



# Challenges and opportunities for base metals in Asia

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## Introduction to CRU

Focused on the quality of our work, our customer contact and our delivery channels.



- Market Analysis, Price Assessment, Consulting, Events & Conferences.
- Primary research and robust, transparent, methodologies.
- We are a global team of experts, key to gaining a real understanding of critical markets such as China.
- We strive to provide customers with the best service and the closest contact - flexible, personal and responsive.

**Significant investment in Asia, over 40 experts in the region.**

## **The growing importance of base metals in Asia**

**Market update**

**Challenges**

**Opportunities**

**Conclusions**

## There are rich deposits of untapped base metals resources in Asia

### China

- World's largest producer of **gold, molybdenum, zinc, lead, coal** and **tin**.
- Highly fragmented, many small operations, very price sensitive.
- Limited resources of high-grade minerals.
- Few large-scale operations with consistent product quality and output.
- Downstream product exports likely to increase.
- Consolidation of higher-cost mines and steady but slower output growth likely
- Government to drive environmental improvements and outbound investment.

### Thailand

- Limited resources of **silver, zinc, manganese**.
- Some potential for growth; may stop mining zinc by 2018

### Malaysia

- Identified but limited resources of **bauxite**, iron ore, thermal coal, **tin** and **manganese**.
- Future investment focus will continue to be in downstream processing.
- Sarawak development processing and will see growth in **aluminium, silicon** and **ferroalloy** smelting.

### Indonesia

- Mining law highly uncertain, designed to increase domestic revenue.
- Abundant resources of **nickel, copper, gold, bauxite, coal** and **tin**.
- Export ban in effect to develop downstream processing in country,
- Several large projects on hold due regulatory issues.
- Development times uncertain but likely see growth in copper and nickel .production.

### Vietnam

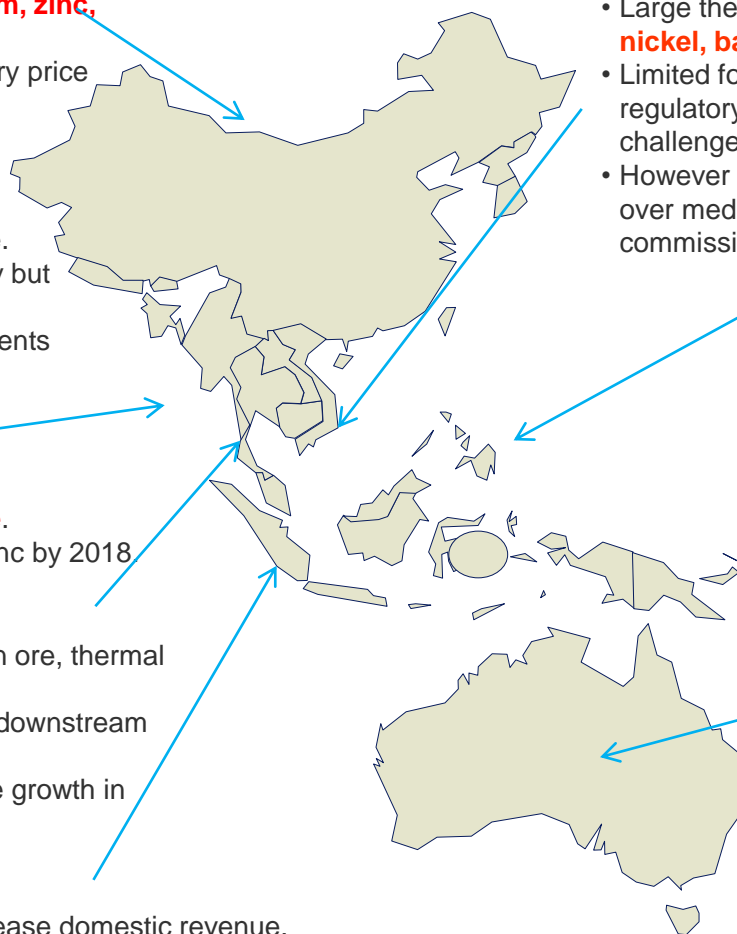
- Large thermal **coal** reserves, currently produces **zinc, nickel, bauxite, coal** and **manganese**.
- Limited foreign investment due to small resources, regulatory issues, investment and market access challenges.
- However increased exploration is likely to see progress over medium term as 2010/2011 projects will start commissioning.

### Philippines

- Produces **nickel, copper, gold, silver, zinc, manganese, coal**.
- Mining law highly uncertain. Resource nationalism is a threat.
- Abundant resources but 'no-go' mining zones >50% land mass.
- Output growth more likely for **copper, gold** and **nickel** projects.
- Brownfield projects more likely to progress over greenfield due to lower risks.

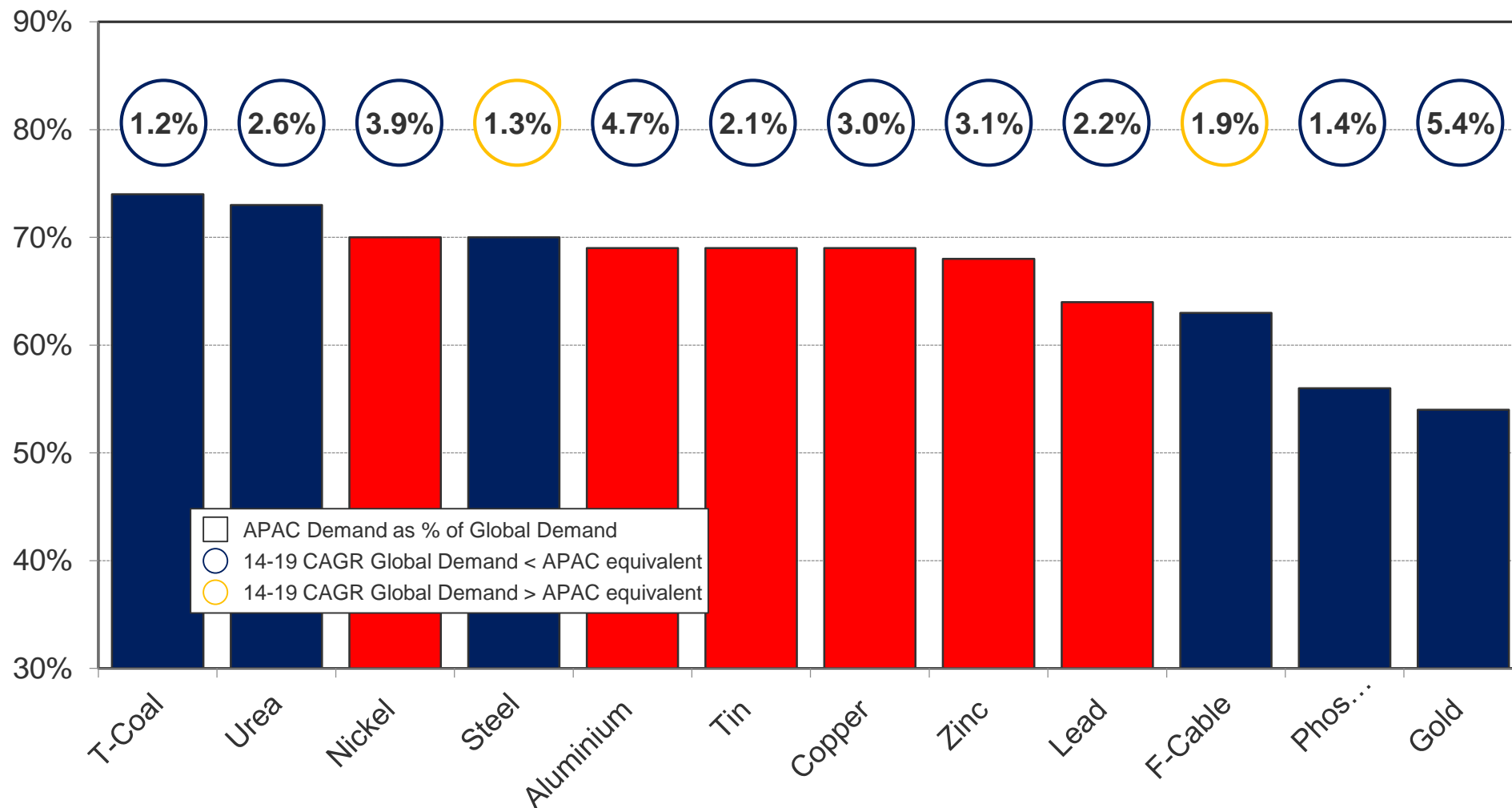
### Australia

- Vast mineral wealth covering **most commodities**, mostly self-sufficient. Largest producer of **iron ore**.
- Mineral exports (mainly to Asia) are an important part of the economy.
- Weaker demand conditions and lower prices will limit projects over the medium-term.
- Expect to see modest output growth over most **base metals** and more for bulks.
- Many projects shelved due to market conditions.



## Domestic demand for base metals is also growing in Asia

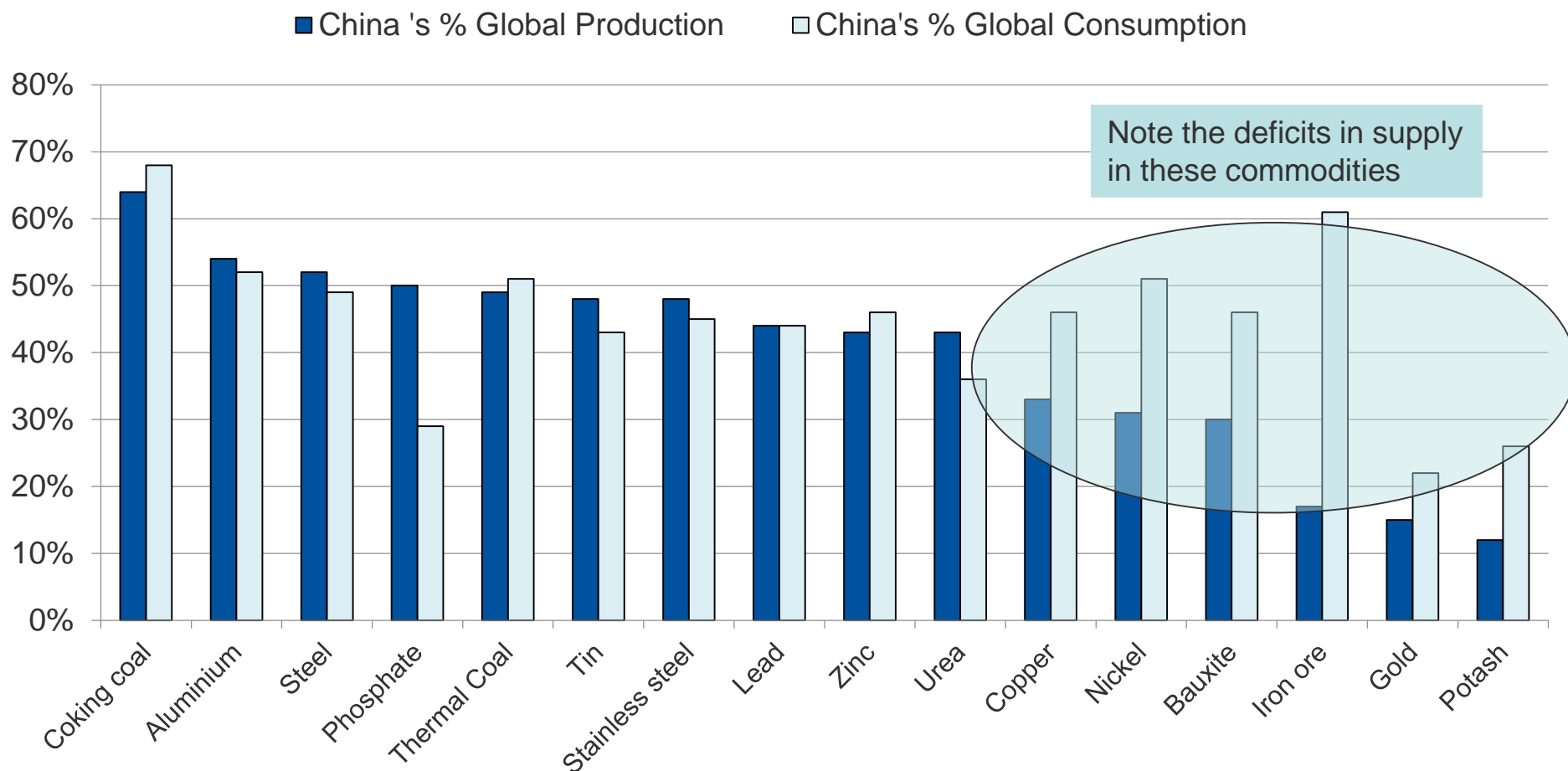
Asia demand as a proportion of global demand, 2014



Note: Asia includes China, India & S.Asia, SE.Asia and N.Asia

## China is still one of the largest producers and consumers of base metals globally

On average, China accounted for 40% of global production and 45% of global consumption across 16 key commodities in 2015



## The growing importance of base metals in Asia

### Market update

### Challenges

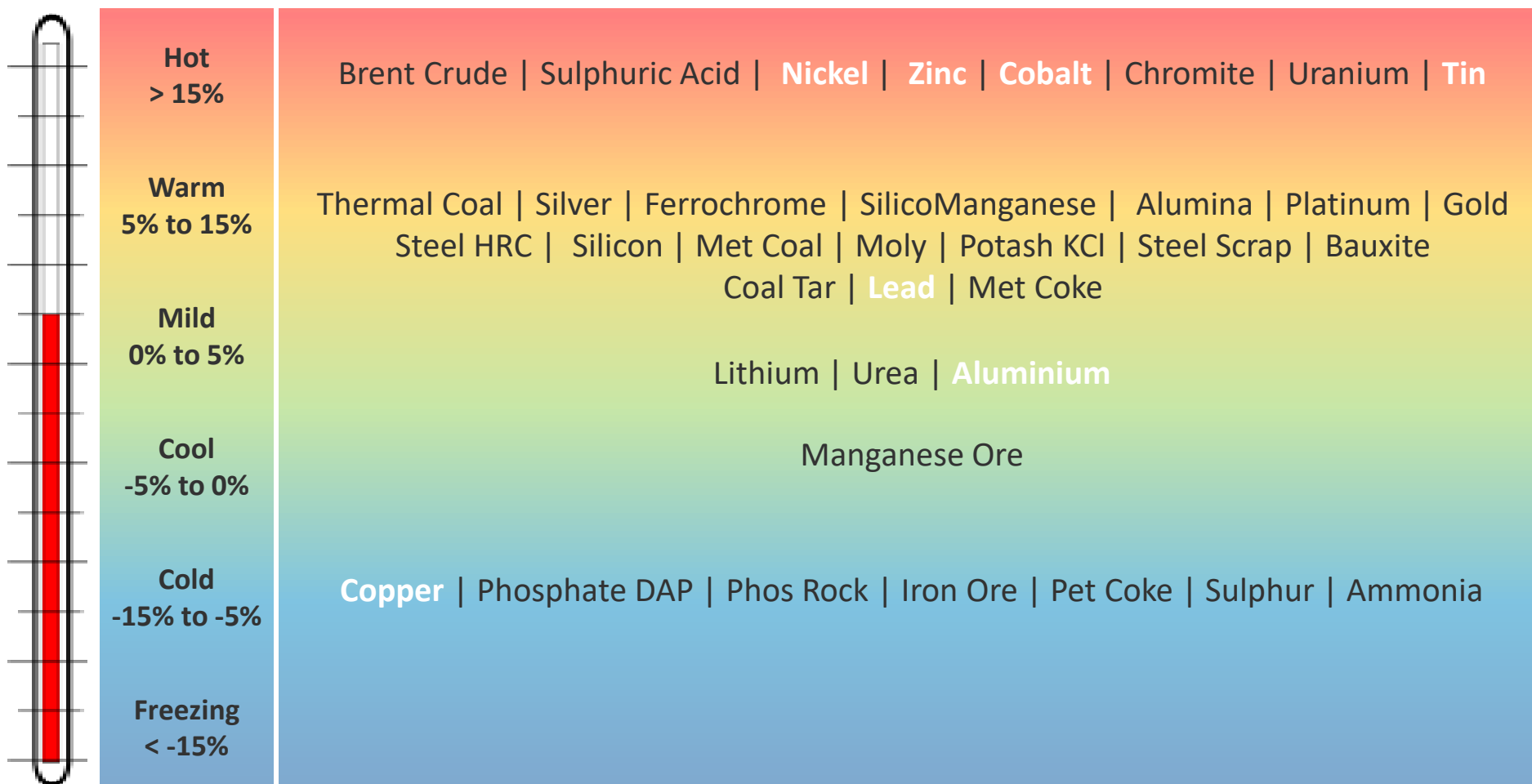
### Opportunities

### Conclusions



# Commodities warming into 2017 from 2016 forecast average

CRU basket of mining, metals & fertilizer price forecasts | 2017 versus 2016



## This is, to an extent, 'despite the global economy'

Commodity markets remain very focused on developments in China's economy.



The outlook remains uncertain and challenging in key jurisdictions

Asia-led global growth, but remaining sub-trend in 2017 and 2018

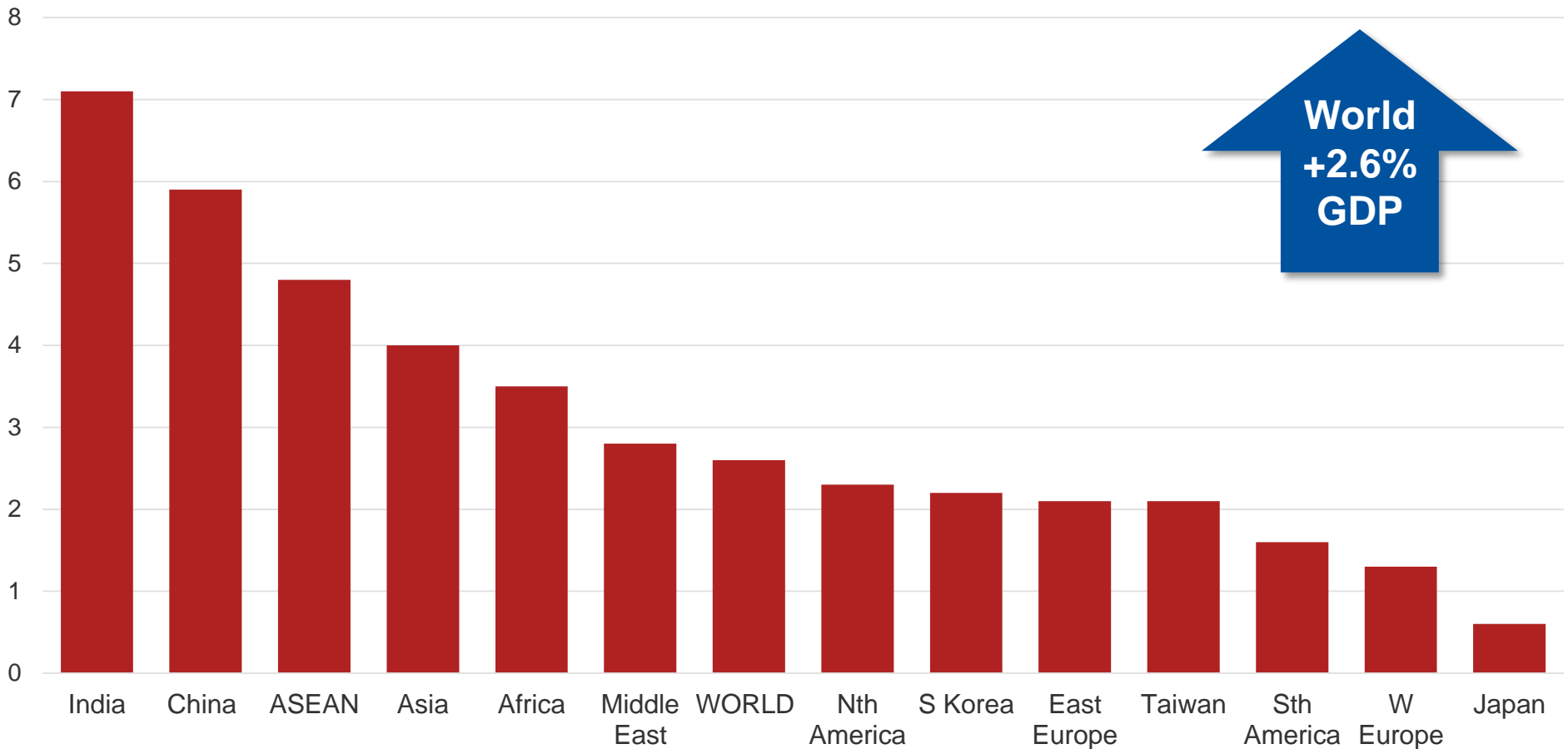
Base case Chinese growth tapering into 2017...

...however concerns over entering the CRU 'China Disorderly Transition' scenario have diminished...for now

Lower probability, but impactful 'low' scenarios do exist (Trump, 'Very Hard' Brexit)

# Asia to remain the global bright spot for GDP in 2017...

...but 2017 growth to be modest by past standards. IP pick driven by end of contraction in Brazil, Russia and Japan and pick up in US as energy output stabilises. China continues to contribute around half of global IP growth



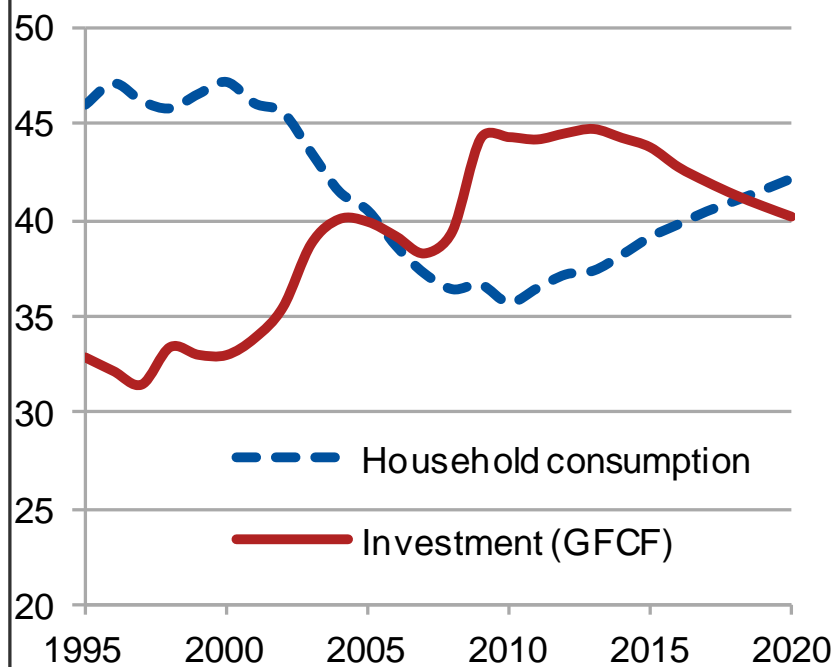
## ...and we assume that China avoids an (economy-wide) hard landing

The challenge is to predict economic transition and impact on commodity demand.

### Other China 2016 themes

#### Rebalancing from investment to consumption

% of nominal GDP



Data: CEIC, CRU

Ongoing reform (corruption, air quality, SOE)

Ongoing deregulation & urbanisation

Fiscal easing to avoid hard-landing

Industrial slowdown, poor real estate sector,  
good auto performance

Stock market volatility driving wider sentiment

Hard data 'vacuum' & a pessimistic global  
audience

# 2016: Zinc is at the front of the fundamental pack but where is the finishing post?

| Price supportive factors                   | Iron Ore | Steam Coal | Copper | Aluminium | Nickel | Zinc |
|--|----------|------------|--------|-----------|--------|------|
| Strong demand (>3%)                        | X        | X          | X      | ✓         | X      | X    |
| Limited new supply                         | X        | X          | X      | X         | X      | ✓    |
| Price-related cuts <sup>(1)</sup> required | ✓        | ✓          | ✓      | ✓         | ✓      | X    |
| Market forecast in deficit                 | X        | X          | X      | X         | ✓      | ✓    |
| Stocks critically low                      | X        | X          | X      | X         | X      | X    |
| Mine costs rising                          | X        | X          | X      | X         | X      | X    |

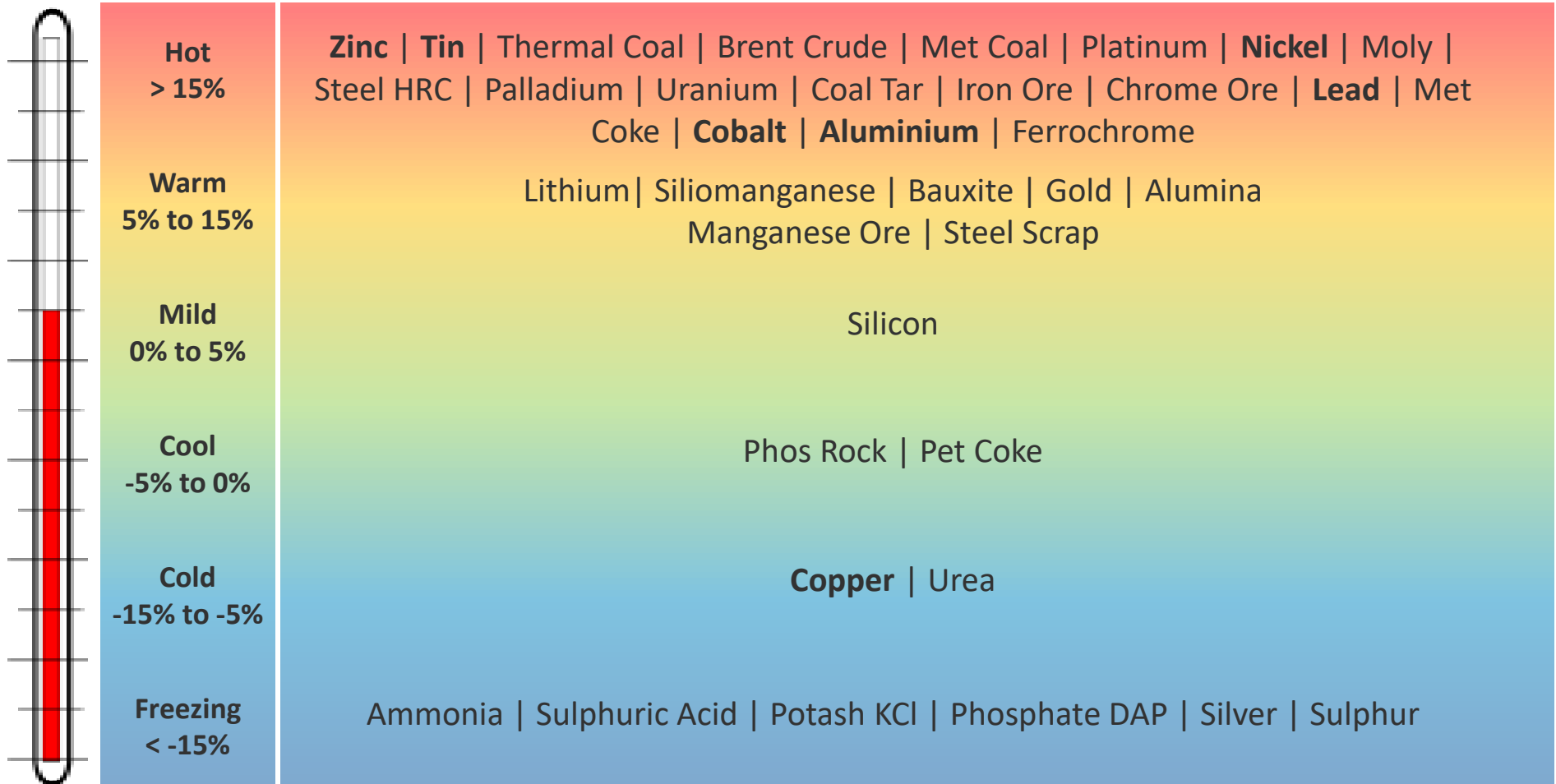


## Base metals scenarios explored in CRU Outlooks since July 2016



# Commodities face warmer outlook to 2020: prices increase 15%\*

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



## Summary: 2017 better – then 2019-2020 warmer again

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- ‘Reversion to mean’ as demand nudges forward & oversupply is curtailed by cuts/closures – **annual market deficits become common**
- CRU assumes global IP growth ex-China pulls its weight - with China growing steadily via the world’s fastest growing consumers
- Demand: Orderly Chinese economic transition
- Supply: Miners act rationally – after a ‘push’ - with costs again creeping higher as energy and ForEx benefits slowly reverse. Higher costs & higher prices return.
- Always be room for world-class projects – and niche small projects too
- CRU forecasts price reversion to equilibrium – and in some cases above - as market cycle tips towards the upside – **laying the seeds for 2020 optimism amongst miners**



## **The growing importance of base metals in Asia**

### **Market update**

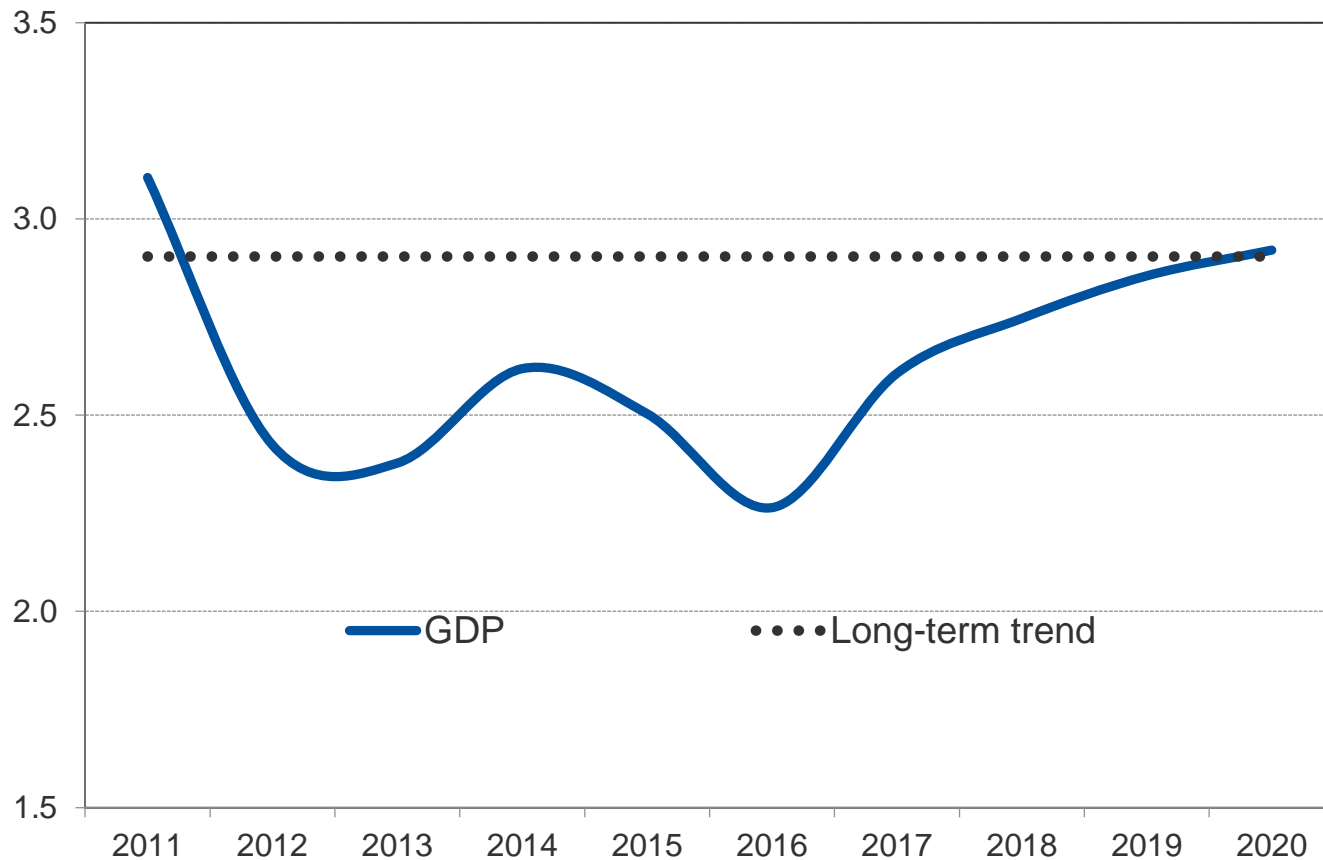
### **Challenges**

### **Opportunities**

### **Conclusions**

## We're stuck in a slow growth world

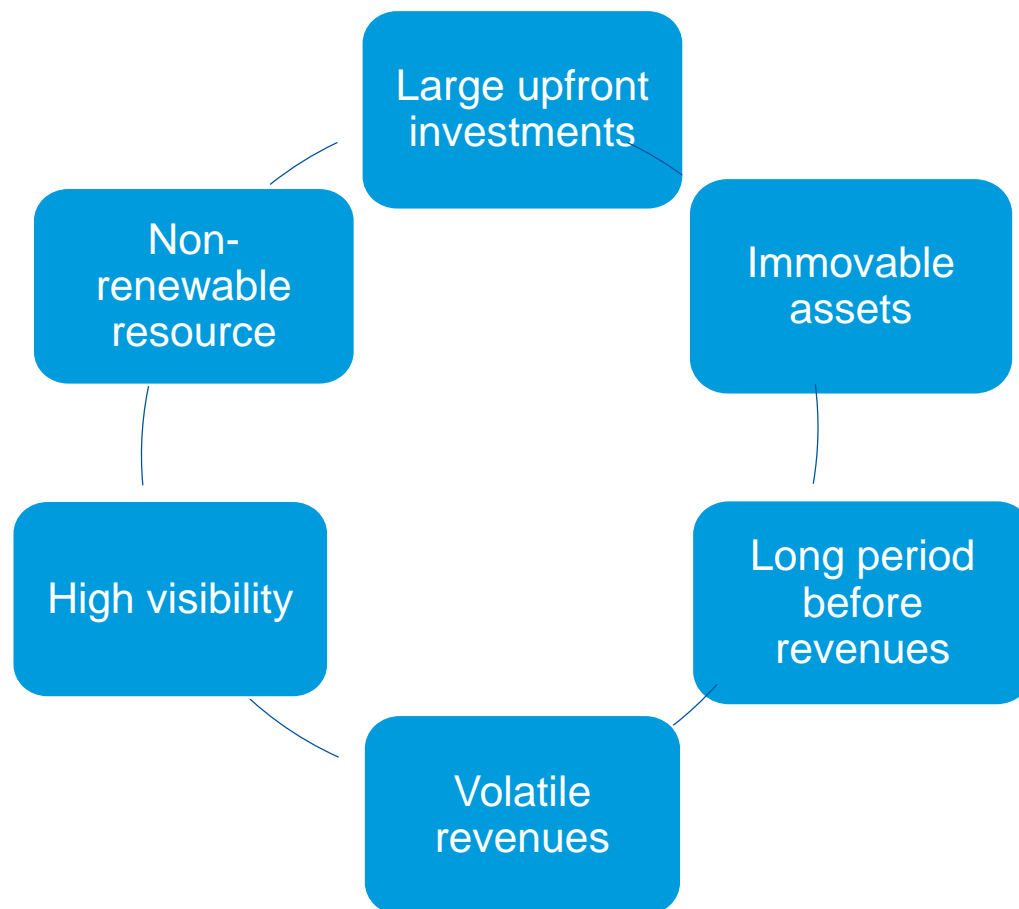
World GDP year-on-year growth (%)



### Growth headwinds:

- Uncertainty
- Imbalances
- Oil
- China

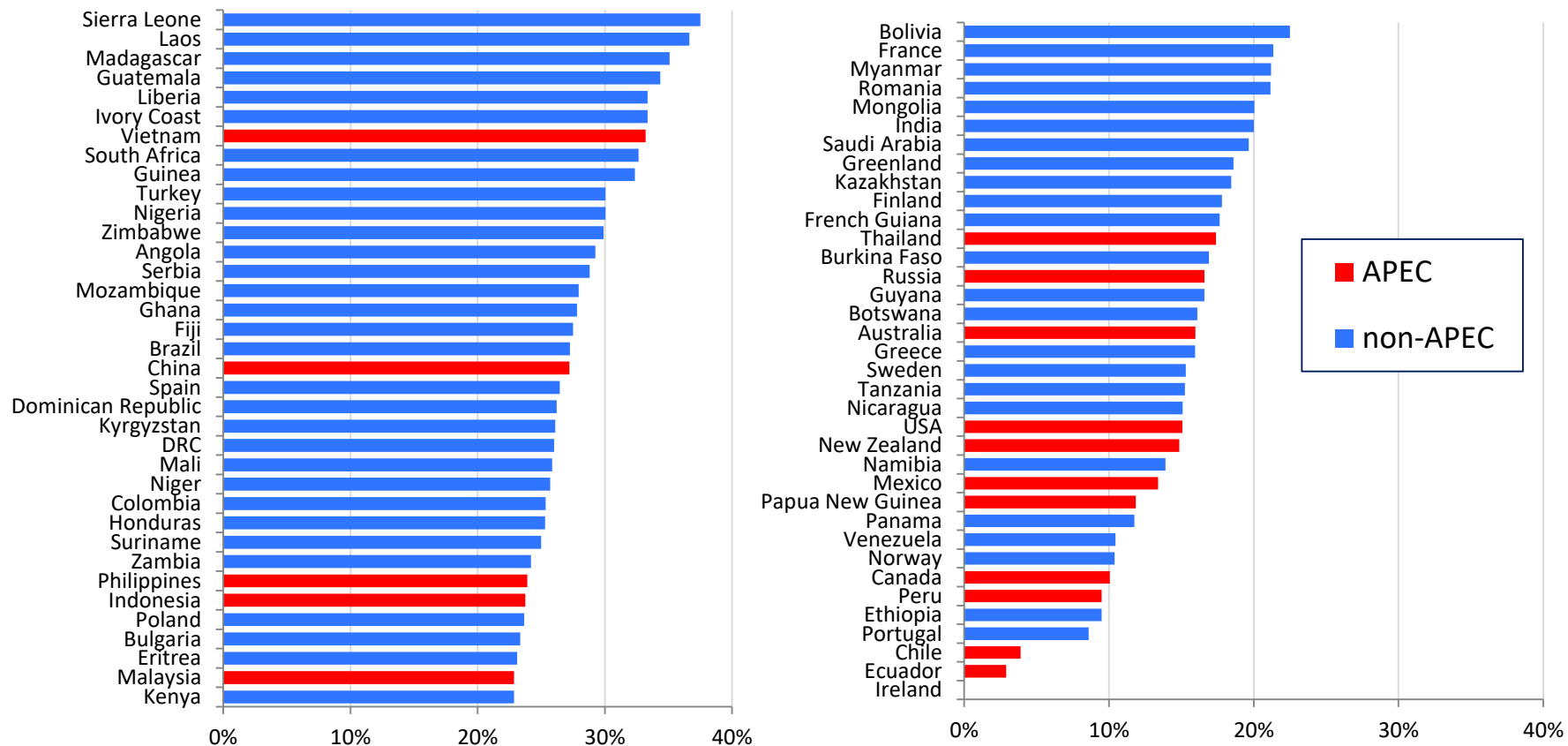
## Mining projects are challenged by a large upfront capex and volatile revenues



Challenges vary between projects in terms of extent (severity) and length (time) with some lasting the entire lifecycle.

# Investment attractiveness varies by country under ideal vs. actual conditions

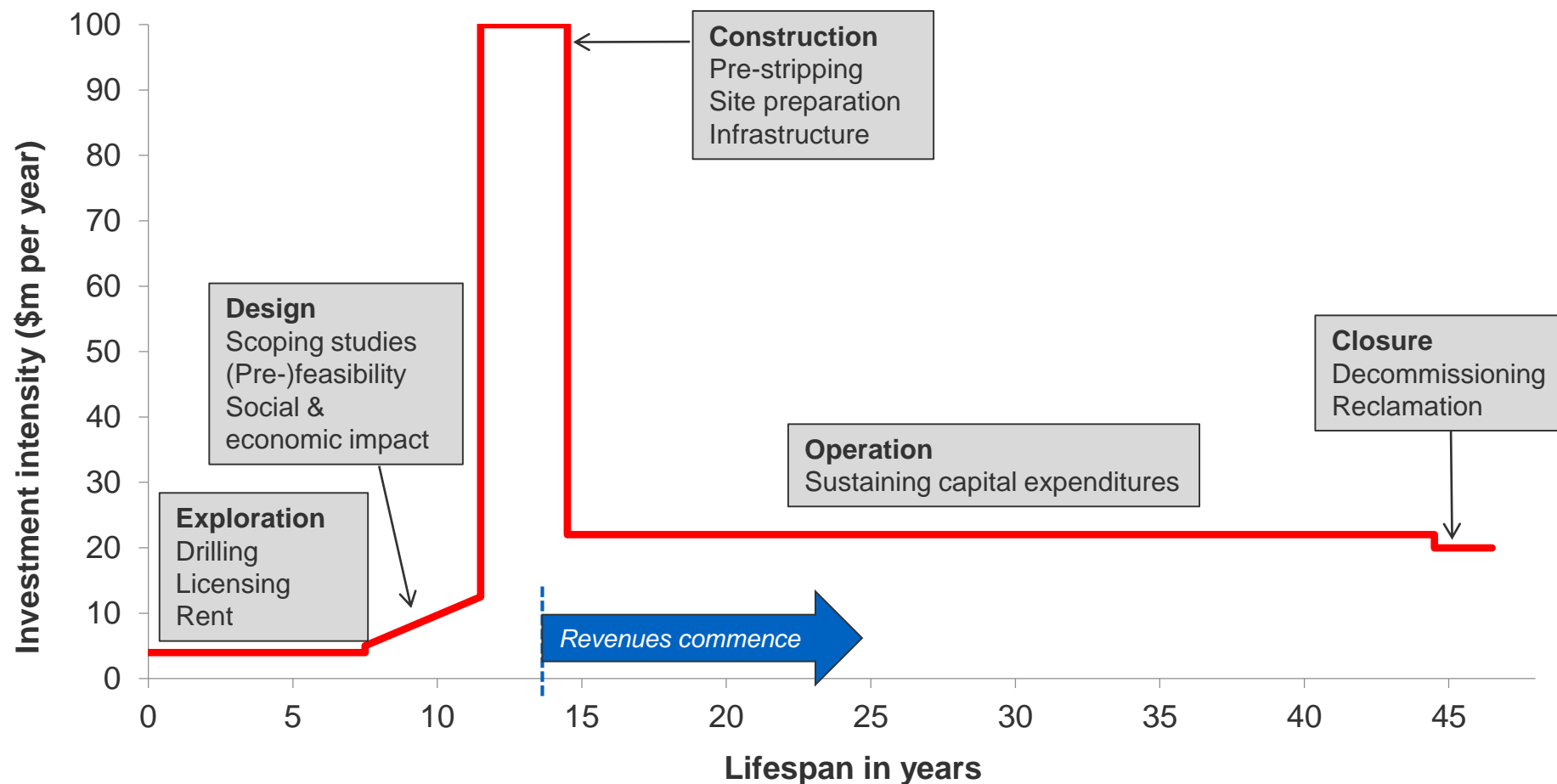
Fraser Institute implied 'room for improvement' index



This discrepancy is preventing some APEC economies from achieving the full potential benefits available from their mineral wealth

## Investment intensity also varies throughout the lifecycle

Investment required per year over lifespan for a theoretical mid-sized mining operation



There is also a significant risk that the market landscape changes during lead times

## Risks associated with mining

| Category                | Sub-category       | Examples  |
|-------------------------|--------------------|---|
| <b>Price risk</b>       |                    | Copper price, gold price, etc   |
| <b>Economic risk</b>    | Global financial   | Inflation, interest rates, WACC, etc                                    |
|                         | Input commodity    | Price of acid, explosives, chemicals, tires, etc                        |
|                         | Industry structure | Competition/barriers to entry   |
|                         | Market             | Size & prospects  |
| <b>Resource risk</b>    | Geological         | Grades and tonnages   |
|                         | Geotechnical       | Ability to mine in practice, loss of reserves                           |
| <b>Operational risk</b> | Mine-related       | Geotechnical events, performance of bottlenecks                         |
|                         | Mill/plant-related | Metallurgical (recovery), performance of bottlenecks                    |
| <b>Management risk</b>  | Management Team    | Who is running the project? Have they done it before?                   |
| <b>Cost risk</b>        | General opex       | Primarily related to scale of operation and grade; and project location |
|                         | National economic  | Exchange rates, taxation, etc   |
| <b>Location risk</b>    | Environment        | Air quality, water, tailings, etc                                       |
|                         | Social/political   | Managing local community expectations                                   |
|                         | Infrastructure     | Power, transportation, etc  |

**The growing importance of base metals in Asia**

**Market update**

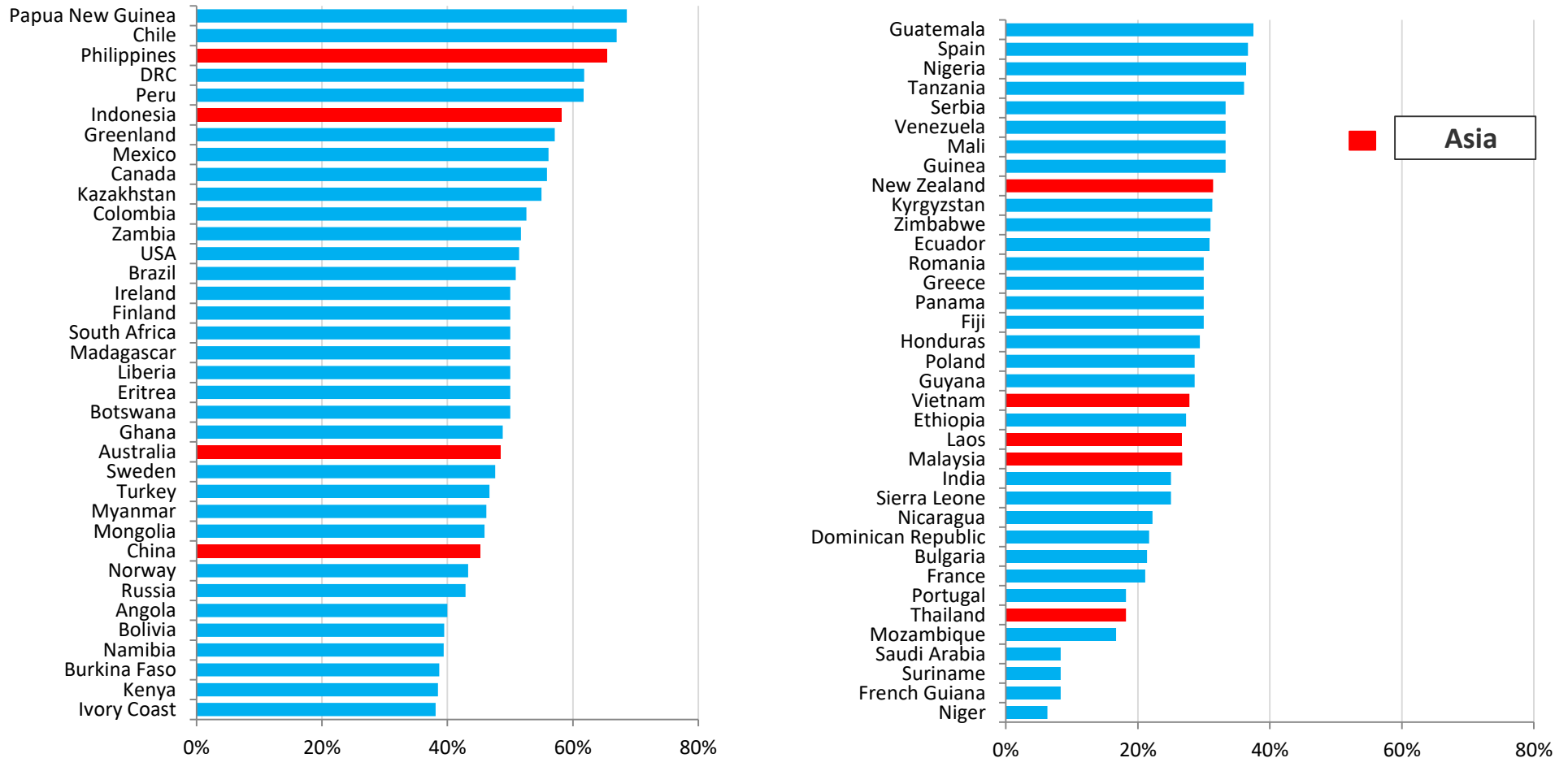
**Challenges**

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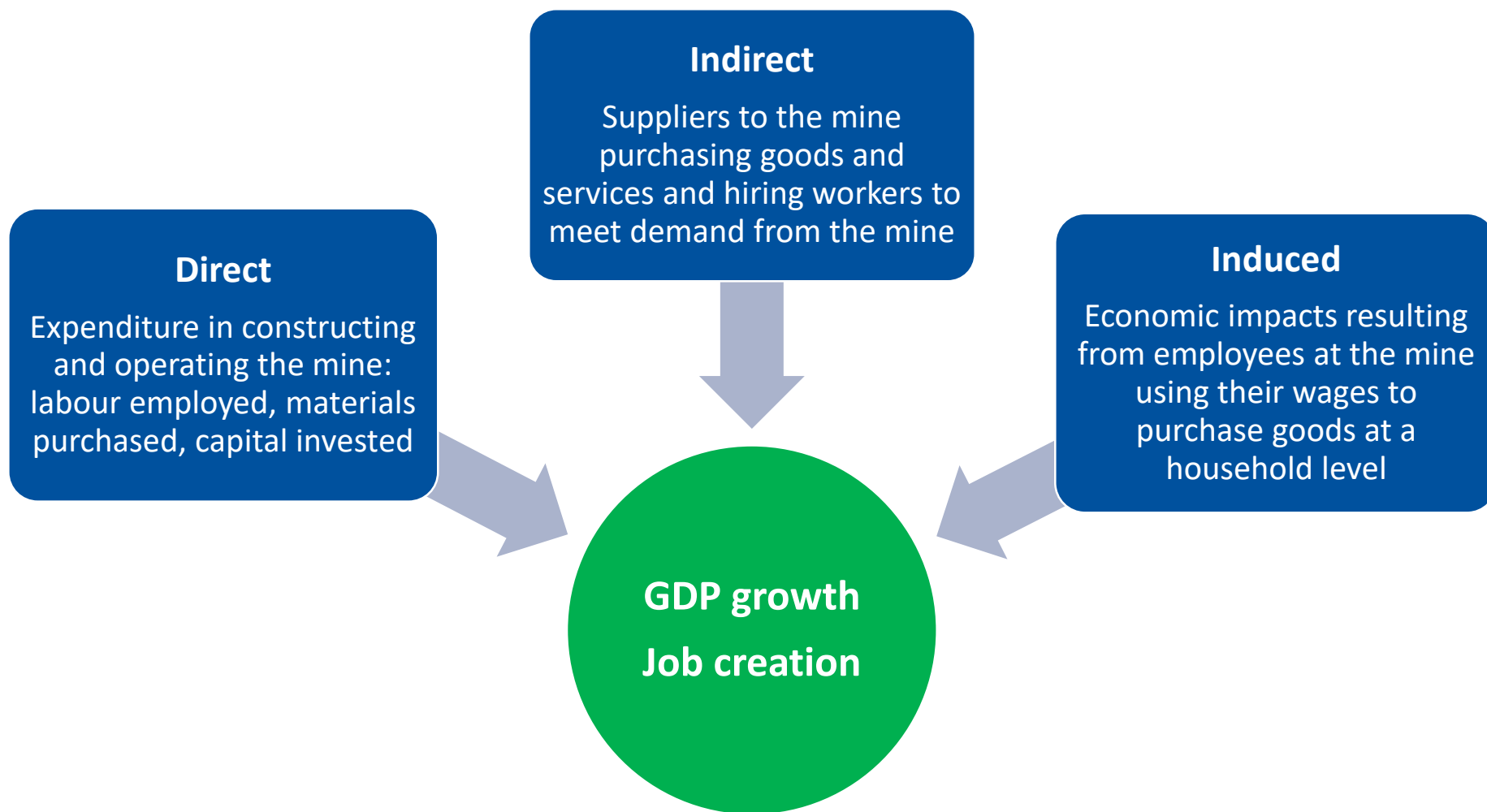
# The excellent geological landscape in Asia presents a significant opportunity

**Fraser Institute survey rating of whether a jurisdiction's geology 'encourages exploration investment' – essentially a subjective measure of mineral potential**





# The mining sector provides benefits to host economies in three main ways



## Mining also provides benefits to local infrastructure and government revenue

- **Infrastructure provision** includes both transport and community infrastructure



Road



Rail



Port



Power



Water



Schools



Healthcare

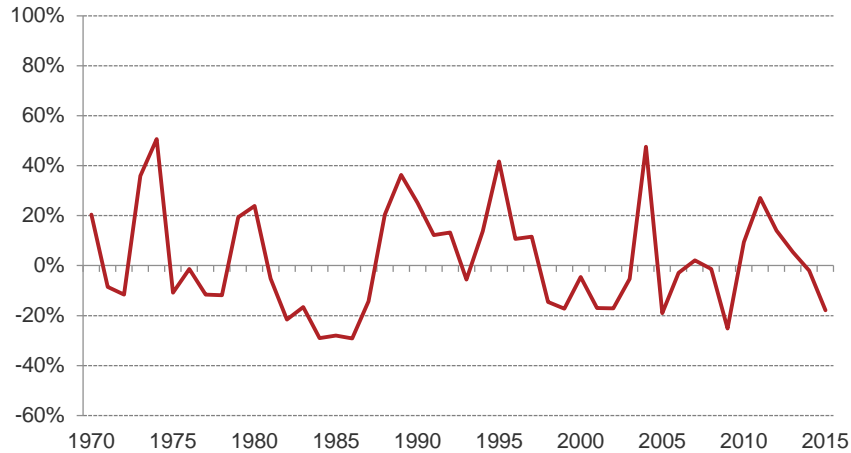


Public  
Spaces

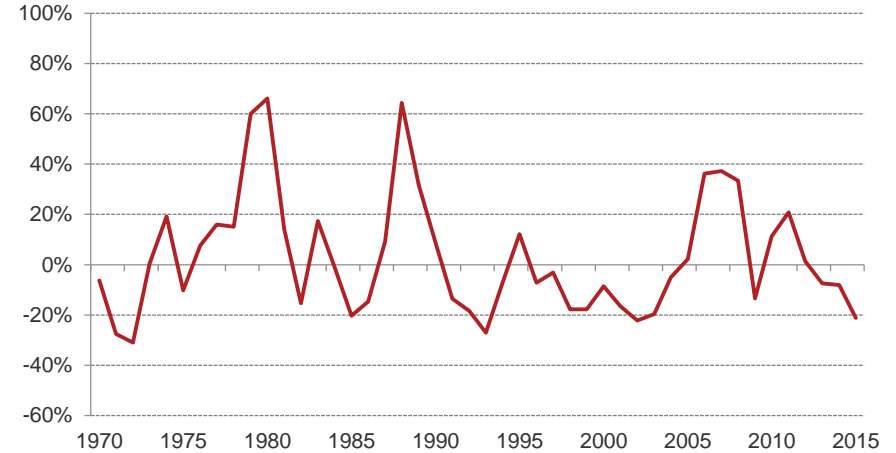
- **Government revenue** through taxation of mining projects improves the national balance sheet and – particularly in developing economies where mining tax take is an important source of revenue for the government – provide funds for public services.

# History suggests that we are close to the bottom

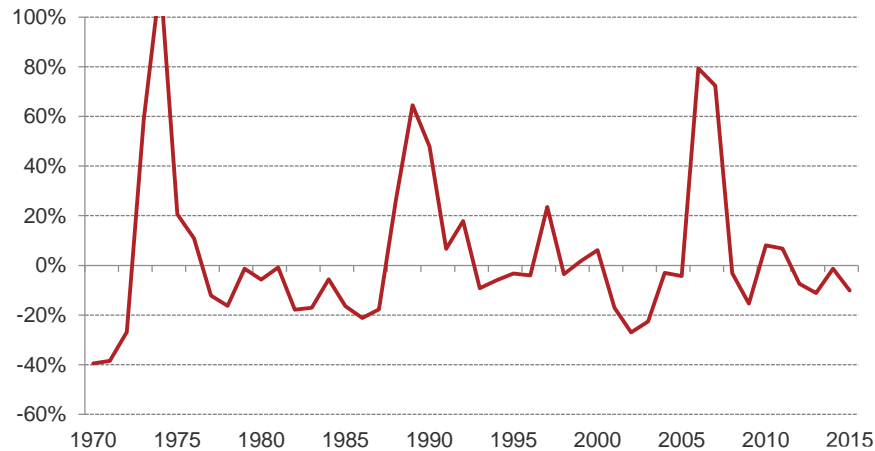
Copper 3M LME % deviation



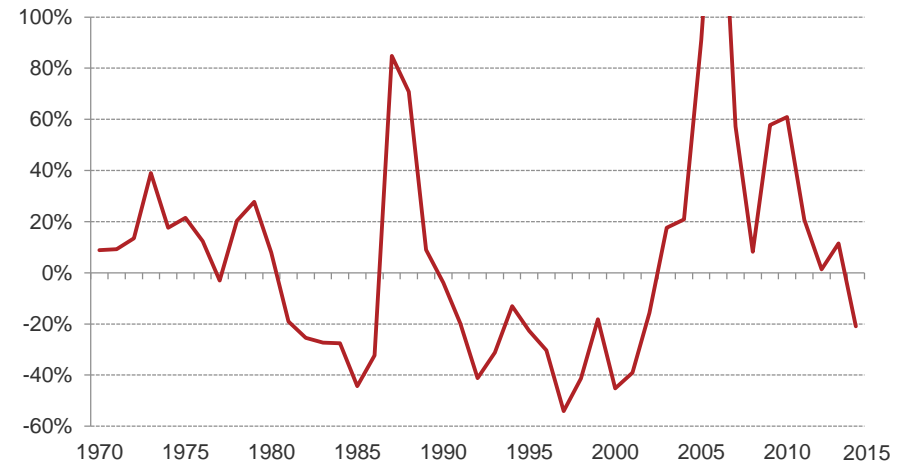
Aluminium 3M: LME % deviation



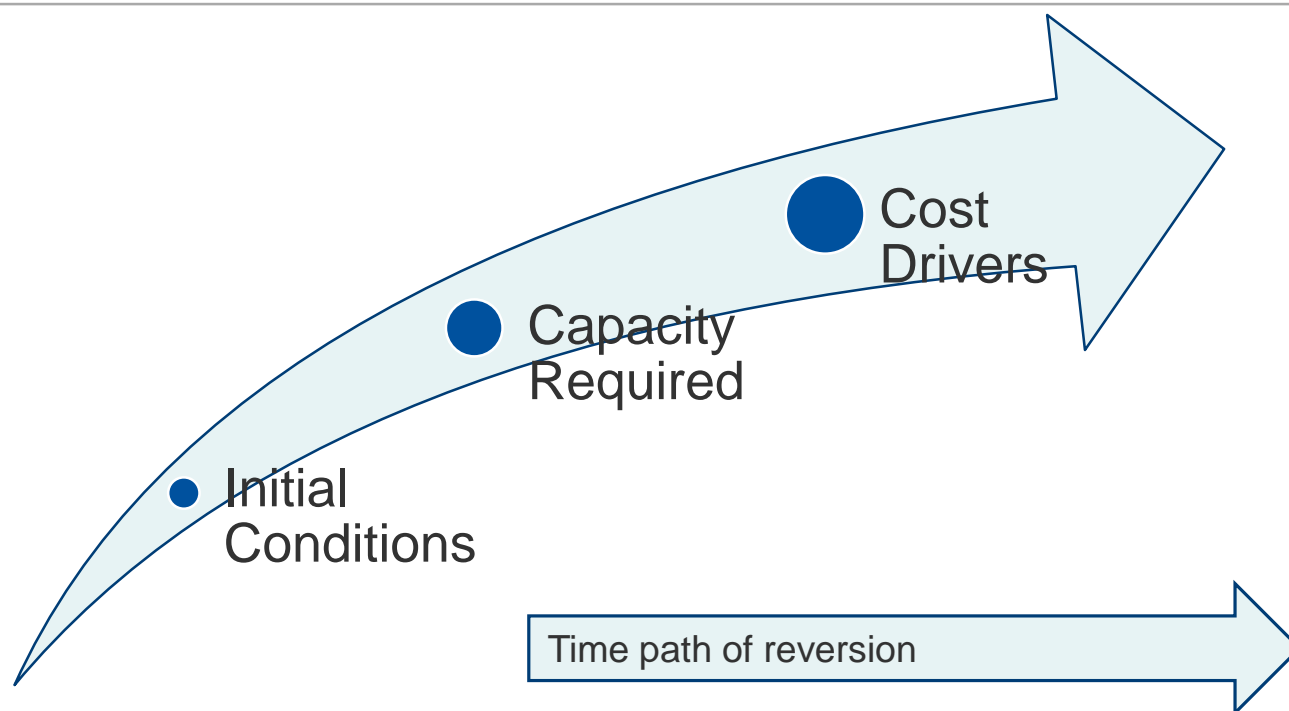
Zinc 3M LME % deviation



LME 3M Nickel % deviation



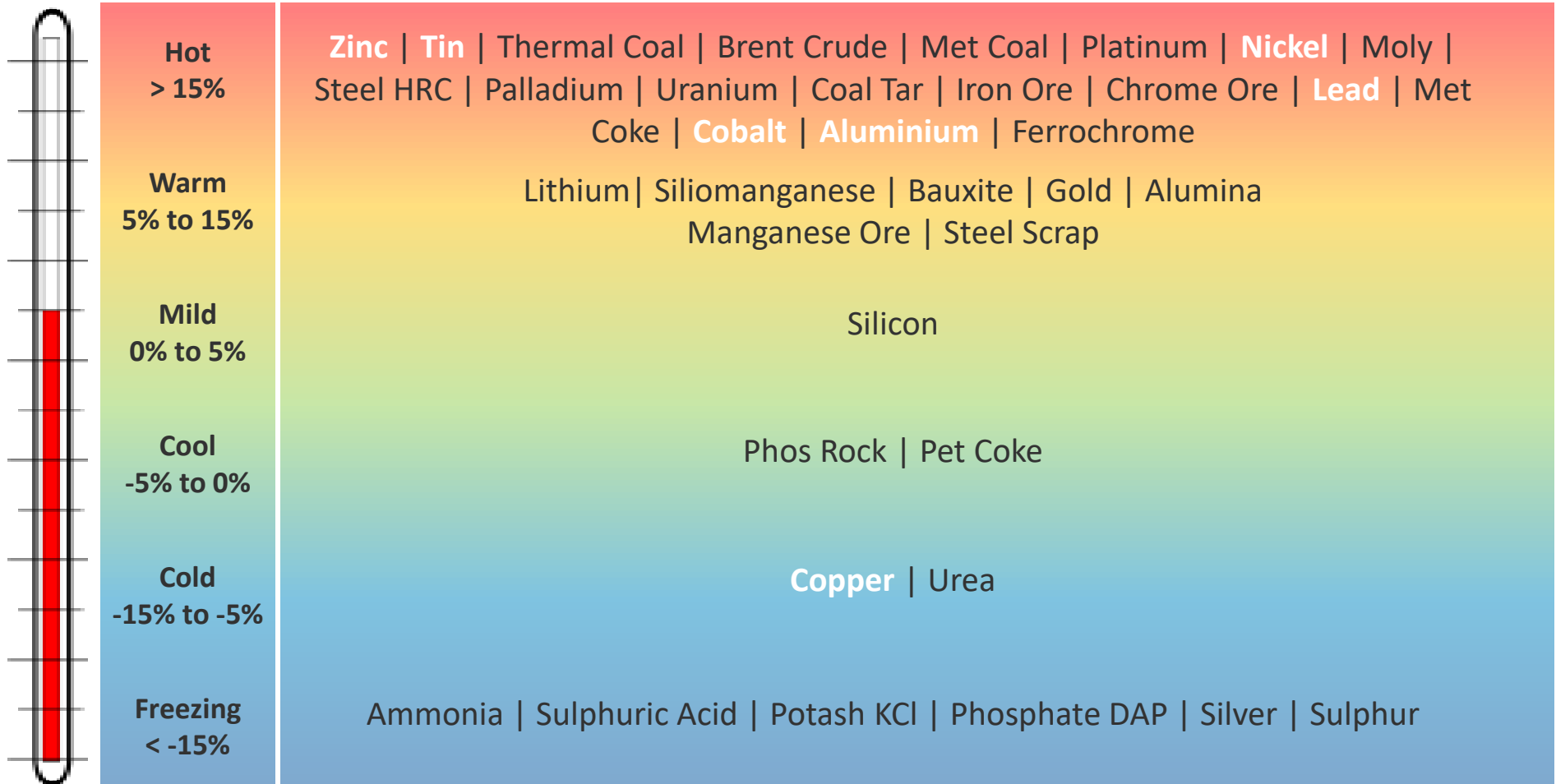
## The only way is up...



| Initial Conditions | Capacity Required | Cost Drivers    |
|--------------------|-------------------|-----------------|
| Inventory          | Demand growth     | Input prices    |
| Excess capacity    | Depletion rate    | Productivity    |
| Current surplus    | Secondary share   | Cost of capital |

# Commodities face warmer outlook to 2020: prices increase 15%\*

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### **Market update**

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### **Conclusions**

## Conclusions

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- There are rich deposits of untapped base metals resources in Asia.
- Demand for base metals in Asia generally outpaces global demand
- CRU forecasts price reversion to equilibrium – and in some cases above - as market cycle tips towards the upside – **laying the seeds for 2020 optimism amongst miners**
- Mining projects are challenged by a large upfront capex, volatile revenues and risks such as resource and location risk
- The excellent geological landscape in Asia presents a significant opportunity. History suggests that we are close to the bottom, and the only way is up



Thank you for listening! For more information:

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