

安泰科  
Antaiko

# Zinc Market Outlook

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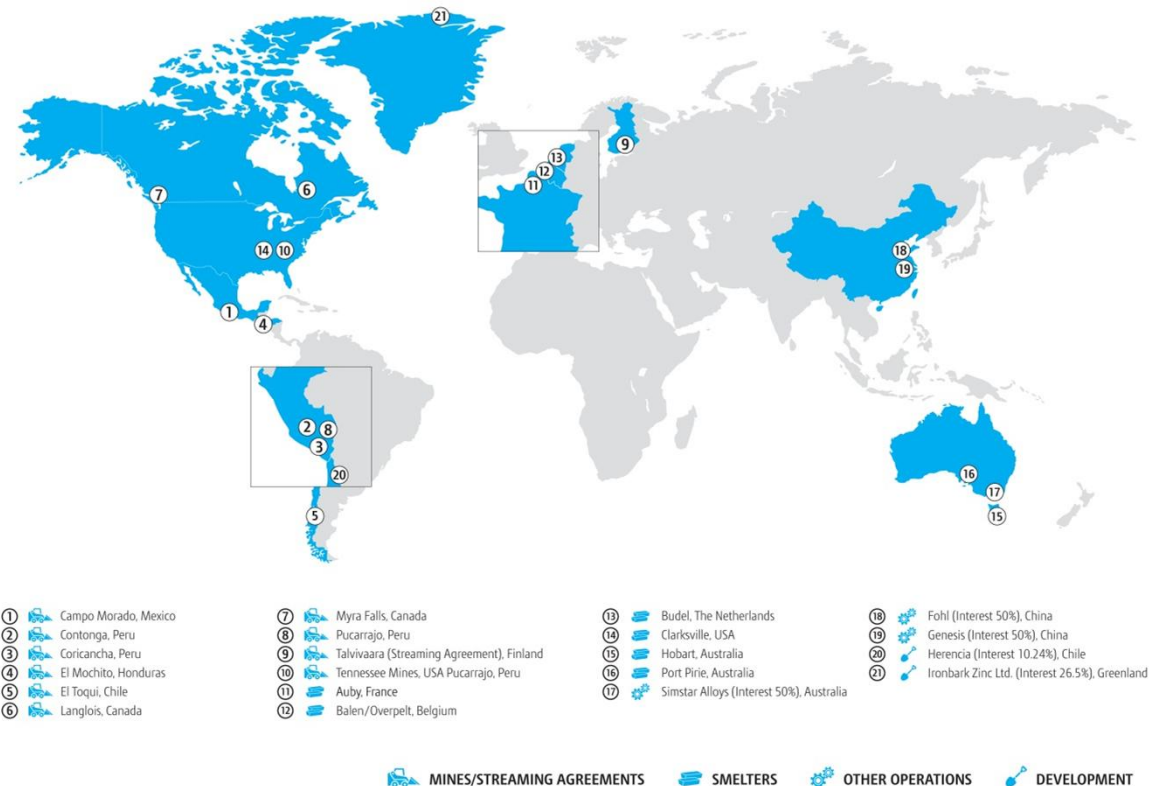
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## Nyrstar's expanding global multi-metals footprint

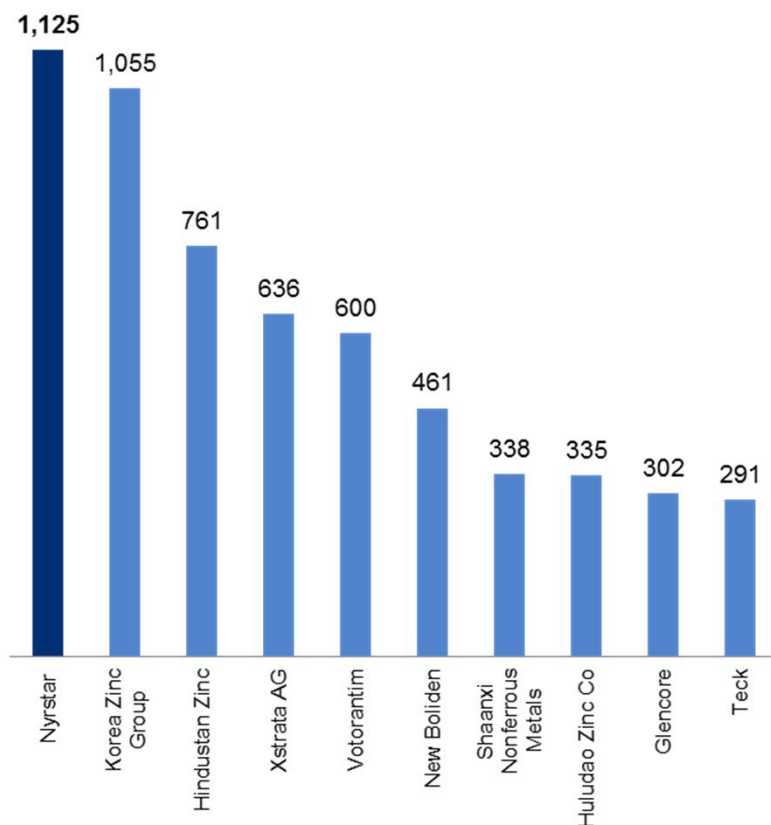
Nyrstar is an integrated mining and metals business, with market leading positions in zinc and lead, and growing positions in other base and precious metals; essential resources that are fuelling the rapid urbanisation and industrialisation of our changing world. Nyrstar is incorporated in Belgium and has its corporate office in Switzerland. Nyrstar is listed on NYSE Euronext Brussels under the symbol NYR, and is a member of the BEL20.

- One of the world's largest integrated zinc producers
  - 1.1 million tpa zinc metal
  - 475,000 tpa zinc in concentrate<sup>1</sup>
- Market leading position in lead
- Expanding multi-metals footprint
  - Growing production of copper, gold, silver and lead
- Nine mining operations
- Six smelters
- Employing over 7,000 people across five continents

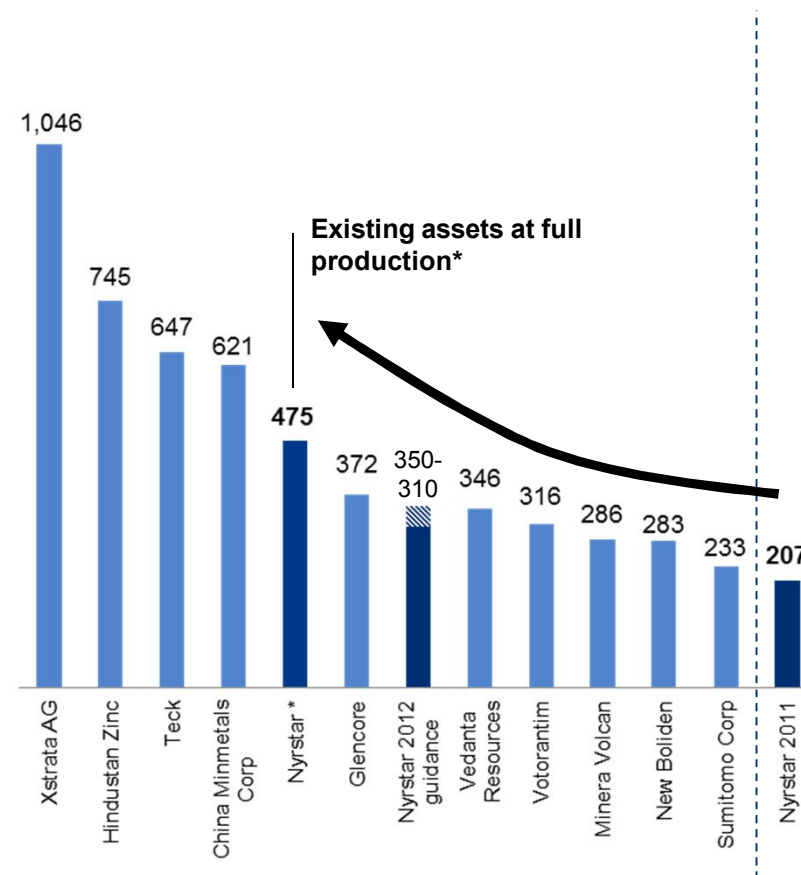


## Nyrstar's zinc output and mining integration at a glance

One of the world's largest zinc smelters (kt pa)



Top five zinc miners (kt pa)



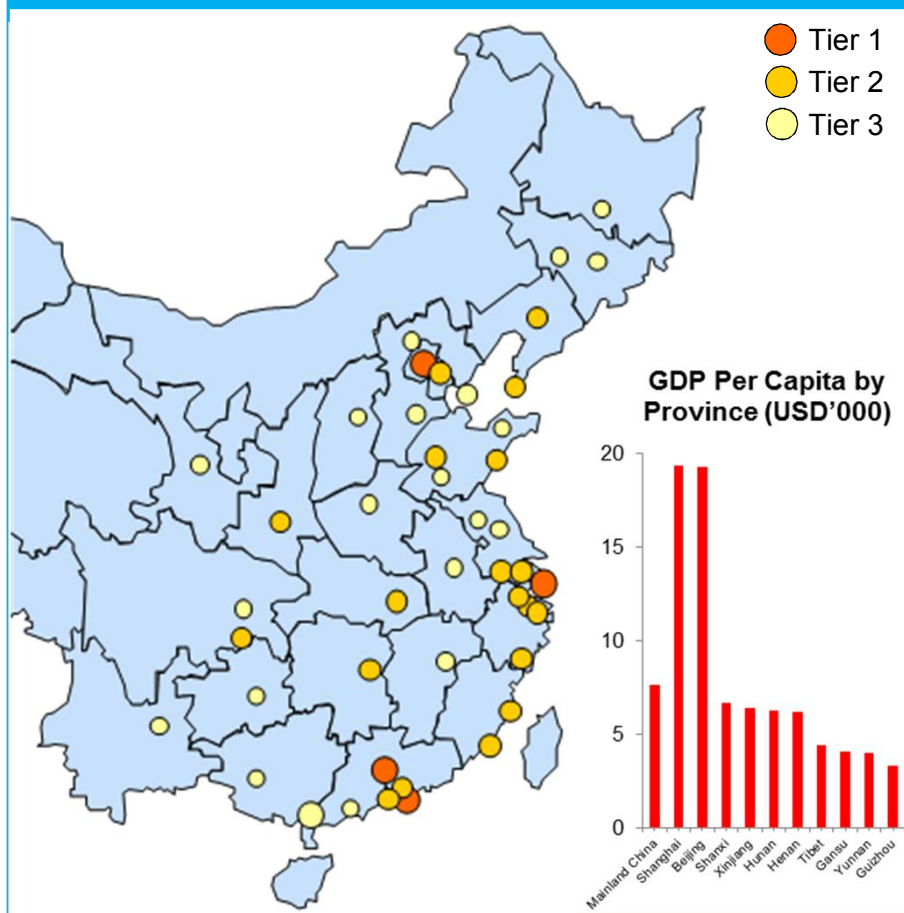
SOURCE: Brook Hunt 2011 mine and smelter production rankings (Long Term Outlook Zinc, Q1 2012). Nyrstar actual 2011 production included

\* Based on full production of mining assets including the Talvivaara zinc streaming agreement

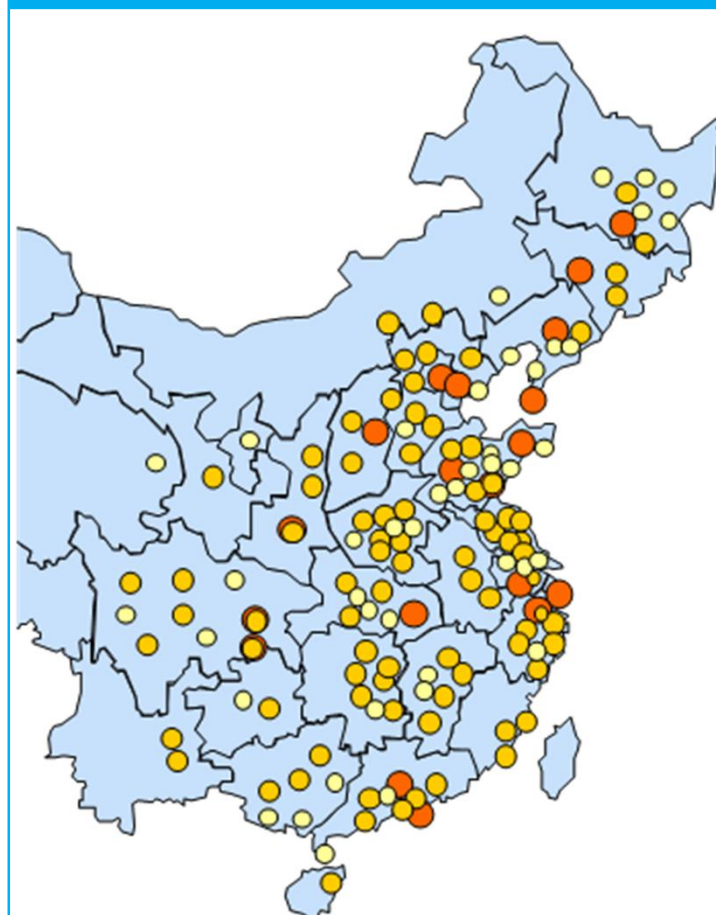


## China's urbanization to date has been mainly coastal but will extend to inland China, adding ~15 Tier 1 cities over the next 15 years

### China's city landscape by city Tier<sup>1</sup> – 2010



### China's city landscape by city Tier<sup>1</sup> – 2025



1 Tier 1 city defined as registered population >4.5 m and GDP/capita >USD 3,000,  
 Tier 2 city defined as either registered population >4.5 m or GDP/capita >USD 3,000  
 Tier 3 city defined as registered population 1.5-4.5 m and GDP/capita USD 1,500-3,000

## Commodity intensity evolves as cities start to develop



**Tier 1 - Shenzhen**

- Consumer dominates economy
- Commodity intensity declines
- Only commodities with increased intensity are light/environmental metals and commodities used in leisure activities



**Tier 2 - Nanjing**

- Increased consumer spending on goods with high commodity content
- Acceleration of energy use
- Increased intensity of copper, zinc and aluminium

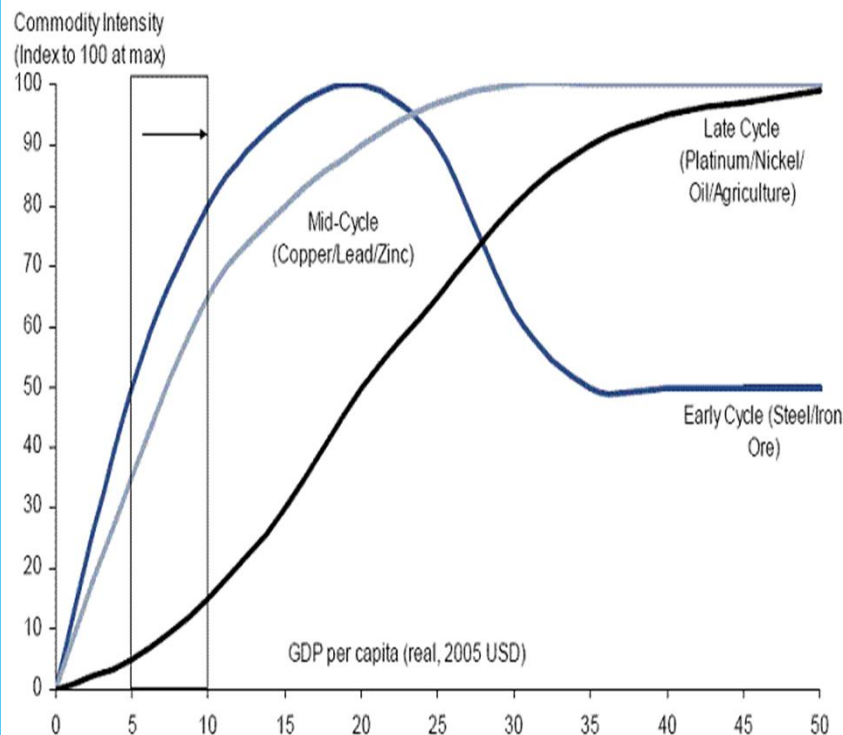


**Tier 3 - Xian**

- Infrastructure and heavy industry dominates economy
- Acceleration in demand for cement, steel, iron ore and coking coal though early stage development
- Early stage increases in demand for energy, other industrial metals, chemicals etc..

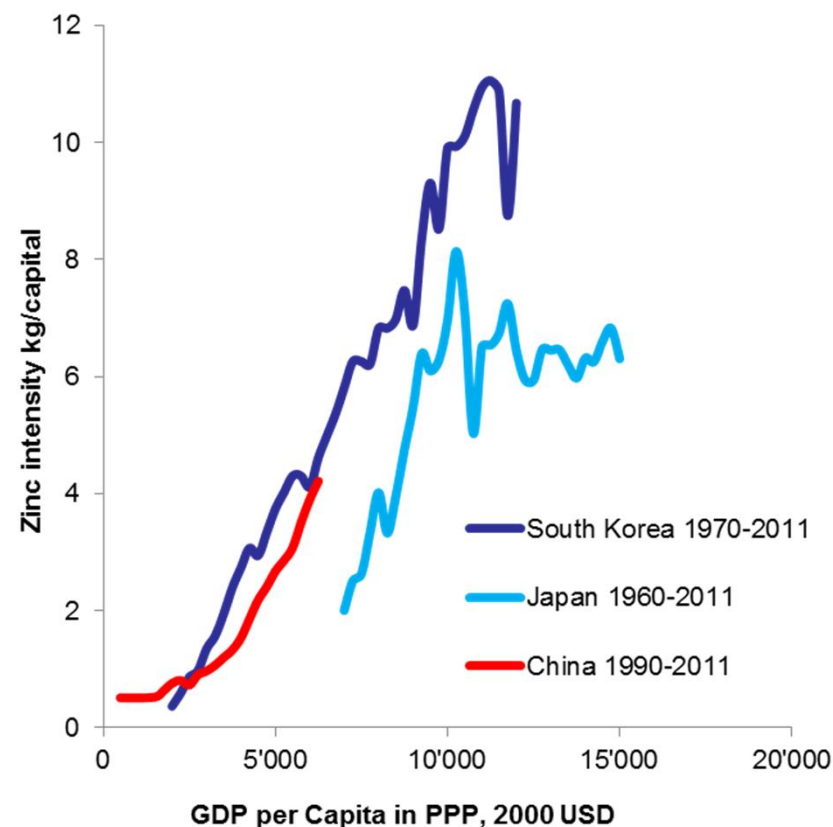
# Zinc is well placed to be a key beneficiary of Chinese economic development

## Zinc is a mid-economic cycle commodity



Galvanizing intensity to peak after steel intensity peaks

## China zinc demand still in infancy

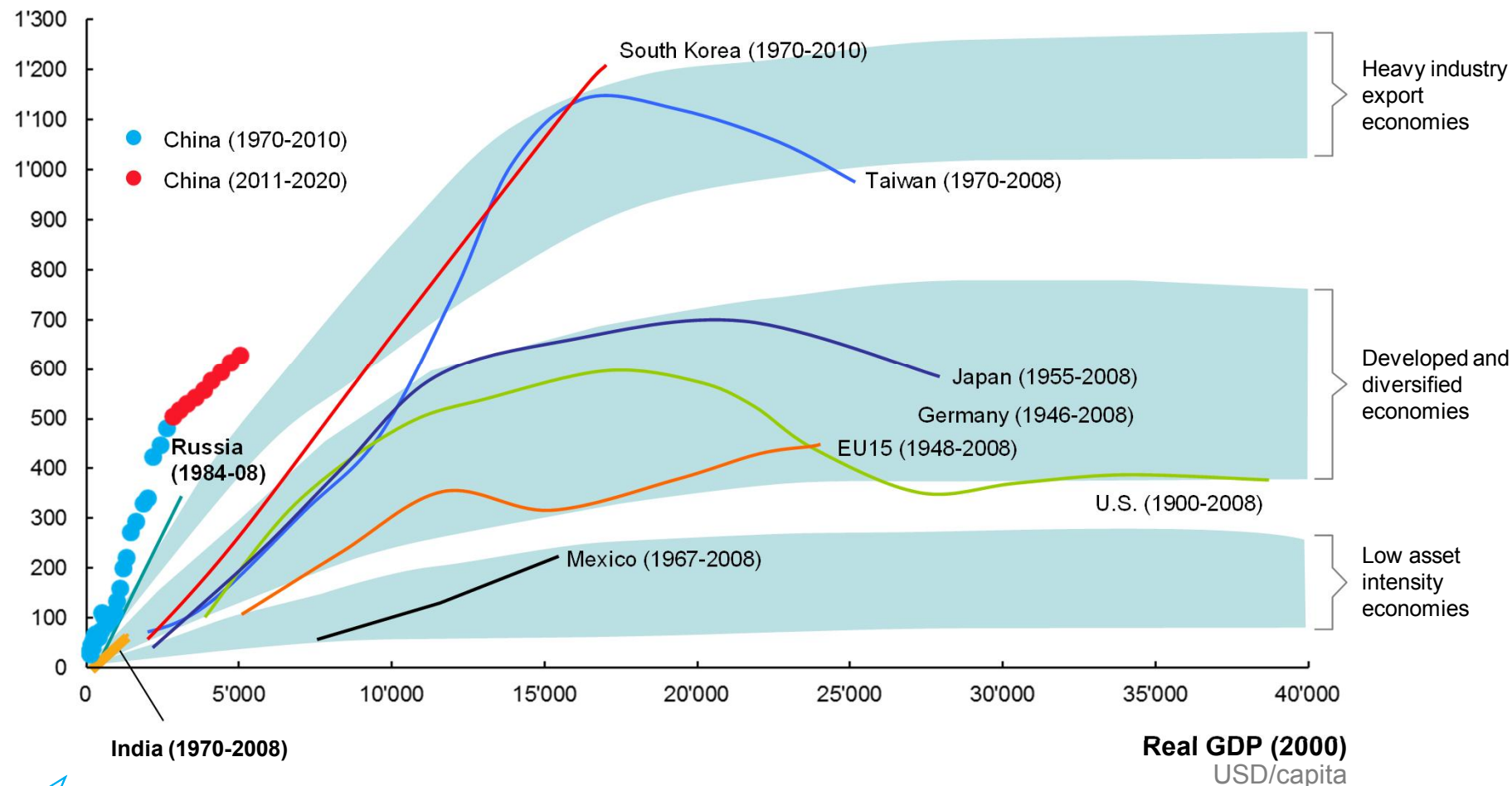


Using zinc consumption as a proxy for galvanising demand we can see strong potential increases in demand

# China is expected to reach a high level of steel consumption per capita faster than other countries but still has far to go

## Crude steel consumption

Kg/capita



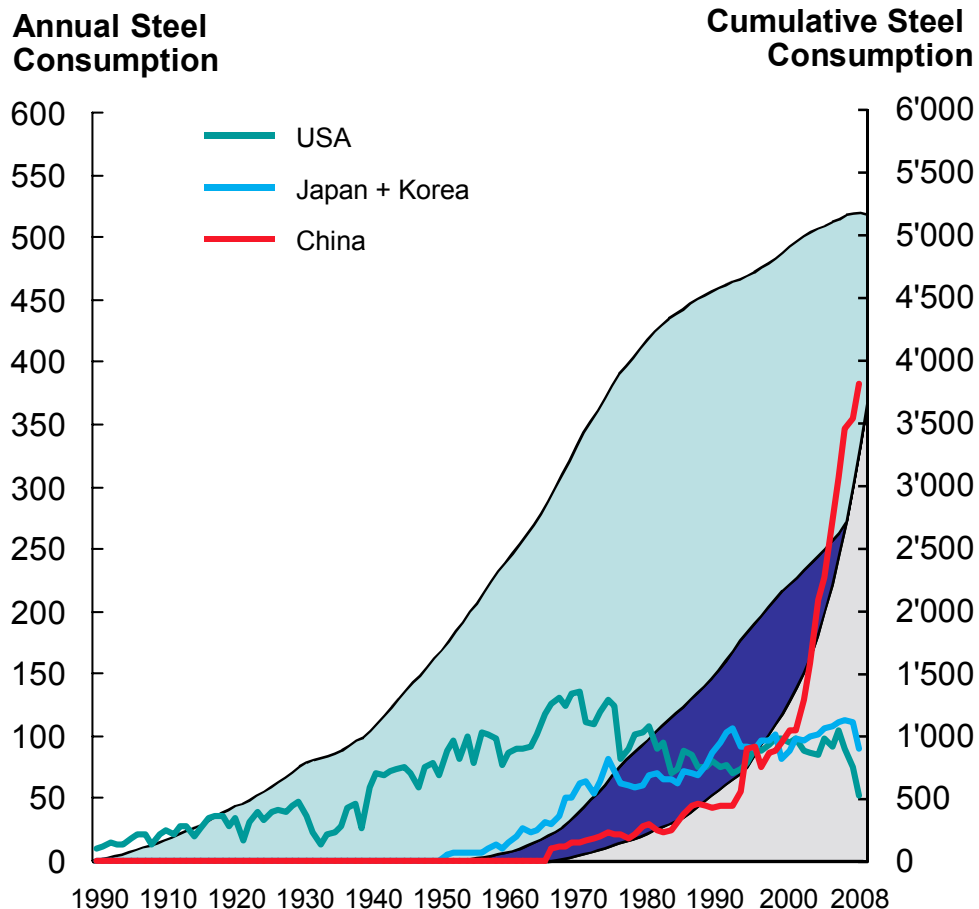
SOURCE: MGI, WSA; Global Insight; IMF; USGS; McKinsey; Brook Hunt



## Cumulative steel consumption demonstrates that China has still a long way to go before it peaks

### Annual and Cumulative Steel Consumption

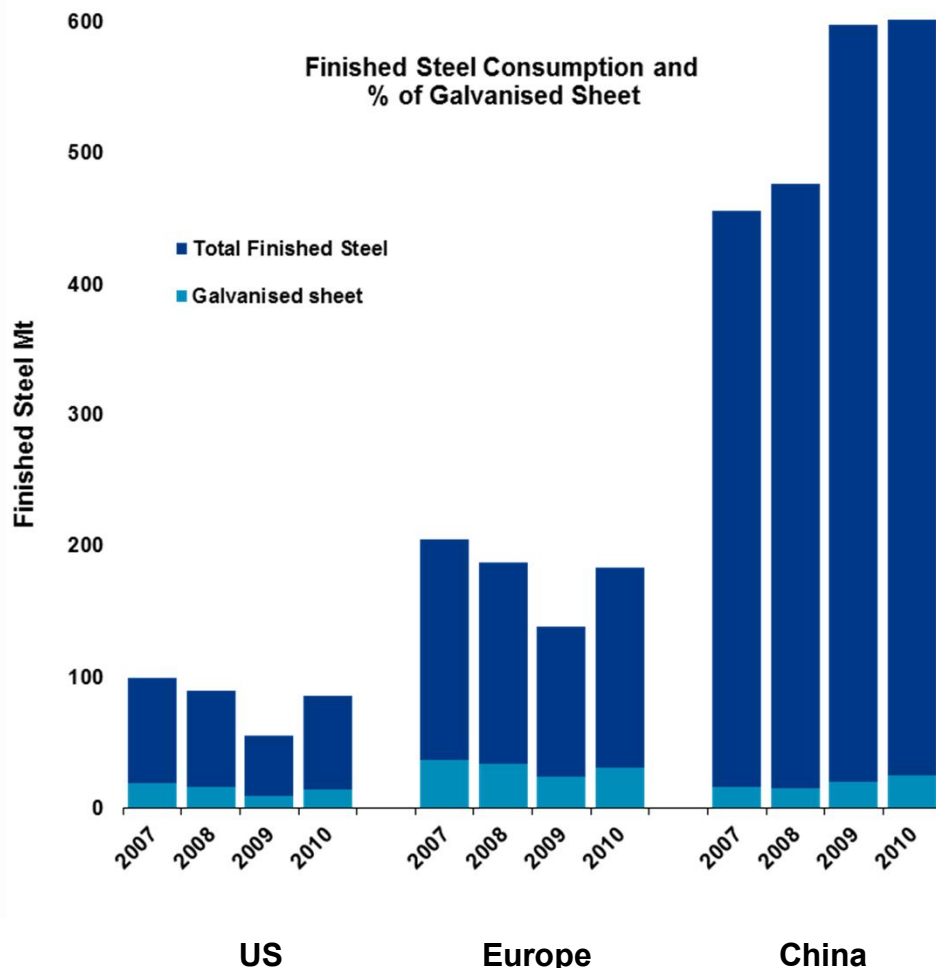
Million metric tonnes



- China's annual demand is 4-5x US levels
- China has accumulated 70% of US stock levels or ~15% on population adjusted basis
- Cumulative stock per capita: China 2.5t, US 16.8t, Korea/Japan 15.8t

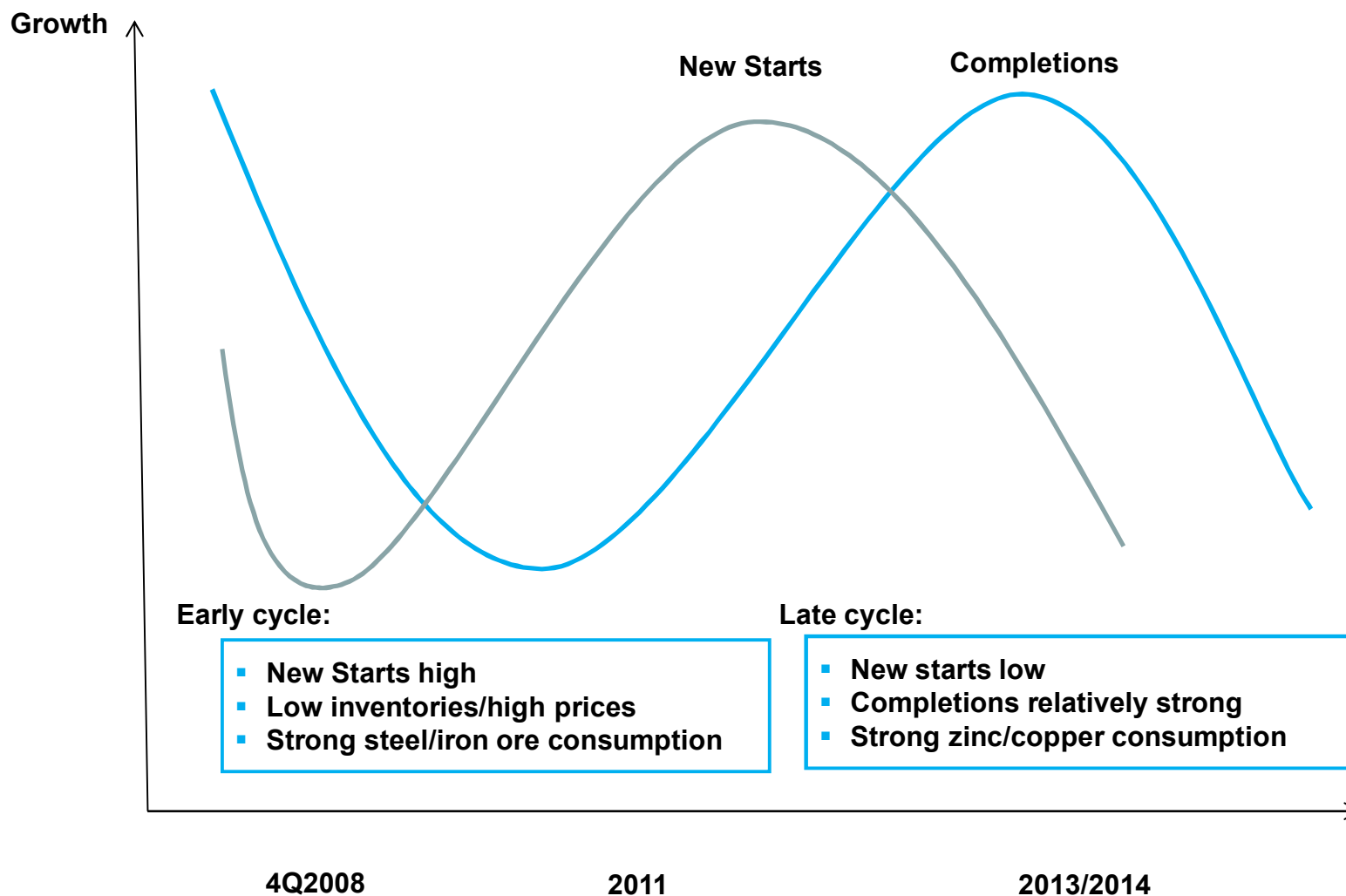
SOURCE: McKinsey; IISI

## Construction growth combined with increased galvanization percentages will continue to drive demand



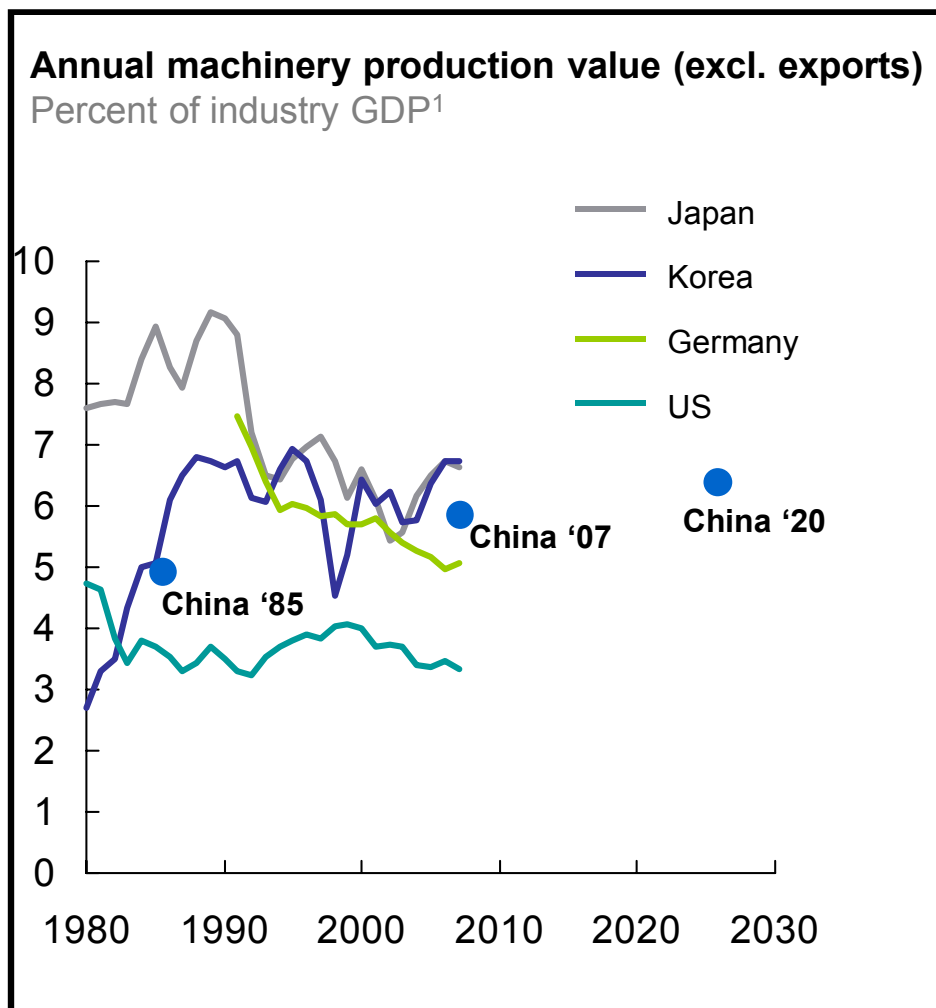
- Approximately 5% of China's steel consumption is in galvanised sheet form (18% in Europe & US)
- As China's urbanisation progresses:
  - Steel demand will continue to grow
  - Steel product mix will shift
  - Increase in galvanized flat products
  - Chinese galvanized steel shipments has so far increased by 13.2% in 2012

## Zinc intensity set to accelerate at the completions stage of the China construction cycle



SOURCE: Goldman Sachs Global ECS Research estimates, Nyrstar Estimates

## Growth in China's industrial economy will be a key driver in zinc growth from the machinery sector



### Two phases visible:



- **Stock build-up** with machinery production as % of industry GDP growing e.g., Korea in 1980s
- **Stock replacement** after Industry GDP growth slows; machinery production at ~6-7% e.g., post 1990s for Japan/Korea



### China's annual machinery production value will increase:

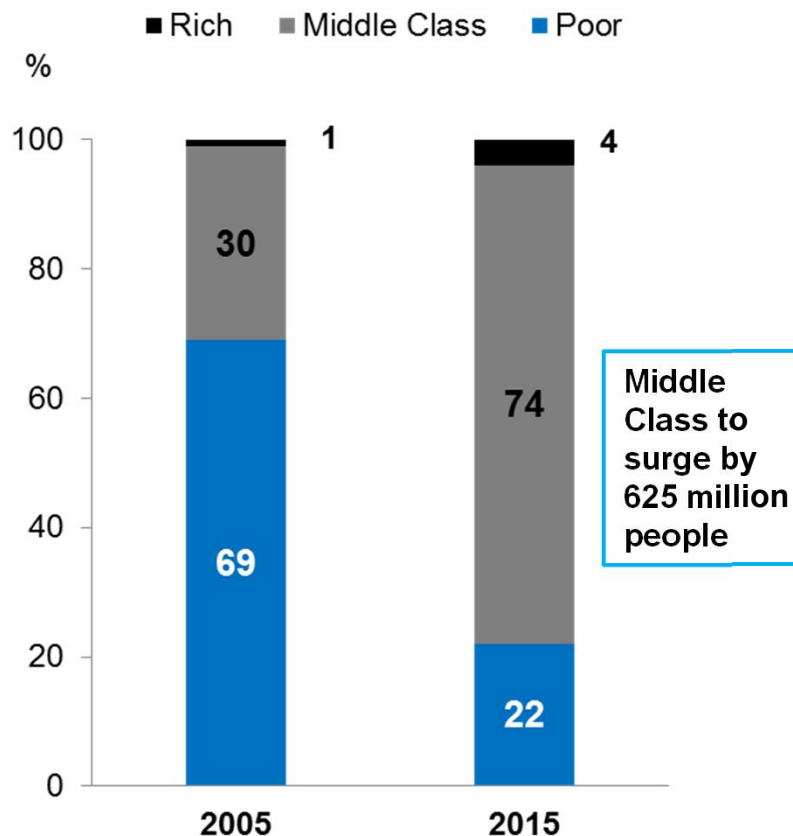
- **Capital equipment build-up** to support growing industry GDP
- **Import substitution** due to increasing localization
- **Growing share of RoW** capital equipment market

<sup>1</sup> A proxy of machinery as % of FAI since FAI is at constant % of industry GDP (~80% for China)



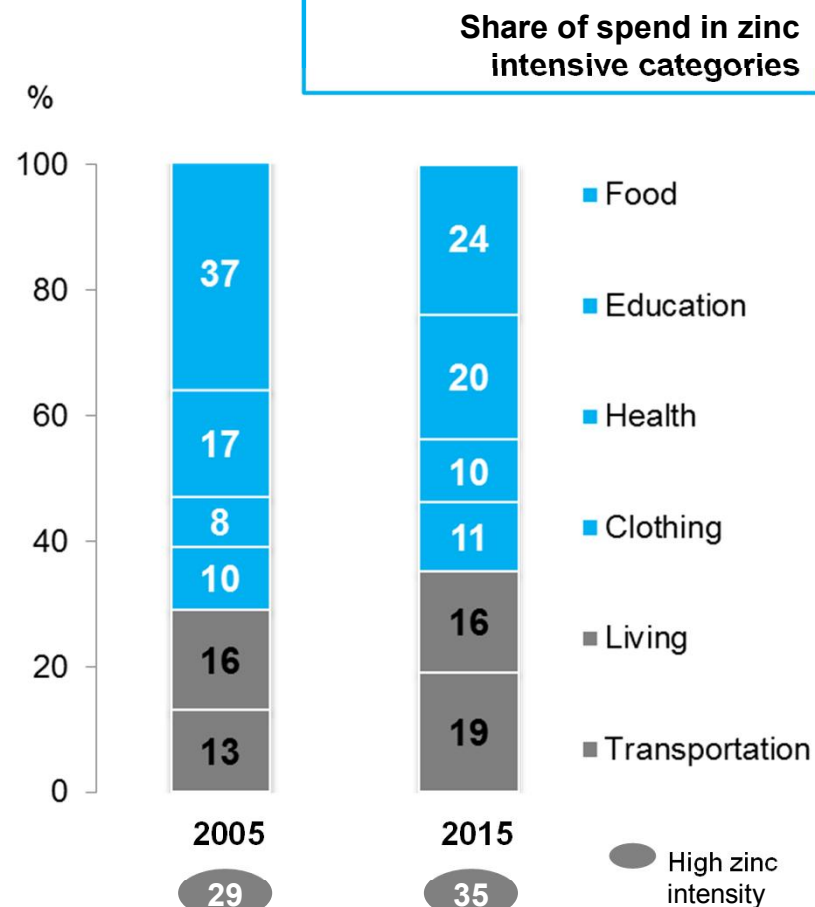
## Rise of the middle class in China will increase zinc demand

### Population breakdown by income



Increased salary expected to change demand patterns

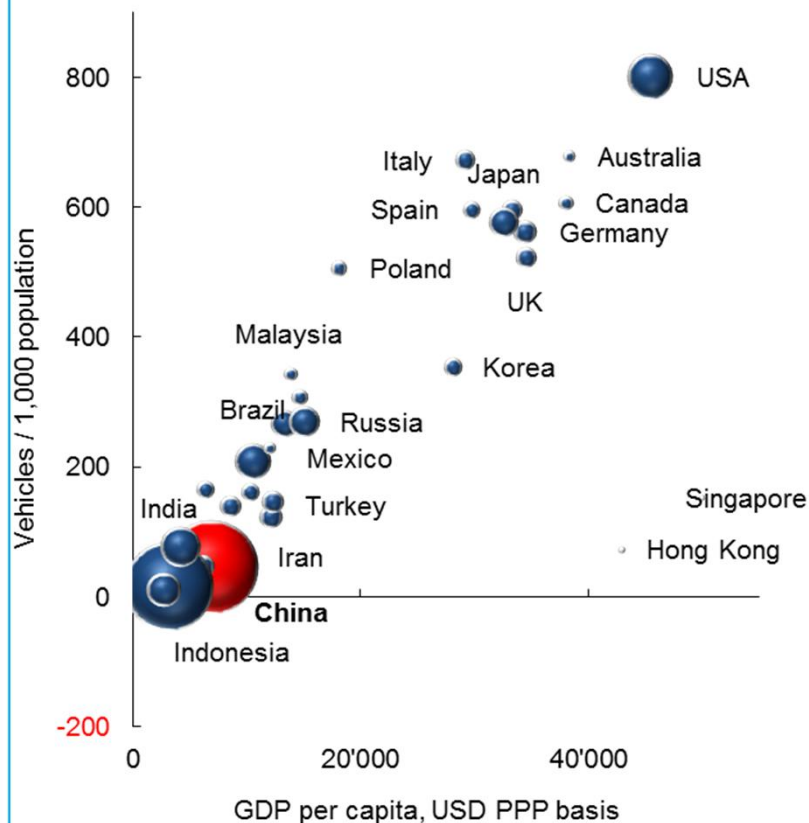
### Middle class to have more budget



Increased spending in living and transportation will lead to increased spend in galvanized products

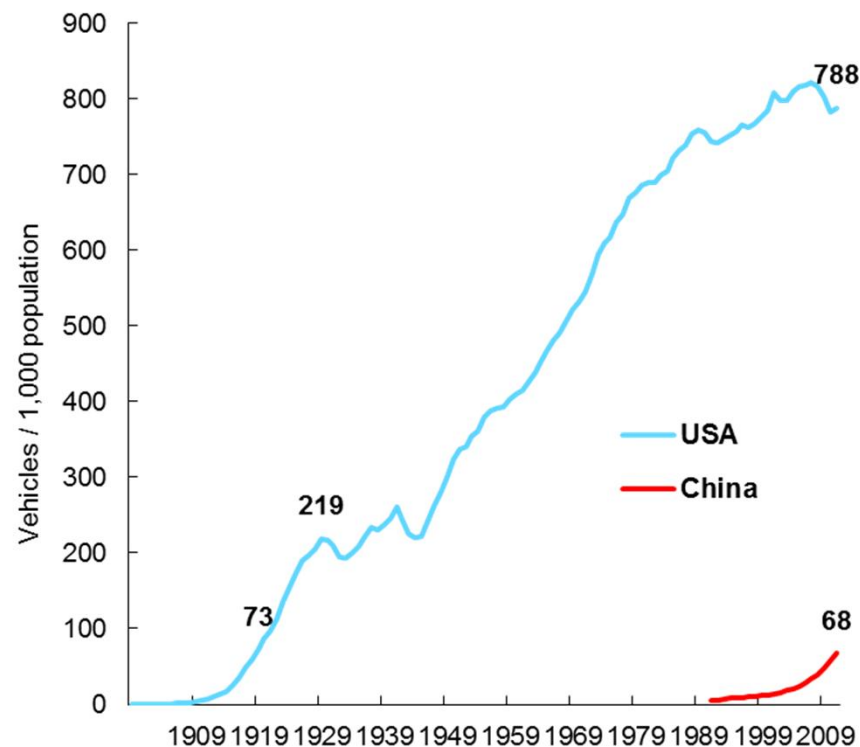
## Vehicle ownership in China still in its infancy

### Vehicle ownership relative to income



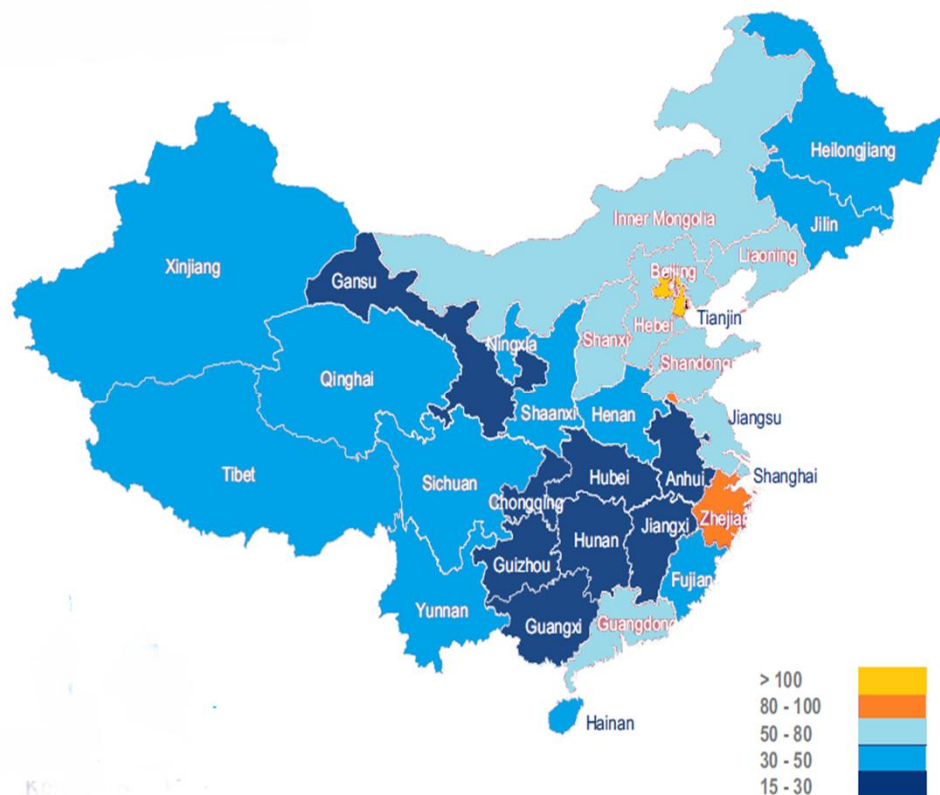
**Increased income expected to increase car ownership**

### Vehicle ownership relative to population



**China's level of vehicle ownership is like the United States in 1920**

## Vehicle ownership remains extremely low but also varied



- Only a handful of provinces are approaching high intensity levels for car ownership per capita
- The fact that ownership intensity is varied means that we see contradictory reports from the auto industry about market health
- As the industry matures, zinc utilisation per unit is likely to increase dramatically Domestic brand Chinese cars
  - Use ¼ the amount of zinc compared to Western brands
  - Are likely to increase zinc utilisation when they target export markets

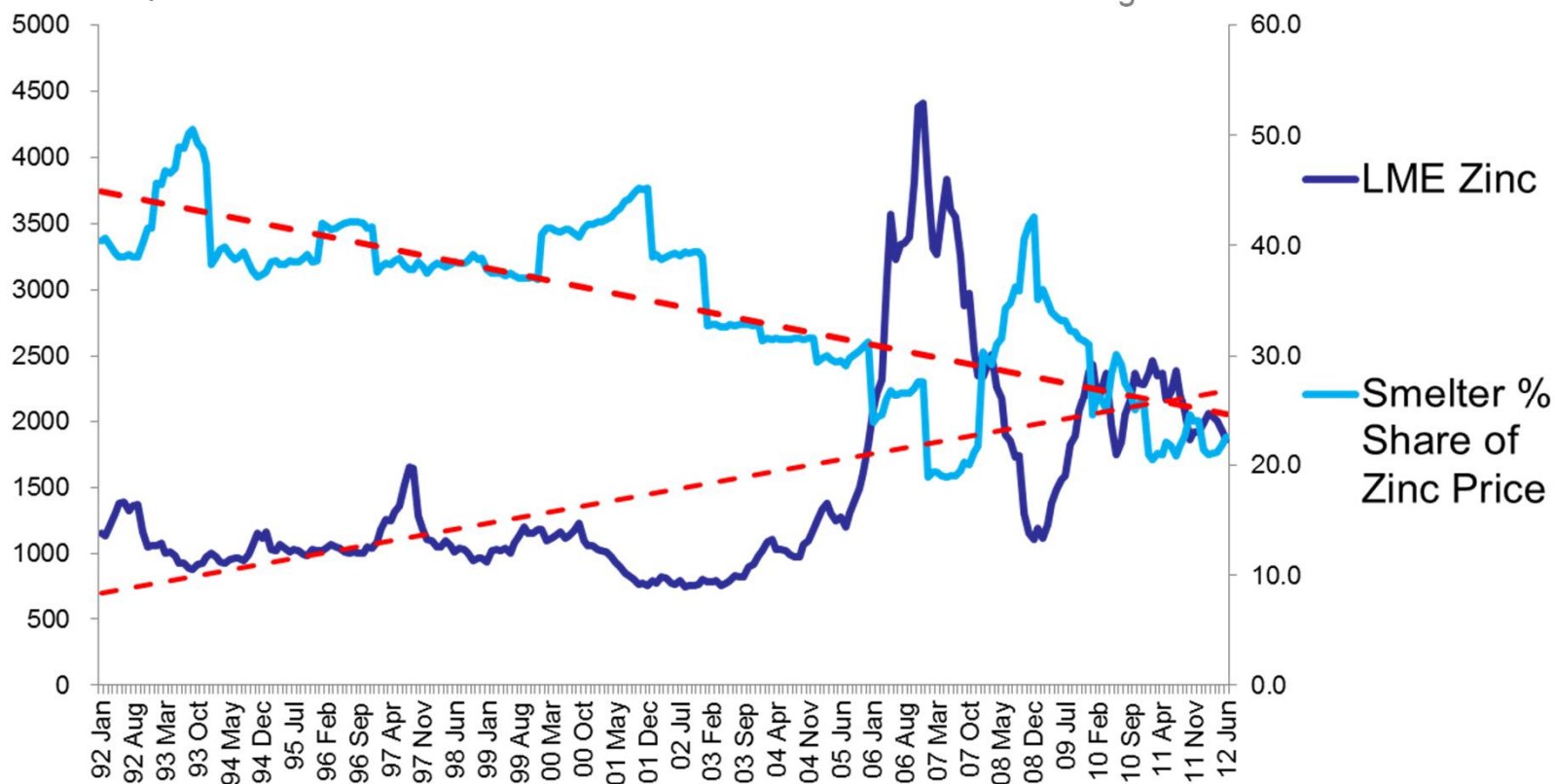
## Profitability of zinc smelting has been squeezed during the commodity boom

### LME Zinc Price

US Dollars per Metric Ton

### Western Smelter Share of Zinc Price

Percentage



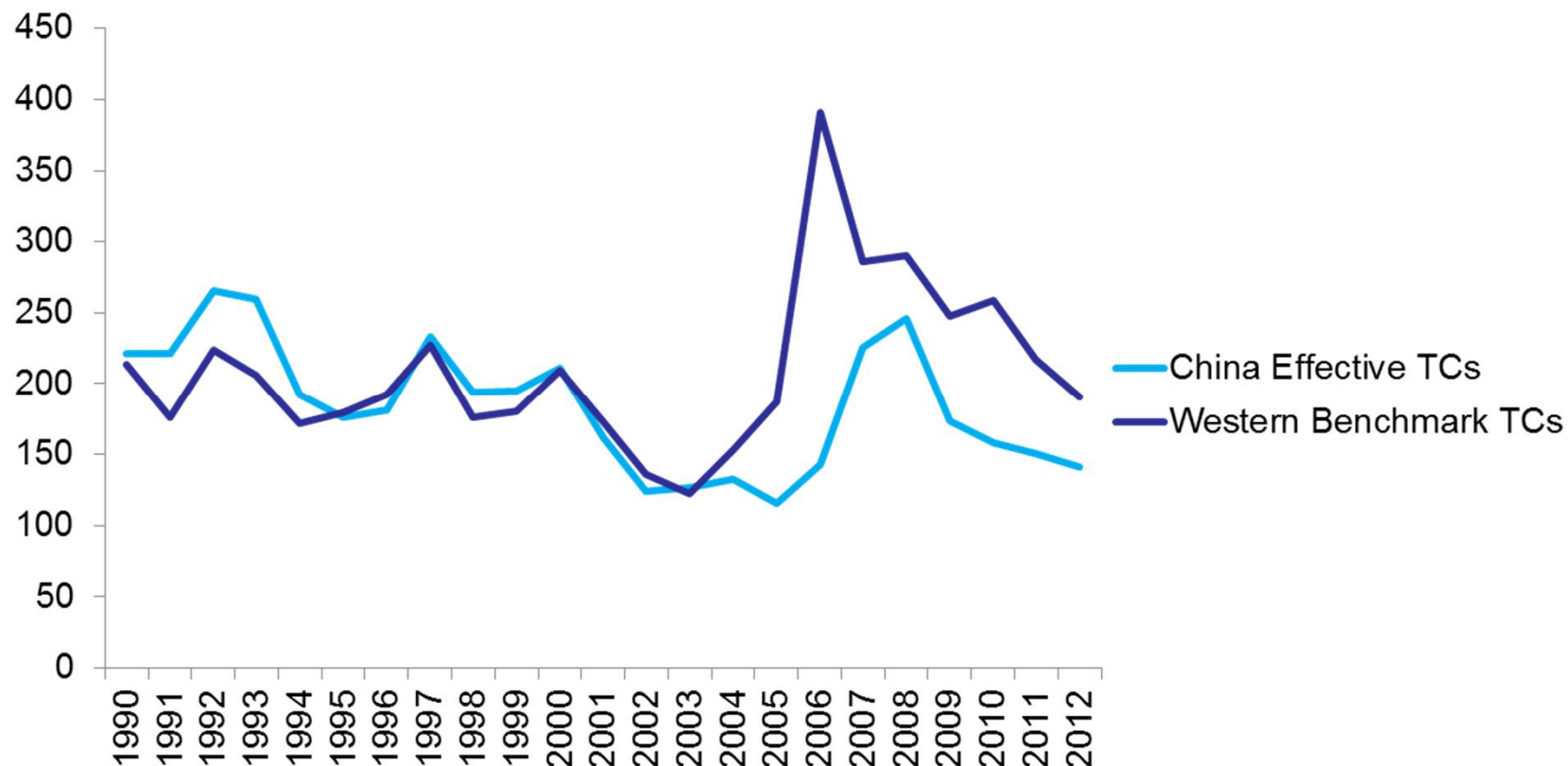
SOURCE: CRU International



## Chinese smelters face worse terms than western smelters

### Treatment Charge

US Dollars per DMT



### Treatment Charge Assumptions

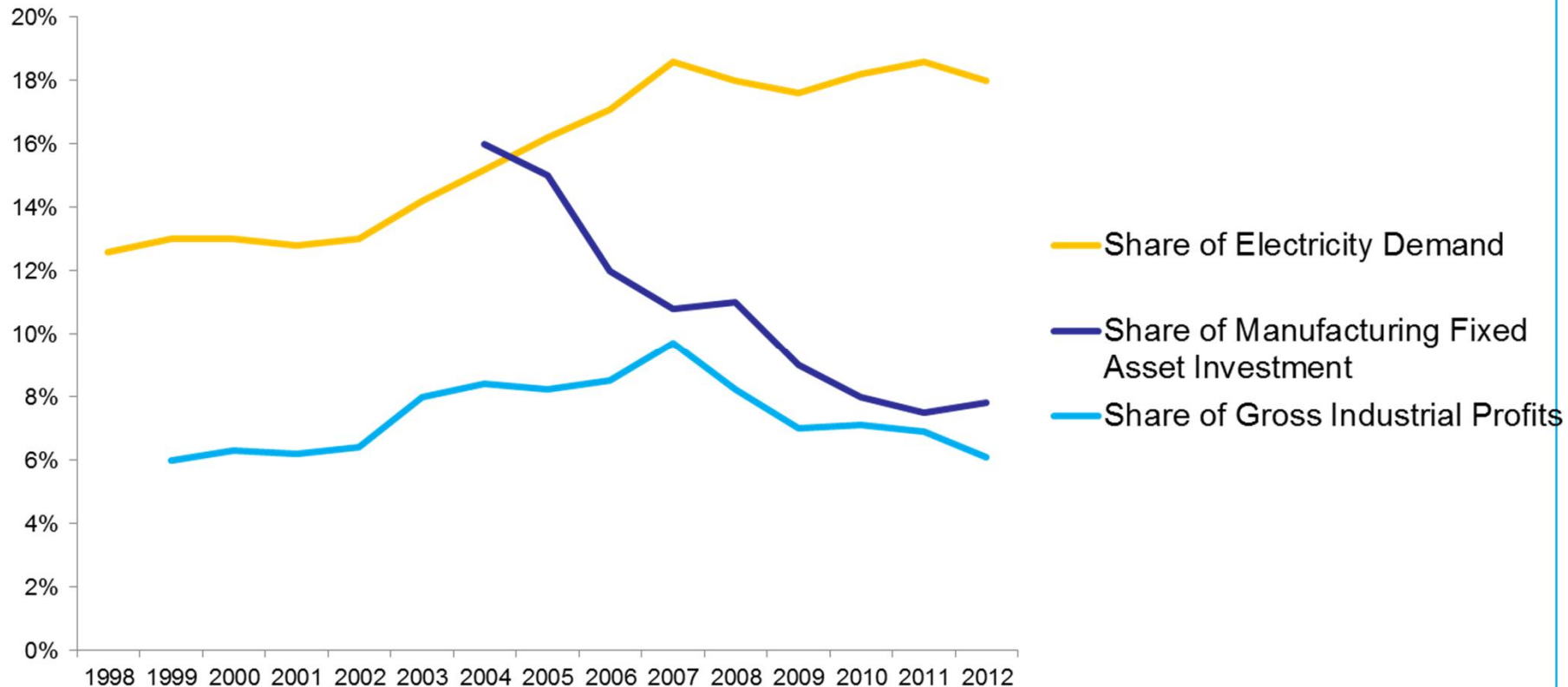
Chinese domestic TCs converted into Western Style TCs, Assumption that 66% of Feed in Chinese smelters is domestic, 34% is import on spot terms.

SOURCE: Wood Mackenzie

## Chinese smelting investment has declined in line with falling profits

### Metal smelting and pressing % of economy-wide aggregates

Percentage

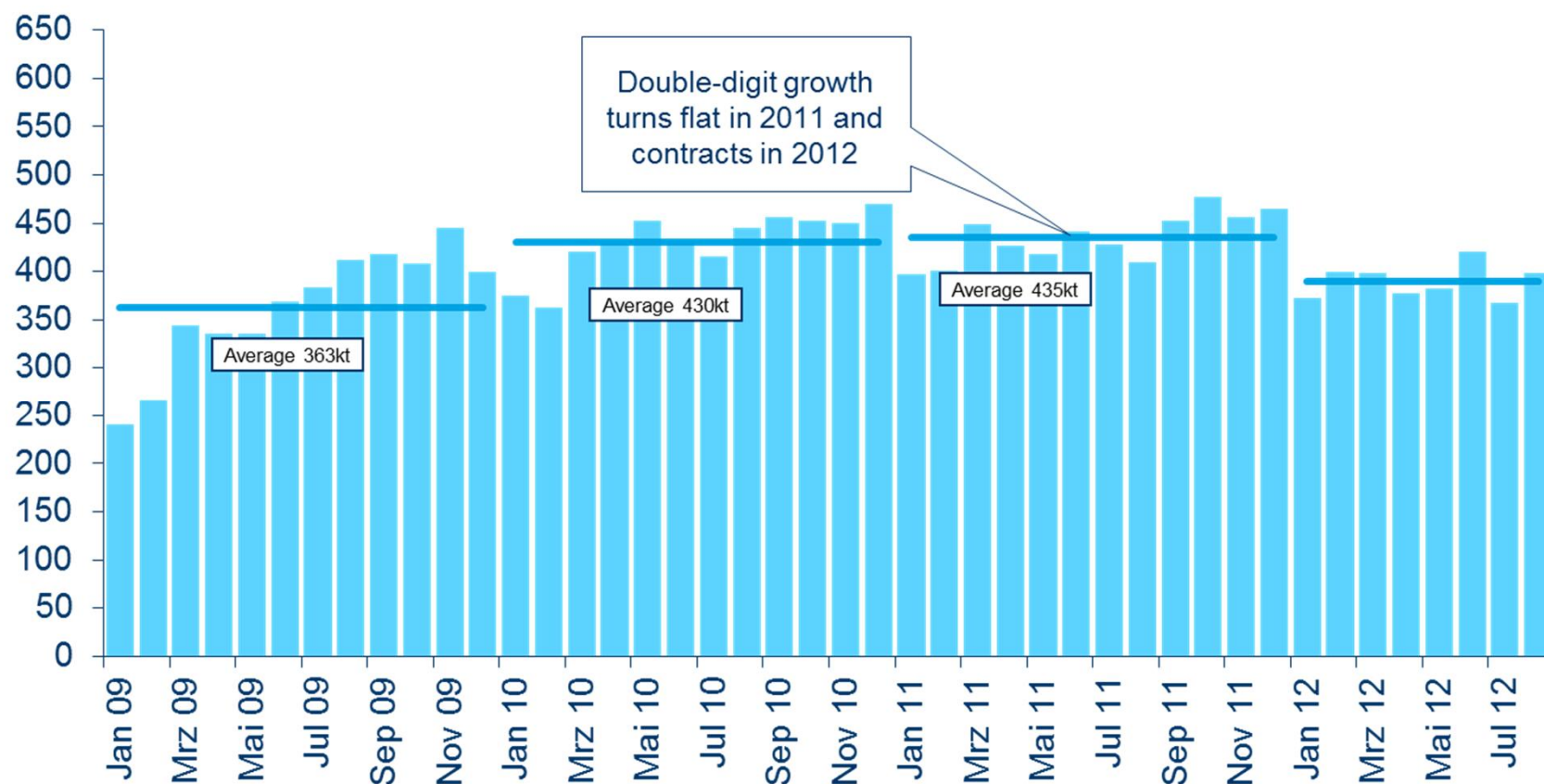


SOURCE: Bloomberg, Gavekal Research

**Few predicted that 2011 and 2012 would be years that the Chinese zinc smelter producers reacted to declining profits and curbed output**

### China Smelter Production

'000mt zinc

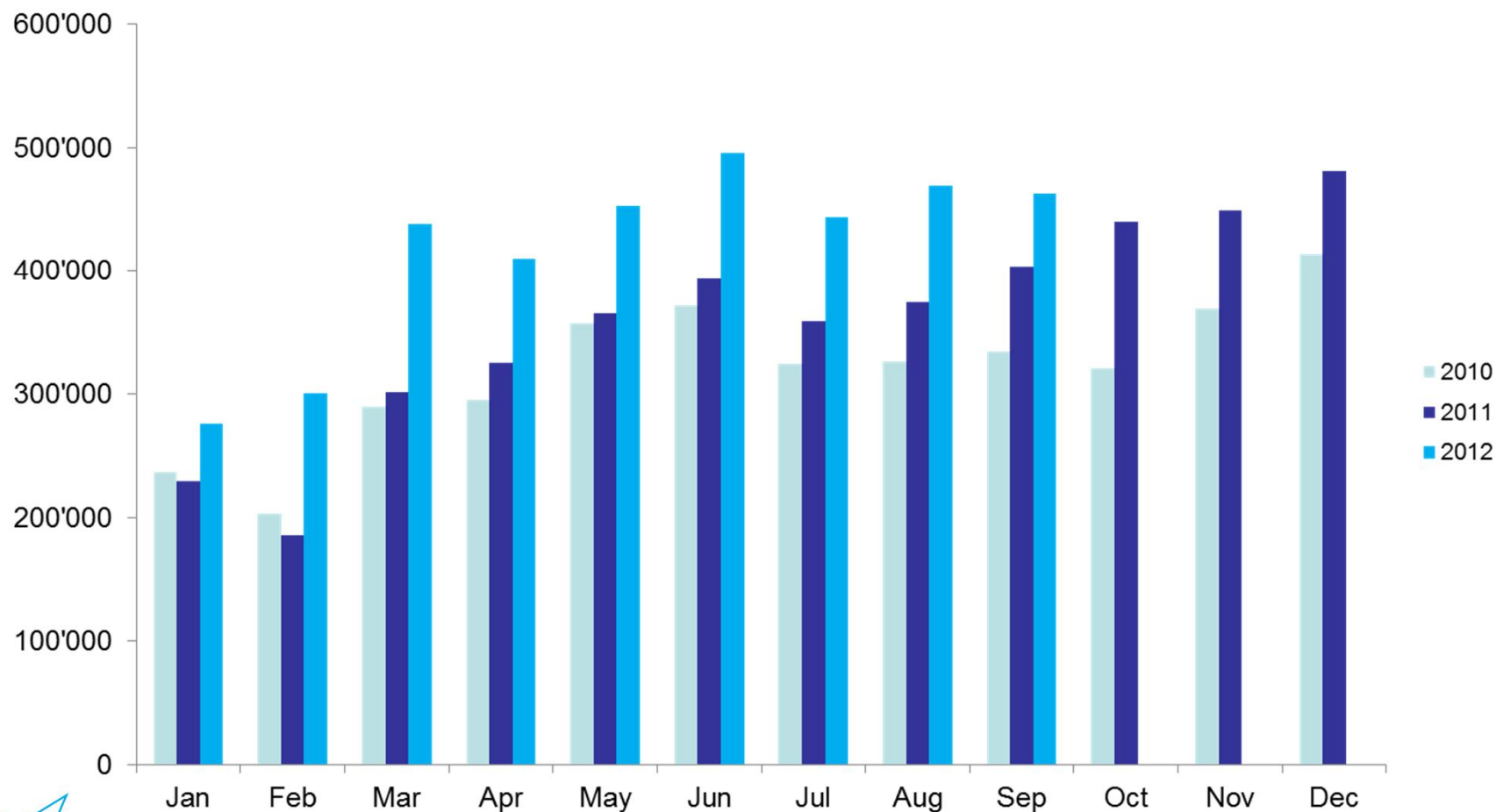


SOURCE: Wood Mackenzie

## Few predicted that 2011 and 2012 would be years that the Chinese zinc mines would ramp up production

### China Mine Production

Metric tons zinc in zinc concentrate



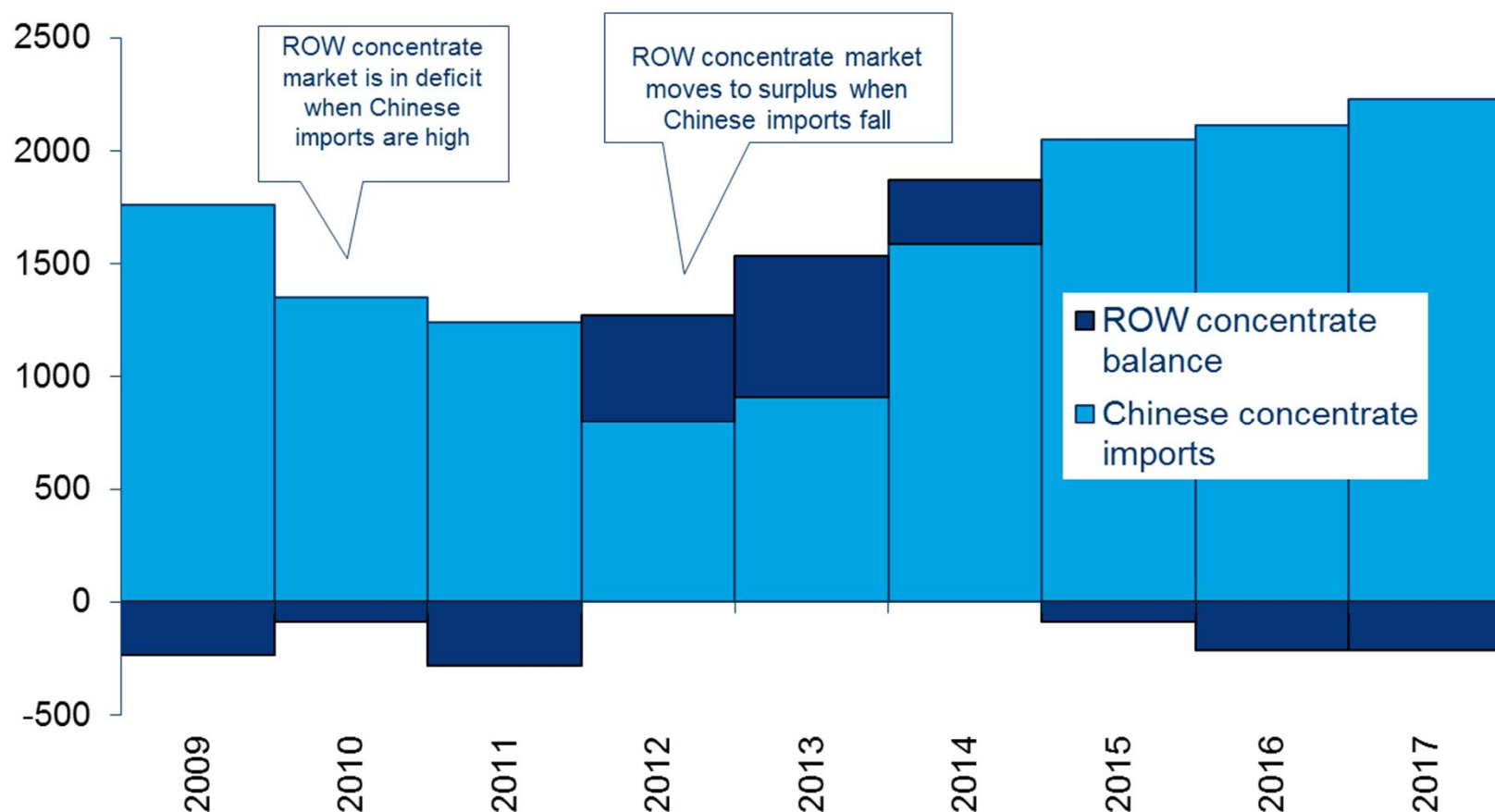
SOURCE: Bloomberg



## Less Chinese zinc smelter production and more mine production has meant a global surplus in concentrate

### Global concentrate balance

'000mt zinc in concentrate

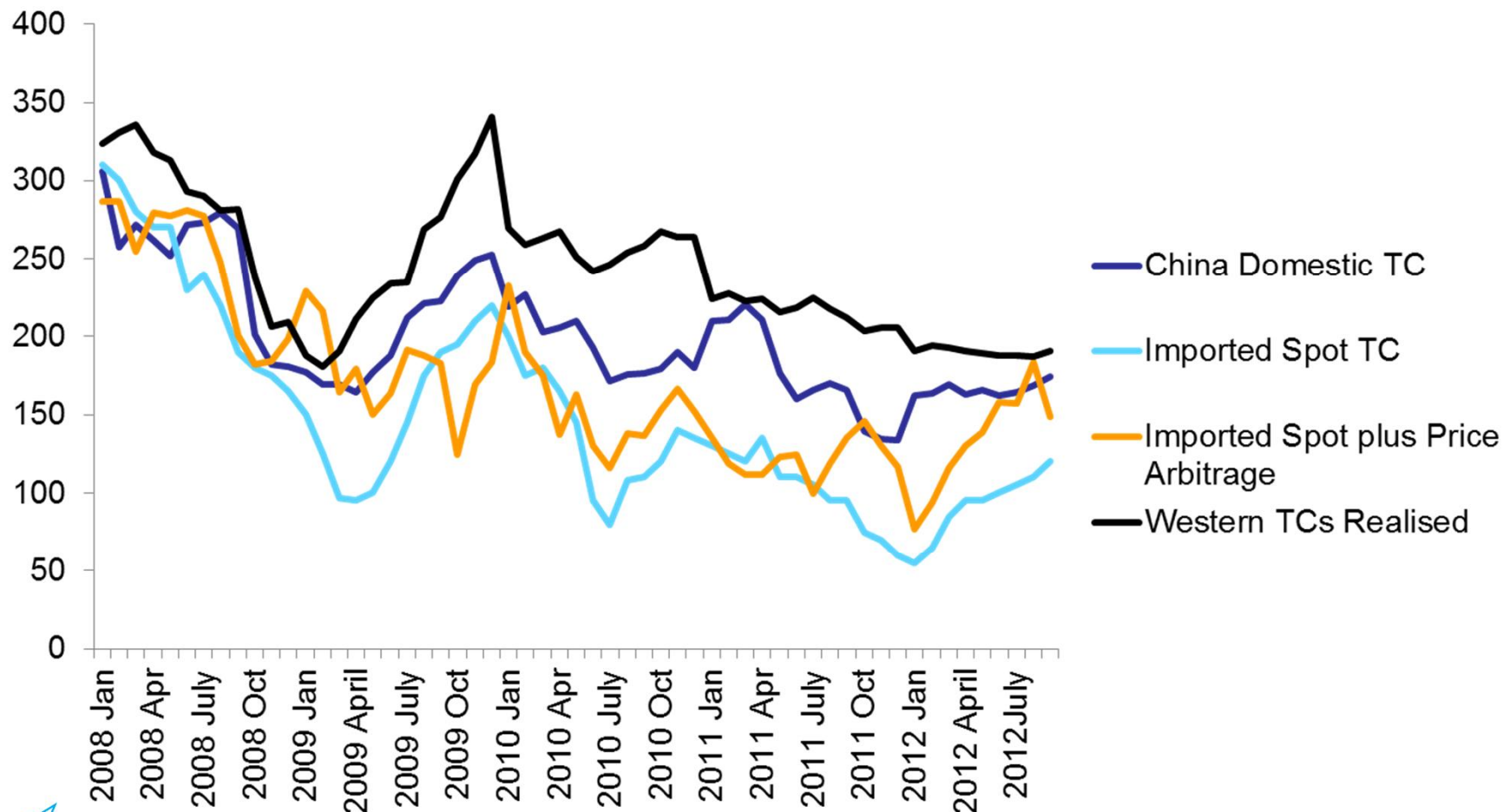


SOURCE: Wood Mackenzie

## Treatment Charges in China and the ROW are starting to converge, even spot is coming close to the Western Benchmark

### Treatment Charge

Dollars per DMT

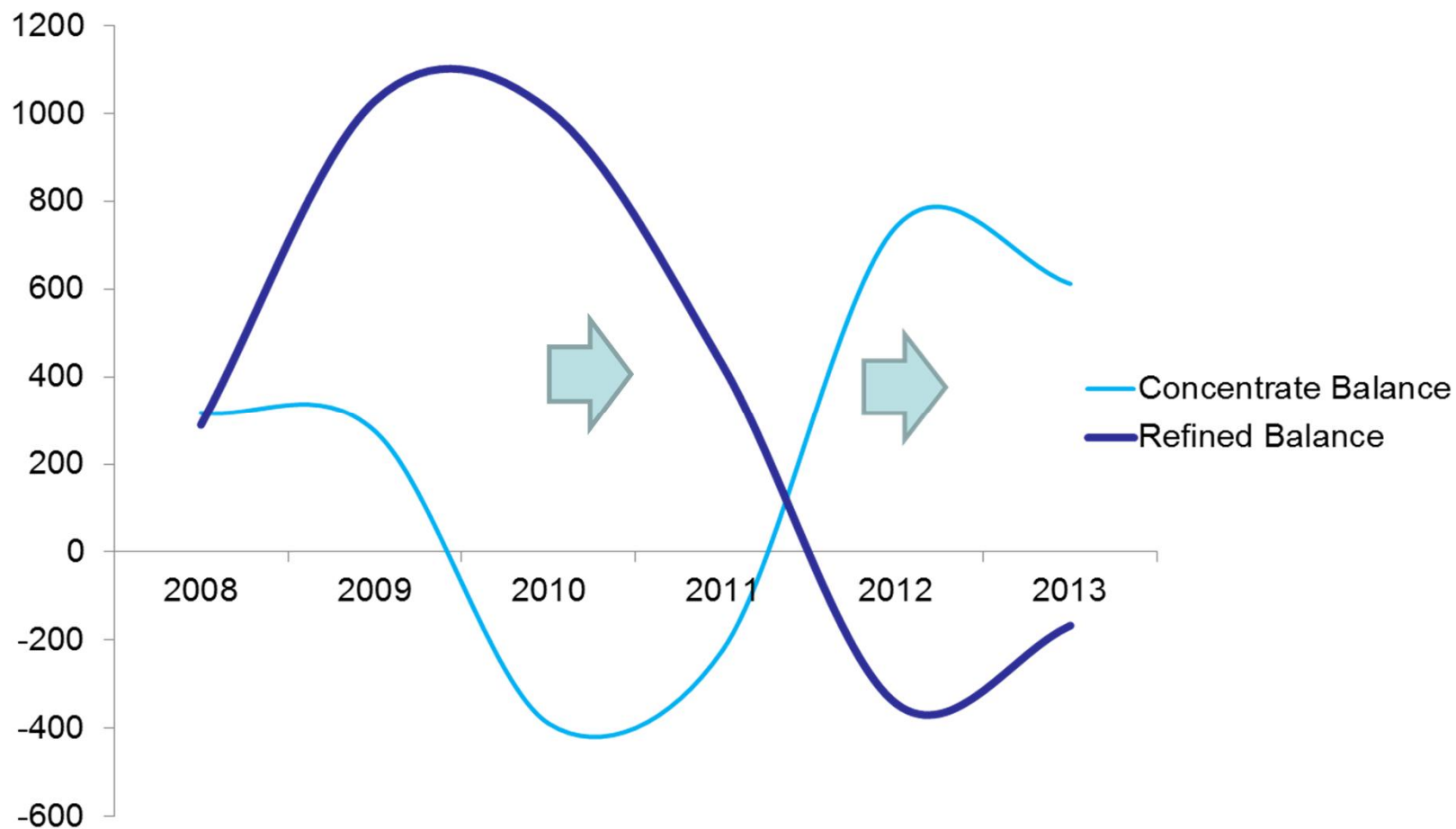


SOURCE: Wood Mackenzie

## Global zinc market surplus has transferred from metal to concentrate

### Global zinc balance

'000mt

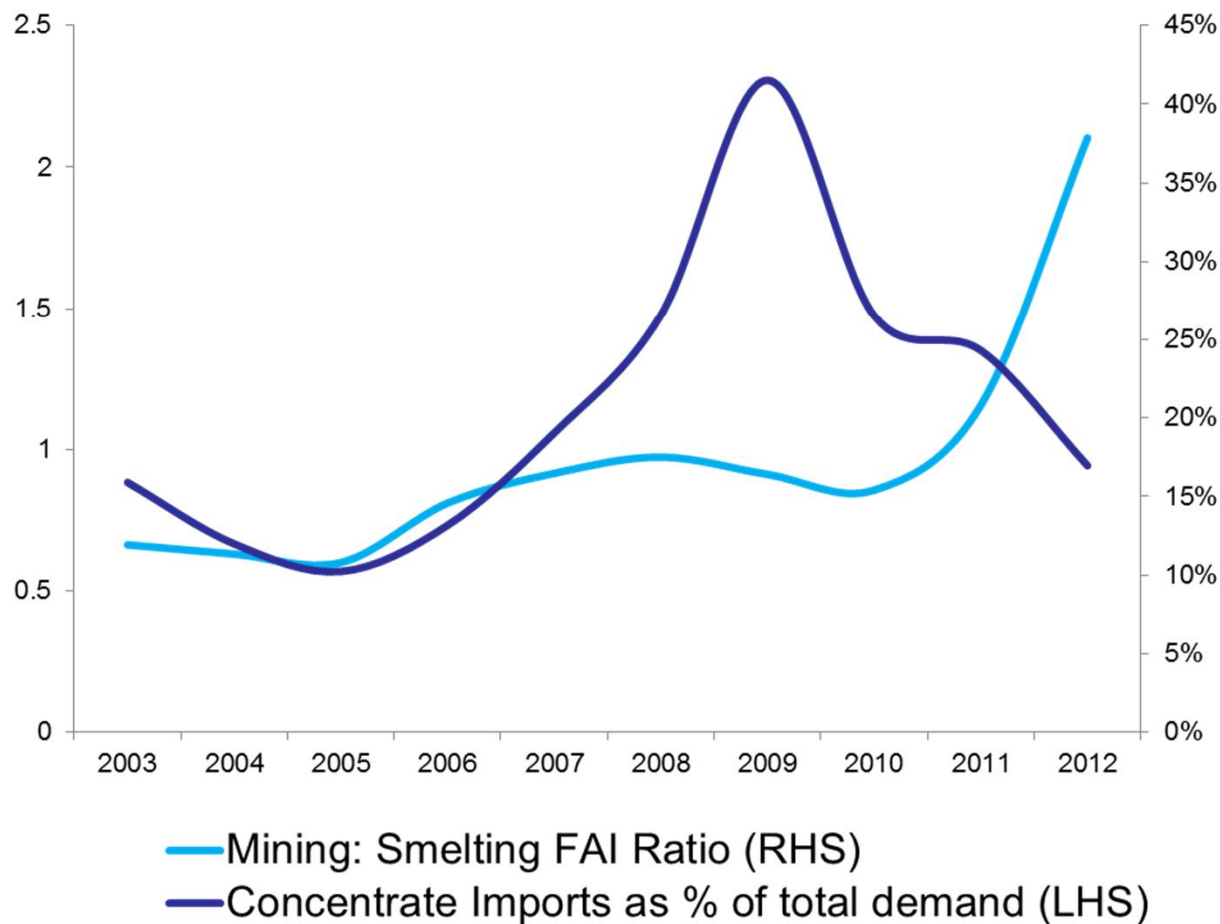


SOURCE: Wood Mackenzie

## Chinese investment in mining continues to outstrip investment in smelting

**China Mining: Smelting FAI Ratio**  
Ratio

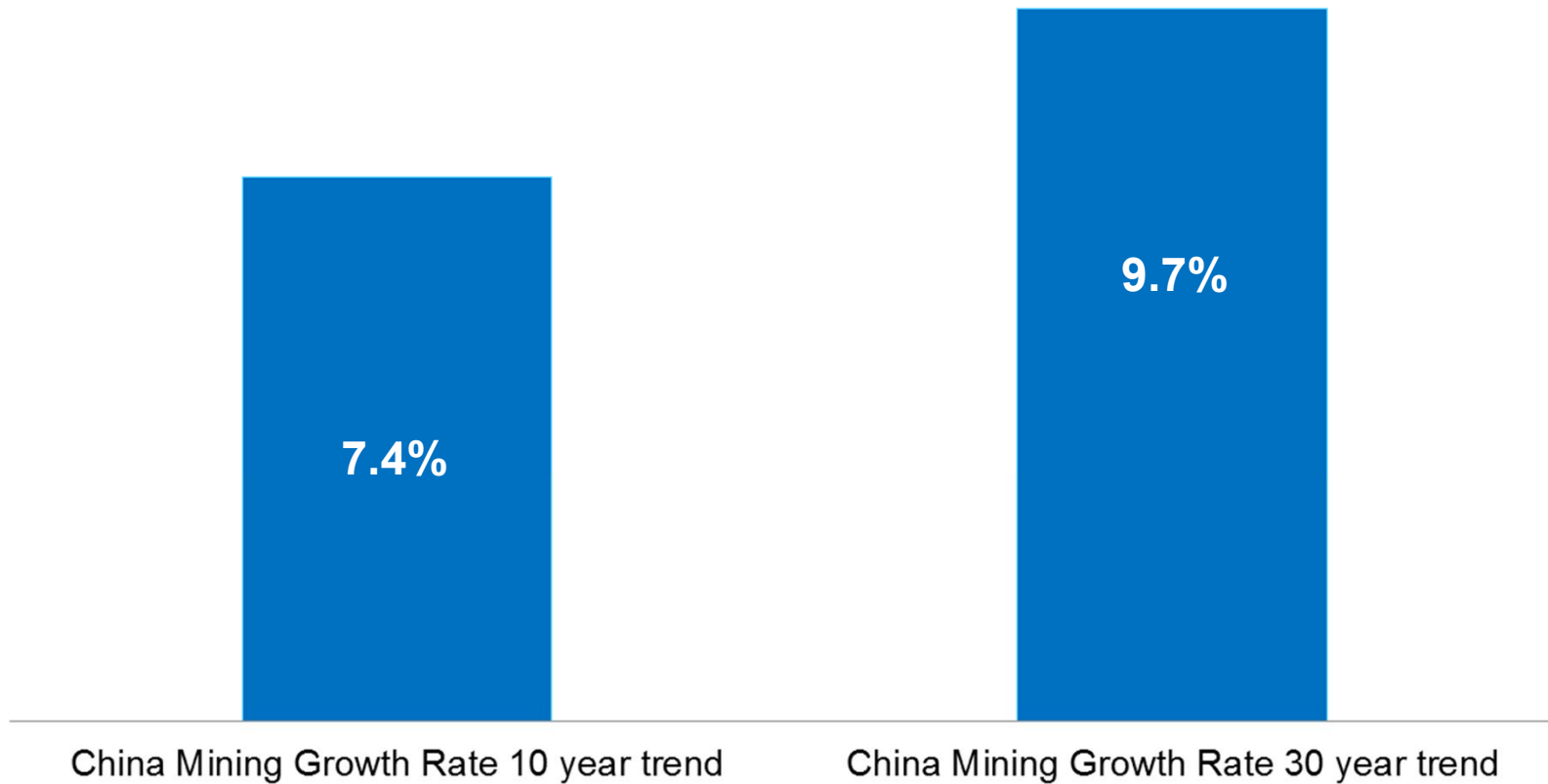
**Zinc imports as percentage of total demand**  
Percentage



SOURCE: Wood Mackenzie, Antaike, Bloomberg, Nyrstar Estimates



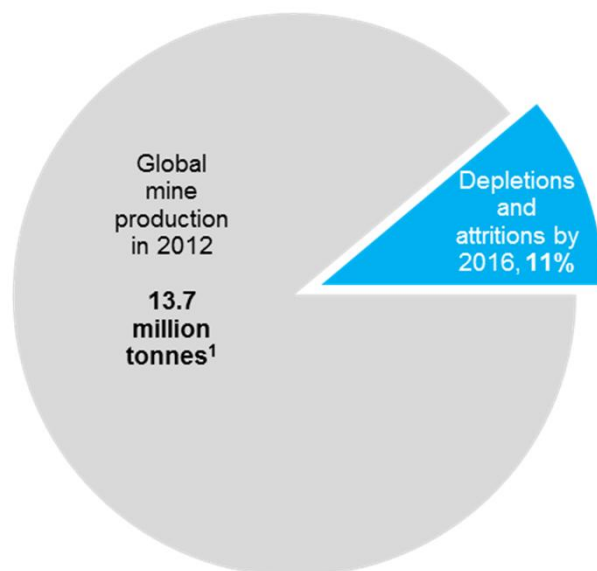
Also important to note that strong mining growth has been a feature of the Chinese market for the last 30 years



SOURCE: Wood Mackenzie

## But there is still uncertainty where zinc will come from given the unusual scale of closures

Zinc mine depletions and attritions by the end of 2016



Zinc mine depletions (and total attritions) between 2012-2016

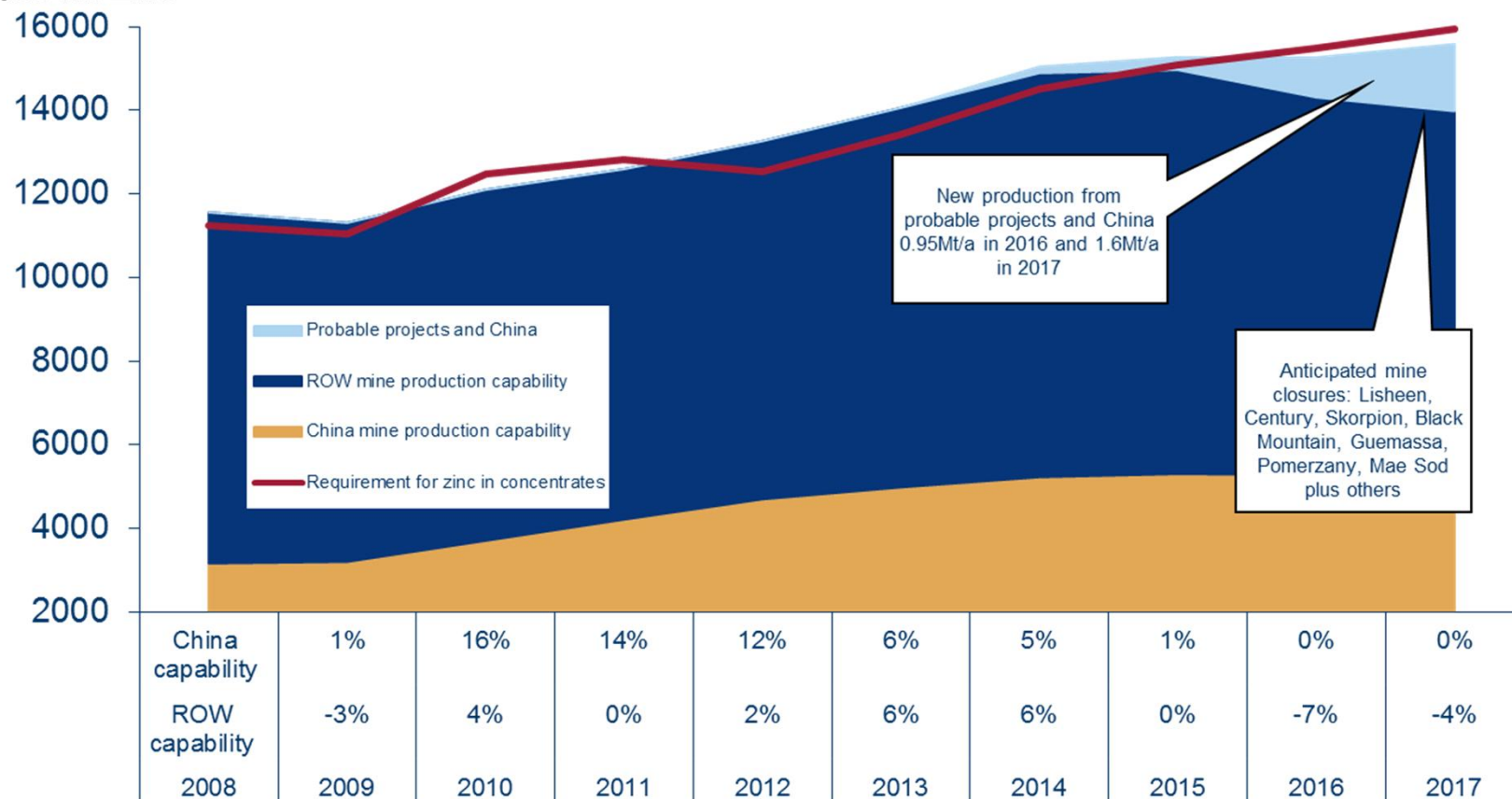
Mine (location)	Zinc production (kt) <sup>2</sup>
Century (Australia)	500
Brunswick (Canada)	200
Lisheen (Ireland)	167
Skorpion (Namibia)	162
Perseverance (Canada)	128
Pomorzany-Olkusz (Poland)	65
Mae Sod (Thailand)	45
Bairendaba Yindu (China)	45
Other depletions and attritions	402
<b>Total depletions and attritions</b>	<b>1,714 (11%)</b>

SOURCE: Wood Mackenzie, Nyrstar Estimates

# The tightness will probably re-emerge towards the middle of the decade

## Mine Capability and Production

'000 Mt Zinc



SOURCE: Wood Mackenzie

## Conclusions

- The Commodity Supercycle is far from over and we are entering the time where zinc should see a shift change in intensity
- The Chinese zinc industry is starting to adjust to lower profits in smelting by moving both downstream and upstream
- As the balance has changed from metal being produced at a surplus to concentrate being in surplus we should see an increase in Treatment Charges both in spot and benchmark terms
- Looking ahead to the middle of the decade, uncertainty on future supply and strong consumption profile will lead to supply tightness which will be exacerbated if the current low price environment discourages projects