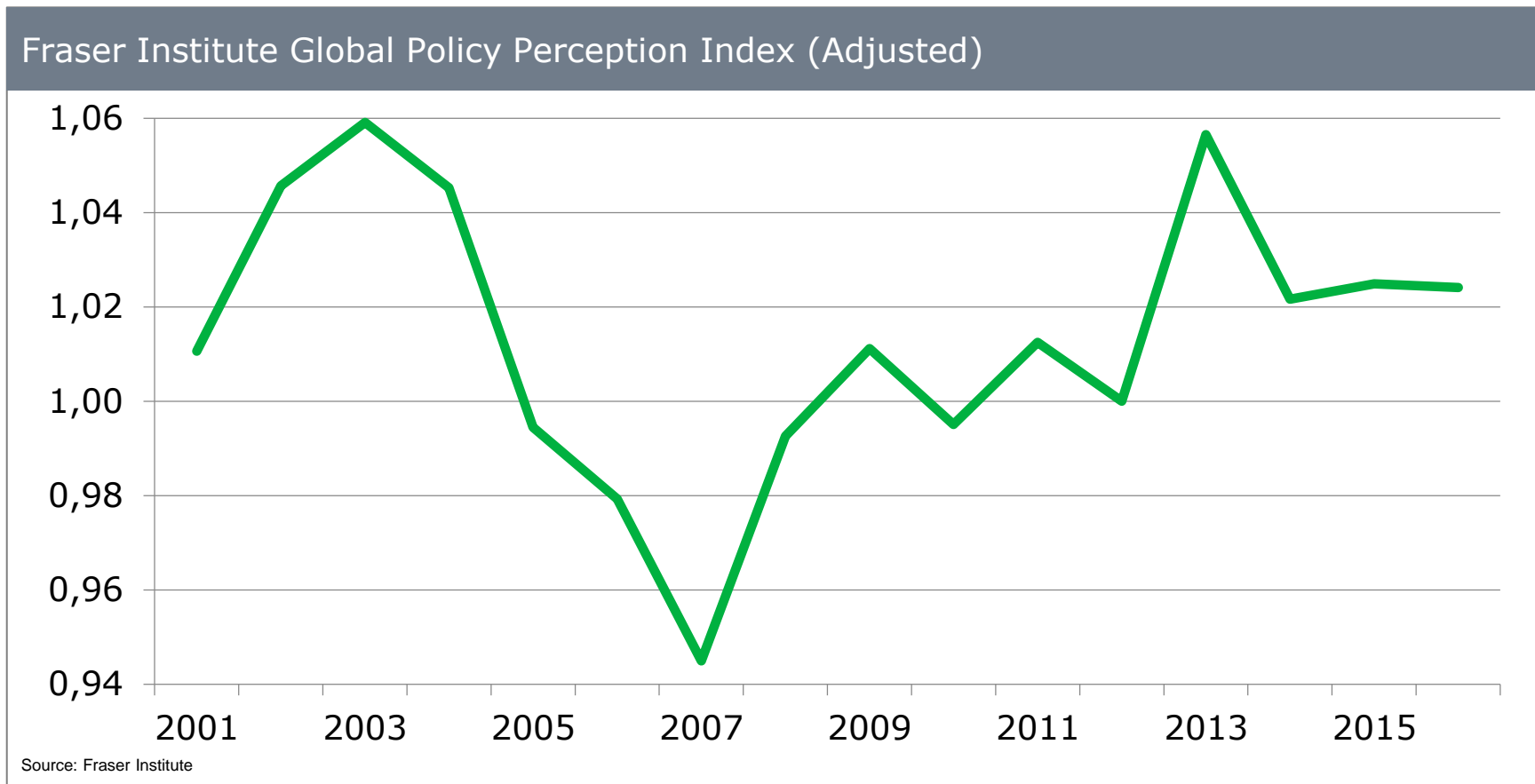
Supply

- > Zinc concentrate supply remains tight in the immediate months ahead.
- > In June, global primary mine production was up 2.5% year on year. Mines in Canada, Peru and China are ramping-up.
- > Growing mine production stabilizes inventory in the next 12-months.

Prices

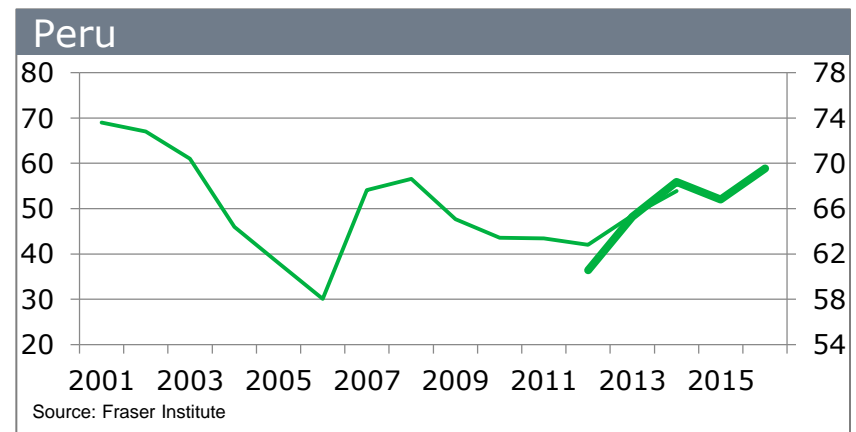
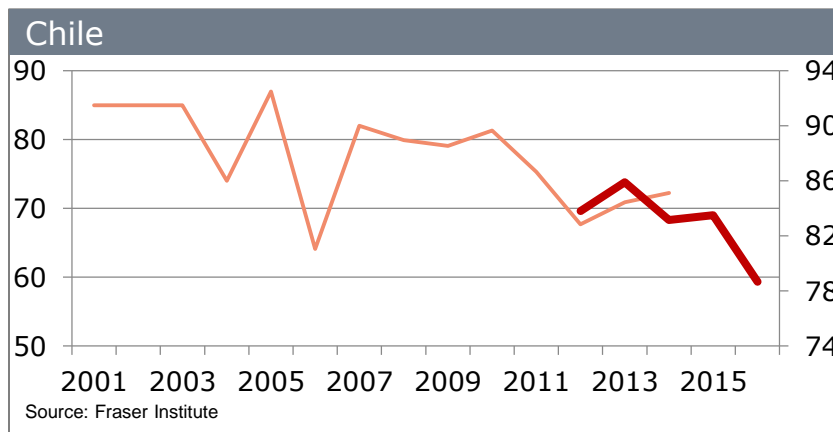
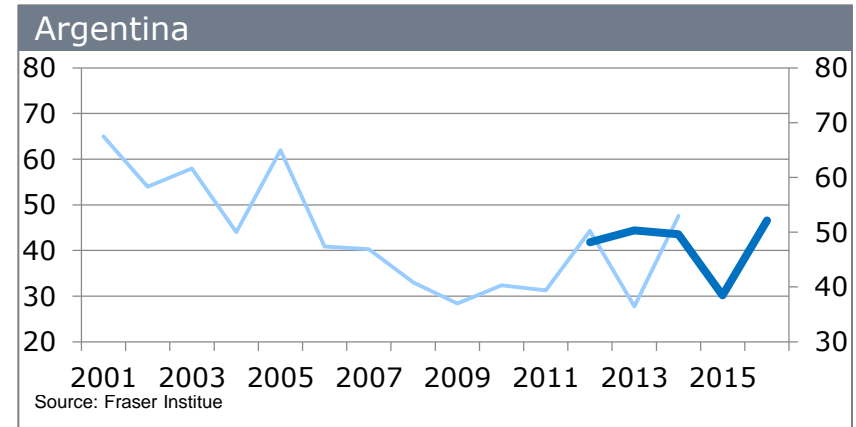
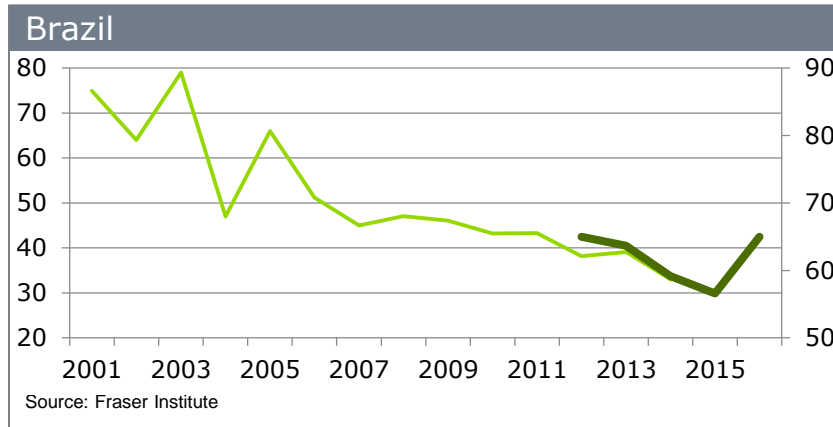
- > Zinc's deficit shrinks to 160,000 metric tons in 2017 and moves closer to balance in 2018. Prices retreat to \$2,600/mt average in 2018.

Climate for the mining industry globally has improved since 2007 and suggests a better investment environment in the near future



Policy Perception Index is composed of survey responses to factors that affect investment decisions: administration of [industry] regulations, environmental and labor regulations, regulatory duplication, legal and tax regime, uncertainty concerning protected areas and dispute land claims, infrastructure, security, trade barriers, institutional stability, geological quality, and availability of skilled labor.

Fraser Institute Policy Perception Index for key South American countries



Index methodology changes in 2015