Is there a limit to the market share of South African chrome units?

Kevin Fowkes
Managing Consultant

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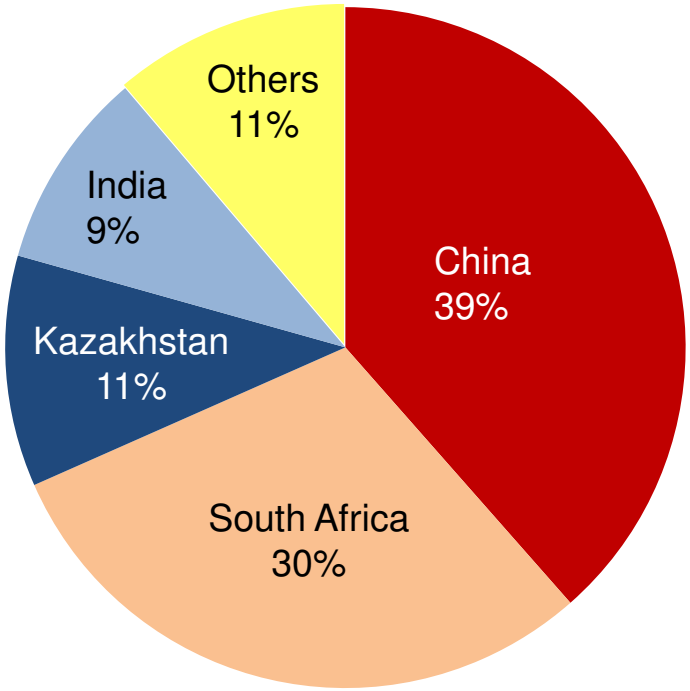
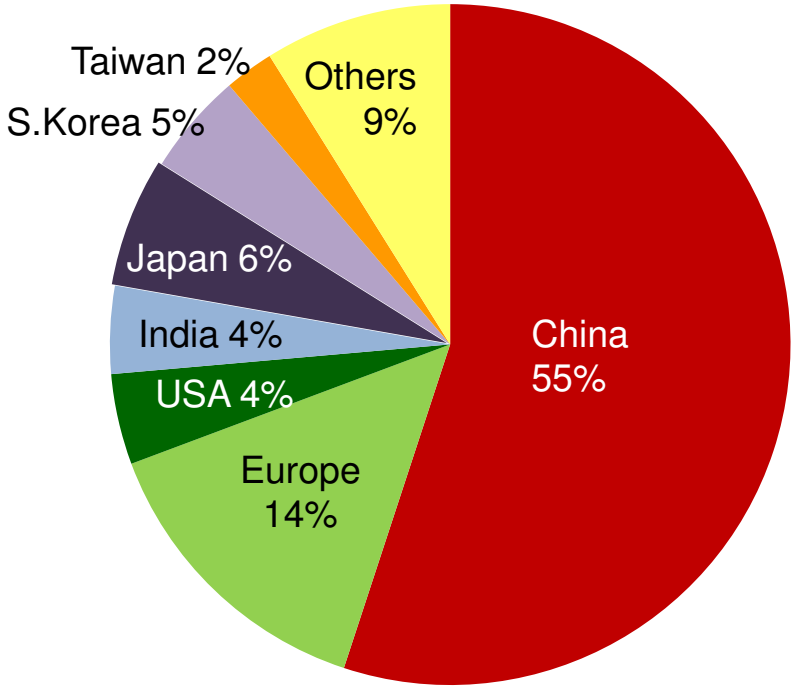
World FeCr supply and demand – increasing domination by China (though it remains a substantial net importer)

Global FeCr production



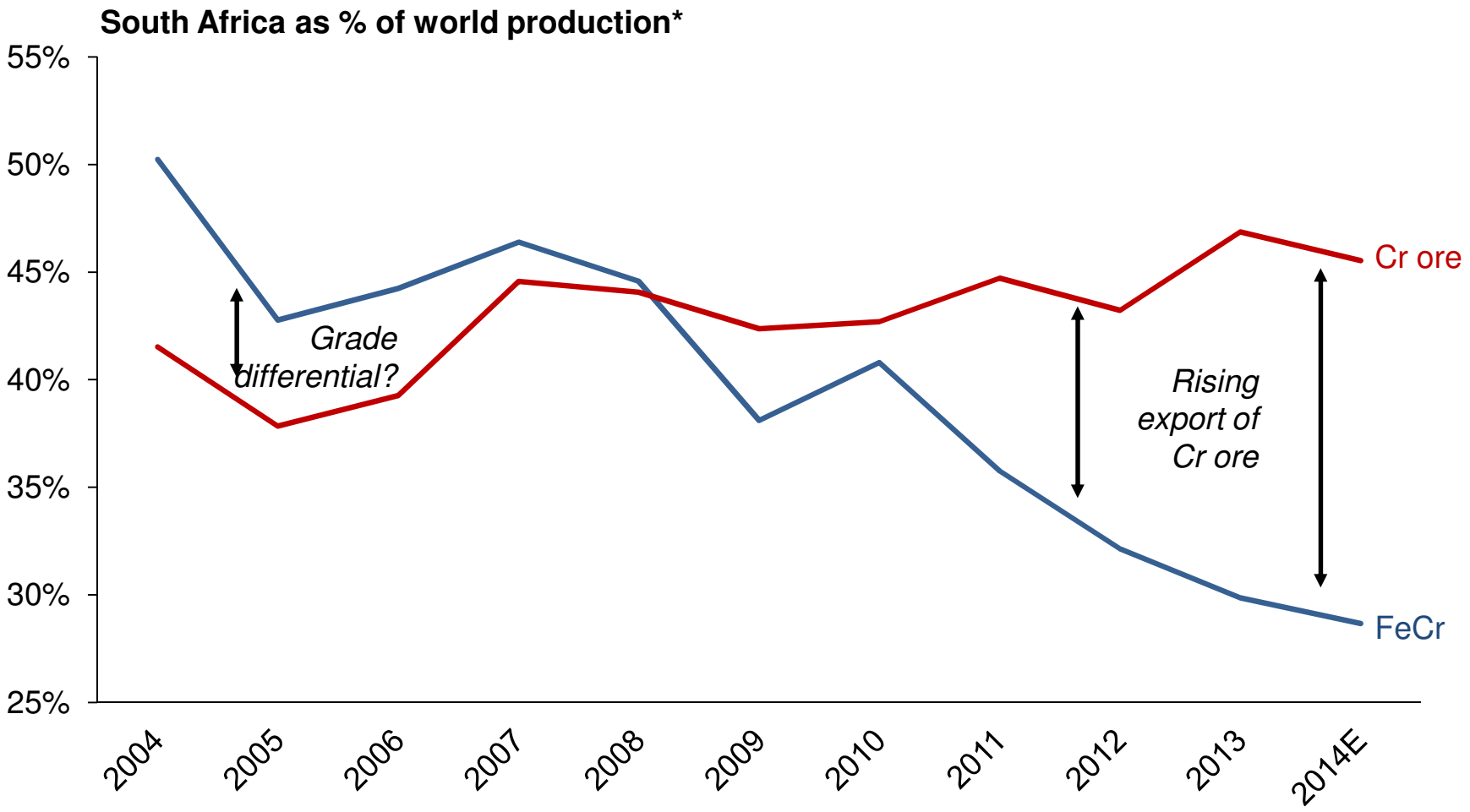
Global FeCr apparent consumption



*Total – 10.4 million tonnes (2013)**

* excludes medium and low carbon grades

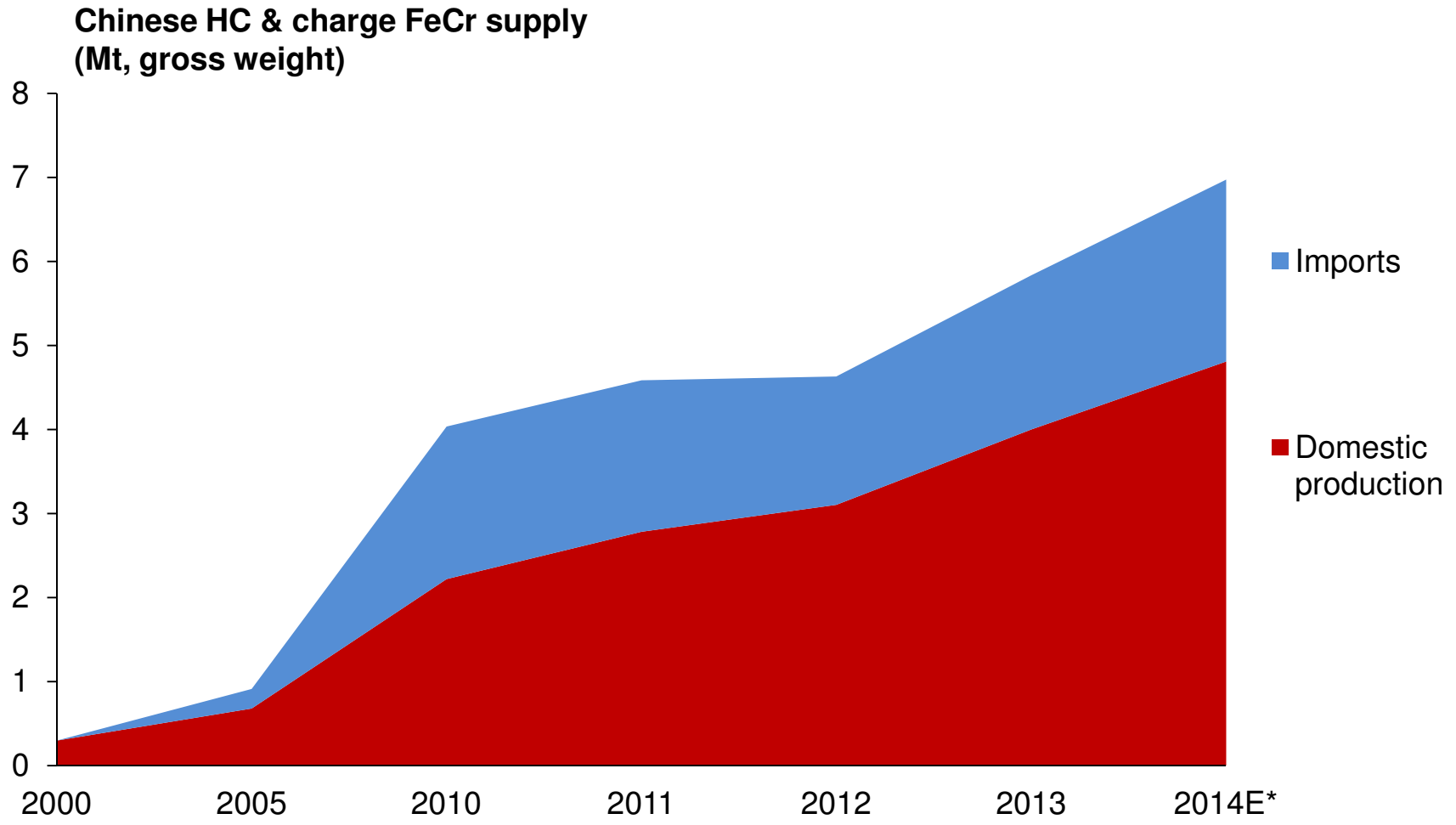
Over the past 10 years, South Africa's share of global chrome unit supply has risen just marginally…its share of world FeCr output has collapsed



Globally, South Africa's share of chrome unit supply does not appear to be rising inexorably …but China shows a somewhat different picture

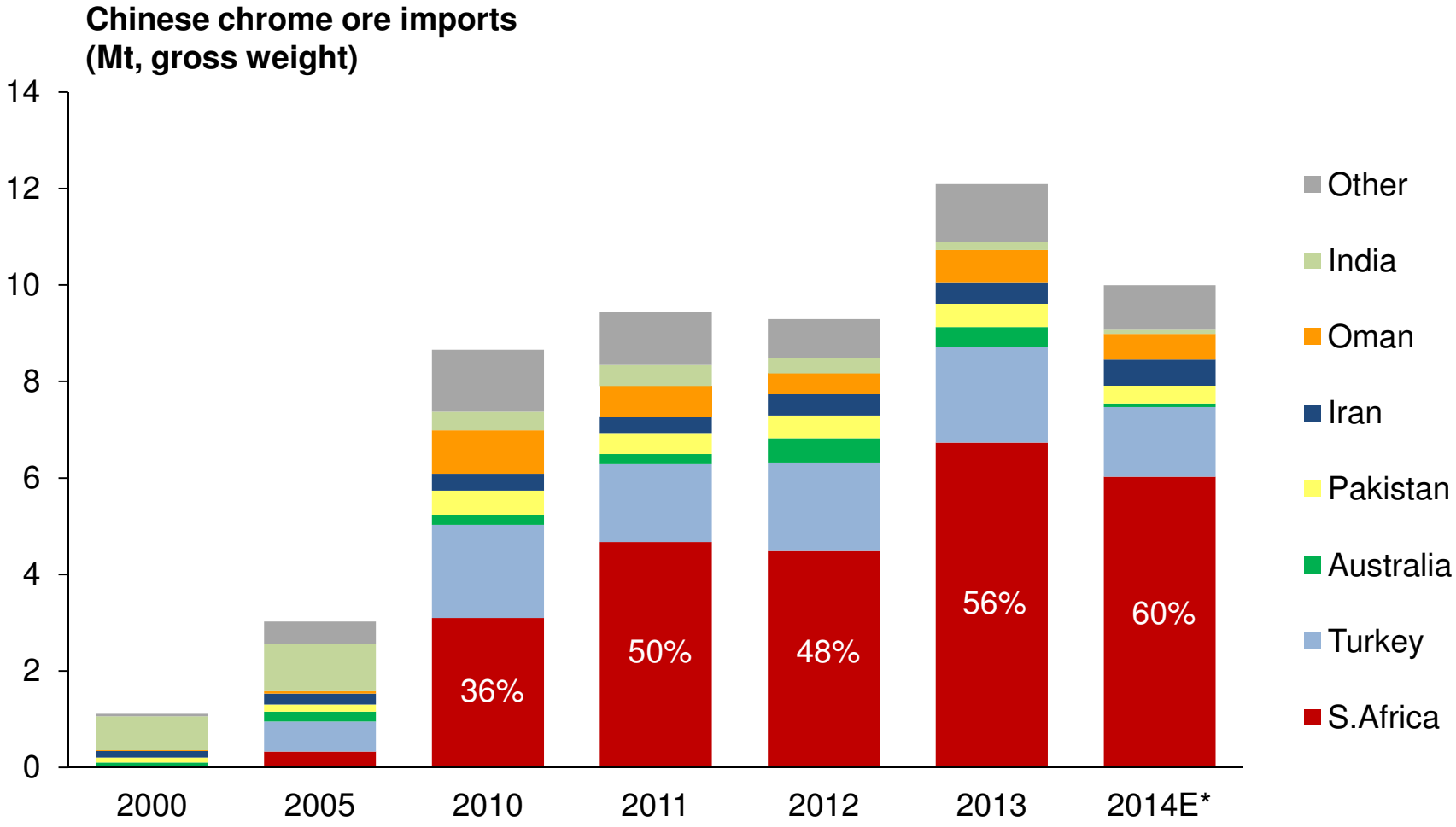
* gross weight basis

Supply of HC & charge FeCr in China looks to be approx. 7Mt in 2014, 70% from domestic producers and 30% from imports



* annualised data from Jan-Jul 2014

South Africa's share of Chinese chrome ore imports has risen from 36% in 2010 to 60% in 2014*



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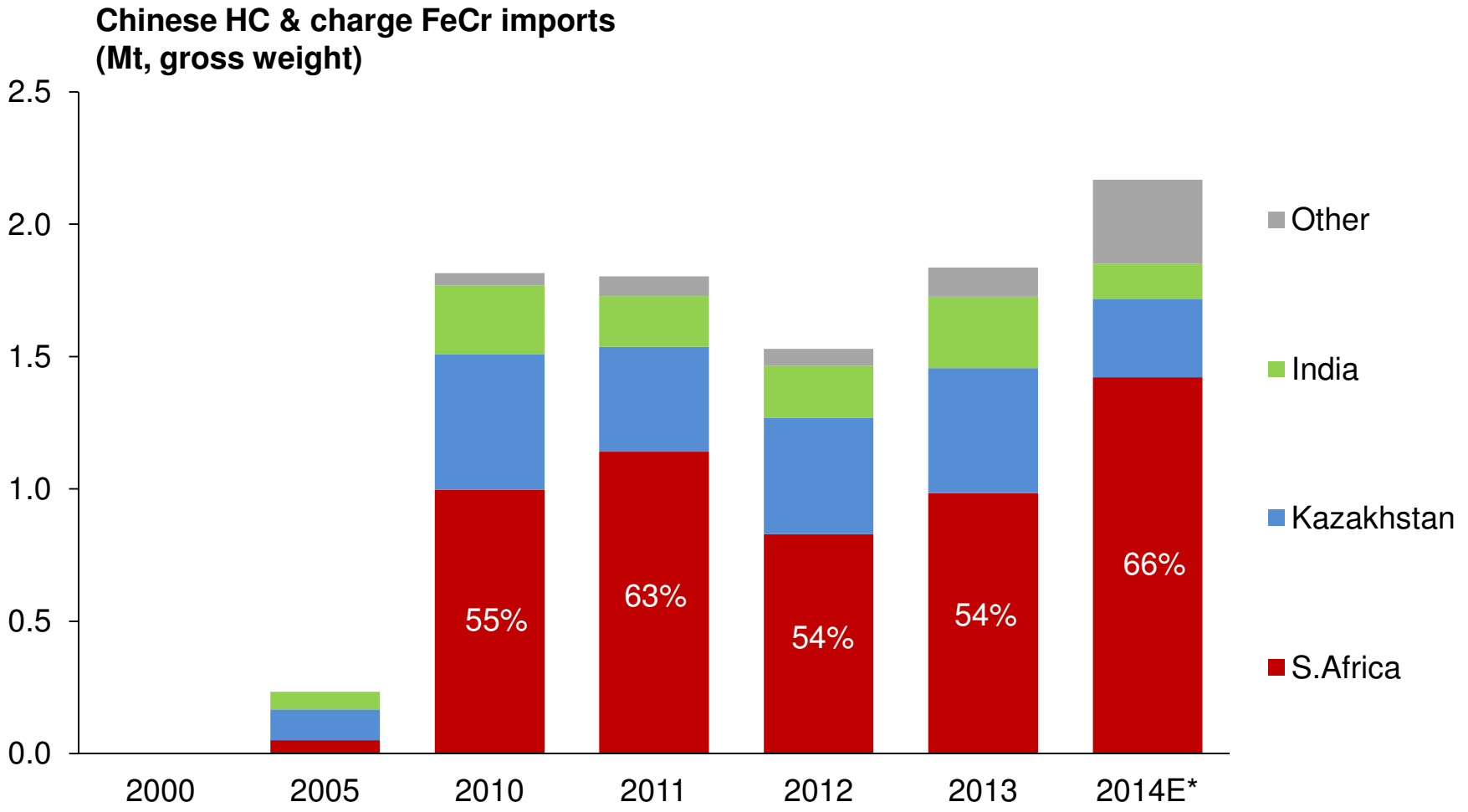
Chinese imports of FeCr have risen by approx. 20% so far in 2014*, with higher imports from South Africa responsible for the increase



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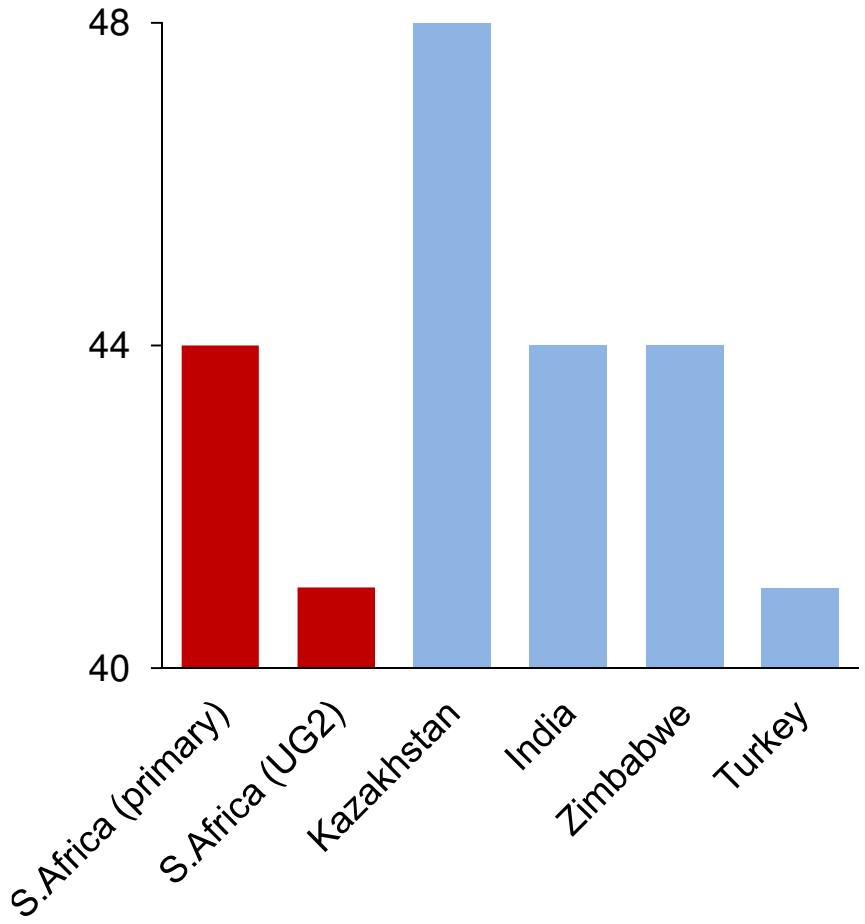
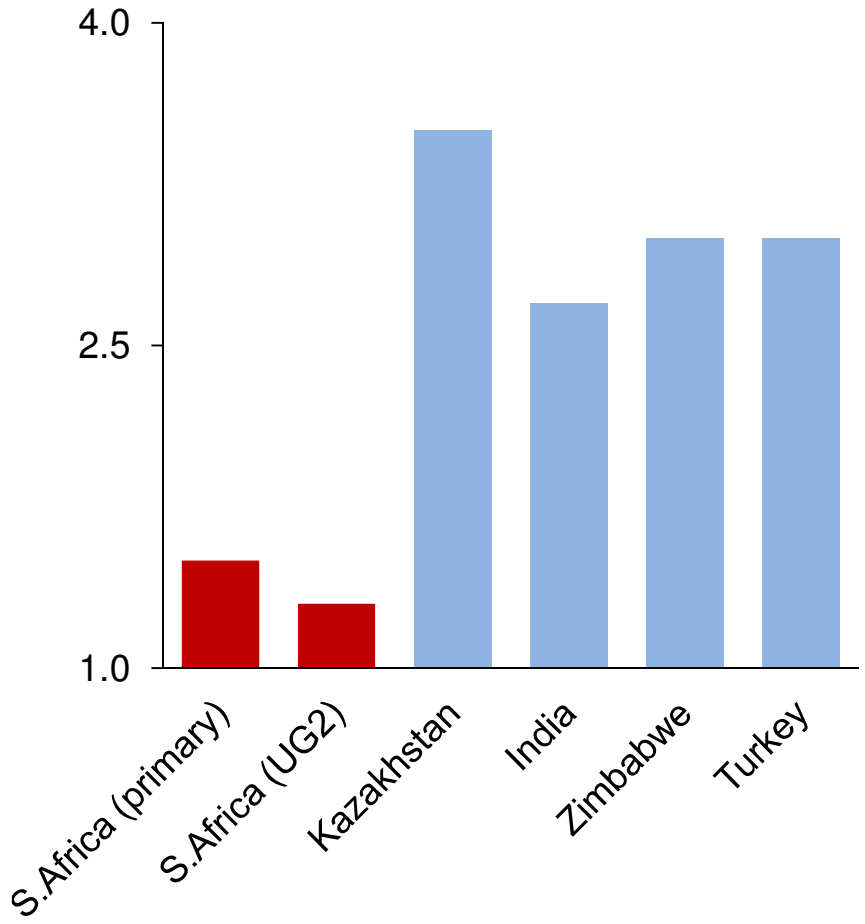
South African ores are not devalued *per se* by a low Cr content, but by their very low Cr to Fe ratio

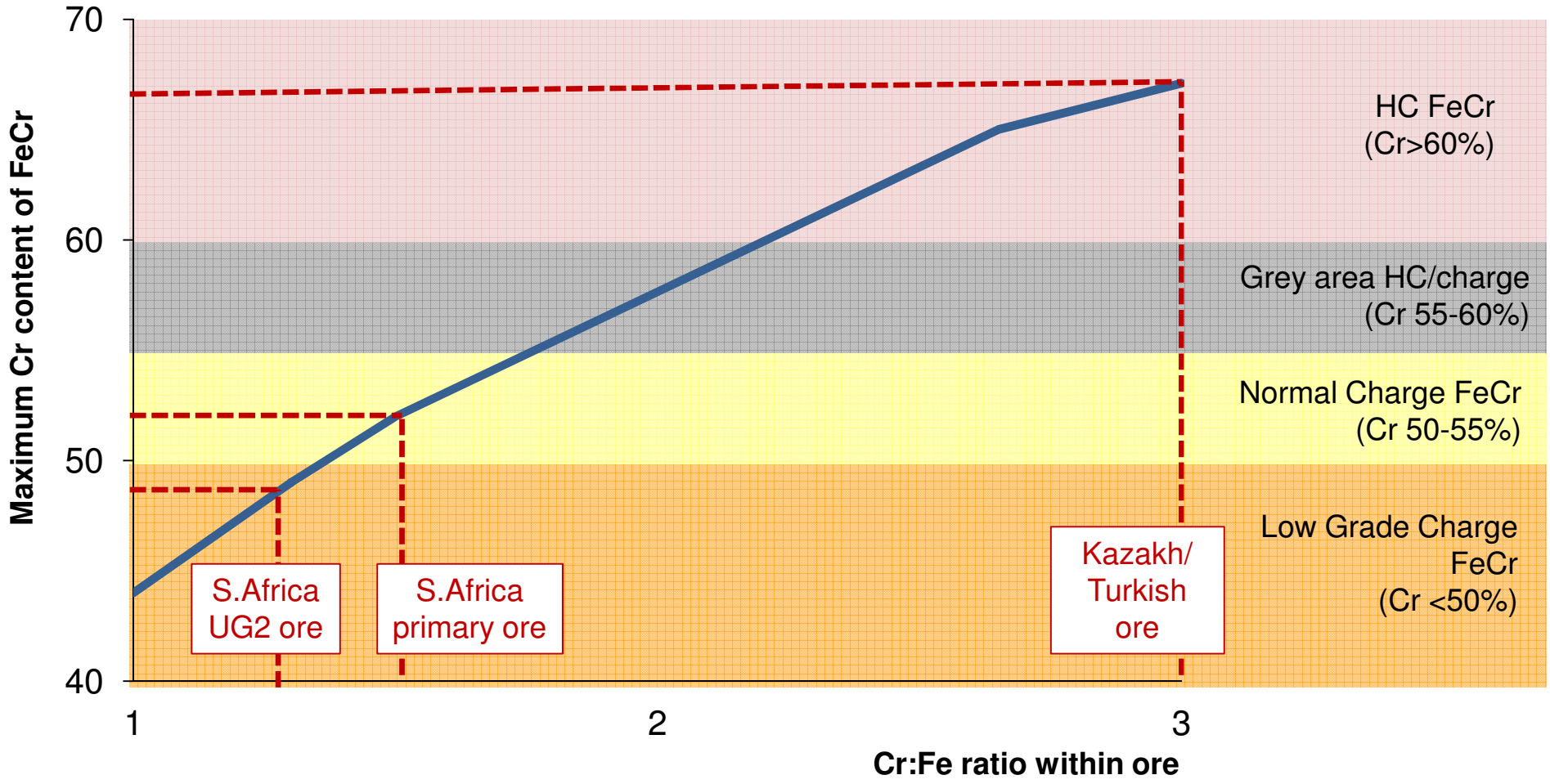
Average/typical Cr_2O_3 content of selected chrome ore concentrates (%)



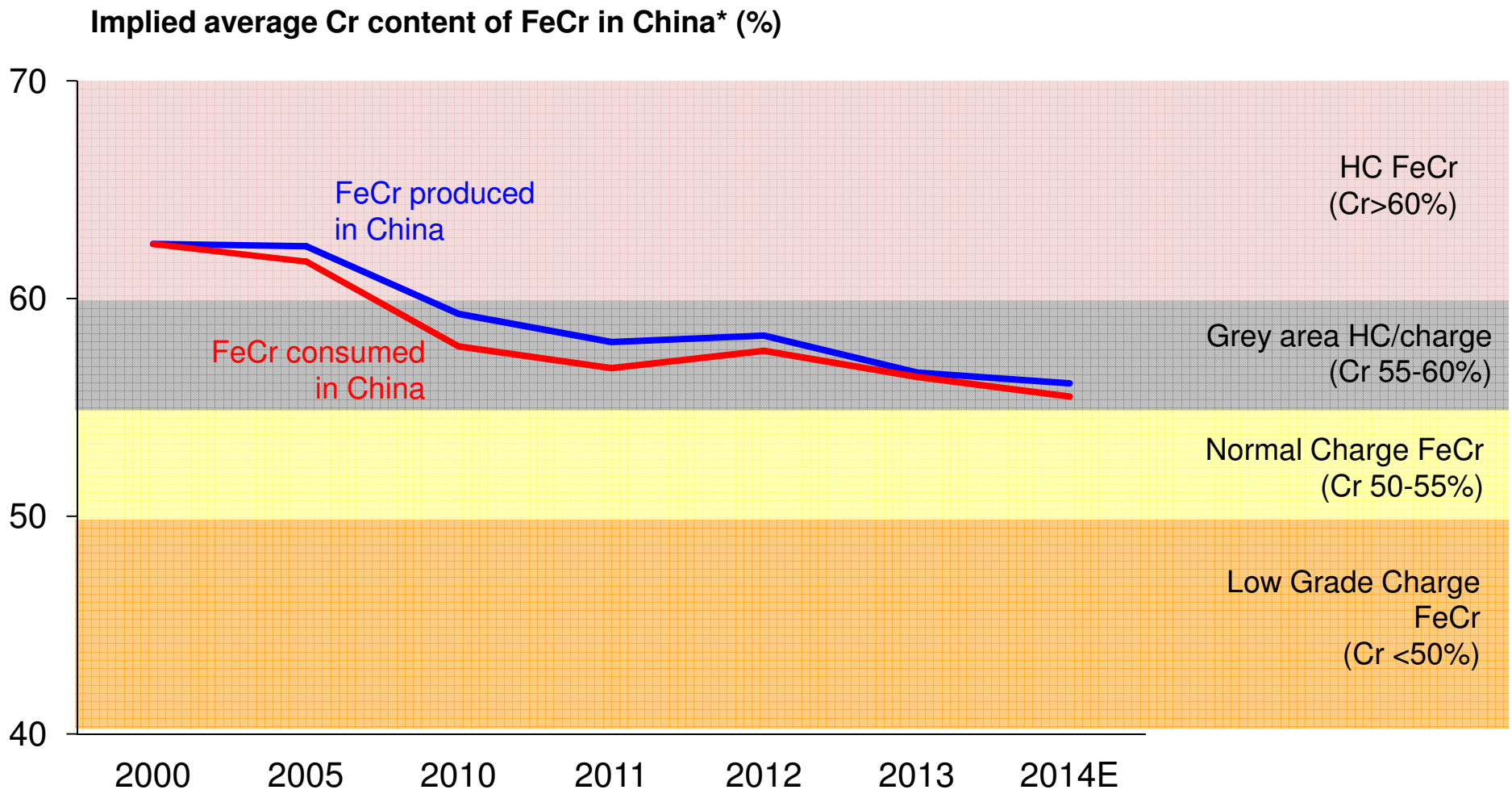
Average/typical Cr:Fe ratio of selected chrome ore concentrates (%)



The Cr:Fe ratio within a chrome ore is the key determinant of the grade of FeCr which can be produced from it



Due to the increasing use of South African ores, the average Cr content of FeCr produced in China has fallen from 63% in 2005 to 56% in 2014



* excludes medium and low carbon grades

Does declining Cr content of FeCr matter to a stainless steel producer?

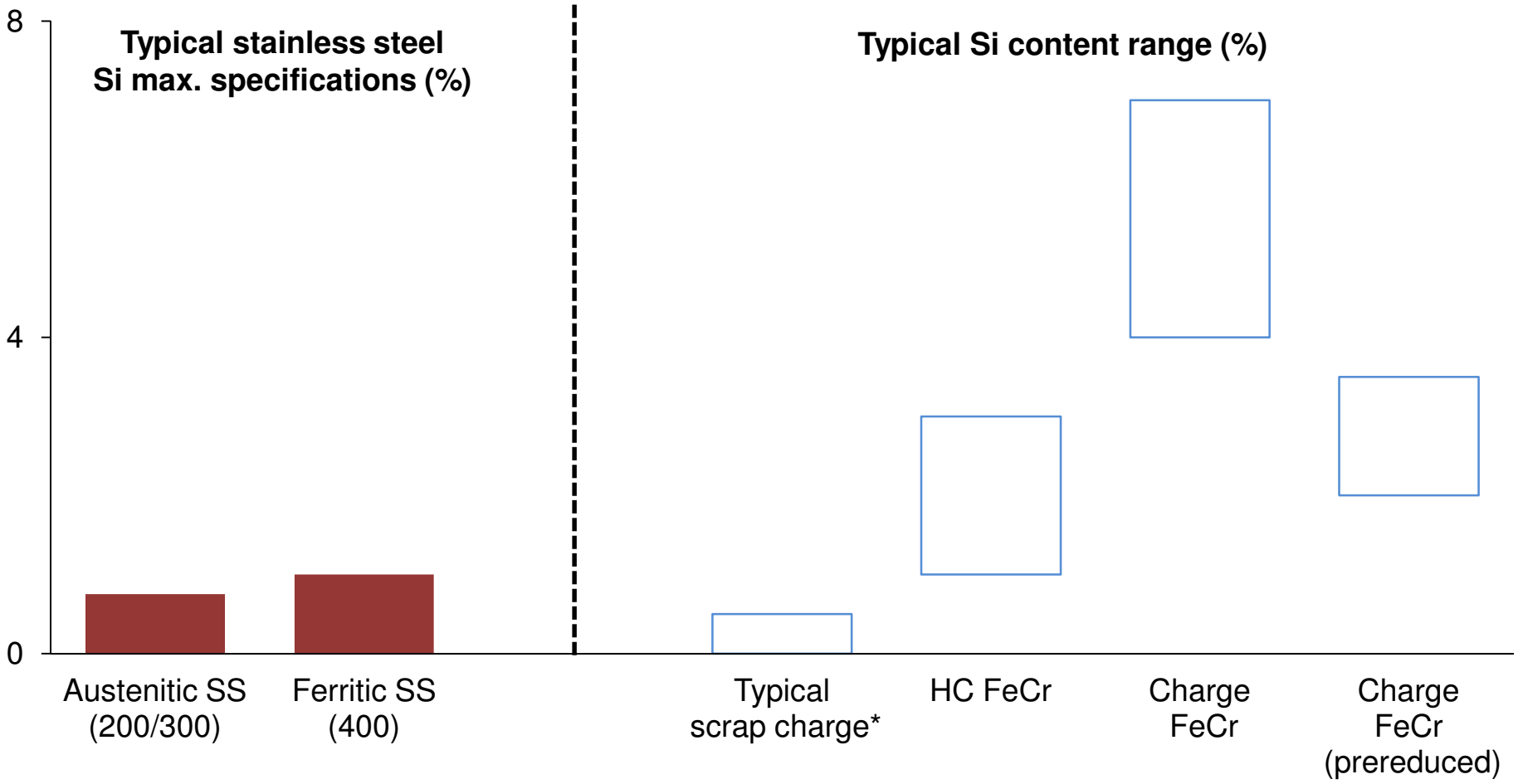
Answer: "It depends"

Key factors are:

- Ability to obtain Cr units from scrap
- Grade of stainless steel produced
- Trade off higher impurities (especially Si) versus more free iron units
- Remember approx 15%* of FeCr used in non-stainless steels

* excludes medium and low carbon grades

FeCr has a much higher Si content than scrap and the max. specification of stainless steels. Charge FeCr has by far the highest Si content



* incorporating a typical blend of both stainless and carbon steels

FeCr has a much higher Si content than scrap and the max. specification of stainless steels. Charge FeCr has by far the highest Si content

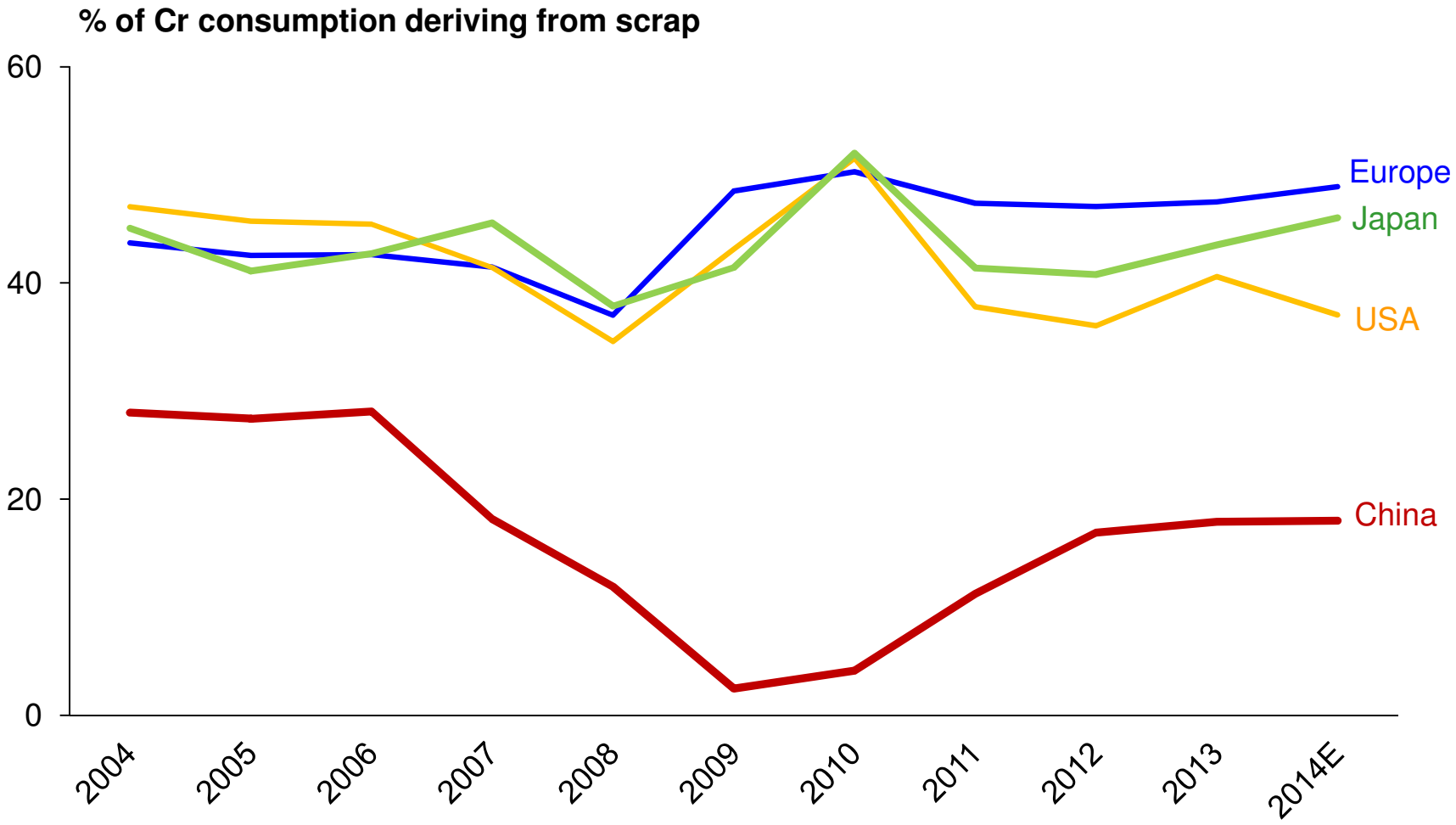
- Charge FeCr naturally has a much higher silicon content than HC FeCr (FeCr produced from ores with a low Cr:Fe ratio generate a less vicious slag)

- **It follows that stainless steel producers using high amounts of scrap are the most flexible to be able to use large volumes of charge FeCr**

- The silicon content of charge FeCr can be reduced to a similar range to HC FeCr using ore pre-reduction technology (eg. Premus)

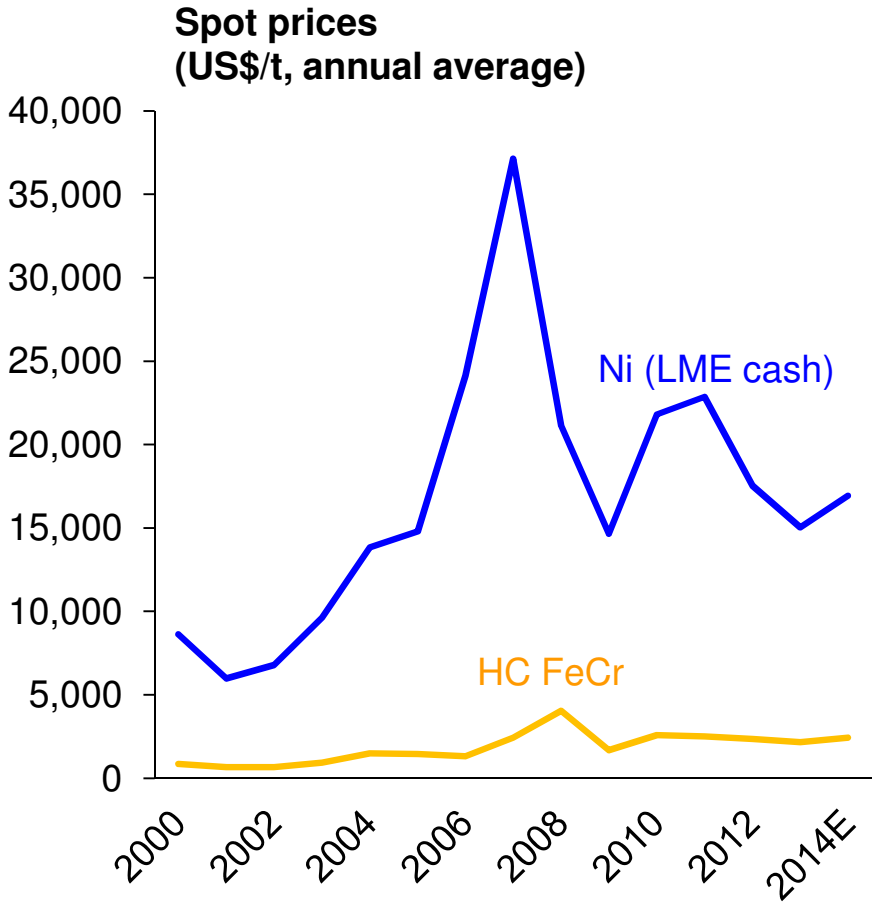
- Silicon can also enter stainless steel from addition of manganese alloys (LC SiMn typically added to stainless steel in many countries in place of EMM)

In developed regions, 40-50% of total Cr consumption derives from scrap. In China, scrap currently accounts for only 18% of Cr consumption



Factors affecting the amount of chromium consumed from scrap (1)

- **Stainless steel scrap prices relative to the price of virgin nickel**



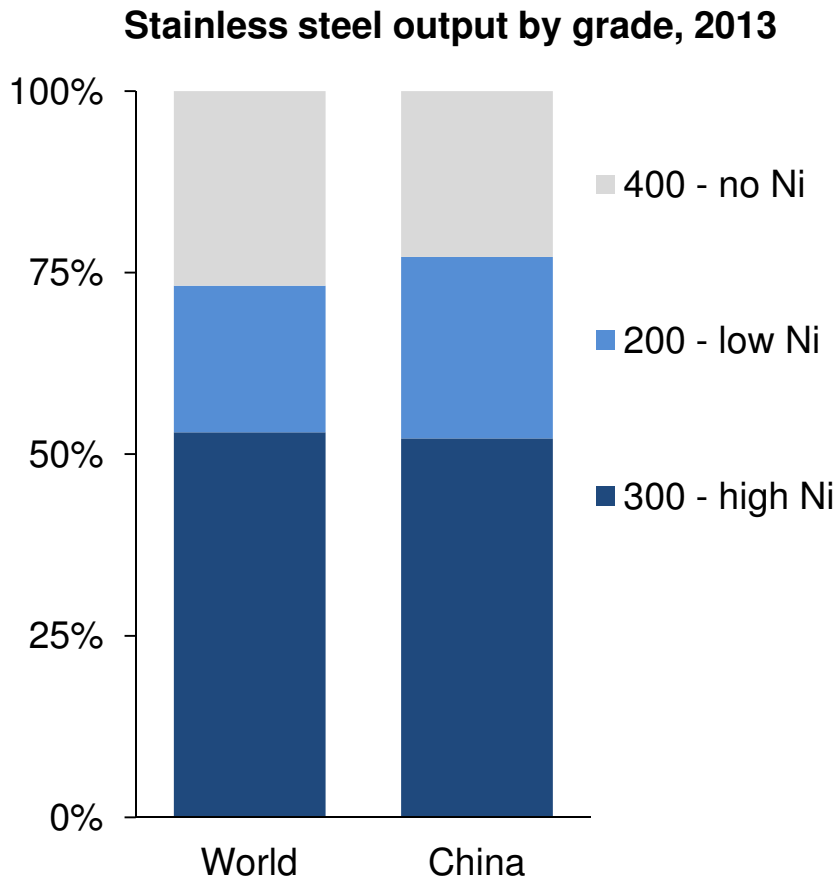
– The prices of both nickel and stainless steel scrap can exhibit considerable volatility

– Nickel is approx. 8 times more valuable than ferrochrome (2014 prices)

Stainless steel scrap is therefore primarily collected/valued for its nickel content, not its chromium content

Factors affecting the amount of chromium consumed from scrap (2)

- **Stainless steel grade mix**



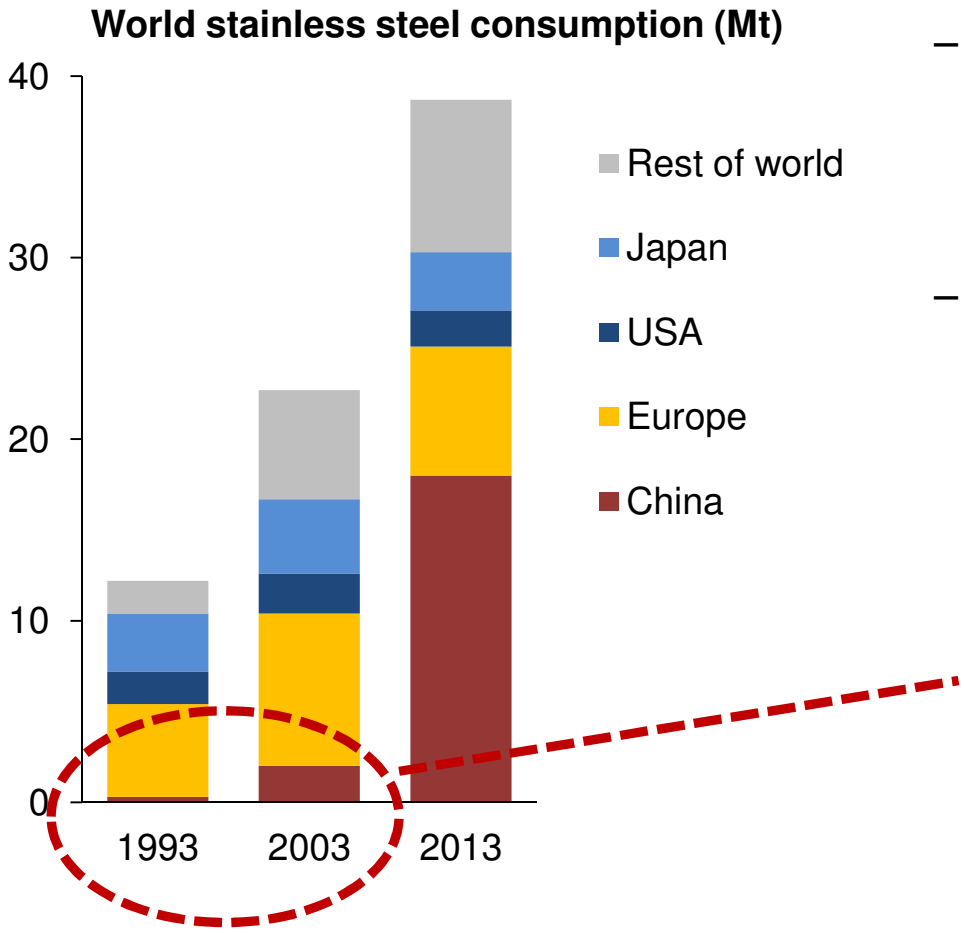
– 300 series grades (austenitics) are by far the most extensive users of stainless steel scrap

– 400 series grades (ferritics) tend to be produced with little or no scrap, because most bundles of stainless scrap tend to be nickel-containing

– 200 series grades are more limited users of scrap, partly due to geography (China dominates global output of these grades)

Factors affecting the amount of chromium consumed from scrap (3)

- **Availability of "obsolete" stainless steel scrap**

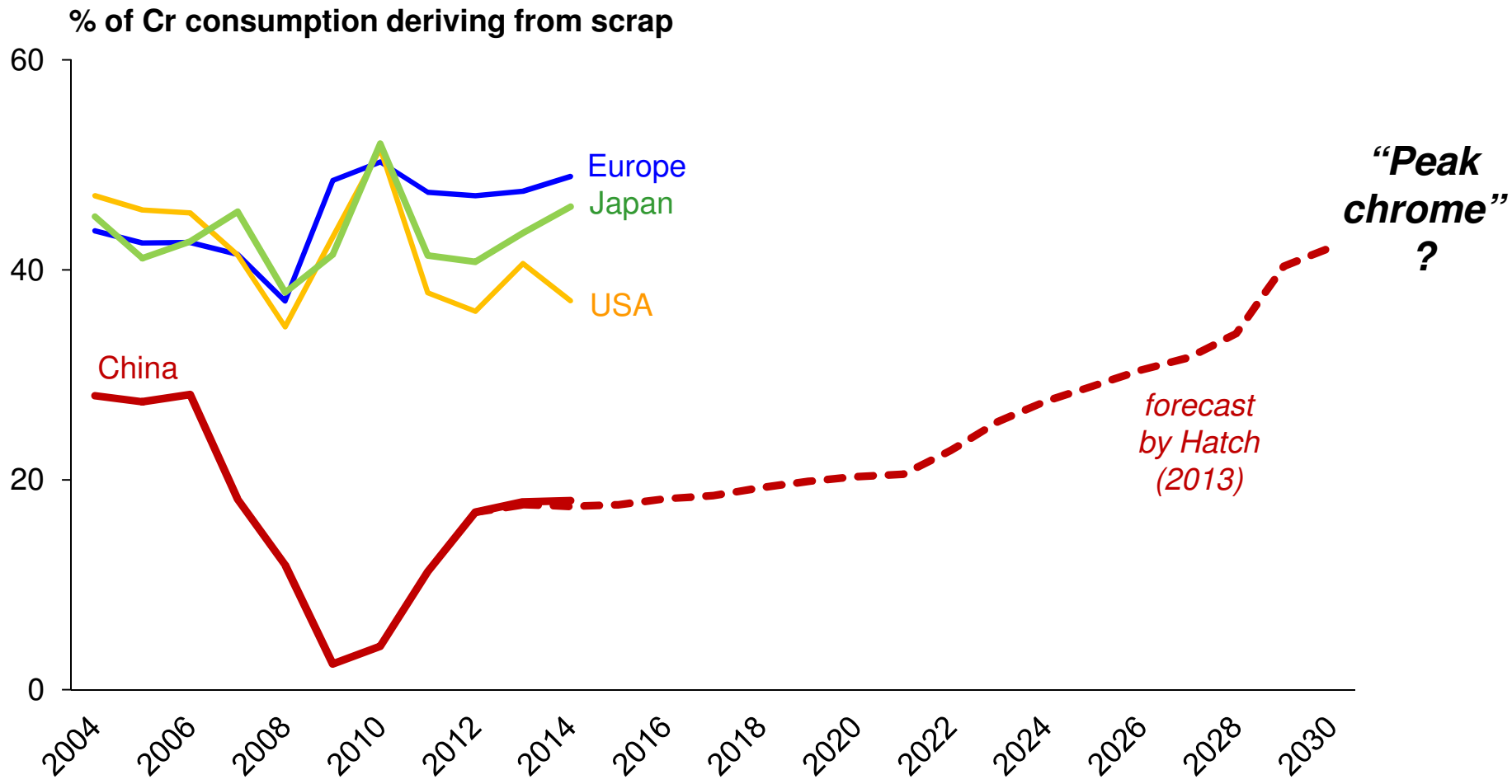


– The largest source of stainless steel scrap comes from obsolete/expired products being scrapped

– Stainless steel products generally have a long life. They are only typically scrapped 10 to 30 years after being consumed

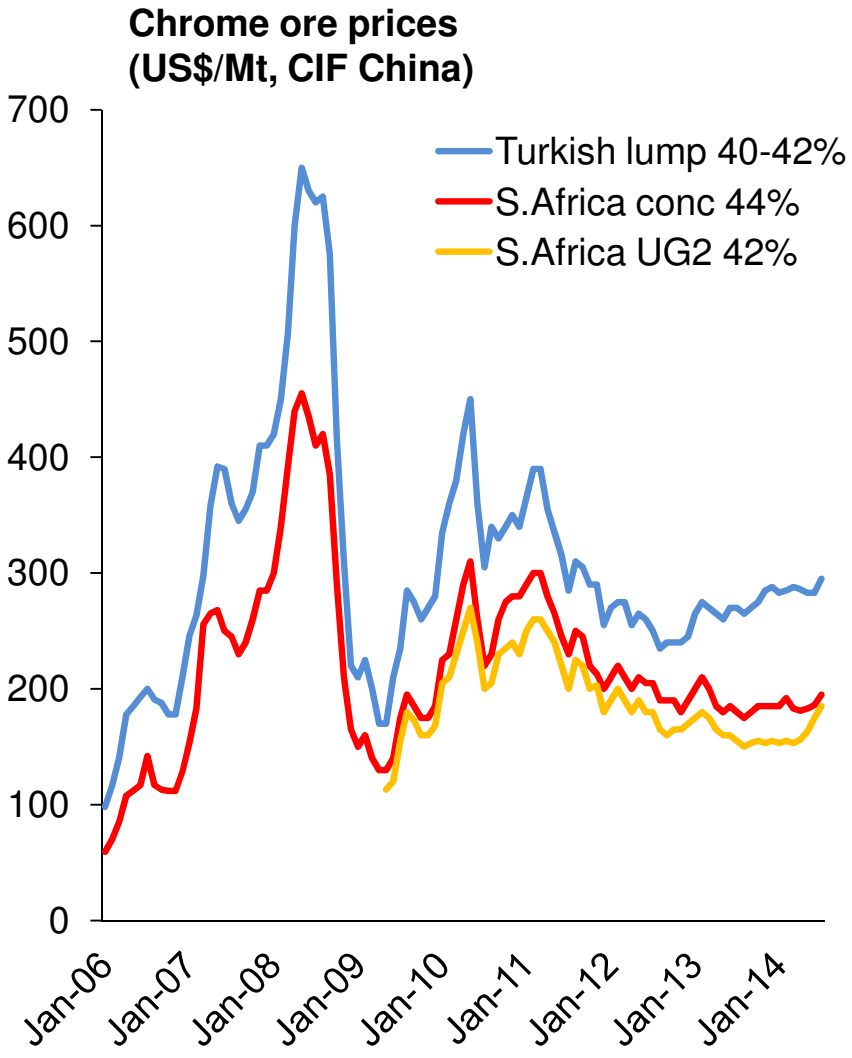
China's generation of stainless steel scrap is currently severely limited, because its stainless steel consumption 10-30 years ago was very low

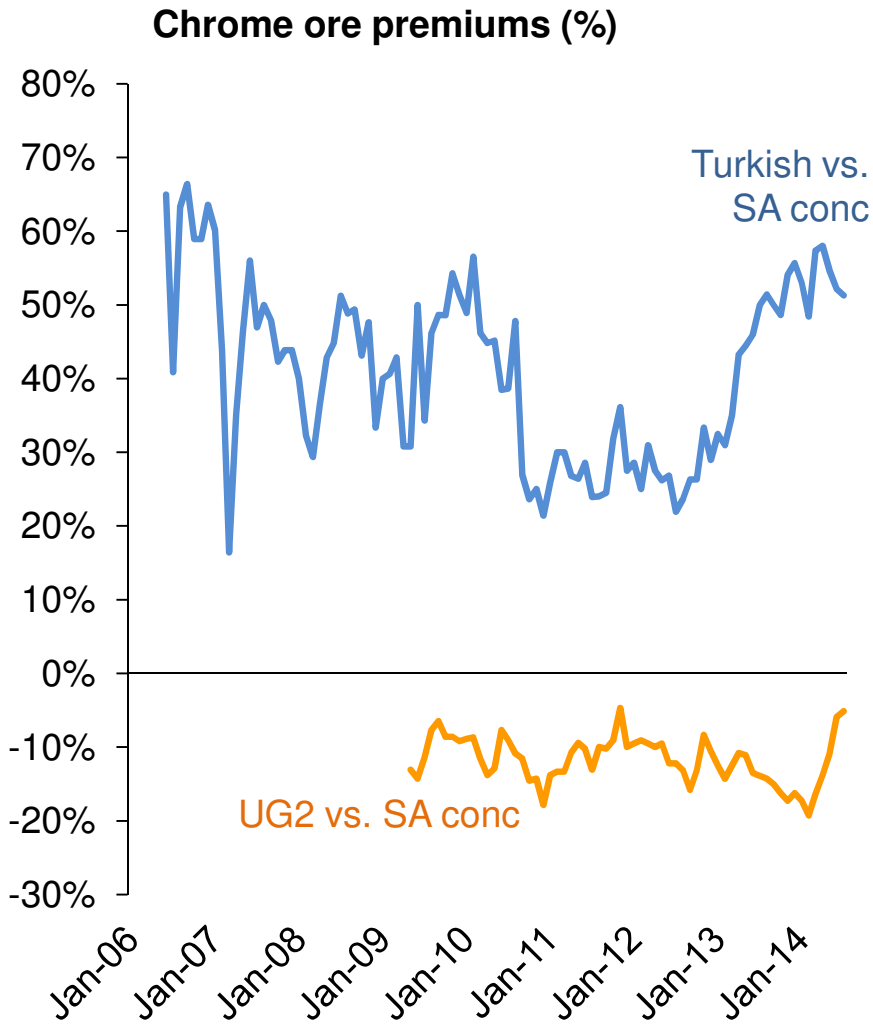
China's scrap consumption rate will gravitate to Western levels as stainless steel products consumed in recent years begin to be scrapped



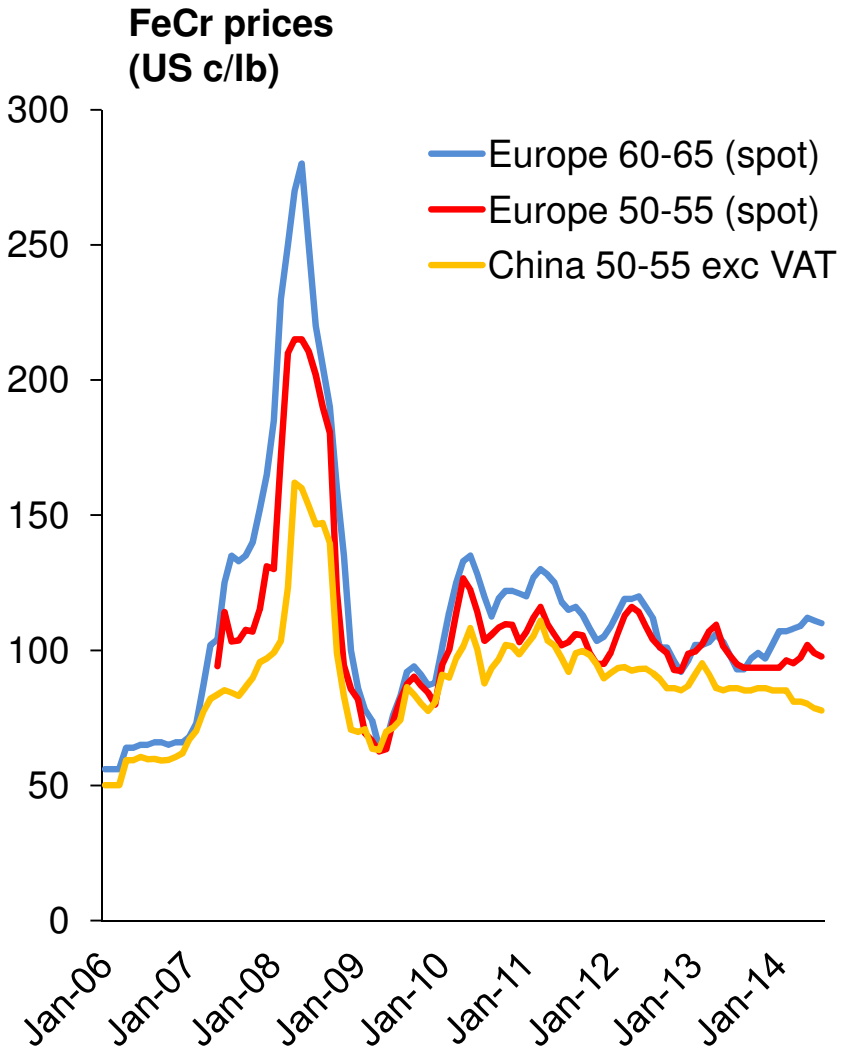
…but in the medium term there may be limited scope for China to increase the proportion of its FeCr consumption deriving from South African units (already over 60%)

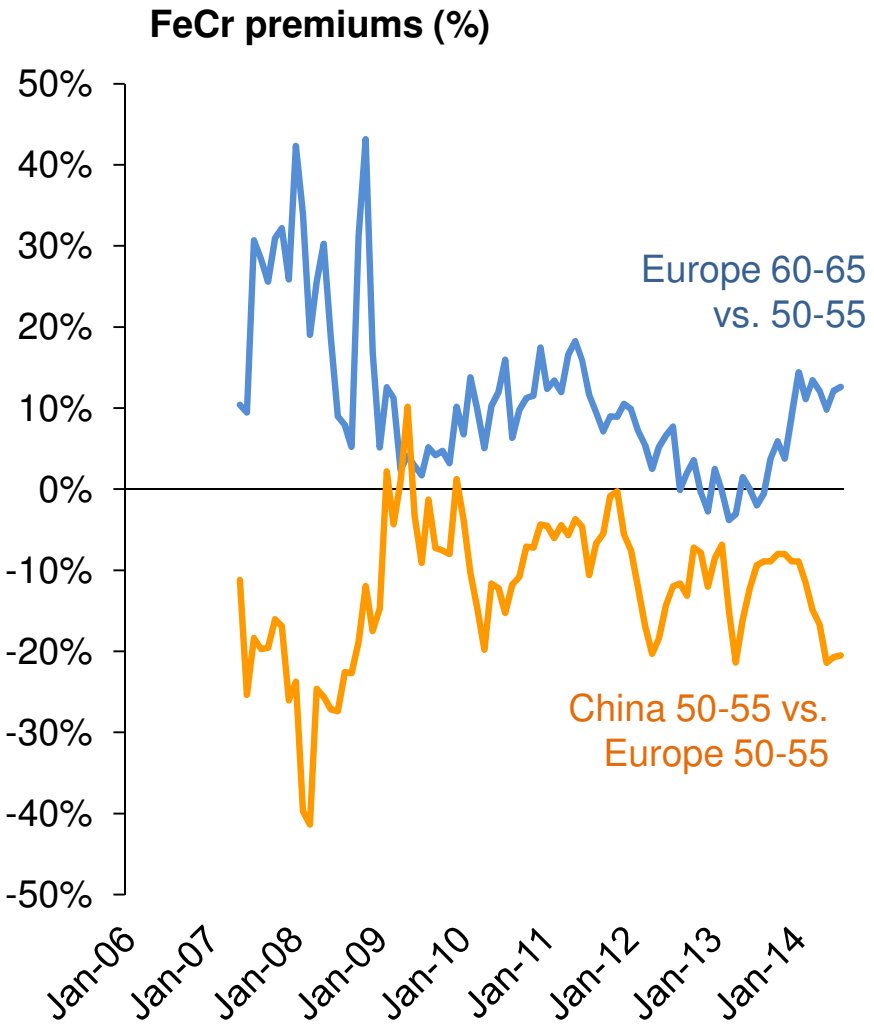
Arguably due to rising supply from South Africa, higher grade ores have regained a high price premium. UG2 discount has narrowed to only 5%





HC FeCr has also re-established a clear price premium over charge chrome, with Chinese prices trading at a widening discount





Why have premiums for HC FeCr and high grade ore widened since 2013, and will they be sustained?

- HC FeCr & higher grade ore re-establishing a stronger price premium is related to differing supply/demand dynamics over the past year
  - Over-supply most concentrated on charge chrome grades (especially China)
  - Some consolidation in HC FeCr (Eti – Tikhvin)
- Can premiums be expected/sustained longer term?
  - Constrained supply base of high grade ores (Kazakhstan, Turkey, India, Zimbabwe…)
  - China will need more higher grade ore in line with FeCr production growth (until scrap availability widens considerably)
  - Constrained by strong purchasing power of stainless steel industry

The growth of chrome unit supply from South Africa may now begin to slow considerably

- This appears to be becoming a consensus view
- UG2 output won't recover to much beyond previous peak levels (cf. Anglo presentation, 03/09/2014)
- Primary chrome ore production will become capacity constrained without new developments
- Logistical constraints
- **Medium term potential for somewhat higher prices for both chrome ore and FeCr**

Thank you for your attention

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