



FeCr Market: from Regional Trends to a Global Picture

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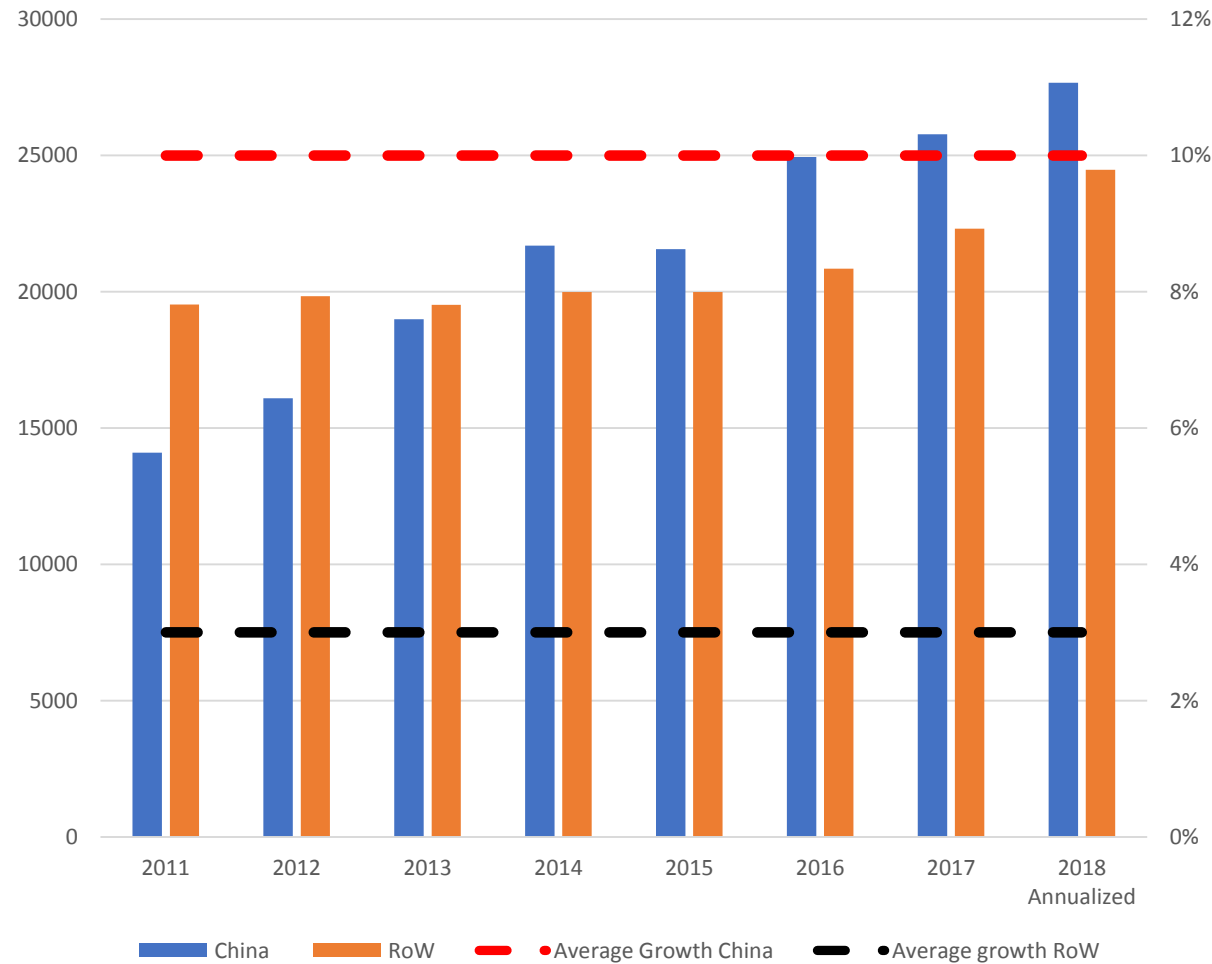
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Industry data is sourced from ICDA, FerroalloyNet, LME, MB, ISSF, OANDA (2019).



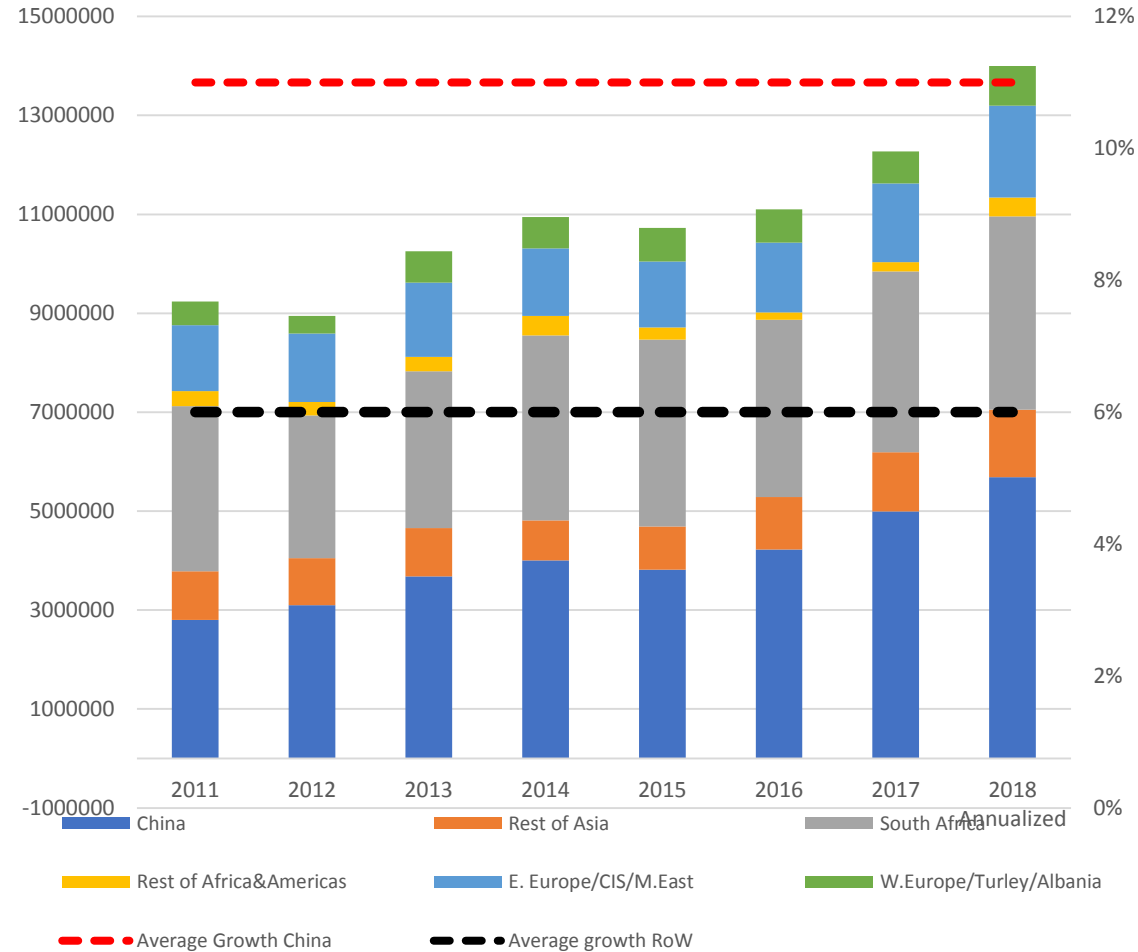
Stainless steel steady growth: key ferrochrome demand drivers



- **Stainless steel production increase from 2017 to 2018 by 3,4 million tonnes, or 6.8%**
- Indonesia accounted for 2,2 million tonnes or roughly $\frac{3}{4}$ of total increase
- Indonesian production might have little impact on the ferrochrome, since technologically the production is designed for use of inhouse liquid ferrochrome and will only purchase chrome ore.
- Indonesian stainless steel industry still has to overcome certain challenges:
 - Financing is running out
 - Environmental issues become more public
 - Cost increases might offset the advantage of Indonesian projects
 - India is considering implementing import duties on the steel produced in Indonesia, due imports increased 9 times and most of the production belongs to Chinese companies

Source: ISSF

Ferrochrome production: current supply factors



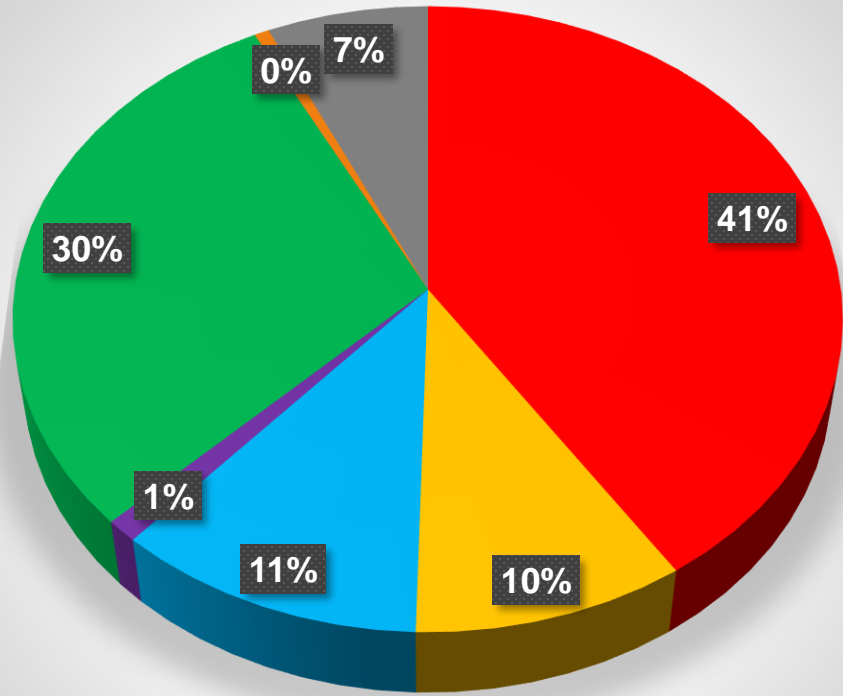
- FeCr production in China rose on average by 11% since 2011
- FeCr production in RoW rose on average by 6% since 2011
- **Kazakhstan**
 - After completion of the new meltshop in Aksu, no new expansion projects have been announced. Increase in capacity utilization and production
- **South Africa**
 - In August 2018, China announced a major project in South Africa, that will consist of: a stainless-steel plant, ferrochrome plant, silicomanganese plant with capacities of **3/3/0.5** million tonnes per year. No further news.
 - Other South African producers, no information on new capacity addition
 - Eskom to hike the electricity tariffs by 23% over next three years and continue load shedding
- **China**
 - 2018 capacity increase of 600,000 tonnes. Total output increased by 6.8% to 5.27 million tonnes. Expected output increase for 2019 at 5% to 5.53 million tonnes

Source: ICDA

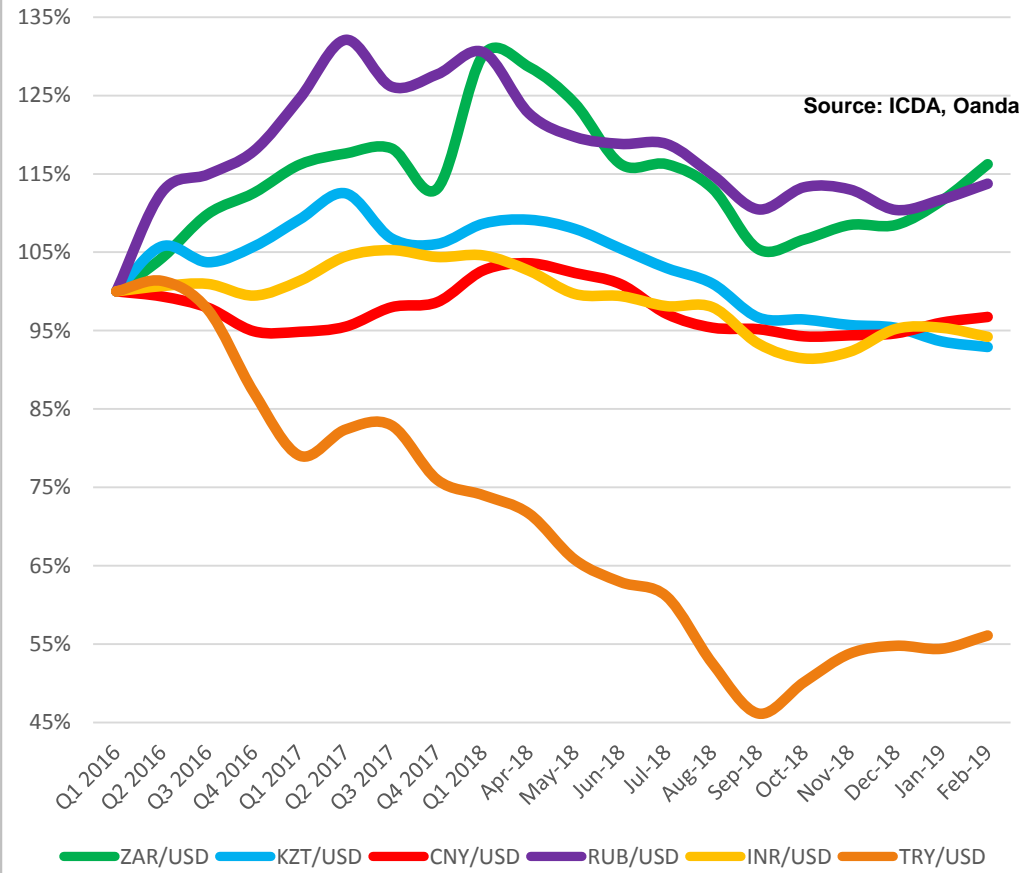


Major HC FeCr producing countries and currency volatility

Global HC FeCr Production



FeCr producing countries currencies exchange rate

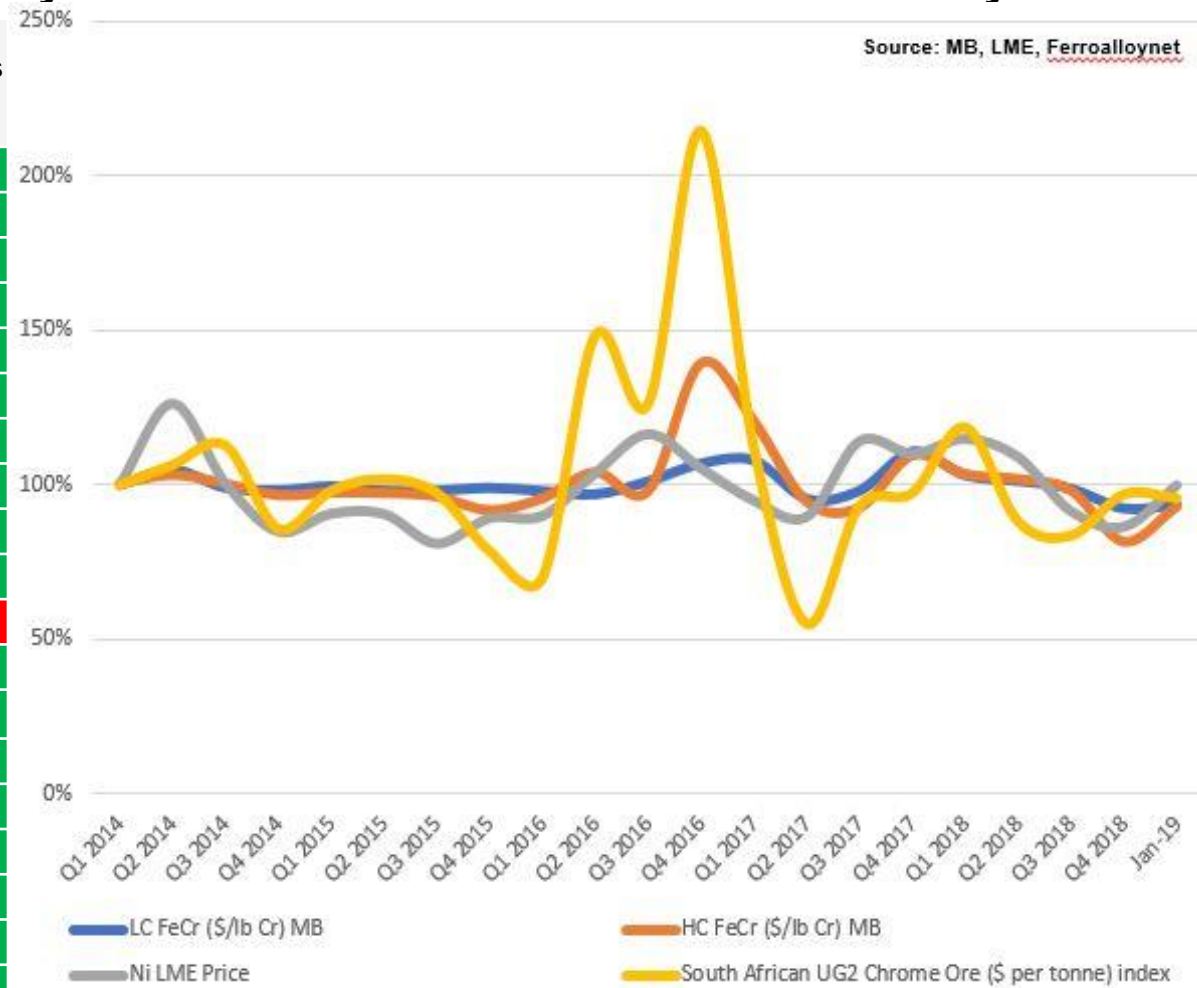


■ China ■ India ■ Kazakhstan ■ Russia ■ South Africa ■ Turkey ■ RoW

— ZAR/USD — KZT/USD — CNY/USD — RUB/USD — INR/USD — TRY/USD

Chrome, ferrochrome, ferroalloys and other commodities market volatility

	2019 YTD	Dec 2017 vs Dec 2018	Dec 2015 vs Dec 2018
Nickel LME	25%	-14%	22%
Iron ore 62% CFR China	20%	-3%	75%
Crude oil Brent	20%	-20%	44%
Zink LME	10%	-24%	57%
Tin LME	10%	-2%	34%
Copper LME	10%	1%	52%
UG2 CIF China	9%	-25%	42%
HC FeCr EU MB	5%	-21%	23%
CIF Shanghai ChCr	5%	-10%	27%
FeV	4%	61%	424%
Platinum LME	2%	-14%	-10%
Gold LME	1%	-4%	22%
SiMn MB	1%	-2%	70%
Average China Tender FeCr	1%	-2%	25%
LC FeCr MB	0%	-10%	5%
Aluminium LME	0%	-17%	24%
FeSi MB	-6%	-22%	42%
EU Benchmark ChCr	-10%	-11%	19%
Cobalt LME	-20%	-26%	131%

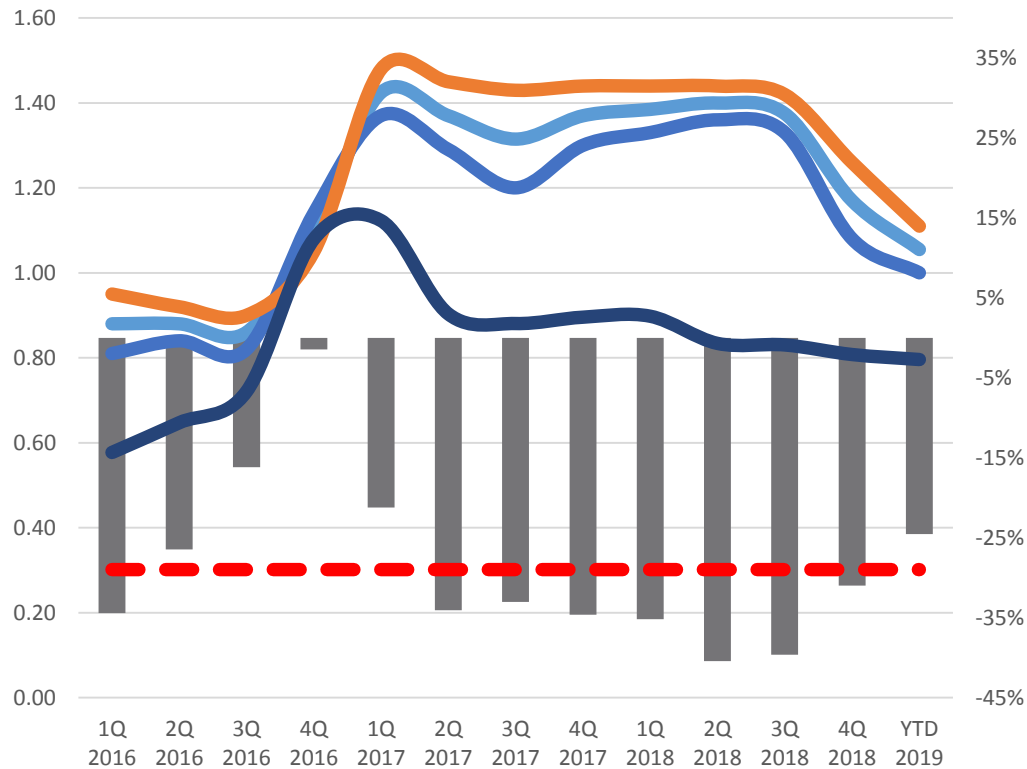




Global FeCr spot prices vs China domestic FeCr prices

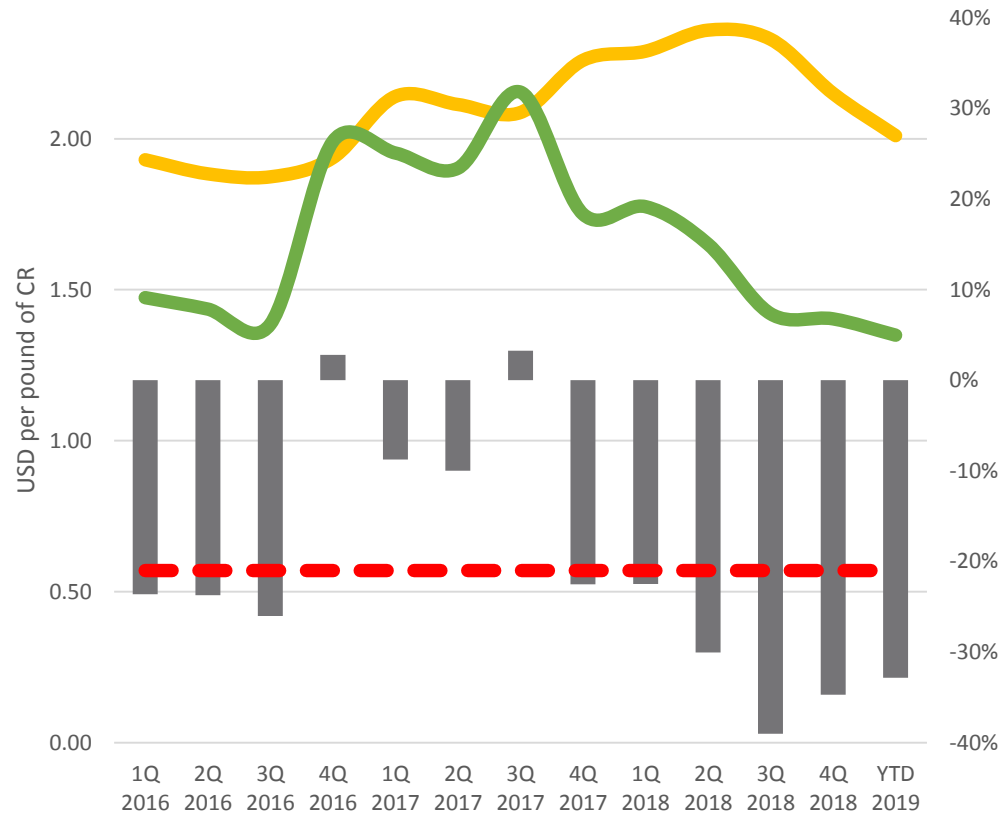
Source: MB, Ferroalloy.net

HC FeCr Global Prices



- Delta between China average price
- Average global price
- Europe
- USA
- China USD per pound
- Average difference

LC/MC FeCr Global Prices



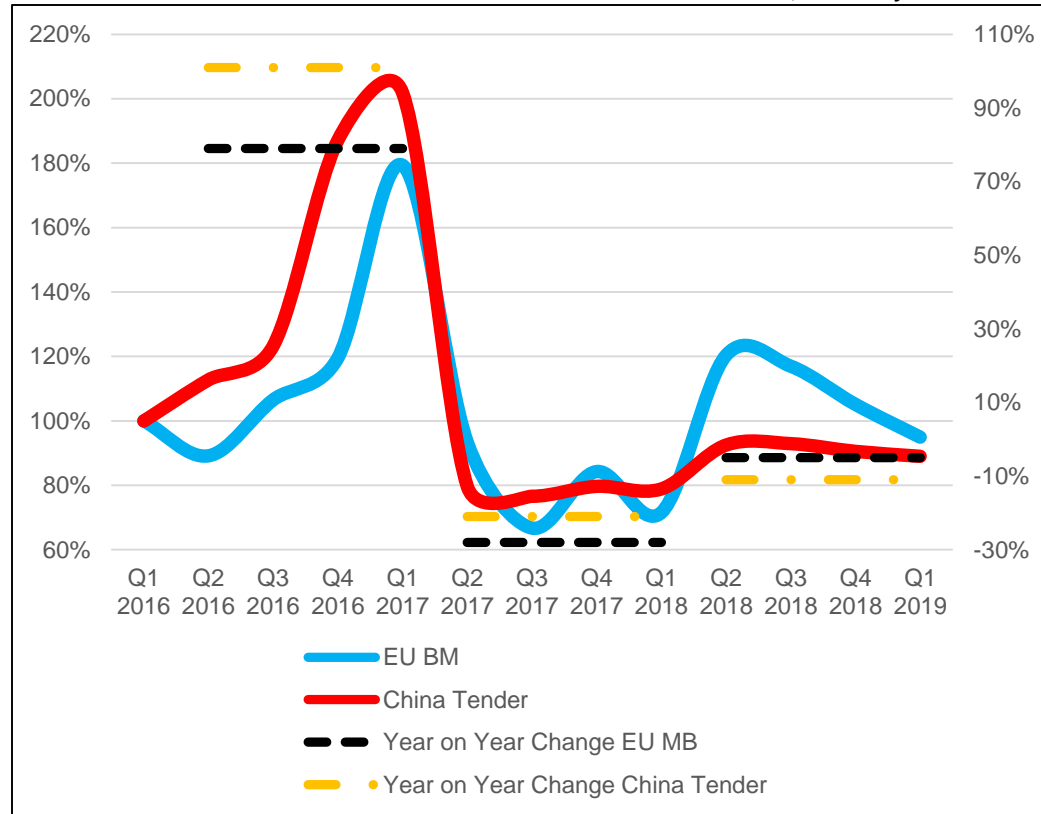
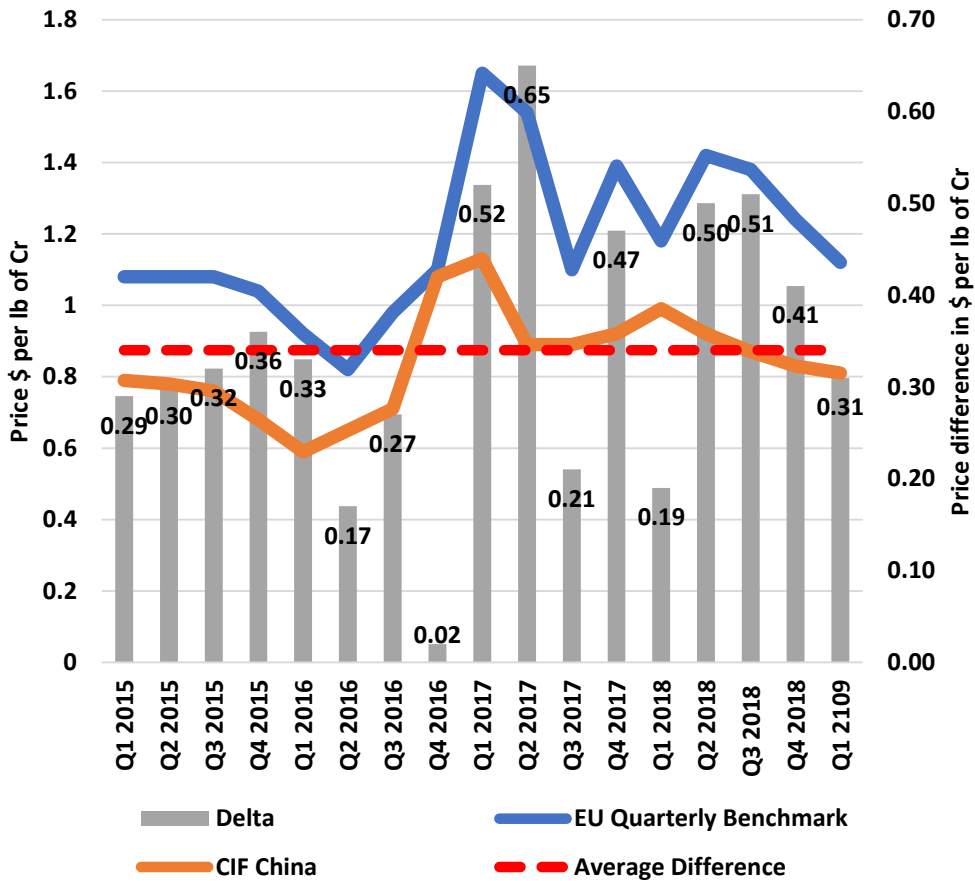
- Delta between China and RoW in %
- Average Global Price
- China USD per pound
- Average difference



FeCr Benchmark vs China domestic FeCr prices

Source: MB, Ferroalloy.net

EU Benchmark vs CIF China South African HC FeCr



Q1 2016 to Q1 2017: EU Benchmark growth of 79%, China Tender growth of 101%
Q1 2017 to Q1 2018: EU Benchmark decrease of 28%, China Tender decrease of 21%
Q1 2018 to Q1 2019: EU Benchmark decrease of 5%, China Tender decrease of 11%
Q1 2016 to Q1 2019: EU Benchmark growth of 22%, China Tender growth of 42%



Ferrochrome industries challenges for 2019

Since beginning of 2019, there were certain general economical upsides which have supported commodities market and improved general outlook for 2019 for many metals, including ferroalloys:

- China/ USA trade war risks are moderating
- On the other hand there are concerns about global economic slowdown or even recession in some regions
- Signs of moderation of quantitative tightening in USA and potential easing in EU
- Massive quantitative easing in China

From the other hand ferrochrome industry faces other risks that will affect it:

- Capacity increase of 600,000 tonnes in 2018 in China, yet the news of electricity shortage in Inner Mongolia can influence new capacity implementation
- No increase in new capacity ex-China
- The price gap between regions was widening until mid-2018, increasing volatility and creating a huge drop from prices ex-China.
- In 2019 we see price improvement in China, that will support the trend in the rest of the world
- Over the past years some of the ferrochrome market participants suggested that international ferrochrome prices should be based on the Chinese domestic market data like Tender Price and CIF Shanghai. Yet to apply the abovementioned indexes directly to contractual formulas ex China, will be misleading and risky from both consumers and producers sides due to specific Chinese domestic matters, like export duty regulations, ecological regulations and RMB exchange rate exposure

The ferrochrome market requires the mechanism which will allow all market participants to measure future expectations on a longer term, with more accuracy and financial responsibility than what exists now. Digital platforms for physical metal with liquid pricing will be able to provide it.



What digitalization can bring to the ferrochrome market

- Over the years ferrochrome industry has been plagued by its pricing mechanisms, which are not liquid and don't have enough credibility to become one leading price indicator.
- With the current digital technology it is possible to create trading platform that will provide market place with liquid trading with financial responsibility and price discovery transparency.
- Some of those platform are classified below by their functional objectives

Type of Platform	Counterparty search/Negotiation	Delivery Terms Variety	Delivery Execution Control	Additional Liquidity Financing Potential	Price Discovery
•Deal/Counterparty search platform	Yes	High	Offline	Offline	Offline
•Performance/Trade finance facilitation	Offline	High	Yes	Yes	Offline
•Supply Chain/ Transparency Control	Offline	High	Yes	Offline	Offline
•Trading Platform with Guaranteed Liquidity and Performance	Yes	Low	Yes	Yes	Yes





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Thank you for your kind attention



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