



Manganese and ferrochrome: falling prices, rising costs – what next?

20th May 2011

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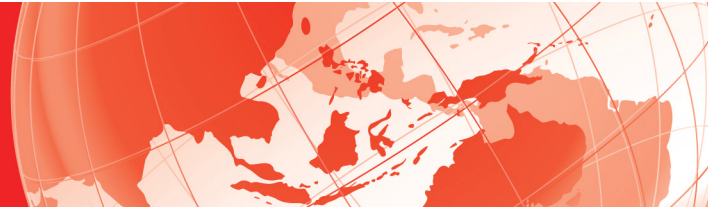
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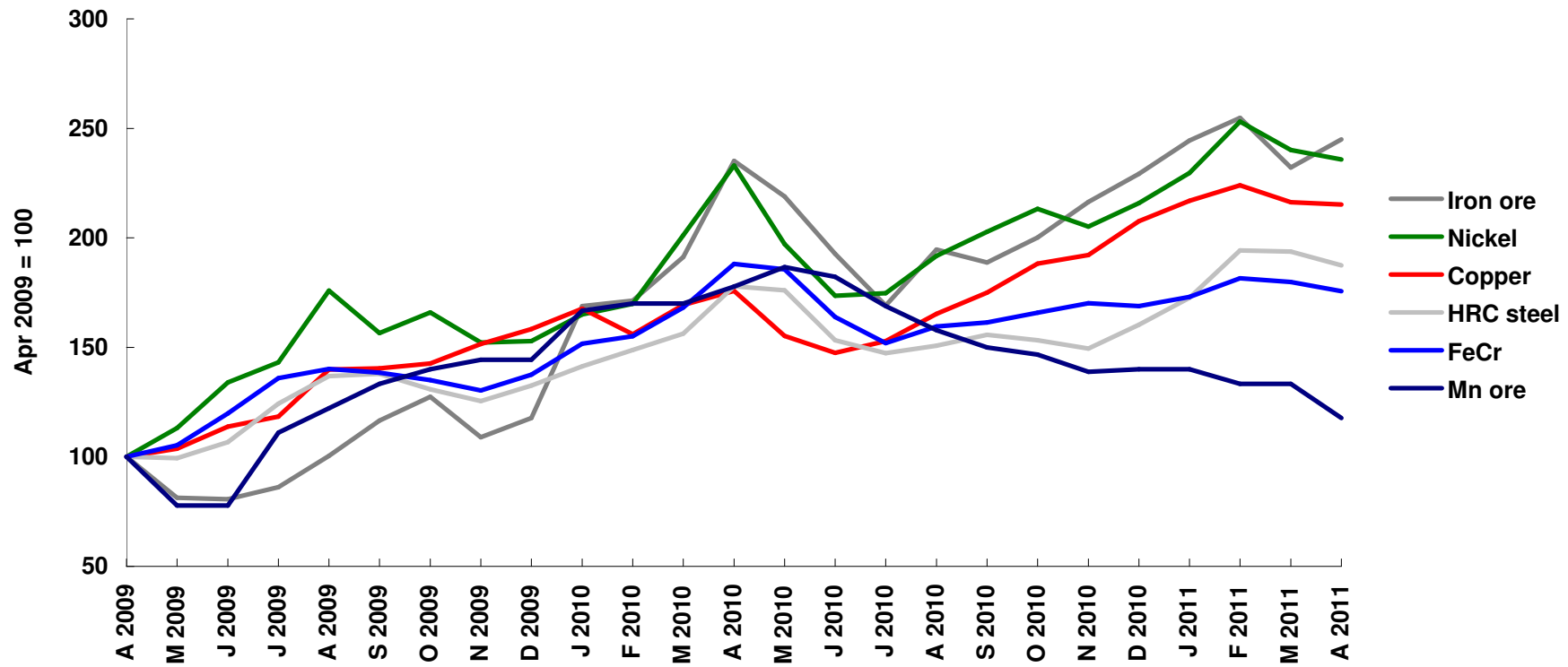
Manganese and ferrochrome: falling prices, rising costs – what next?

- Mn ore and FeCr prices are falling, disappointing expectations – why?
- What is the outlook for Mn ore and FeCr demand? What about supply?
- What are the costs of Mn ore and FeCr production today? What is the outlook?
- Who are the lowest and highest cost producers today? How will this change?
- Can investors expect future price rises? What does the outlook mean for margins?

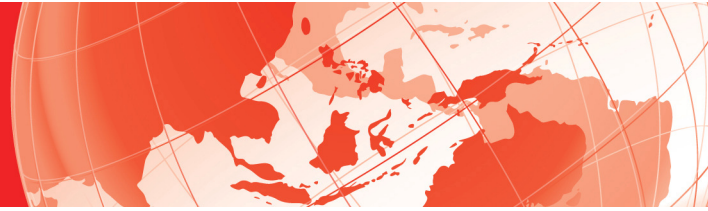


Mn ore and FeCr prices underperform other bulks and base metals; iron ore – steel price contrast important

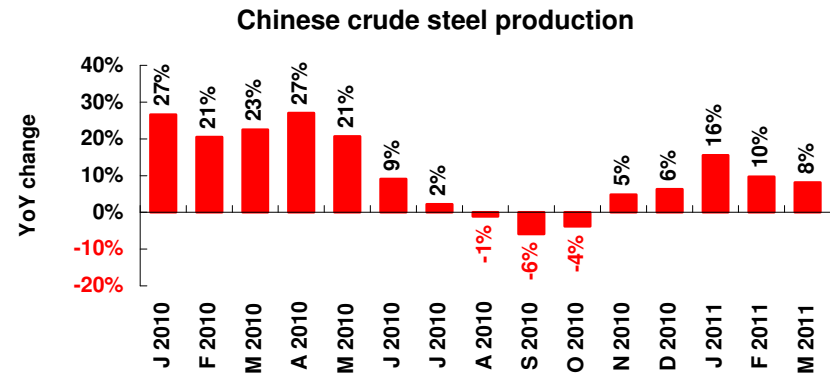
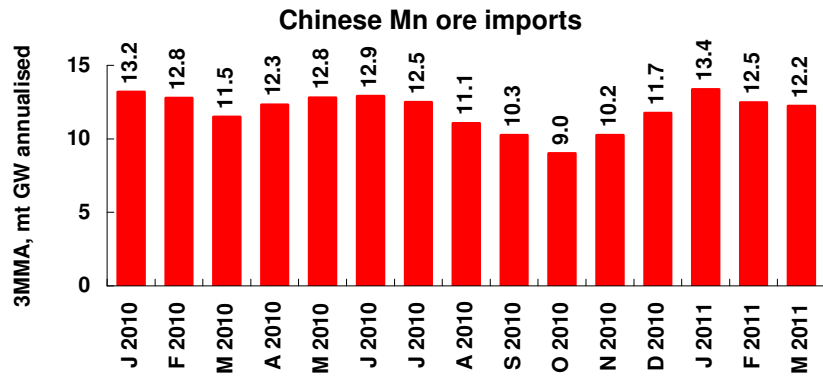
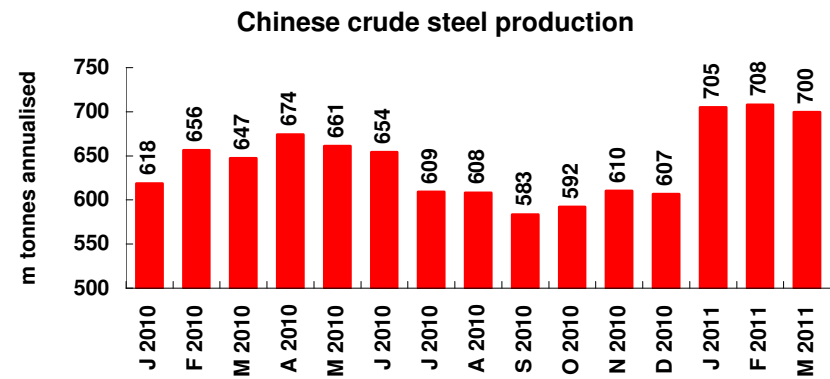
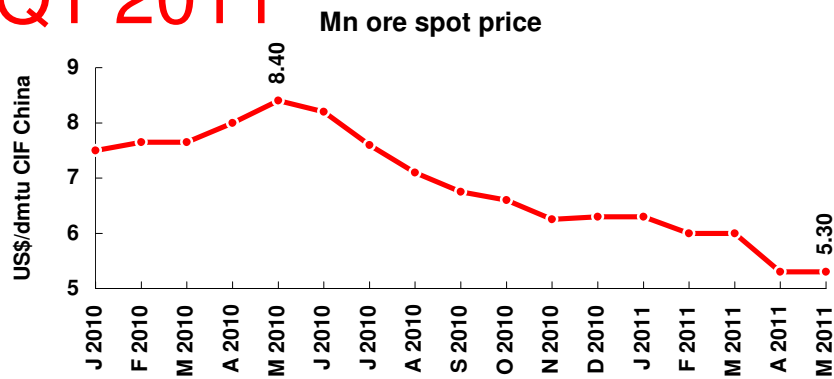
Bulk commodities and base metals prices



Source: CRU, LME, Platts, SBB, Macquarie Research, May 2011. Note: indices calculated based on month average prices



Mn ore prices fall as import demand declines in China, fail to rally as crude steel output rebounds in Q1 2011

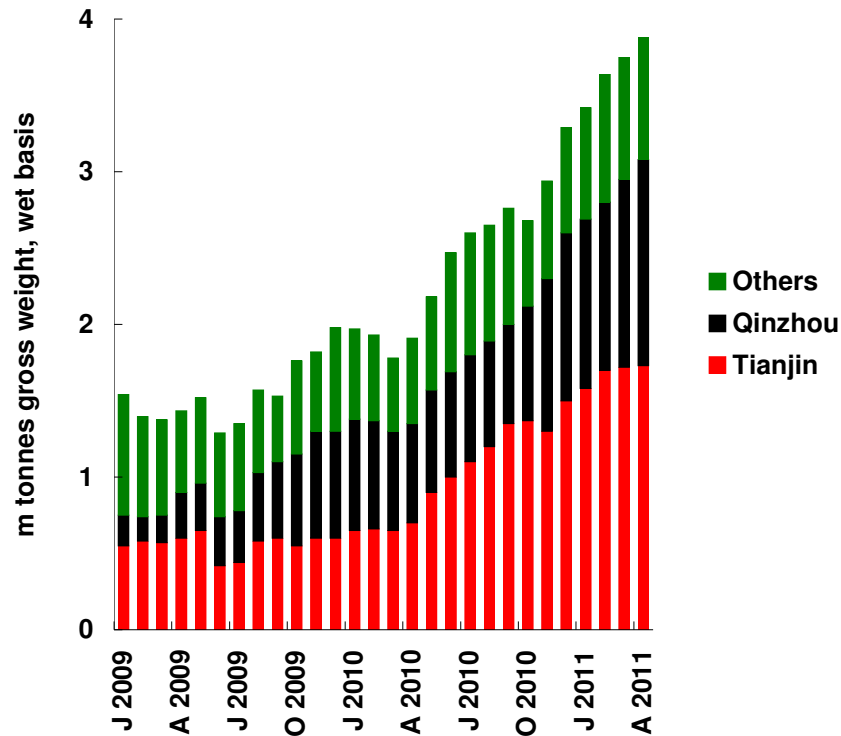


Source: CISA, CRU, GTIS, worldsteel, Macquarie Research, May 2011

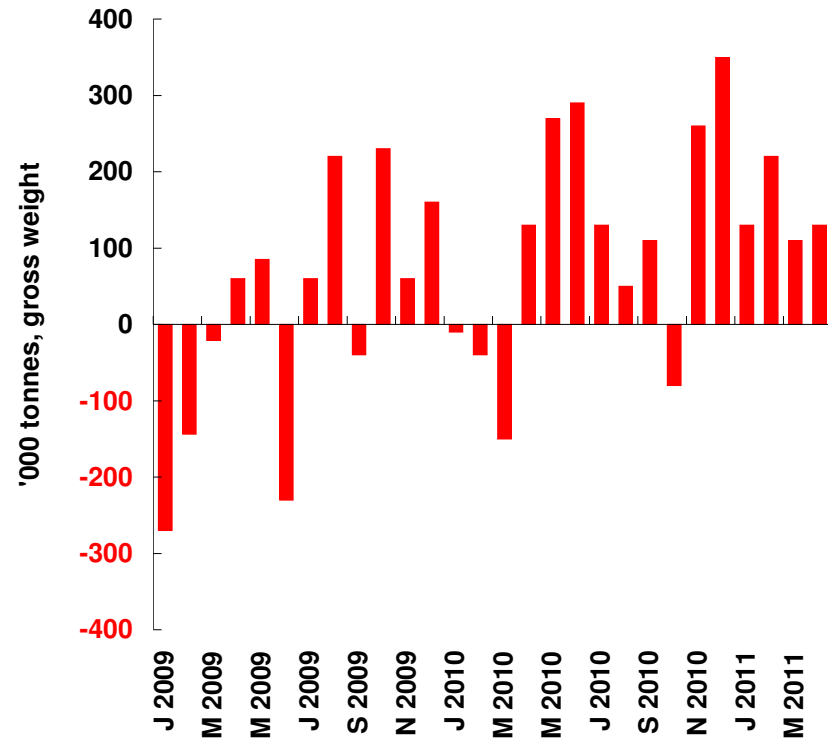


Chinese Mn ore port stocks build up steeply, reflecting current supply side pressure on prices

Chinese Mn ore port stocks



Chinese Mn ore port stock changes



Source: IMnI, Macquarie Research, May 2011



Despite reported drop in output by major producers of Mn ore in Q1 2011

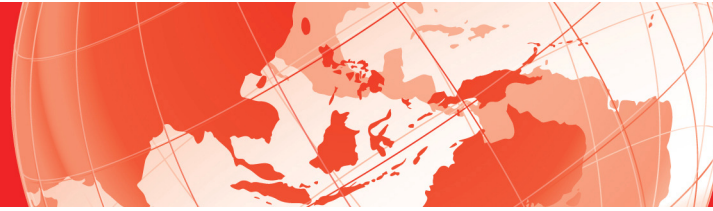
◇Reference : Production at Major Manganese Mines

(Unit:1,000MT)

	Manganese Mine	Jan--Mar 2010 B	Jan--Mar 2011 A	Jan. -Dec 2009	Jan. -Dec 2010	Compared A/B %
◇BHP Billiton · S. Africa · Australia	Wessels, Mamatwan Groote Eylandt · Sub Total	781 929 1,710	514 838 1,352	1,599 2,327 3,926	3,343 4,039 7,382	79.1%
◇ASSMANG · S. Africa (Sales quant.)	Nchwaning	e 770	e 653	1,990	2,852	84.8%
◇Vale · Brazil	Azul (Para) Urucum (Mate Grosso) Others (Minas Gerais) · Sub Total	356 41 - 397	417 52 29 498	1,382 169 105 1,656	1,550 184 106 1,840	- 125.4%
◇Comilog (Eramet) · Gabon	Moanda	755	797	1,992	3,201	105.5%
◇OM Holdings · Australia	Boots Creek	175	182	648	831	104.1%
◇ENRC · Kazakhstan		218	172	904	996	90.8%
◇Total		e 4,025	e 3,654	11,116	17,102	90.8%

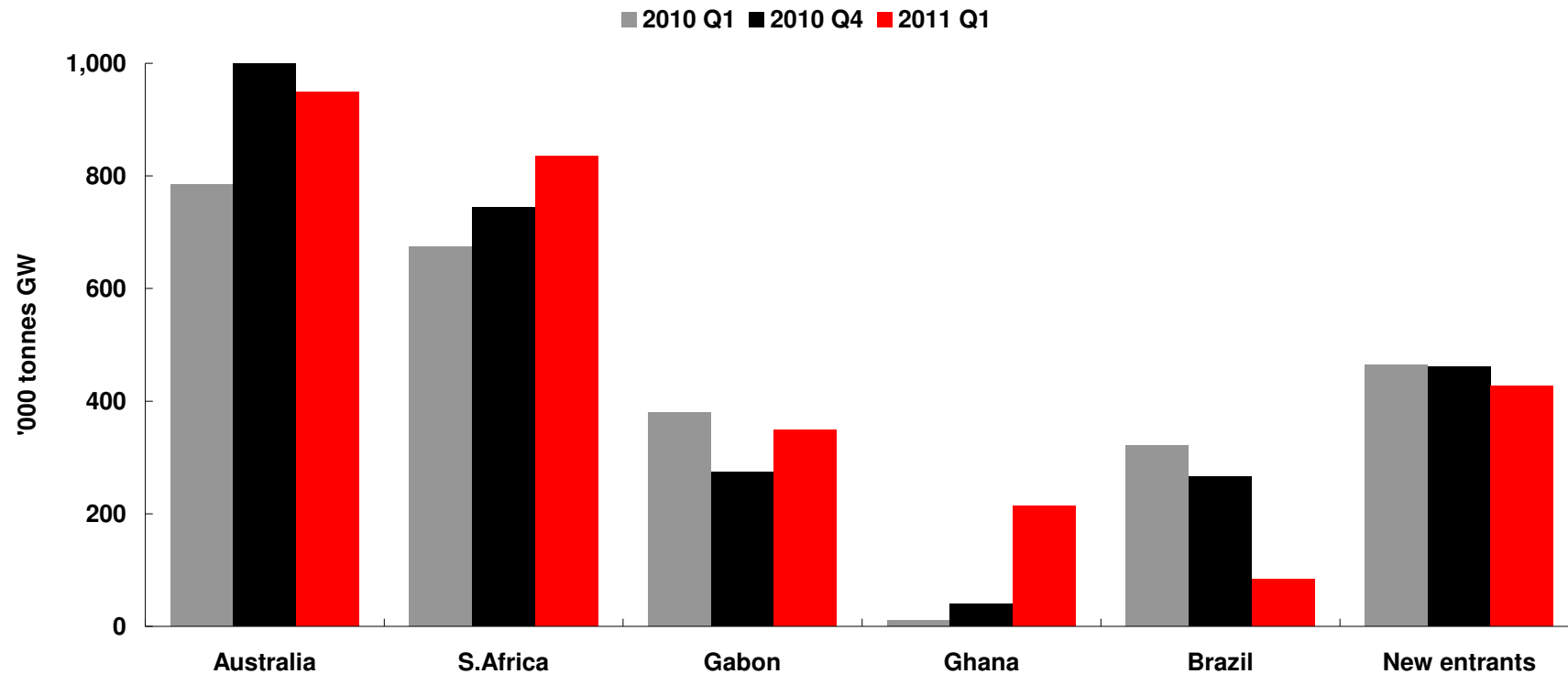
(NB) e=Estmat.

Source: Tex Report 19 May 2011, Macquarie Research, May 2011



However, Chinese Mn ore import data show strong rise in arrivals from most major producer countries

Chinese Mn ore imports - key suppliers

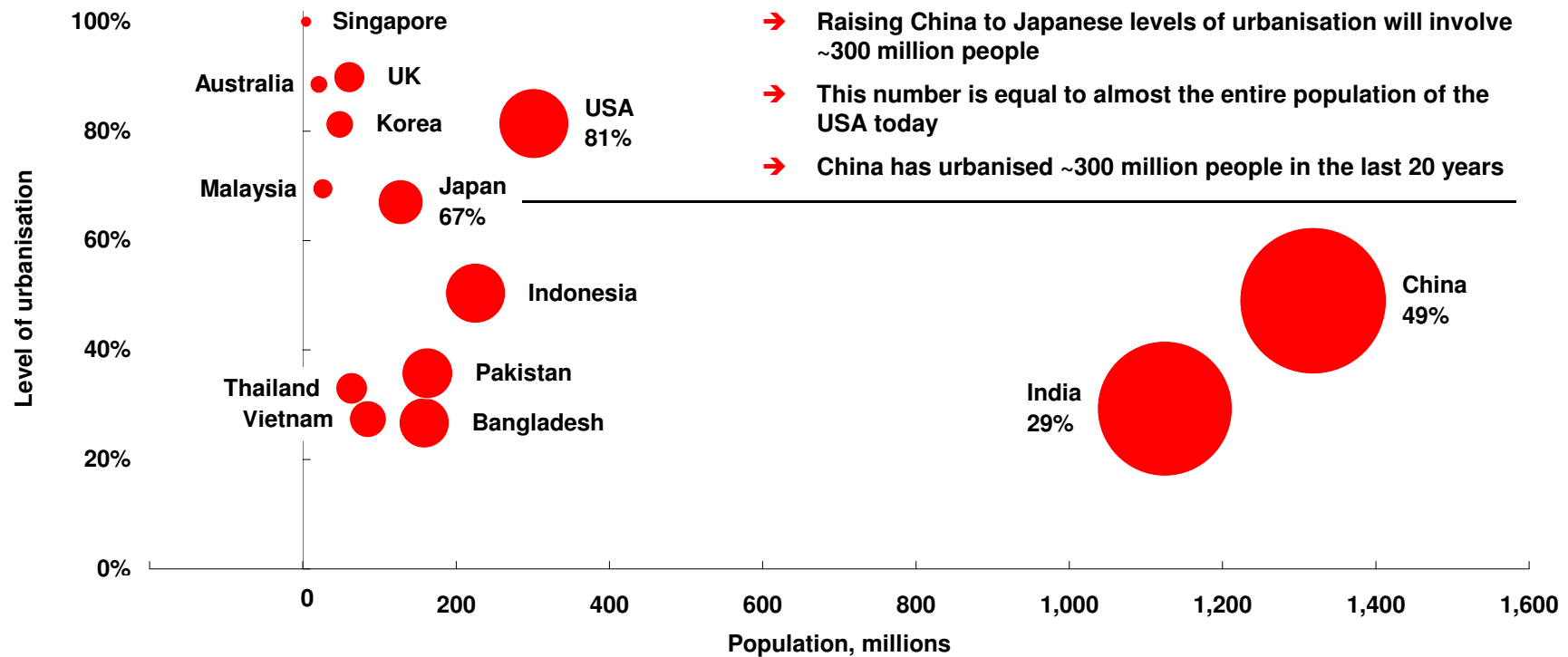


Source: GTIS, Macquarie Research, May 2011. Note: new entrants are Indonesia, Malaysia, Myanmar, Namibia, Vietnam



Strong long-term outlook for steel demand through Chinese urbanisation; construction is main end use

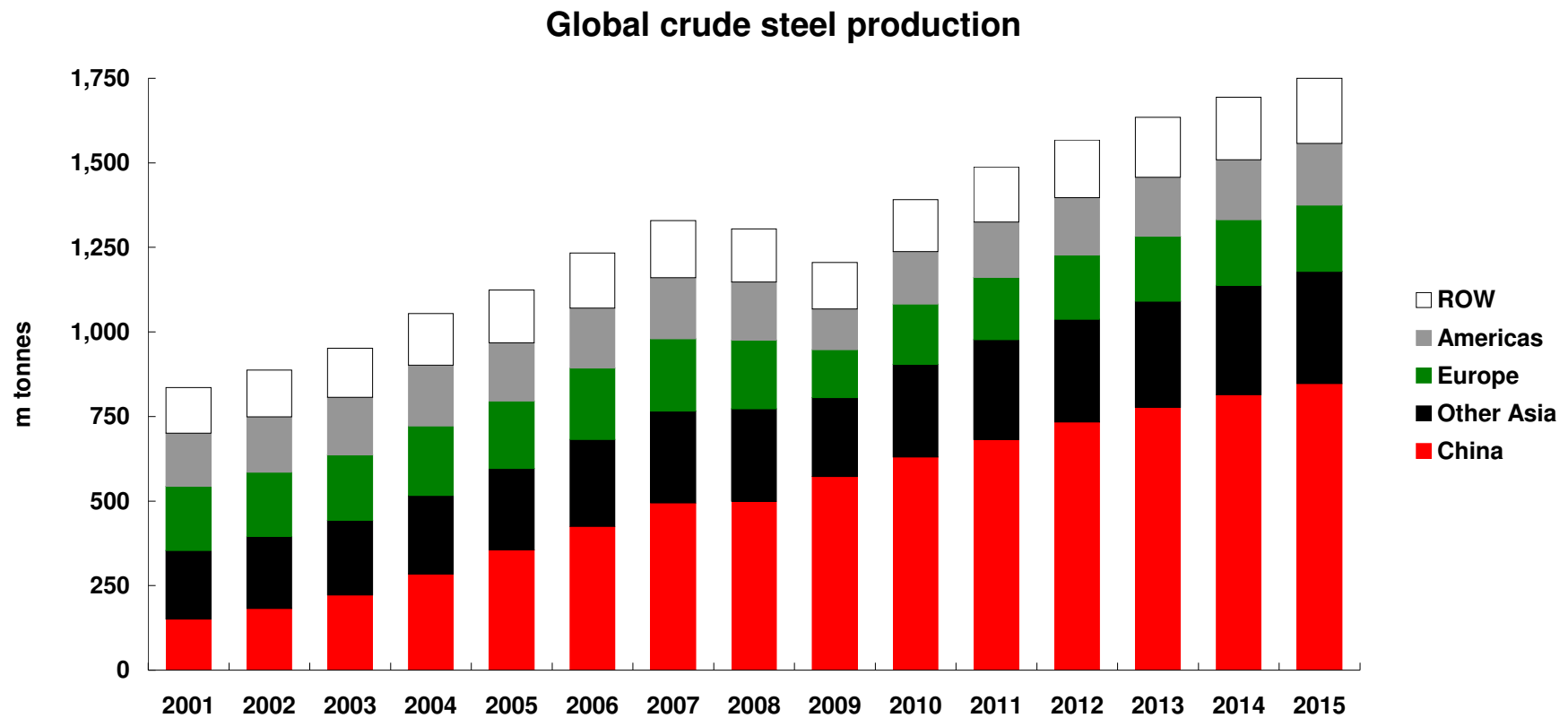
Population and urbanisation levels



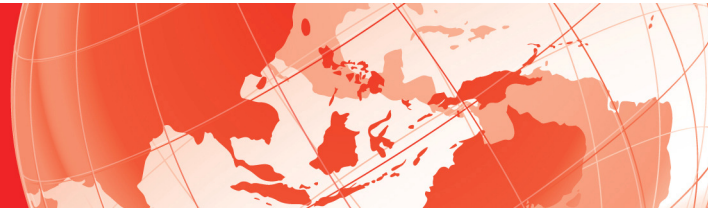
Source: NBS, World Bank, UN, Macquarie Research, May 2011



Global crude steel production is forecast to increase substantially in the coming years, driven by China

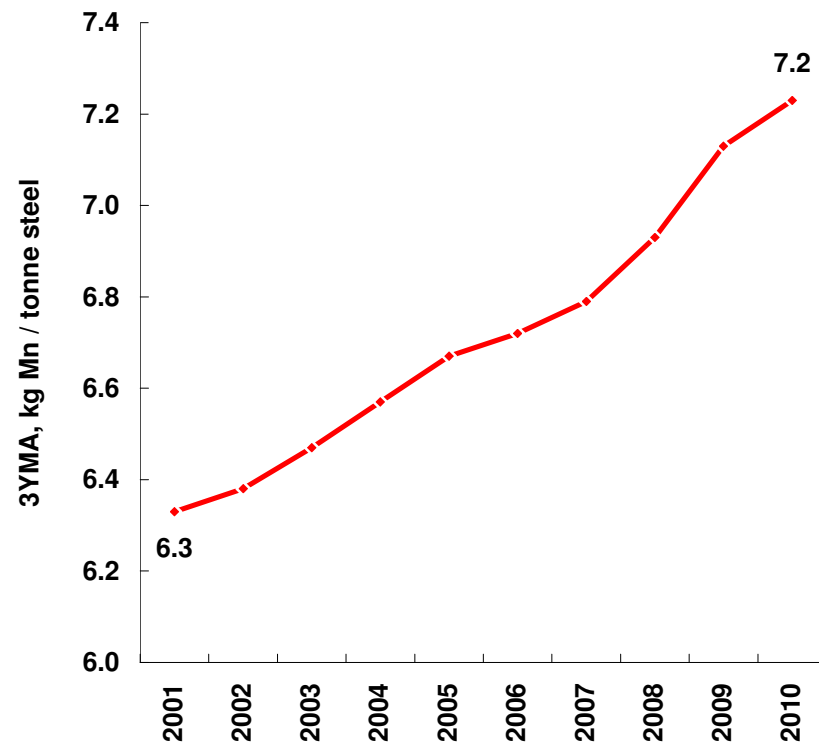


Source: worldsteel, Macquarie Research, May 2011. Note: 2011-2015 data are forecasts

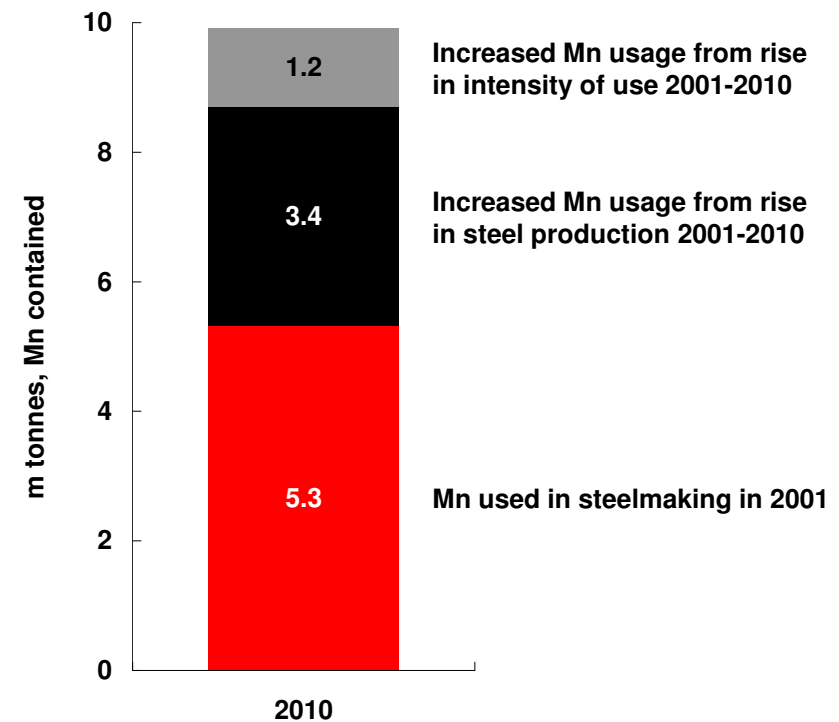


And Mn intensity in steelmaking has been increasing, although we think this trend will now moderate

Unit Mn usage in crude steelmaking



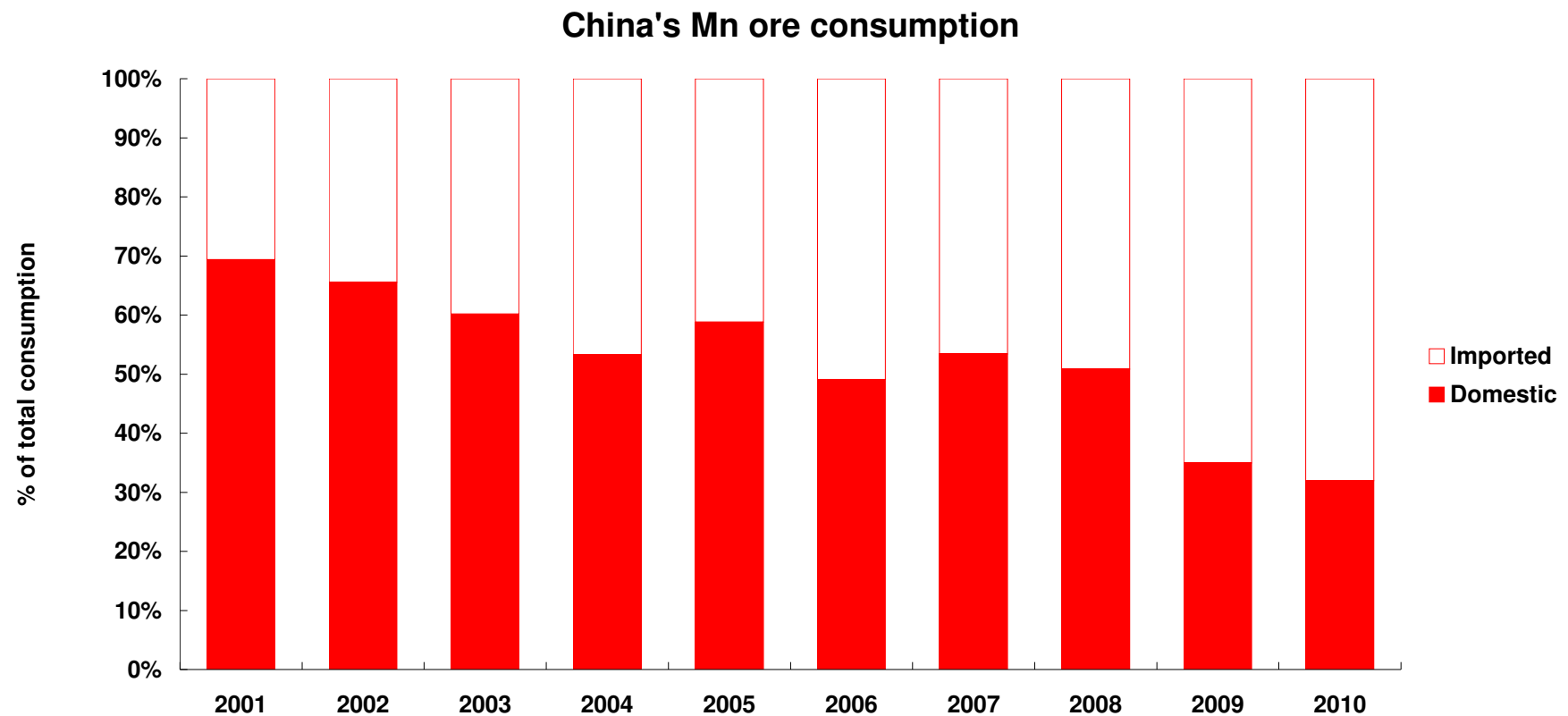
Global Mn ferroalloys consumption



Source: IMnI, worldsteel, Macquarie Research, May 2011. Note: Mn units in steelmaking exclude direct-charged Mn ore and EMM



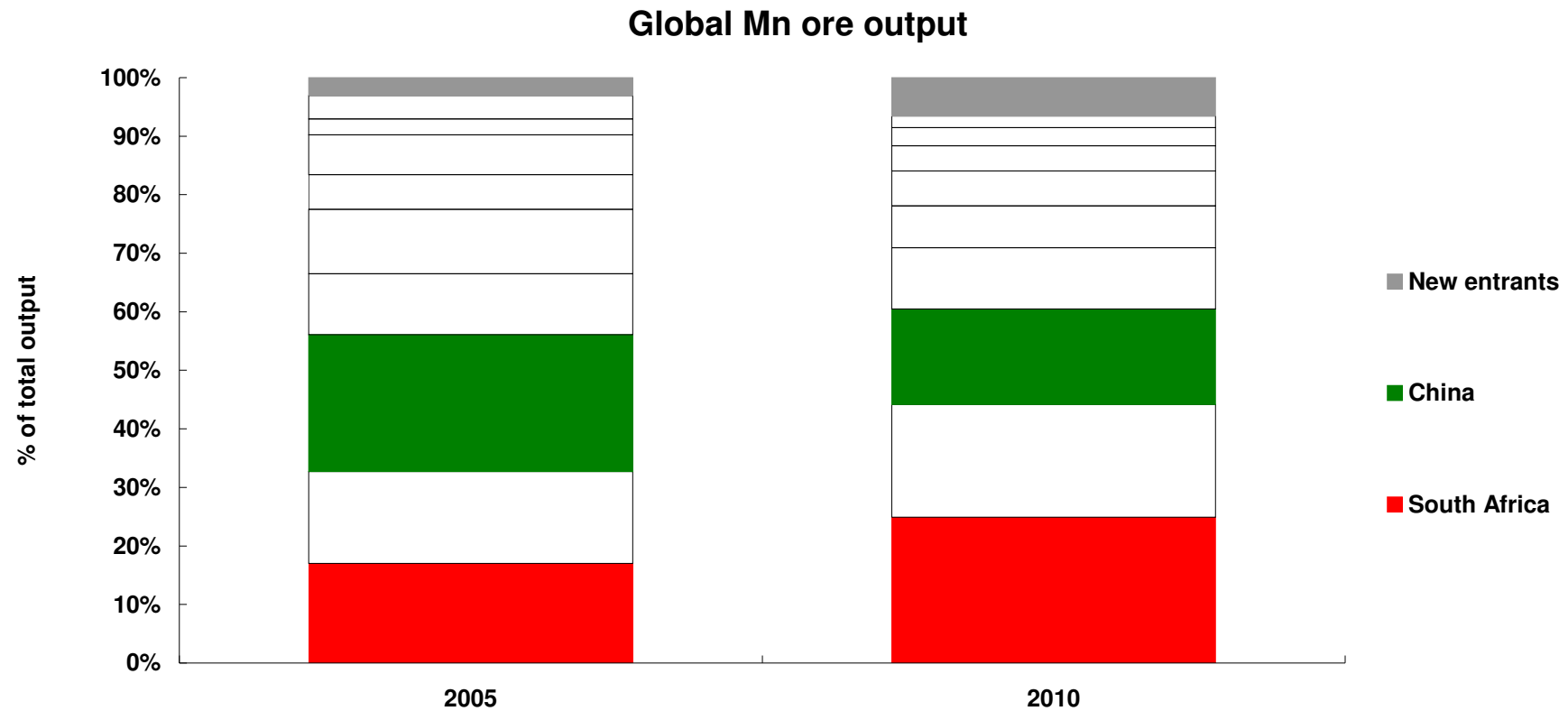
China's Mn ore supply switch – 70% imports today; 70% domestic ten years ago



Source: GTIS, SBB, Macquarie Research, May 2011



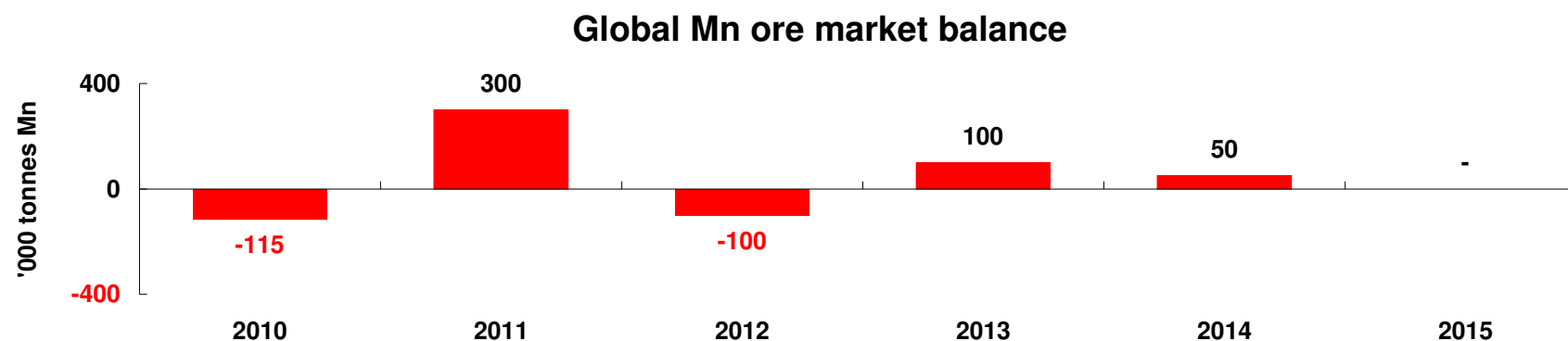
There has been a substantial shift in the mix of world Mn ore supplies; points to future direction



Source: IMnI, SBB, Macquarie Research, May 2011



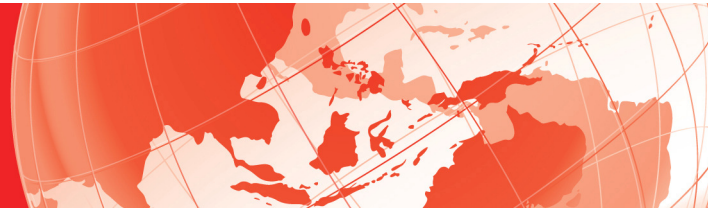
Macquarie's Mn ore market balance – surplus in 2011, moving into balance from 2012



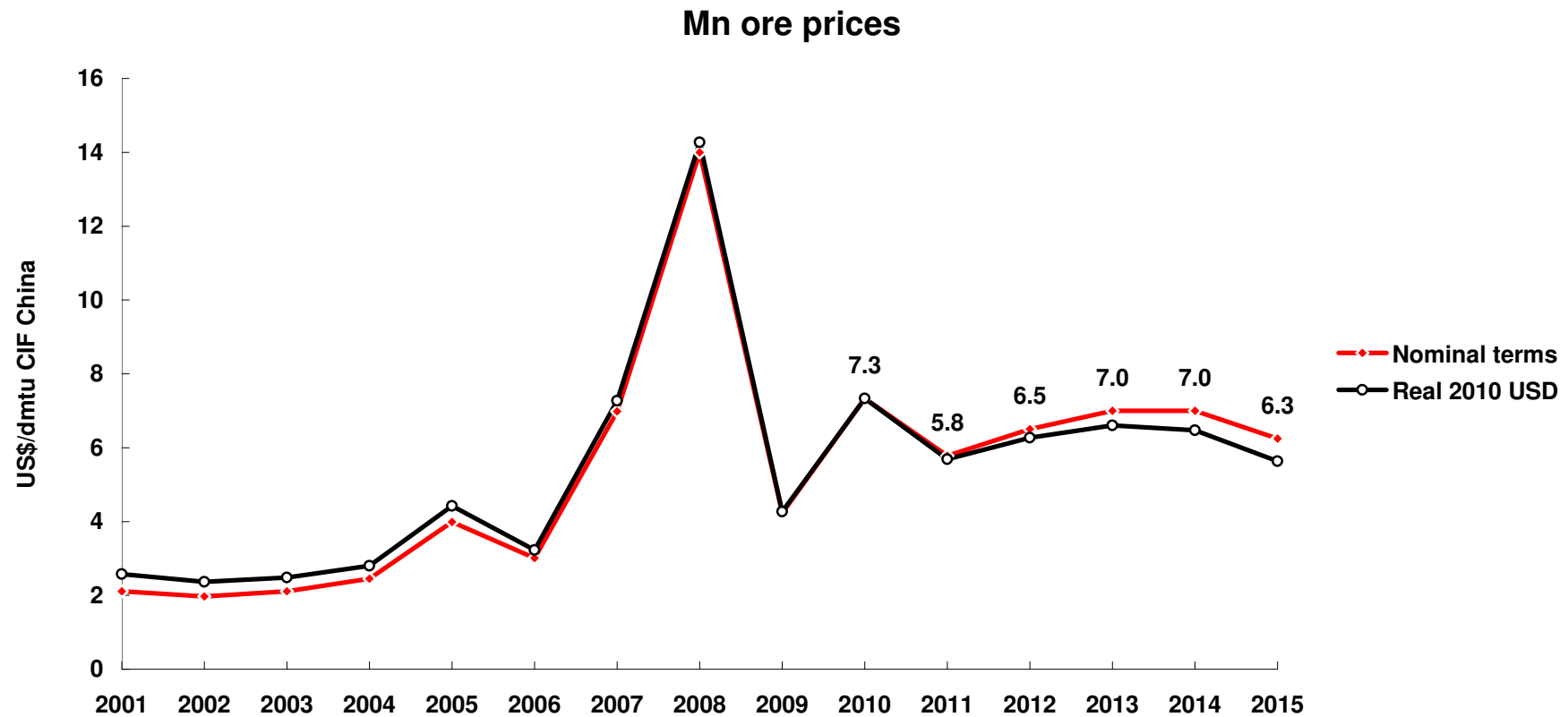
Global Mn ore market balance ('000 tonnes)

	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>
Production	14,990	15,900	16,600	17,800	18,600	19,350
Consumption	15,105	15,600	16,700	17,700	18,550	19,350
Balance	-115	300	-100	100	50	0

Source: Macquarie Research, May 2011. Note: 2011-2015 data are forecasts



Mn ore prices forecast to rise from dip in 2011, but not repeating price spike of late 2000s

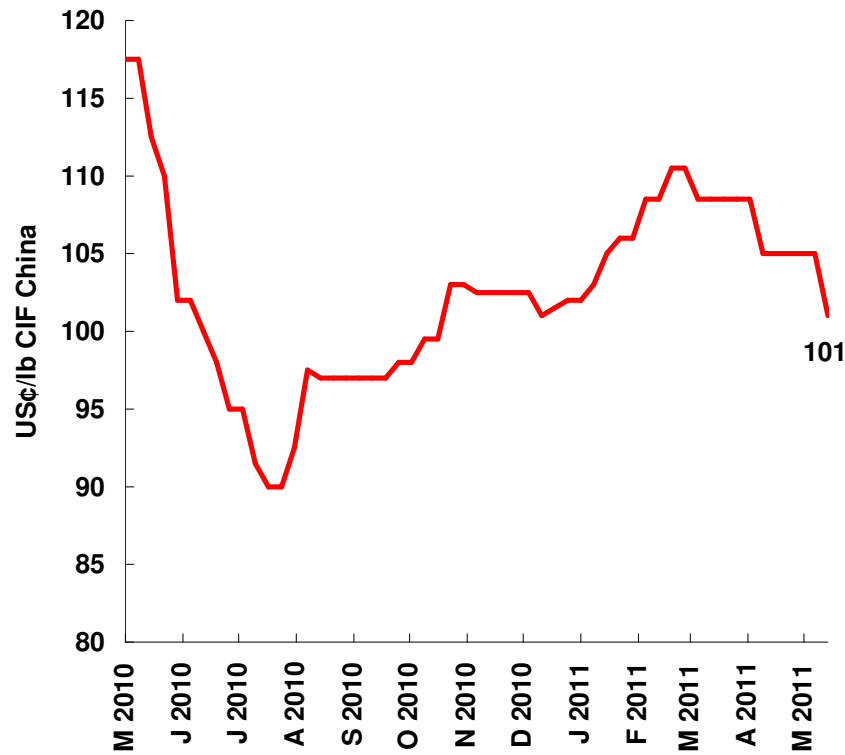


Source: CRU, Macquarie Research, May 2011

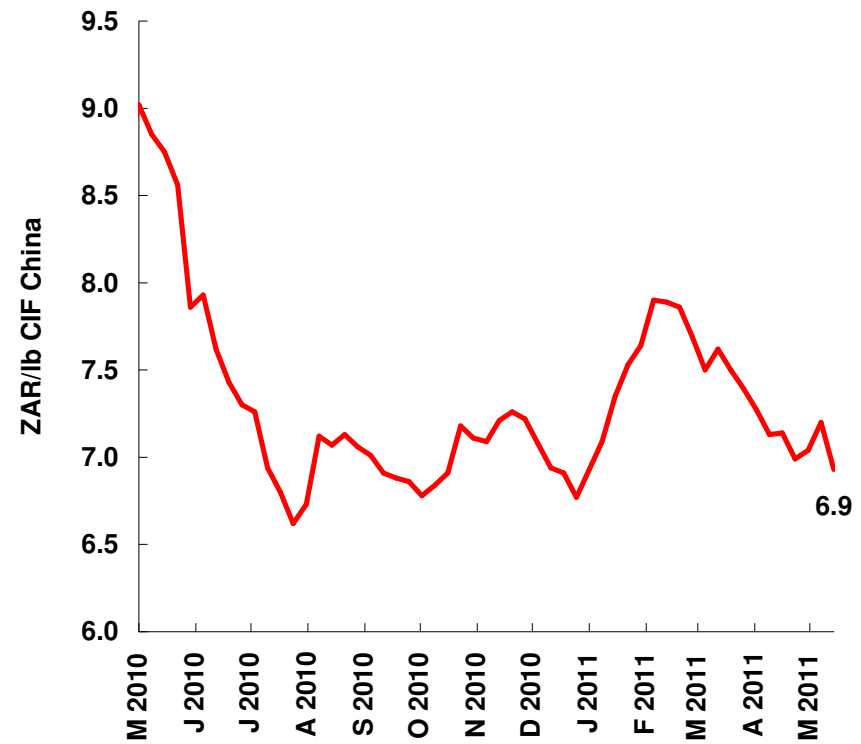


Spot FeCr prices have been falling for three months; drop in rand terms leaves prices down year-on-year

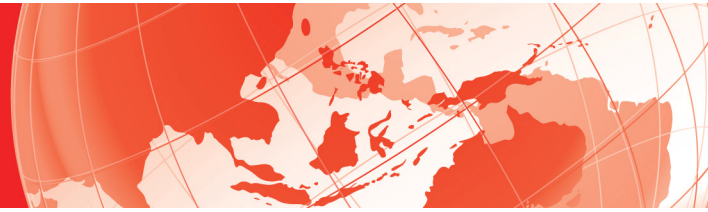
Chinese HCFeCr spot prices



Chinese HCFeCr spot prices

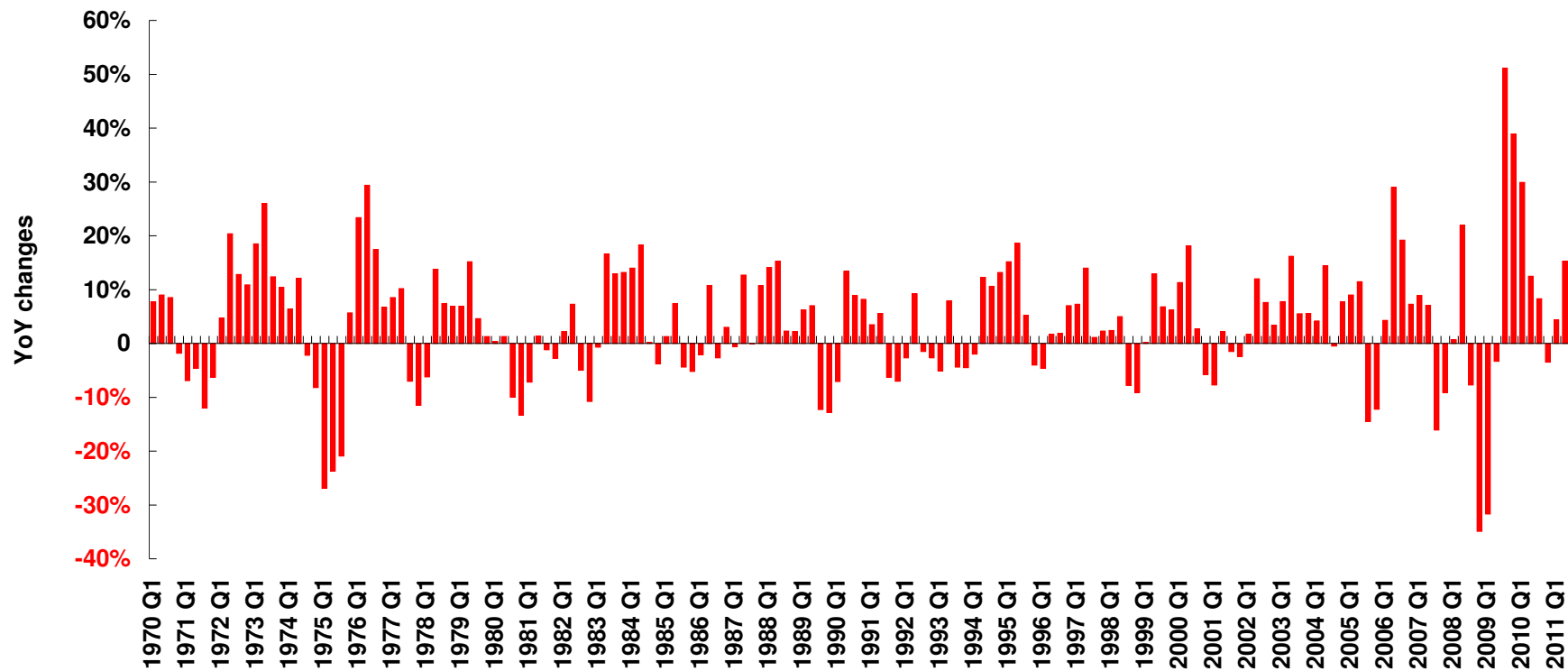


Source: SBB, Macquarie Research, May 2011. Note: Spot prices, 58%-60% Cr, 6%-8% C



Strong rebound in stainless steel output from recession; largest swing seen for at least 40 years

Global stainless steel production

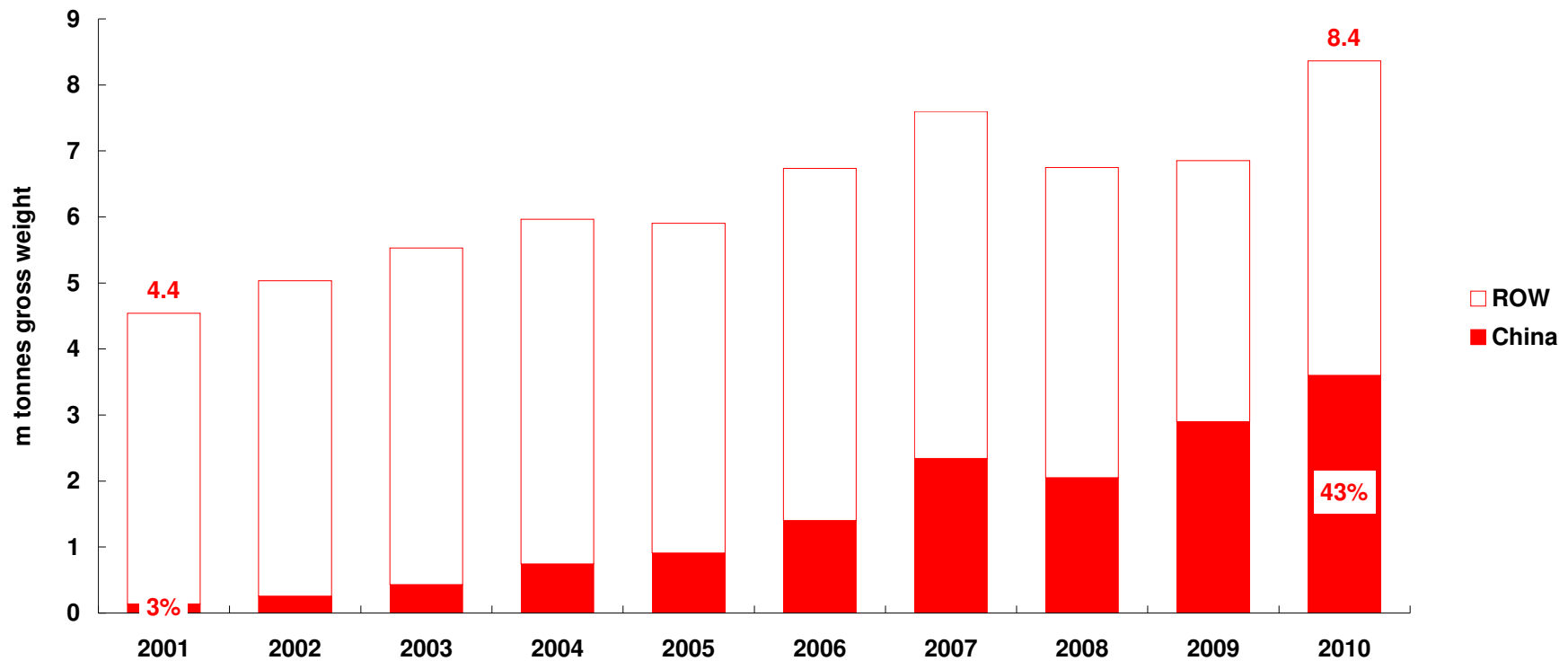


Source: AISI, Eurofer, IBS, ISSF, KOSA, TSIIA, Macquarie Research, May 2011



FeCr demand recovers to reach new record in 2010. China now accounts for over 40% of world demand

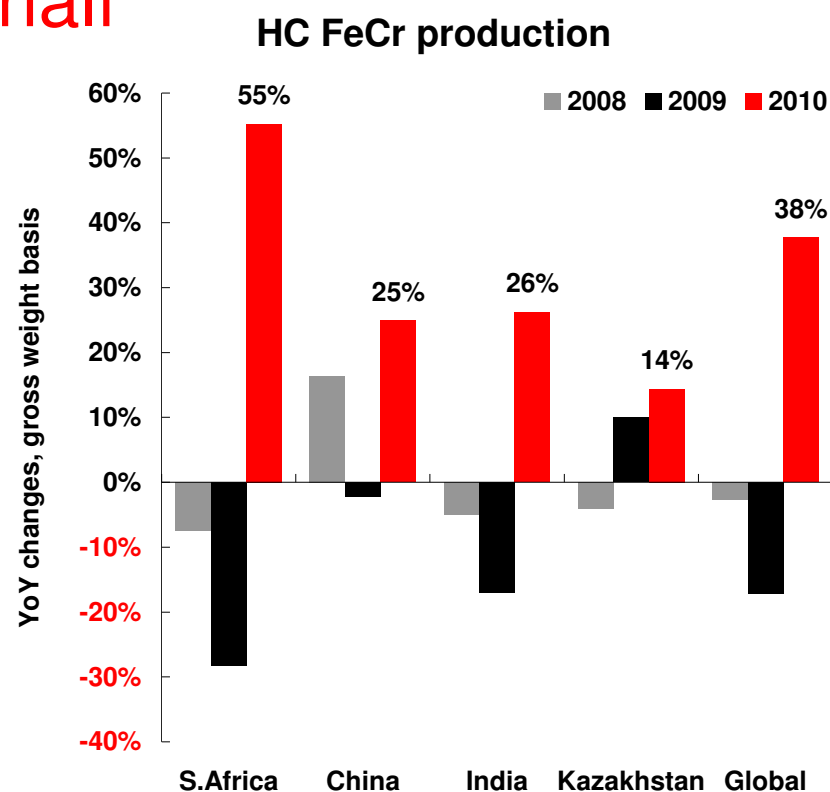
Global FeCr consumption



Source: CRU, ICDA, Macquarie Research, May 2011



FeCr responds robustly to rising in demand in 2010 – global output up by over one-third, S.Africa by over half



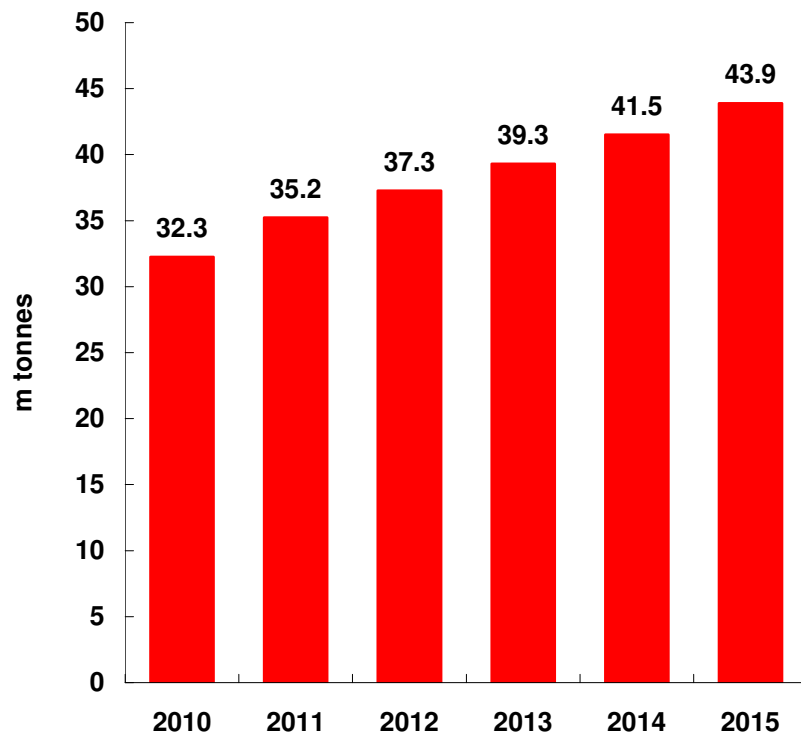
- S.Africa's HC FeCr production increased by 55% YoY to **new record** of ~3.6m tonnes in 2010. Some producers reported to be pricing aggressively in China in 2H 2010, increasing discounts on sales into Europe
- China's output increased by one quarter in 2010 to **new record** of over 1.8m tonnes. Output has doubled in only five years
- Indian output also up by one quarter to **new record** of ~900,000 tonnes in 2010
- Kazakh output up more modest 14% YoY but still sets **new record** of ~1.2m tonnes
- 2.4m tonnes gain in global output equal to S.Africa's entire production in 2009

Source: CRU, ICDA, Macquarie Research, May 2011

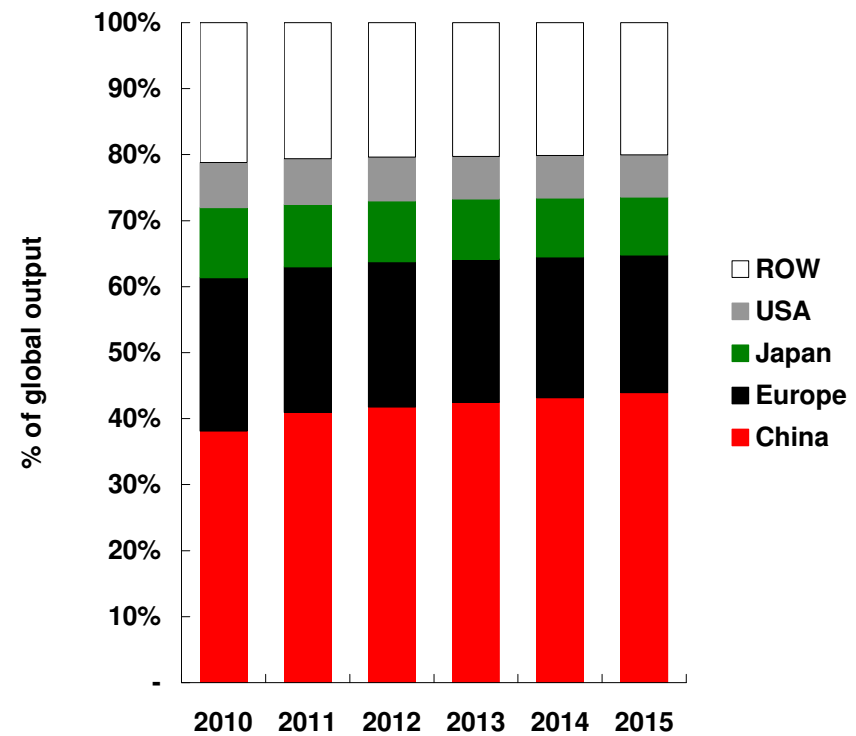


Global stainless steel output is forecast to rise by 33% 2010-2015, driven by China

Global stainless steel production



Global stainless steel production

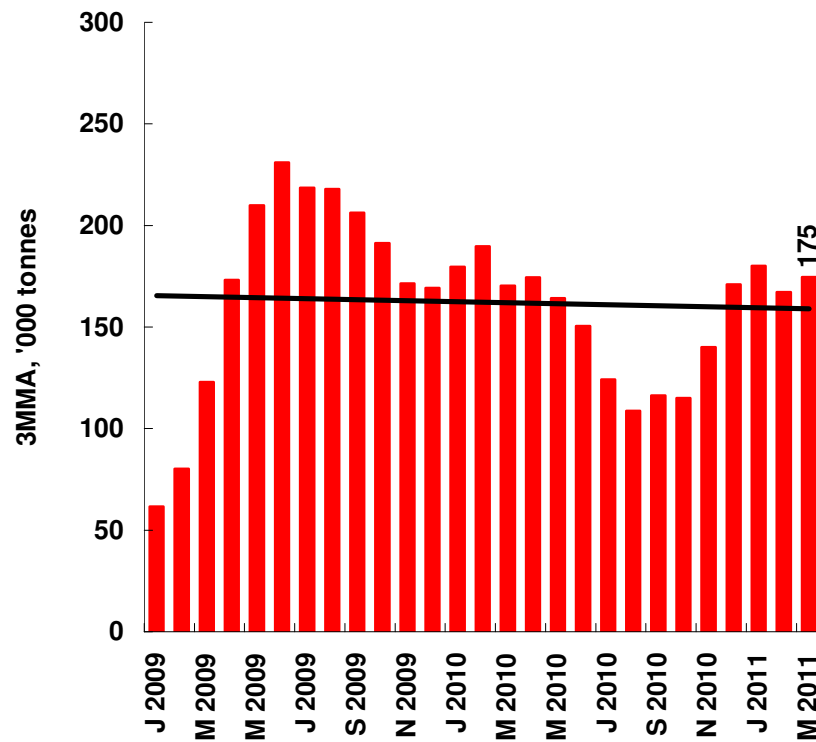


Source: AISI, Eurofer, IBS, ISSF, KOSA, TSIIA, Macquarie Research, May 2011. Note: 2011-2015 data are forecasts

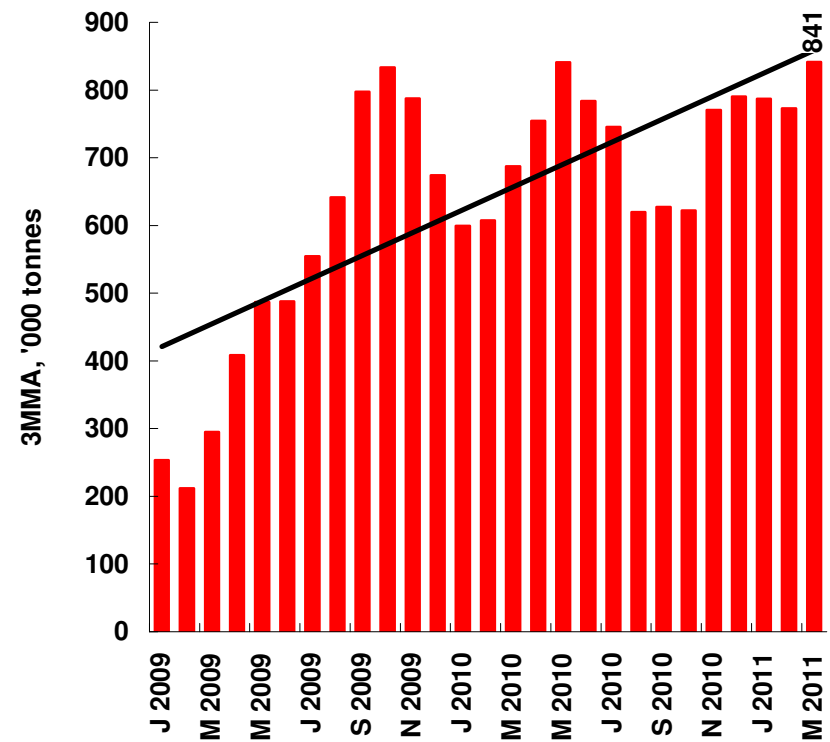


China's FeCr import trend has been flat but imports of chrome ore are on a rising trend; expected to continue

Chinese FeCr net imports



Chinese Cr ore imports

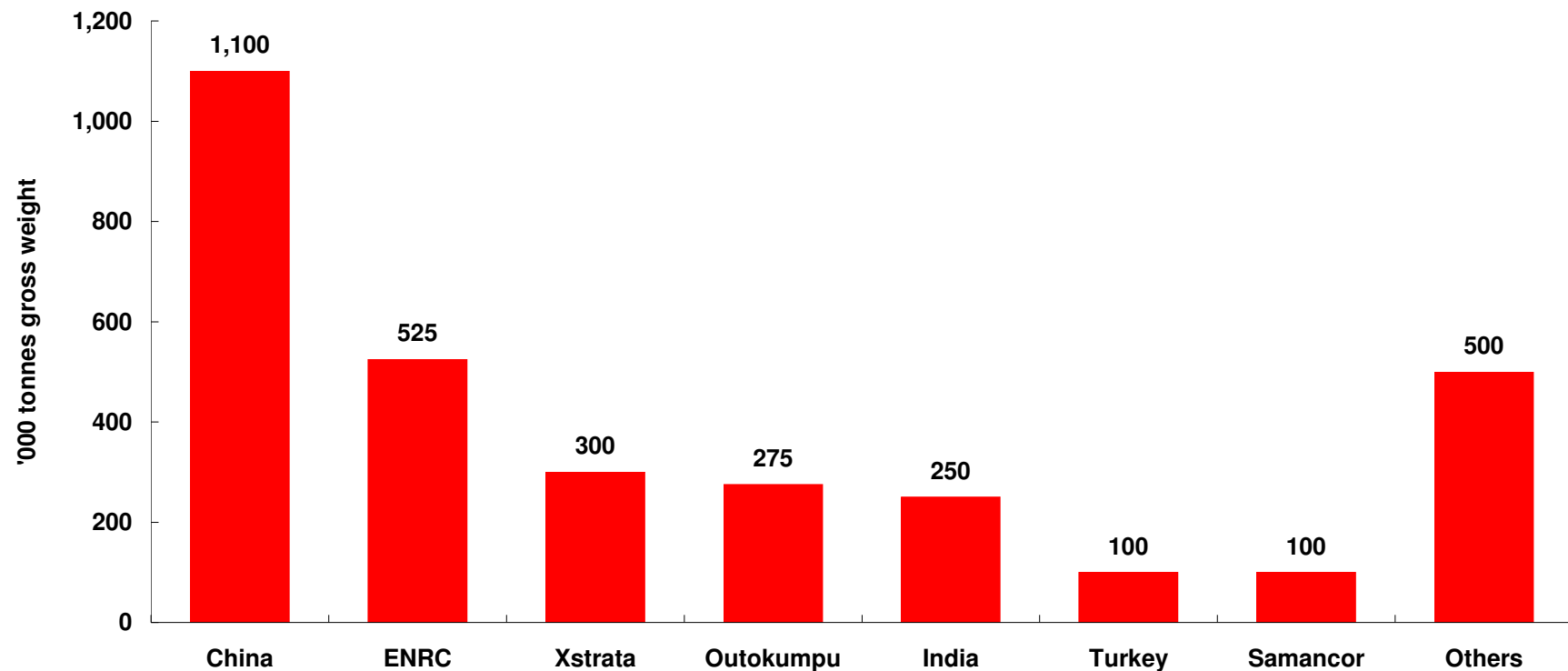


Source: GTIS, Macquarie Research, May 2011. Note: all data are gross weight



China is expected to lead expansion of FeCr output over next five years

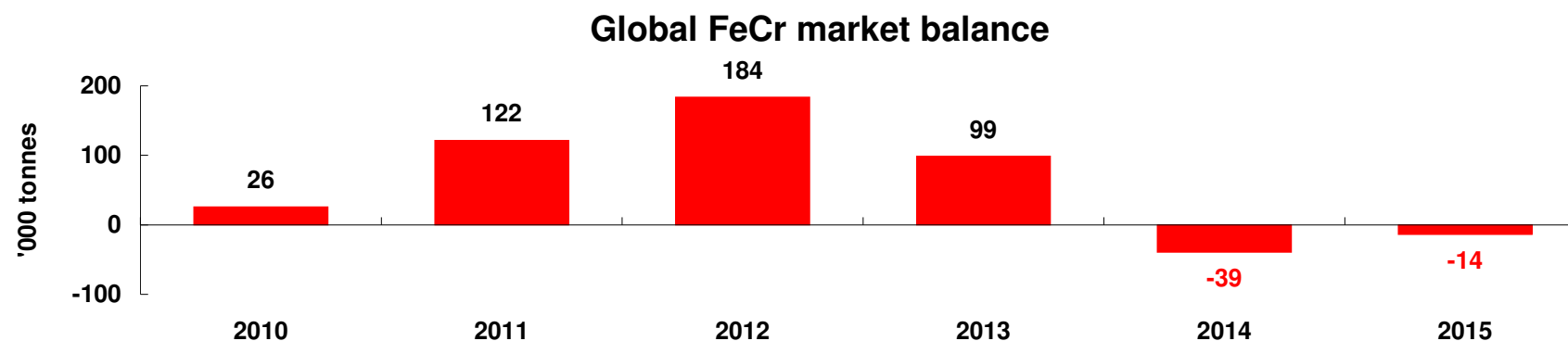
Forecast expansions of HC FeCr production 2010-2015



Source: Macquarie Research, May 2011. Note: data are forecasts



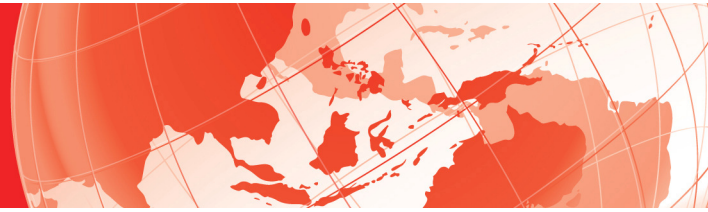
Macquarie's FeCr market balance – market in surplus over next two-to-three years



Global FeCr market balance ('000 tonnes)

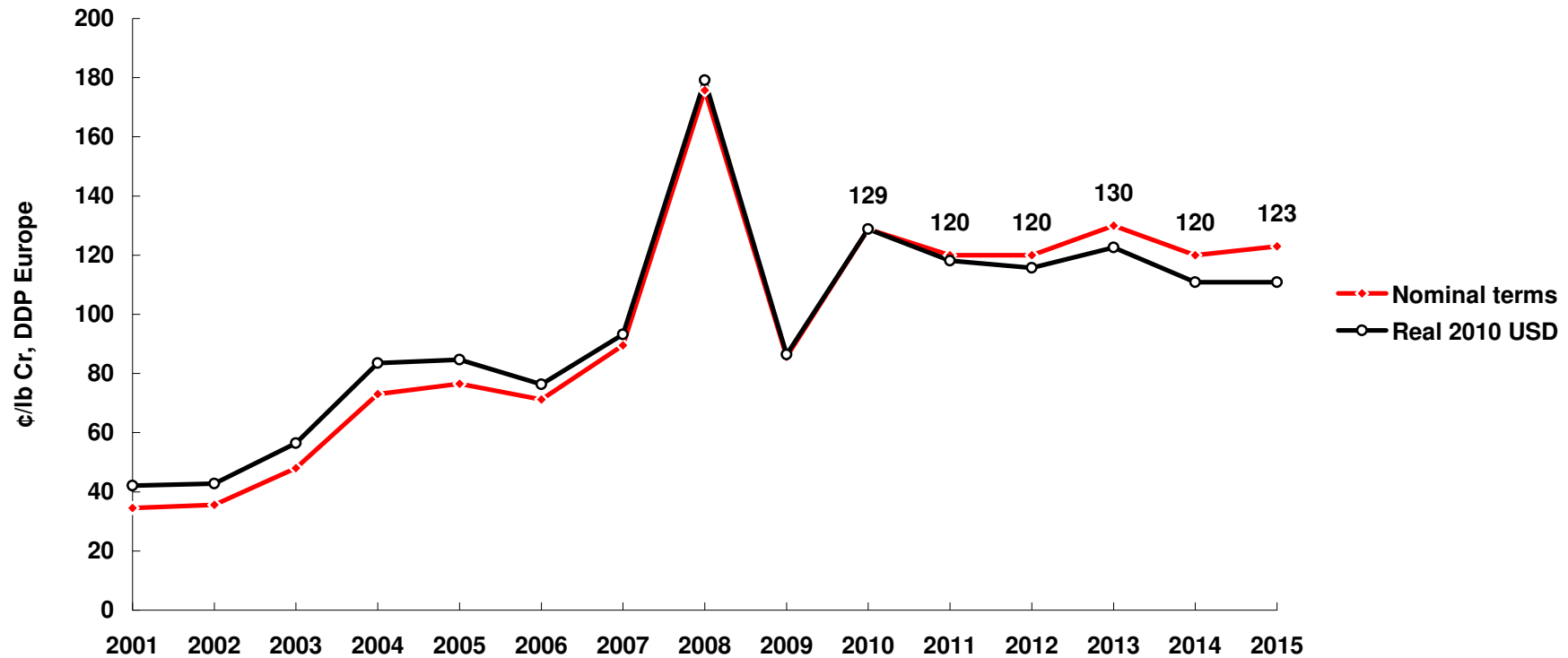
	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>
Production	8,540	9,470	9,954	10,341	10,799	11,420
Consumption	8,514	9,348	9,770	10,242	10,838	11,434
Balance	26	122	184	99	-39	-19

Source: Macquarie Research, May 2011. Note: 2011-2015 data are forecasts

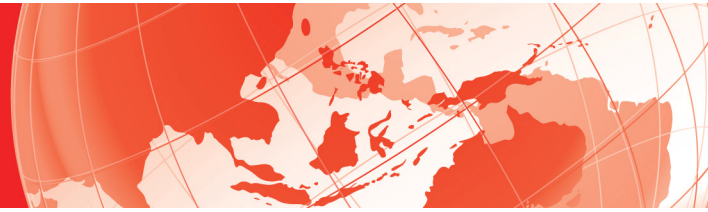


FeCr prices are forecast to increase in 2011, remaining high by historic standards in future

Charge chrome prices

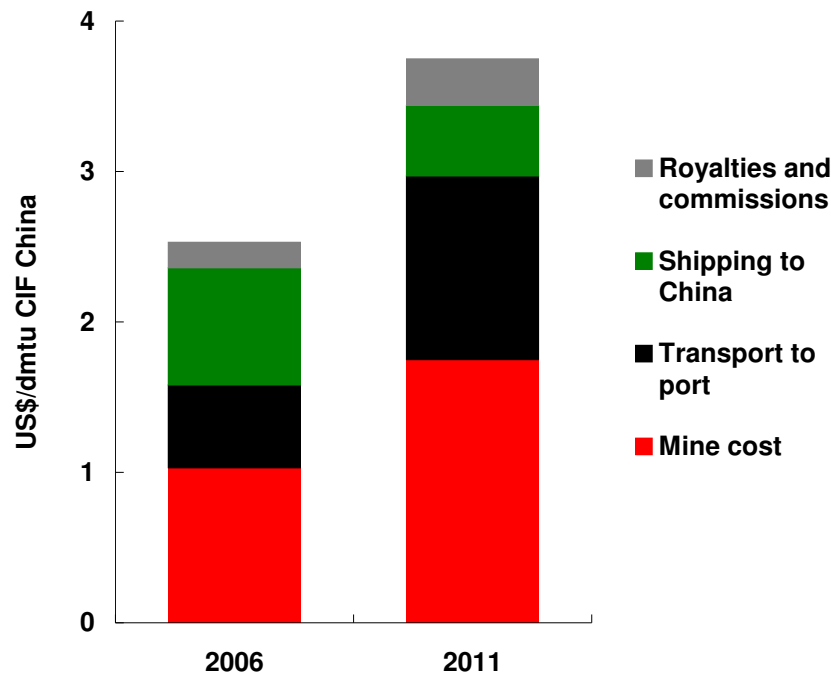


Source: CRU, Macquarie Research, May 2011. Note: 2011-2015 data are forecasts

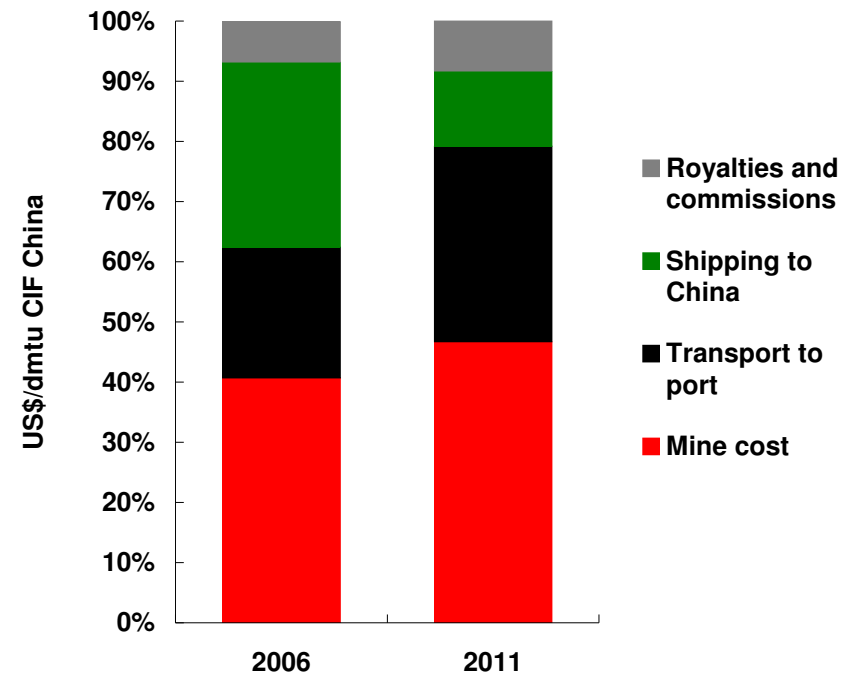


Average Mn ore cash production costs rise 50% from 2006-11; mining and inland transport are key drivers

Mn ore production costs
- global average



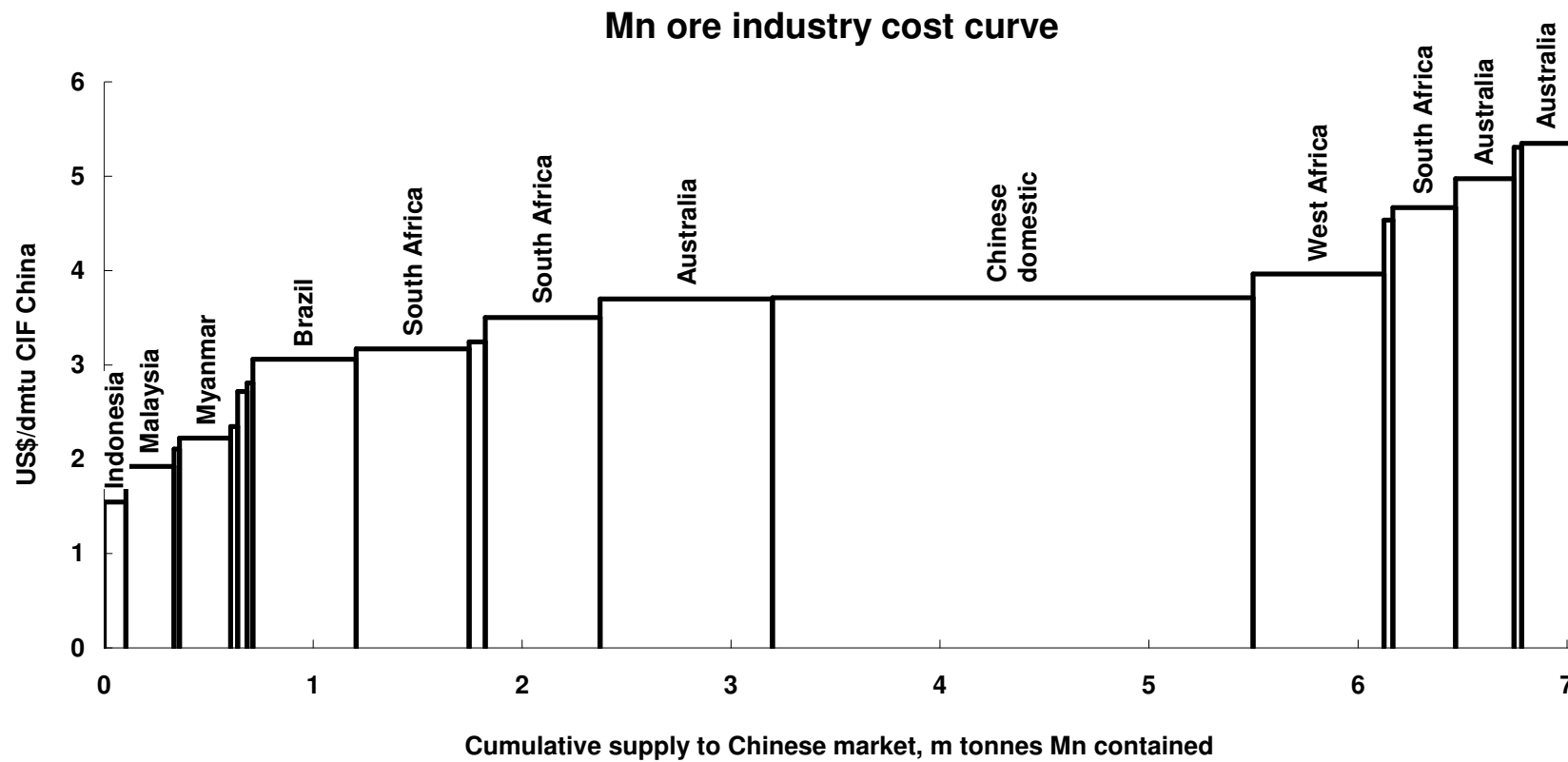
Mn ore production costs
- global average



Source: SBB, Macquarie Research, May 2011



2011 Mn ore industry cash cost curve



Source: SBB, Macquarie Research, May 2011



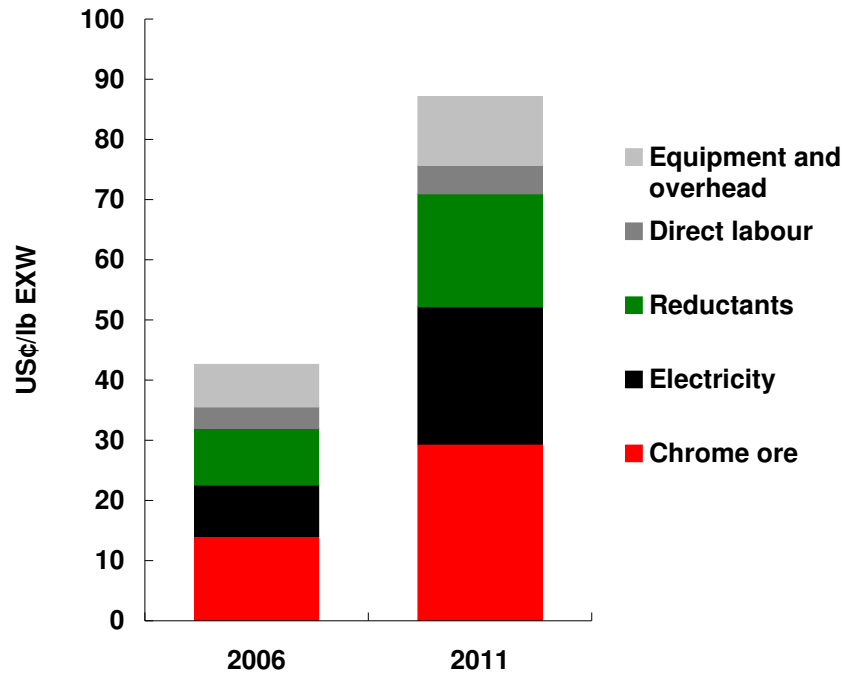
Mn ore costs: summary of key developments

- Average Mn ore cash costs increase from ~US\$2.50/dmtu to ~US\$3.70/dmtu over past five years on a CIF China basis
- Industry cost curve has a steep tail while major the high-volume producers – BHP Billiton, Assmang, Vale , Eramet – are all low-cost
- Highest cost supply at \$5.00-5.50/dmtu CIF China – smaller Australian mines and new producers in the Kalahari. Cost position for S.Africans will increasingly depend on percentage of shipments that need to be trucked from the Kalahari to port
- Emerging low-grade producers in Asia (Myanmar, Indonesia, Malaysia) are believed to be low-cost at sub-US\$3/dmtu CIF China due to their proximity to China plus frugal operations. There is little sustaining capex and this is not a tenable cost position if such supplies are to be significantly expanded

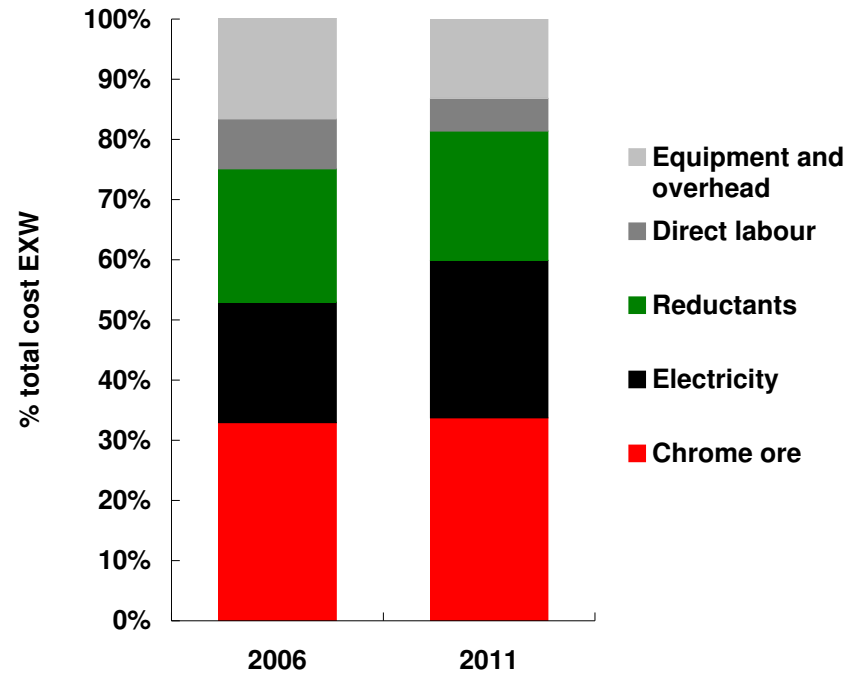


Average FeCr cash production costs double from 2006-11; raw materials and power are key drivers

**FeCr production costs
- global average**



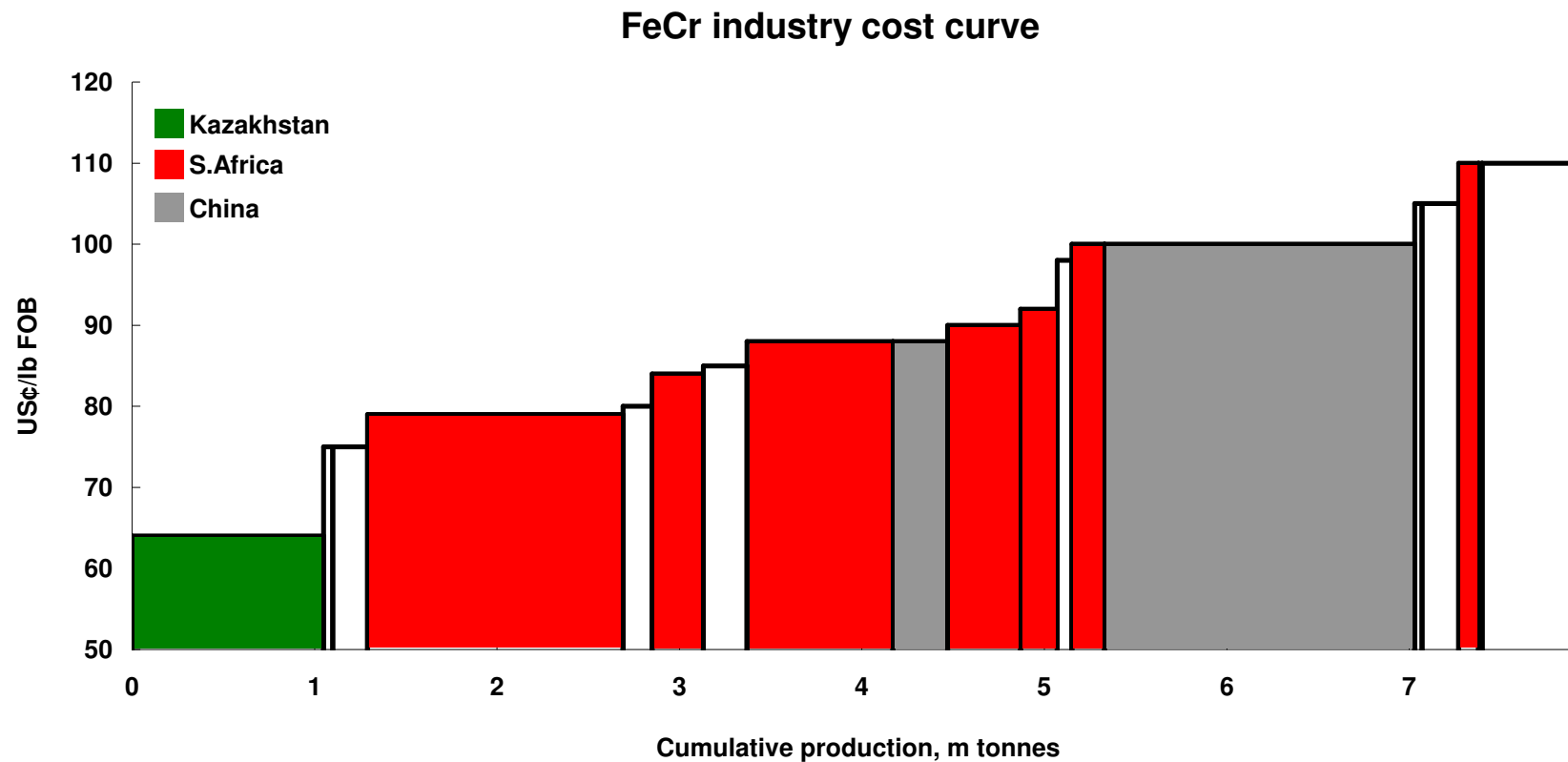
**FeCr production costs
- global average**



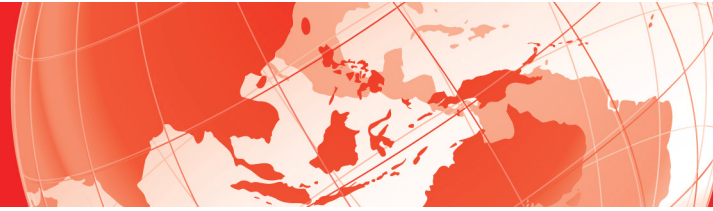
Source: SBB, Macquarie Research, May 2011. Note: data are for HC and charge FeCr



2011 FeCr industry cash cost curve



Source: SBB, Macquarie Research, May 2011. Note: data are for HC and charge FeCr



FeCr costs: summary of key developments

- Average FeCr ex-works production costs up from ~40¢/lb to ~85¢/lb over last five years
- Significant loss of competitiveness for S.Africa. There is little difference now between costs of S.Africans and non-integrated Chinese and Indian FeCr producers
- Highest cost supply needs 100-110 c/lb FOB (non-integrated Chinese, Indians and S.Africans). This represents ~30% of global production
- Power tariffs in South Africa will continue to rise at ~25% pa for next few years and will cause further significant deterioration in competitiveness
- Kazakh production is now very well established as by far the lowest cost suppliers; well placed to expand at very competitive cost

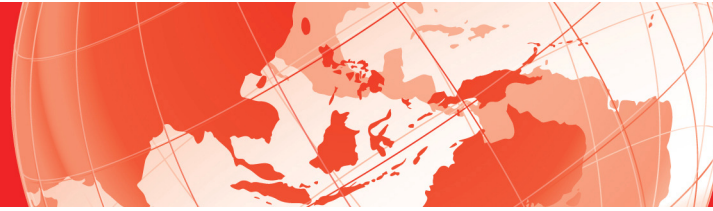


Mn ore market outlook: summary

- Mn ore price currently under pressure from strong supply, high stocks. However, production – trade data contrasts suggest supply side pressure may soon ease, although steel output also likely to dip short term
- Don't doubt demand – outlook for Mn ore demand is positive, in our view, driven steel consumption in ongoing urbanisation and industrialisation of China. However, Mn intensity in steelmaking may not rise much further
- New mine output will be needed, which will depend on higher prices to incentivise investment. S.Africa probably has a key role to play but currently infrastructure constrained
- However, China's Mn-rich slag supplies and the way its steelmakers

Source: Macquarie Research, May 2011

use



FeCr market outlook: summary

- Don't doubt demand – outlook for FeCr demand is positive, in our view, driven by ongoing urbanisation and industrialisation of China
- China is expected to pursue imports of raw materials from overseas and to increase alloy production at home
- New output will be needed. The most competitive producers are expected to contribute most to increasing production
- Sufficient capacity to maintain market surplus in short-to-medium term, putting prices under some pressure; risk of supply-side shake out in South Africa
- If this happens, prospects for stronger prices in the medium term



Important disclosures:

Recommendation definitions

Macquarie - Australia/New Zealand

Outperform – return >5% in excess of benchmark return (>2.5% in excess for listed property trusts)
Neutral – return within 5% of benchmark return (within 2.5% for listed property trusts)
Underperform – return >5% below benchmark return (>2.5% below for listed property trusts)

Macquarie - Asia

Outperform – expected return >+10%
Neutral – expected return from -10% to +10%
Underperform – expected <-10%

Macquarie First South - South Africa

Outperform – return > 10% in excess of benchmark return
Neutral – return within 10% of benchmark return
Underperform – return > 10% below benchmark return

Macquarie - Canada

Outperform – return > 5% in excess of benchmark return
Neutral – return within 5% of benchmark return
Underperform – return > 5% below benchmark return

Macquarie - USA

Outperform (Buy) – return > 5% in excess of benchmark return
Neutral (Hold) – return within 5% of benchmark return
Underperform (Sell) – return > 5% below benchmark return

Recommendation – 12 months

Note: Quant recommendations may differ from Fundamental Analyst recommendations

Volatility index definition*

This is calculated from the volatility of historic price movements.

Very high–highest risk – Stock should be expected to move up or down 60-100% in a year – investors should be aware this stock is highly speculative.

High – stock should be expected to move up or down at least 40-60% in a year – investors should be aware this stock could be speculative.

Medium – stock should be expected to move up or down at least 30-40% in a year.

Low–medium – stock should be expected to move up or down at least 25-30% in a year.

Low – stock should be expected to move up or down at least 15-25% in a year.

* Applicable to Australian/NZ stocks only

Financial definitions

All "Adjusted" data items have had the following adjustments made:

Added back: goodwill amortisation, provision for catastrophe reserves, IFRS derivatives & hedging, IFRS impairments & IFRS interest expense

Excluded: non recurring items, asset revals, property revals, appraisal value uplift, preference dividends & minority interests

EPS = adjusted net profit /efpowa*

ROA = adjusted ebit / average total assets

ROA Banks/Insurance = adjusted net profit /average total assets

ROE = adjusted net profit / average shareholders funds

Gross cashflow = adjusted net profit + depreciation
*equivalent fully paid ordinary weighted average number of shares

All Reported numbers for Australian/NZ listed stocks are modelled under IFRS (International Financial Reporting Standards).

Recommendation proportions – For quarter ending 31 March 2010

	AU/NZ	Asia	RSA	USA	CA	EUR	
Outperform	50.55%	62.20%	42.25%	42.39%	62.16%	46.74%	(for US coverage by MCUSA, 6.53% of stocks followed are investment banking clients)
Neutral	36.63%	19.02%	47.89%	50.35%	31.89%	34.78%	(for US coverage by MCUSA, 9.62% of stocks followed are investment banking clients)
Underperform	12.82%	18.78%	9.86%	7.27%	5.95%	18.48%	(for US coverage by MCUSA, 0.0% of stocks followed are investment banking clients)



Company Specific Disclosures:

Important disclosure information regarding the subject companies covered in this report is available at www.macquarie.com/research/disclosures.

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