Chinese Steel Market Outlook under New Environmental Regulations

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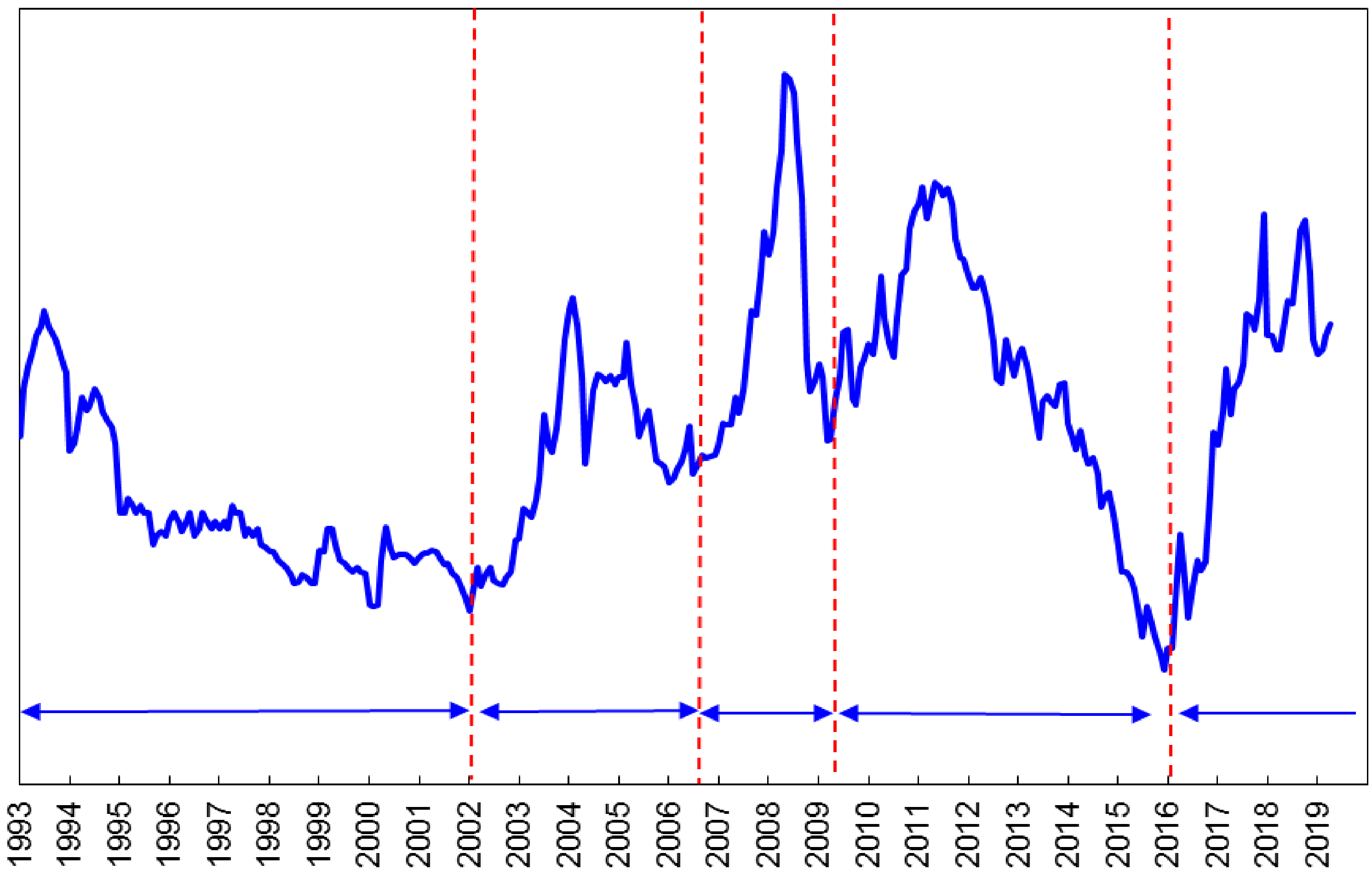
Chinese steel market stronger than expected in 2018

Shanghai rebar price



Source: mysteel

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Chinese economic growth slows down: de-leveraging and trade conflict

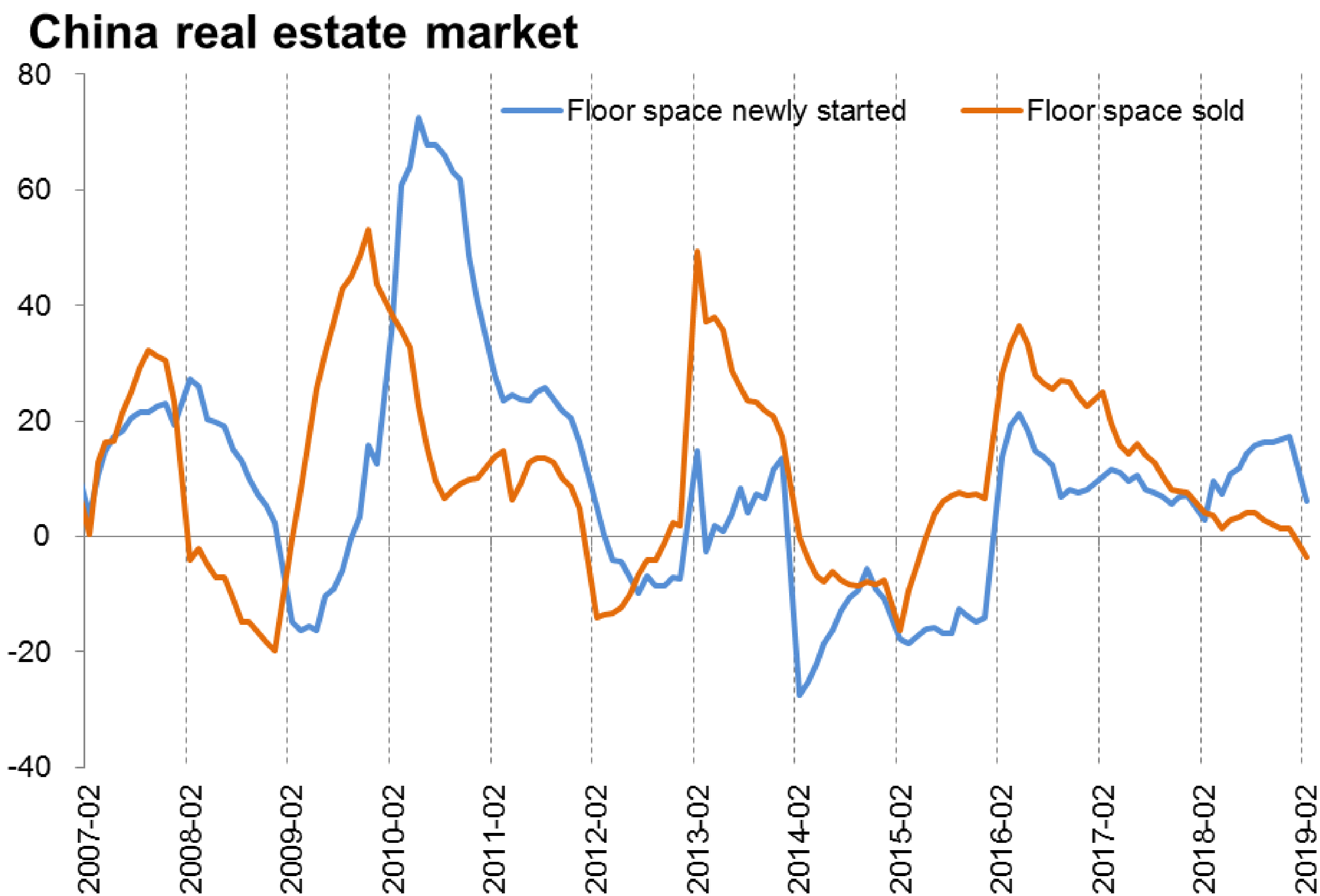
Source: NBS

Housing became the main driven force for economic growth in 2018

Y-o-Y %		2011	2012	2013	2014	2015	2016	2017	2018
FAI	FAI	23.8	20.6	19.6	15.7	10.0	8.1	7.2	5.9
	Real Estate FAI	27.9	16.2	19.8	10.5	1.0	6.9	7.0	9.5
	Manufacturing FAI	31.8	22.0	18.5	13.5	8.1	4.2	4.8	9.5
	Infrastucture FAI	6.5	13.7	21.2	21.5	17.2	17.4	19.0	1.8
Real Estate	Floor space Under Construction	25.3	13.2	16.1	9.2	1.3	3.2	3.0	5.2
	Floor space starts	16.2	-7.3	13.5	-10.7	-14.0	8.1	7.0	17.2
	Floor space sold	4.9	1.8	17.3	-7.6	6.5	22.5	7.7	1.3
Automobile	Auto Output	3.0	6.3	18.4	7.1	2.7	13.1	3.2	-3.8
	Auto Sales	2.5	4.3	13.9	6.9	4.7	13.7	3.0	-2.8
Mechanical Machinery	Excavator	15.3	-13.4	1.4	-13.8	-23.4	19.4	77.2	47.9
	Power Generating Equipment	14.0	-7.5	-4.8	9.2	-13.8	4.7	-7.3	-9.3
	Container	27.9	4.9	6.5	22.1	-11.6	-13.3	48.3	10.1
Shipbuilding	Shipbuilding Completion	16.8	-21.4	-24.7	-13.9	7.1	-15.6	20.8	-19.0
	New Ship Orders	-51.9	-43.6	242.2	-14.2	-47.9	-32.6	60.1	8.7
	Ship Orders in Hand	-23.5	-28.7	22.5	13.7	-17.4	-19.0	-12.4	2.4
Domestic Appliances	TV	8.5	7.5	-0.2	6.2	7.1	8.7	1.6	14.6
	Air Conditioner	24.6	4.9	11.6	11.5	0.0	4.5	26.4	10.0
	Refridgerator	20.3	-3.1	10.6	-1.0	-1.9	4.6	13.6	2.5
	Washing Machine	11.5	1.4	8.2	-3.3	0.7	4.9	3.2	-0.4

Source: NBS

Growth of housing starts recorded 10-year high



Source: NBS

3-year Action plan to win Blue Sky Protection Campaign announced in July

Targets: by 2020

- SO2 and Nox emission ↓ by 15% compared to 2015
- PM2.5 ↓ by 18%
- Share of days in good air quality to be over 80%
- Share of pollution days ↓ by 25%

Broader coverage for inspection

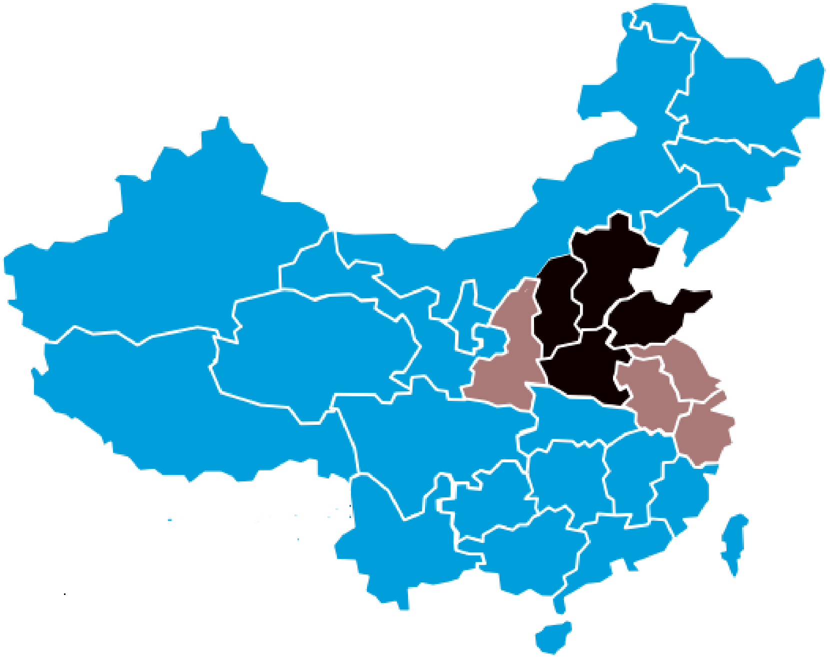
- 2+26 cities (black on map, covered in 2017)
- Yangtze River Delta (purple, added in 2018)
- Fenwei Plain(purple, added in 2018)

Capacity restriction

- By 2020 coking capacity should be reduced to 0.4*steelmaking capacity
- Hebei steel capacity should be reduced to below 200mtpa

Strict emission requirement for steel industry

- Ultra-low emission standard to be executed from Oct 1 2018



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Ultra-low emission standard in China extremely high, costly to meet with

Evolution of emission control regulations for sintering process and comparison with other countries/regions

Release Time	Publisher	Regulations	Type	PM (mg/m³)	SO_2 (mg/m³)	Nox (mg/m³)
2012/6/27	Ministry of Environmental Protection	《Standards for discharge of air pollutants in iron and steel sintering and pelletizing industries》 (GB28662-2012)	General emission requirement	80	600	500
			General emission requirement	50	200	300
			Special emission requirement for key areas	40	180	300
2017/6/13	Ministry of Environmental Protection	《Standards for discharge of air pollutants in iron and steel sintering and pelletizing industries》 (GB28662-2012)	Special emission requirement in "2+26" cities	20	50	100
2018/1/16	Ministry of Environmental Protection	《Announcement on the implementation of special emission limits of air pollutants in the beijing-tianjin-hebei air pollution transmission channel cities》	Special emission requirement in "2+26" cities	20	50	100
2018/5/7	Ministry of Ecological Environment	《Work plan of ultra-low emission reconstruction for iron and steel enterprises》	Ultra-low emissions standard	10	35	50

Taiwan, China	Built after 2012	20	102.5	133
	Built before 2012	30	205	205
Japan	General area	150		451
	Special area	100		
South Korea	From 2010	30	772	450
Germany	New plant	20	500	400
	Existing plant	50		

Source: MEP, MEE

Production restriction lasted almost the whole year, also pushed cost up

Production restriction time range

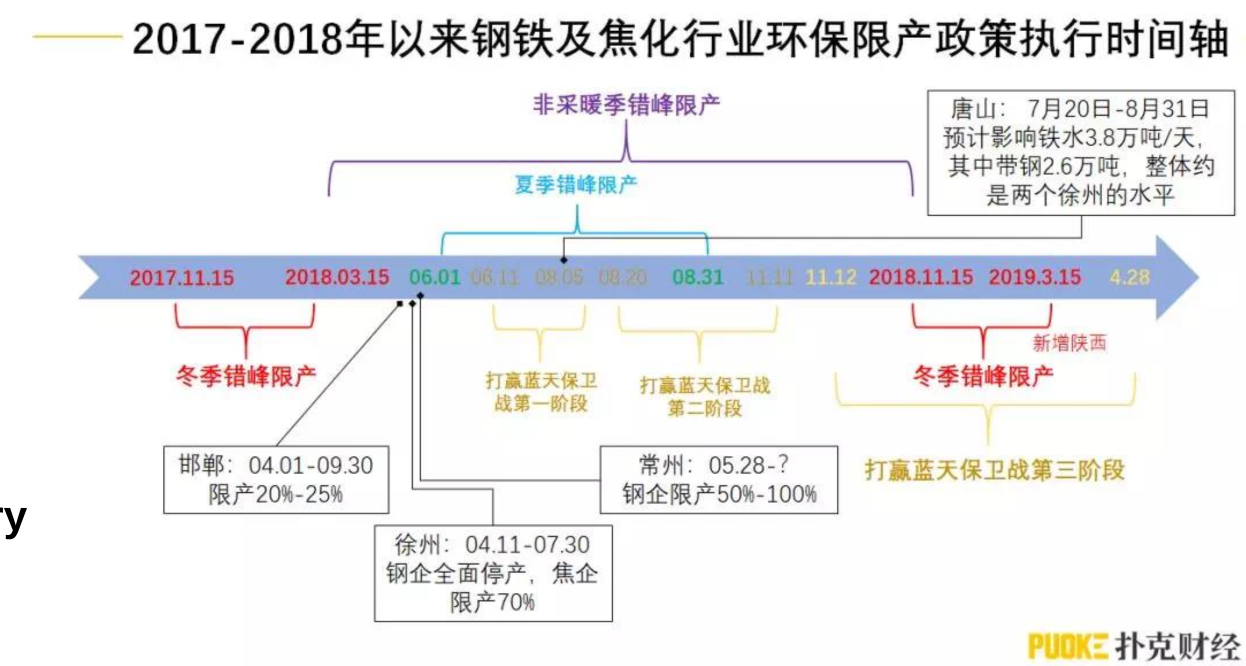
- Winter heating season
- Non-heating season
- Summer season
- ……

Production restriction area

- 2+26 cities
- Yangtze River Delta
- Fenwei Plain

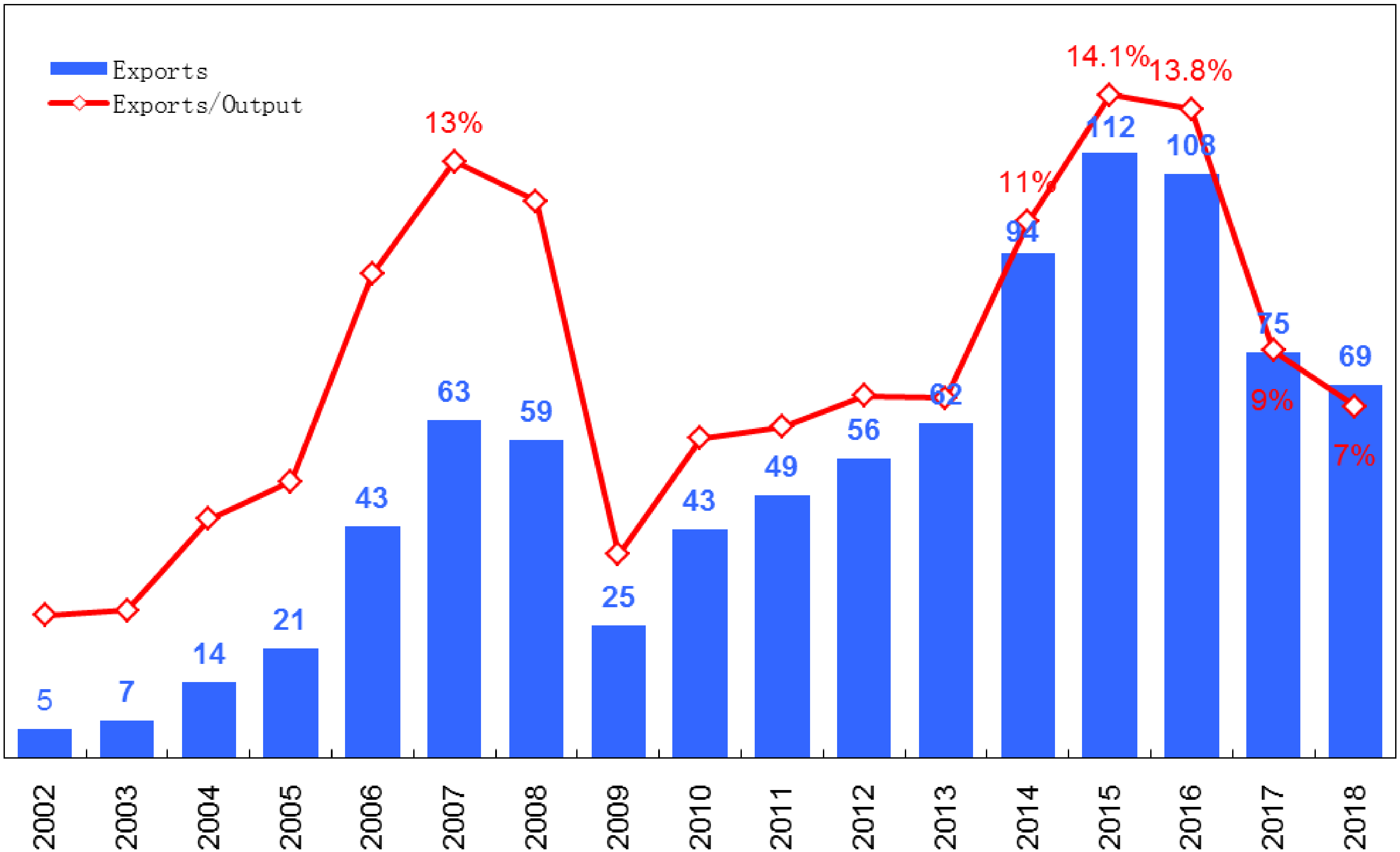
Production restriction industry

- Coke industry
- Steel industry



China Steel exports ↓ further due to shrinking cost competitiveness

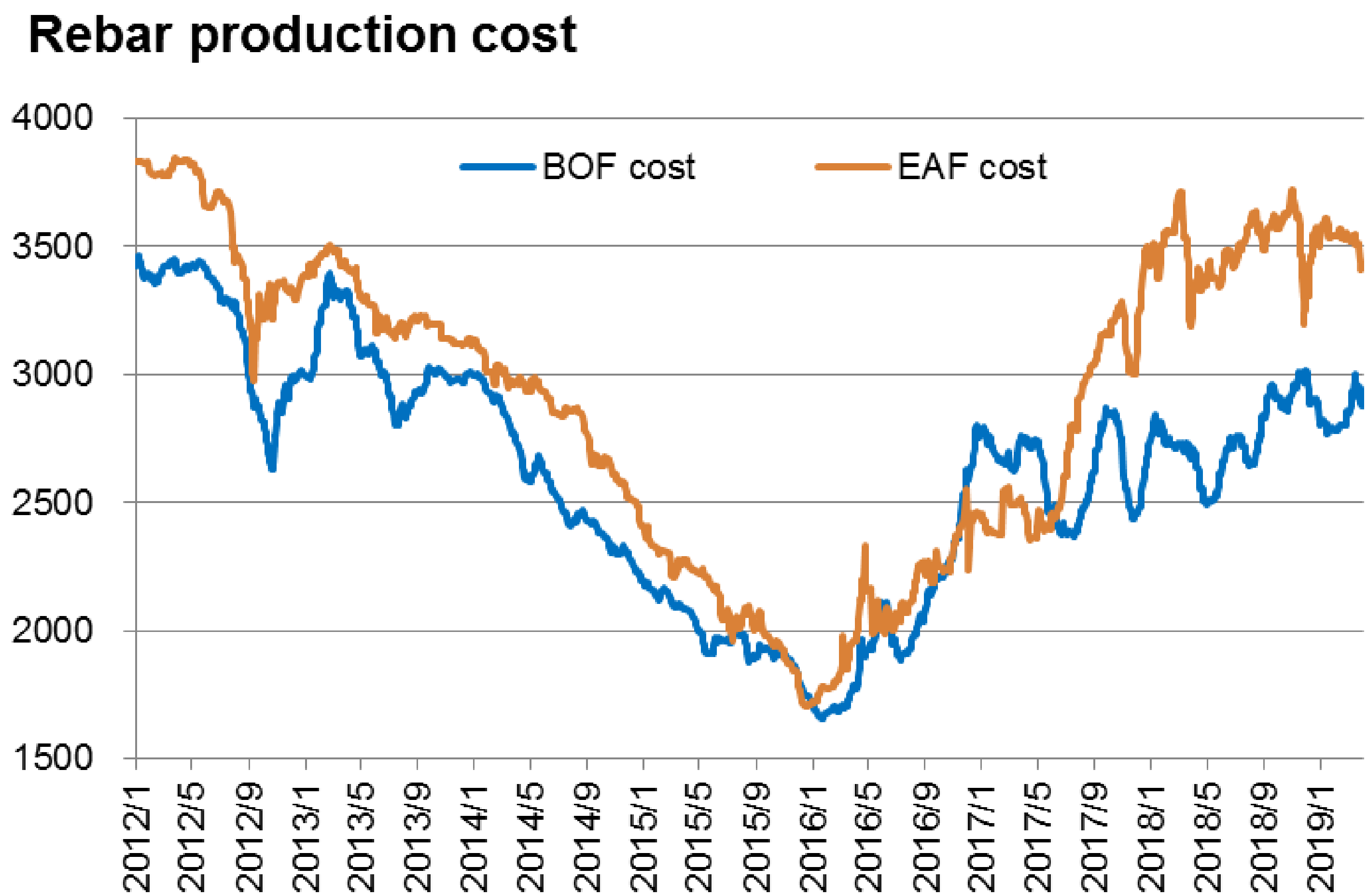
China steel products: share of exports to output



Source: CISA

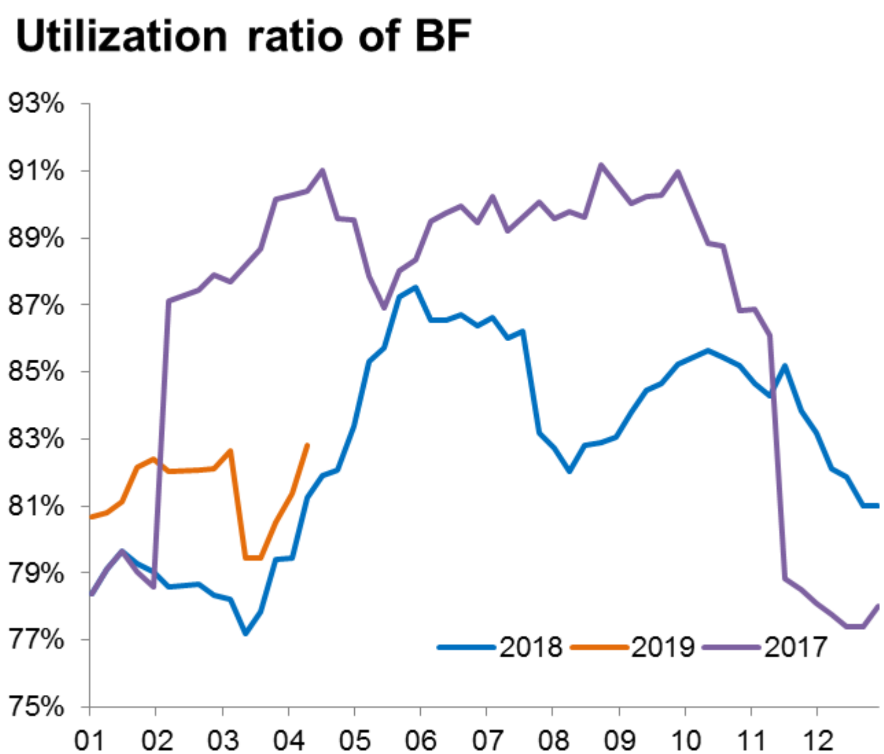
Though cost of EAF outperformed BOF drastically since 2017H2…

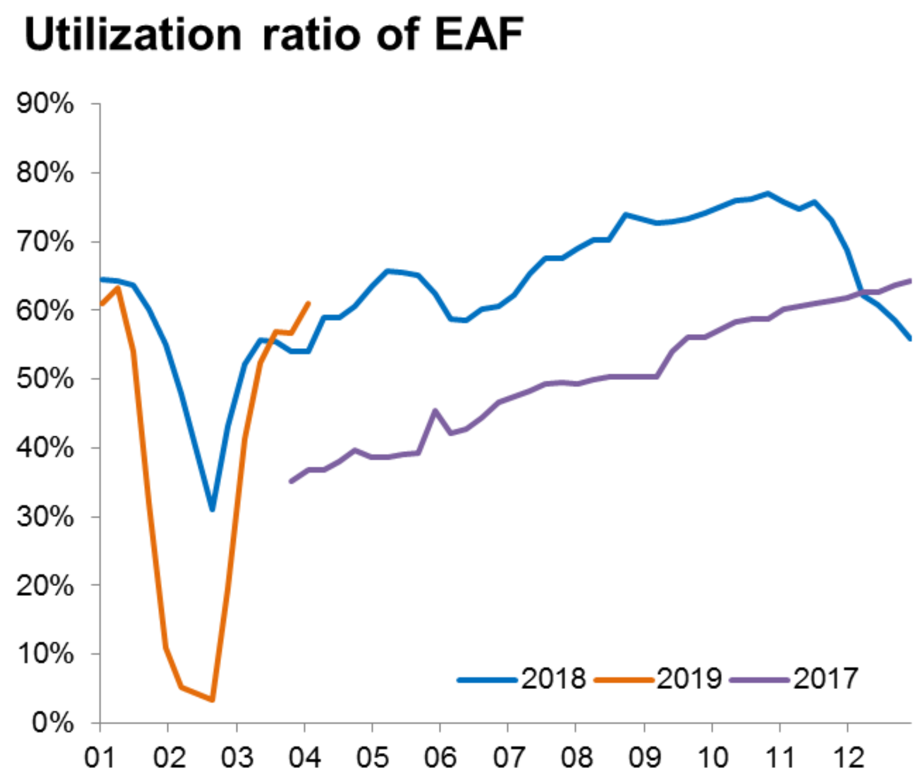
2012~2016: EAF>BOF 2017H1: BOF>EAF 2017H2~: EAF>>BOF



Source: mysteel

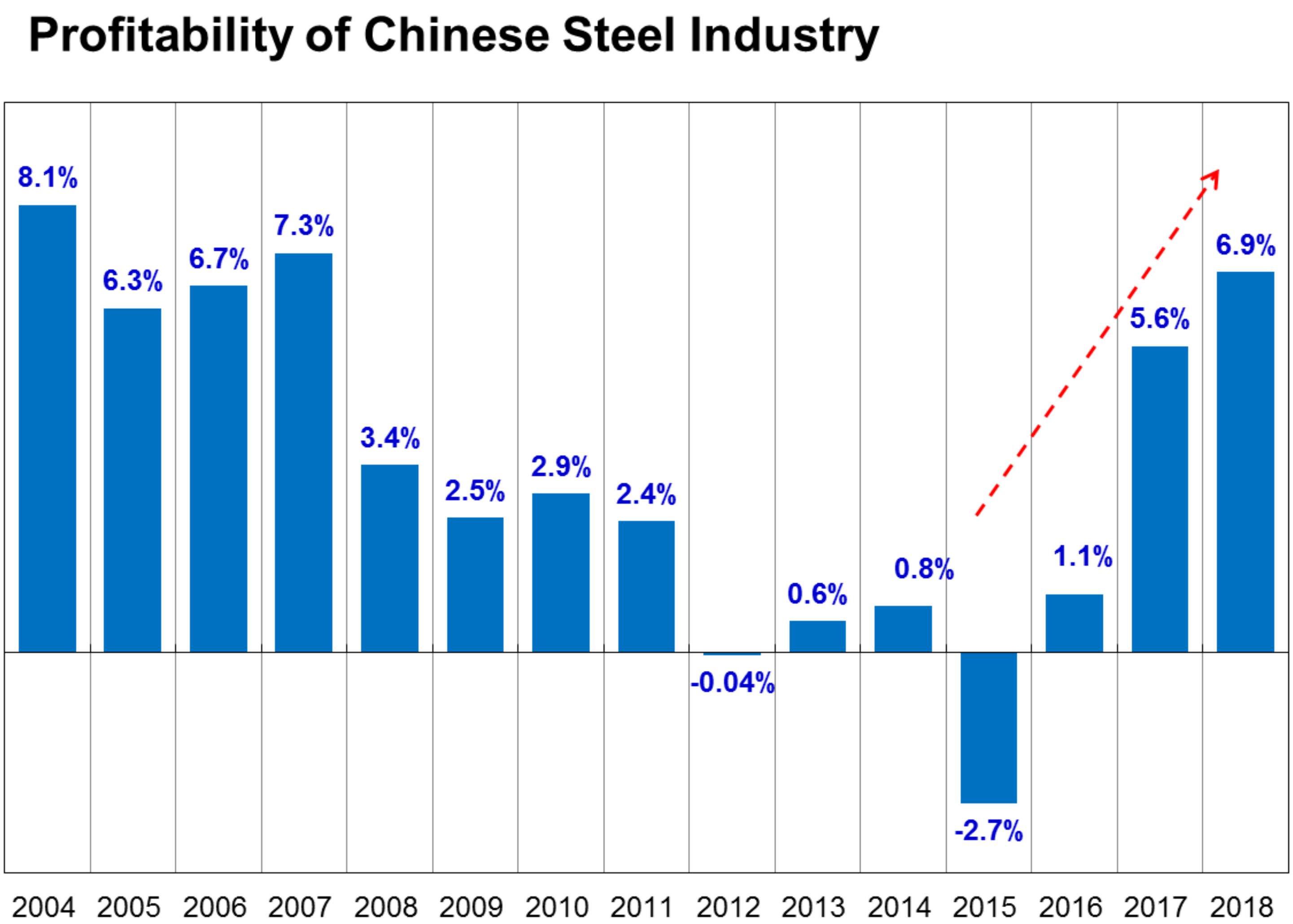
…utilization ratio of EAF in 2018 jumped by 20% vs. 2017…





Source: mysteel

…due to the restrictions on BF output and high profit margins



Source: CISA

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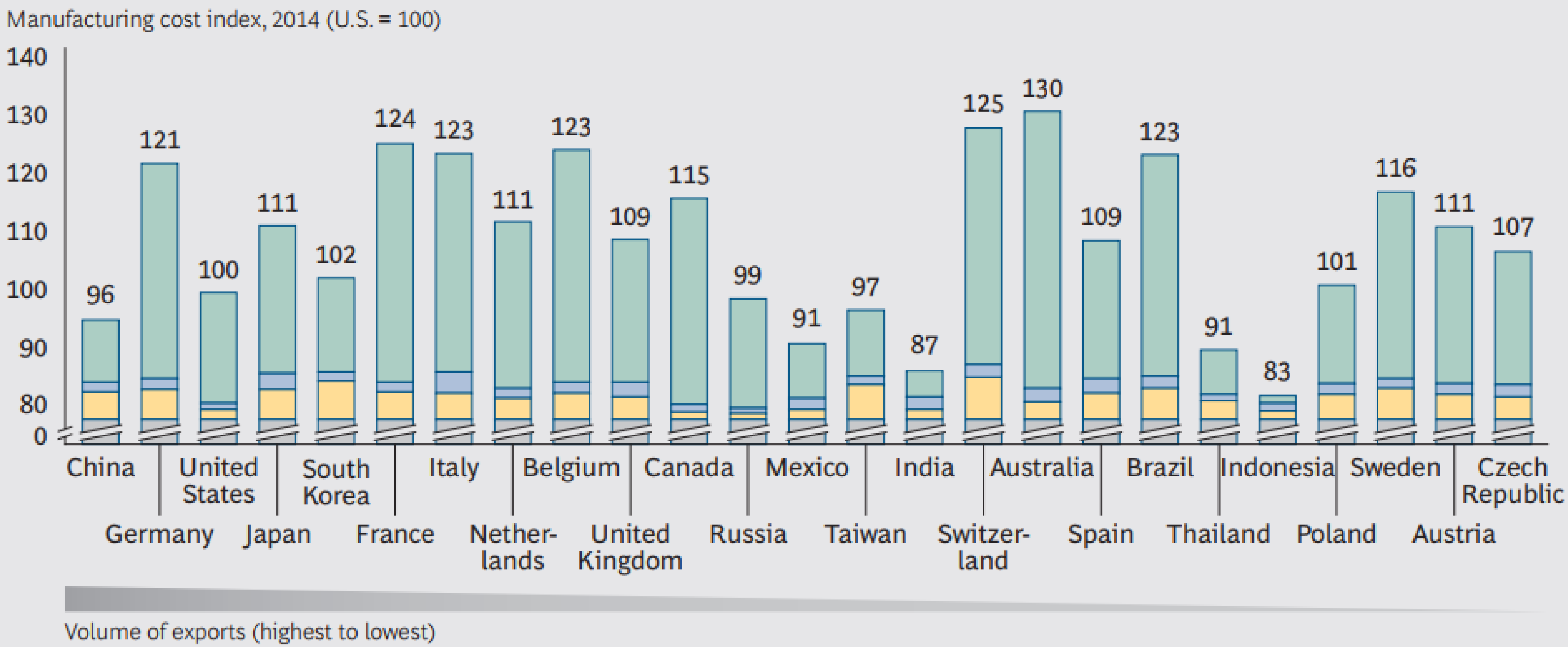
Global manufacturing relocation started before US-China trade conflict

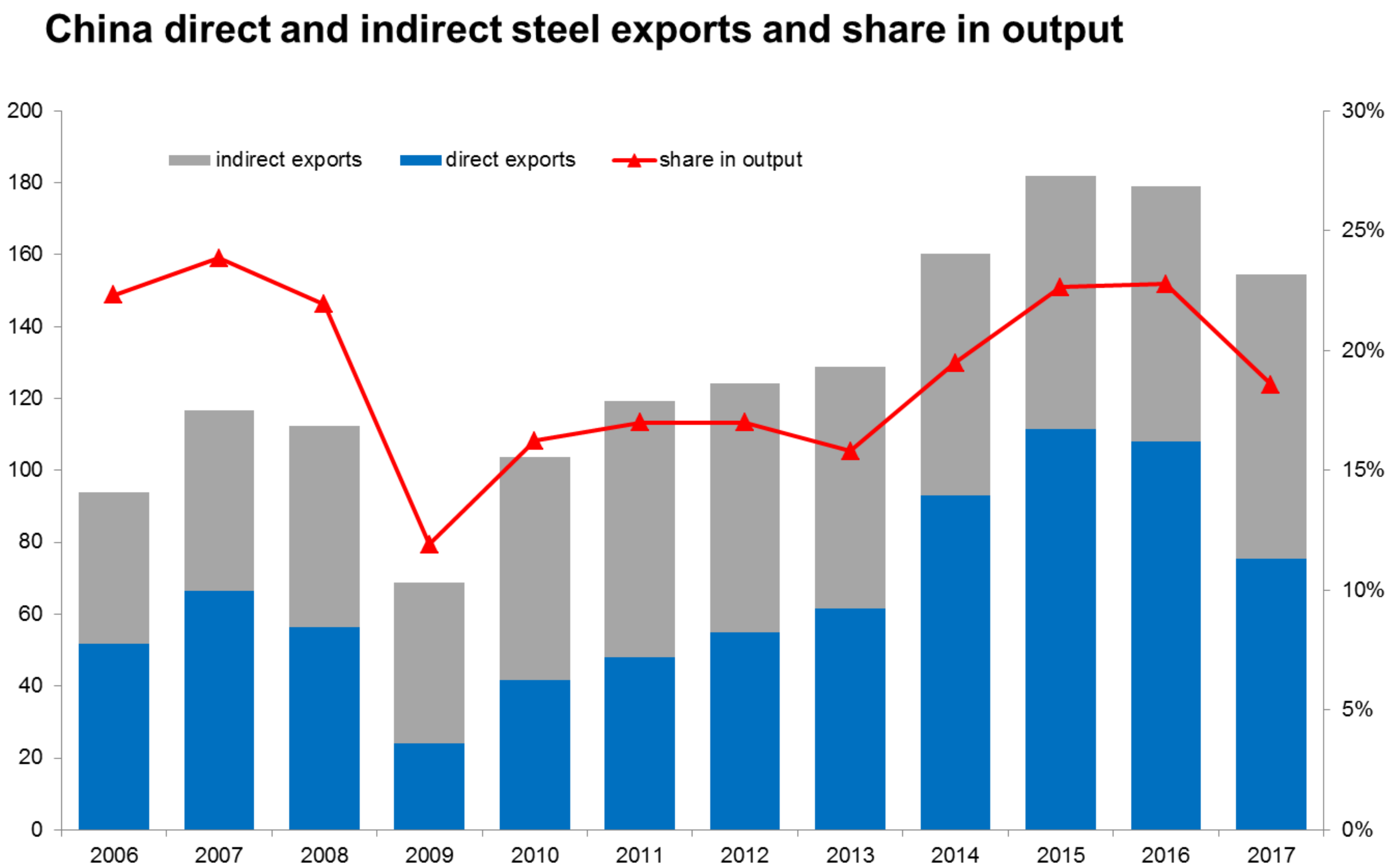
EXHIBIT 1 | Comparing the Top 25 Export Economies



Sources: U.S. Economic Census; U.S. Bureau of Labor Statistics; U.S. Bureau of Economic Analysis; International Labour Organization; Euromonitor International; Economist Intelligence Unit; BCG analysis.
Note: The index covers four direct costs only. No difference is assumed for other costs, such as raw-material inputs and machine and tool depreciation. Cost structure is calculated as a weighted average across all industries.
[1]Adjusted for productivity.

Source： BCG The Shifting Economics of Global Manufacturing

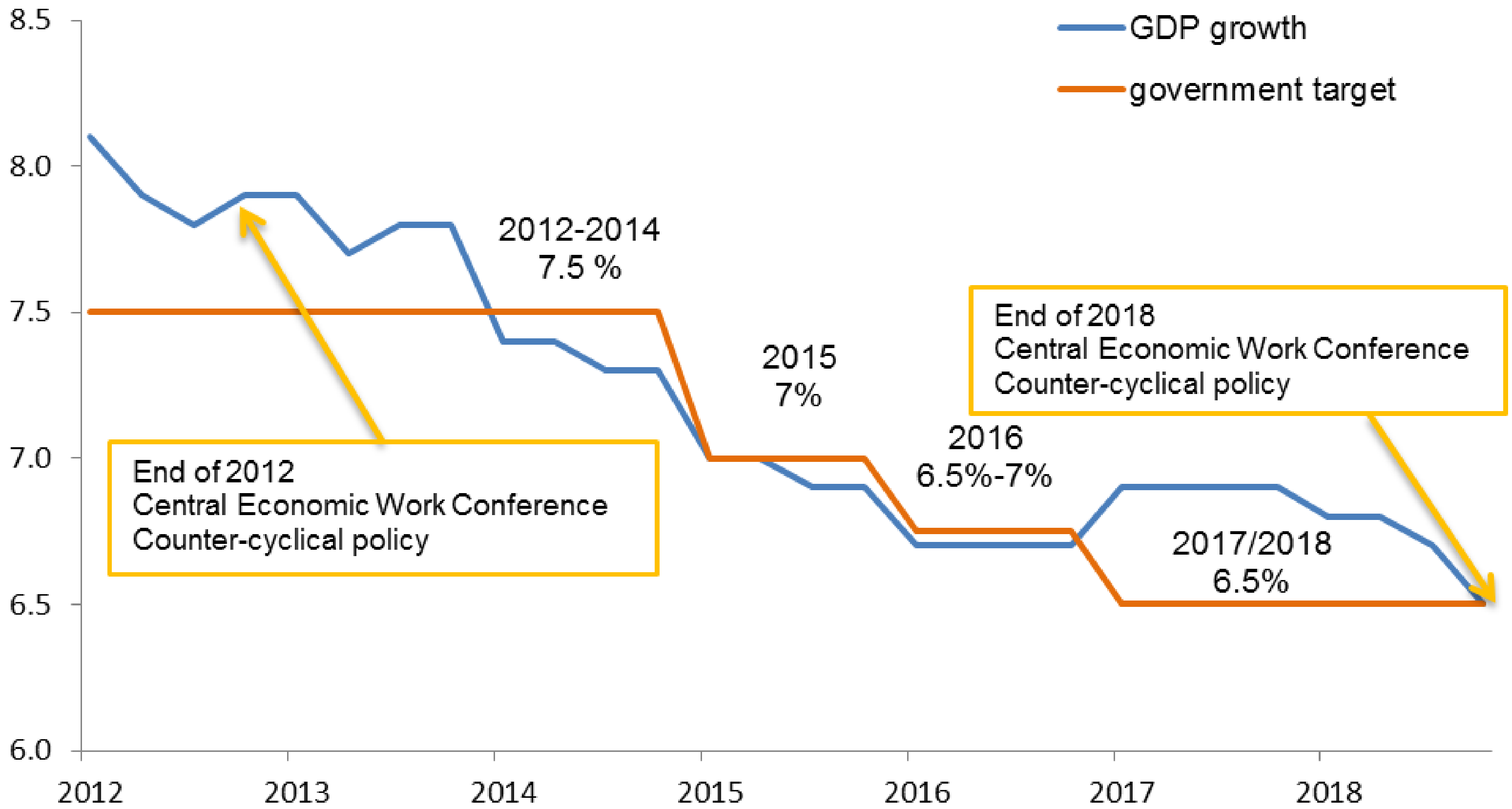
Both indirect steel and direct exports will show signs of weakening



Source： worldsteel

Counter-cyclical policy employed, but long term economic slowdown inevitable

China GDP growth and government target

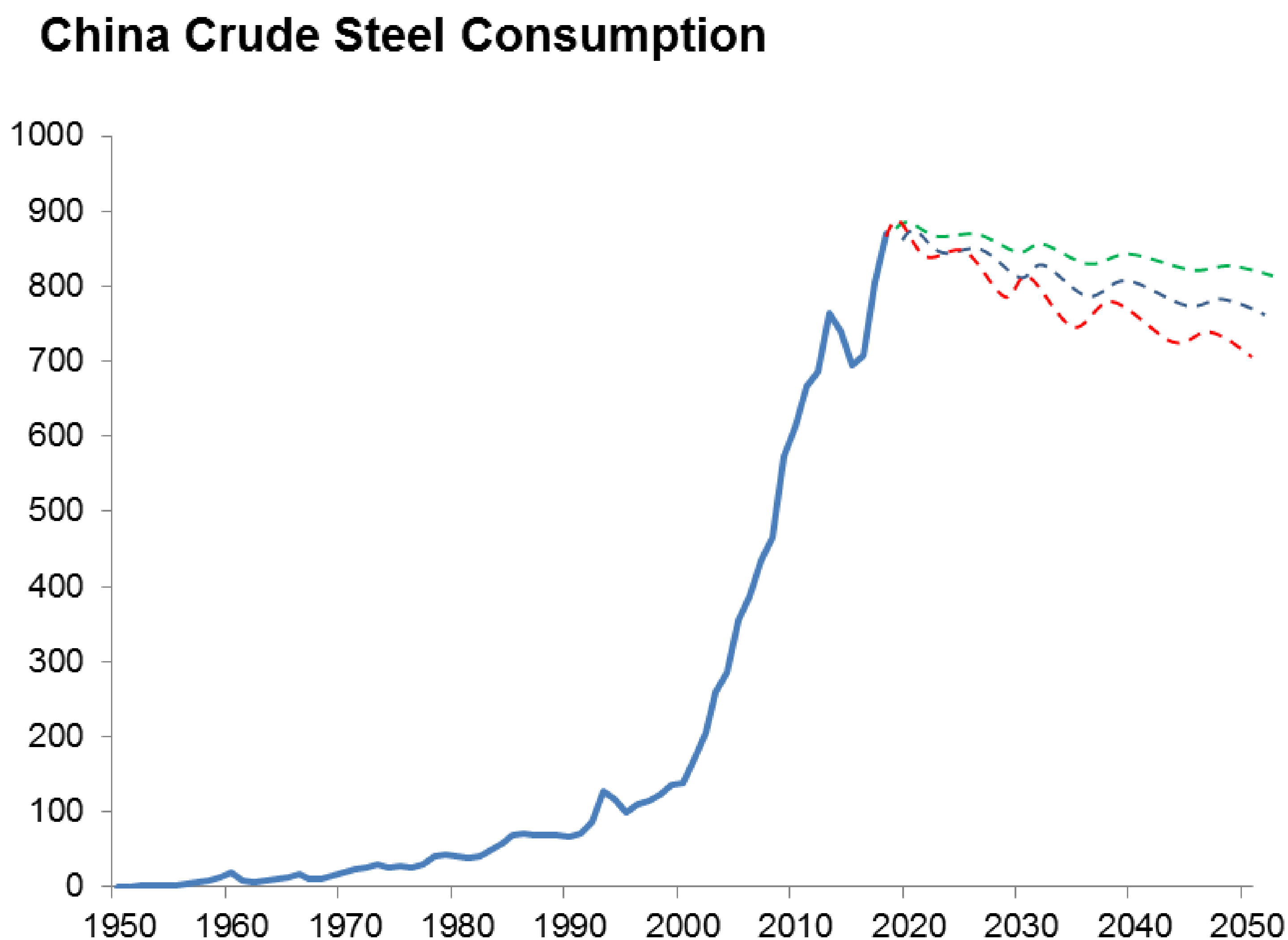


Key Tasks of New Urbanization Construction in 2019: released on April 8

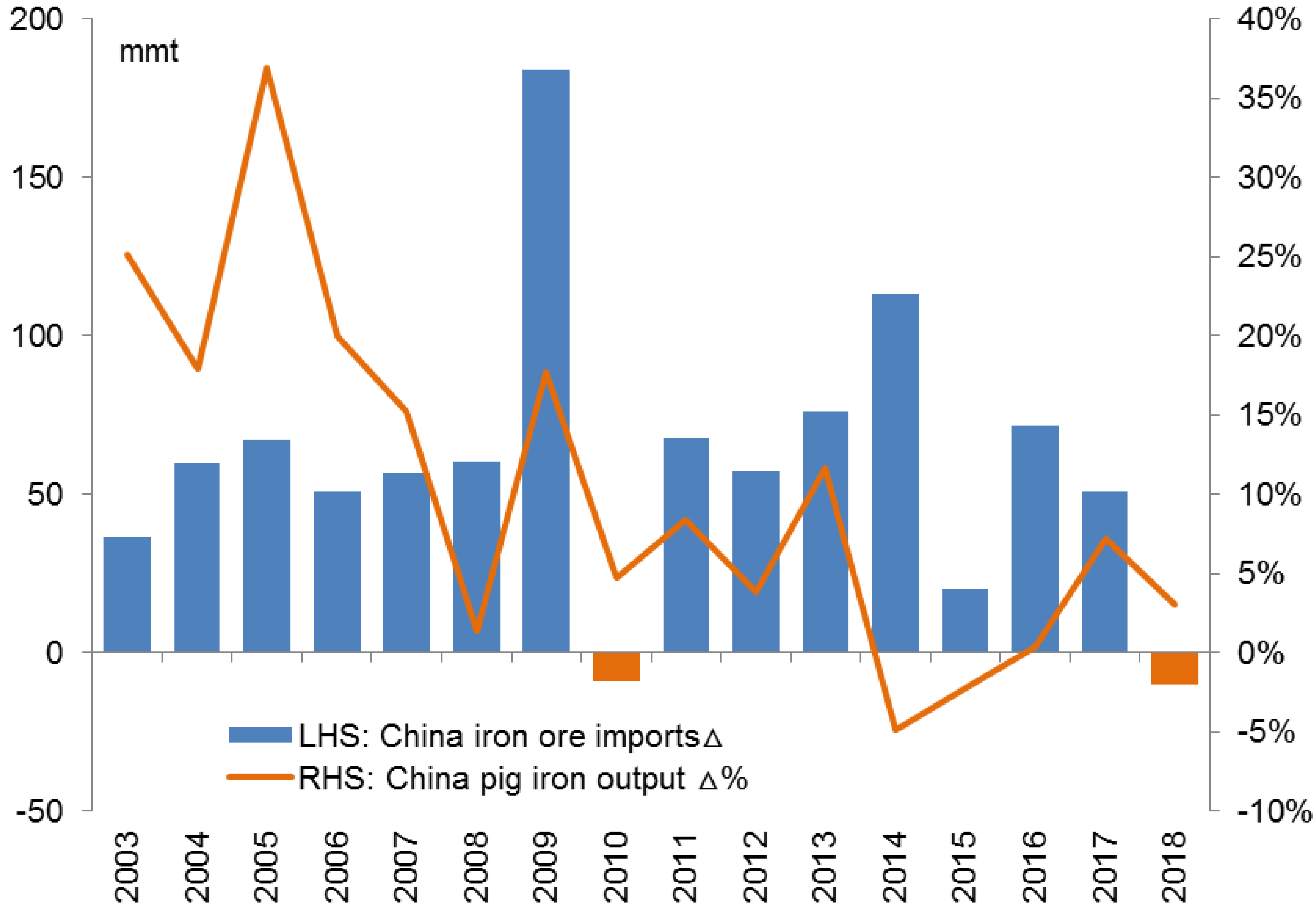
city type	Medium and small cities	Ⅱ big cities	Ⅰ big cities	Super big cities	Megacities
population	<1million	1-3million	3-5million	5-10million	>10million
number of cities	583	59	10	5	4
population share%	51.1%	15.8%	5.8%	4.9%	3.1%
New hukou registration policy	hukou registration restriction already removed	hukou registration restriction to be removed completely	hukou registration requirement to be loosen	hukou registration policy to be improved / registration scale to be expanded	

Source： NDRC

China steel demand is peaking / might plateau…

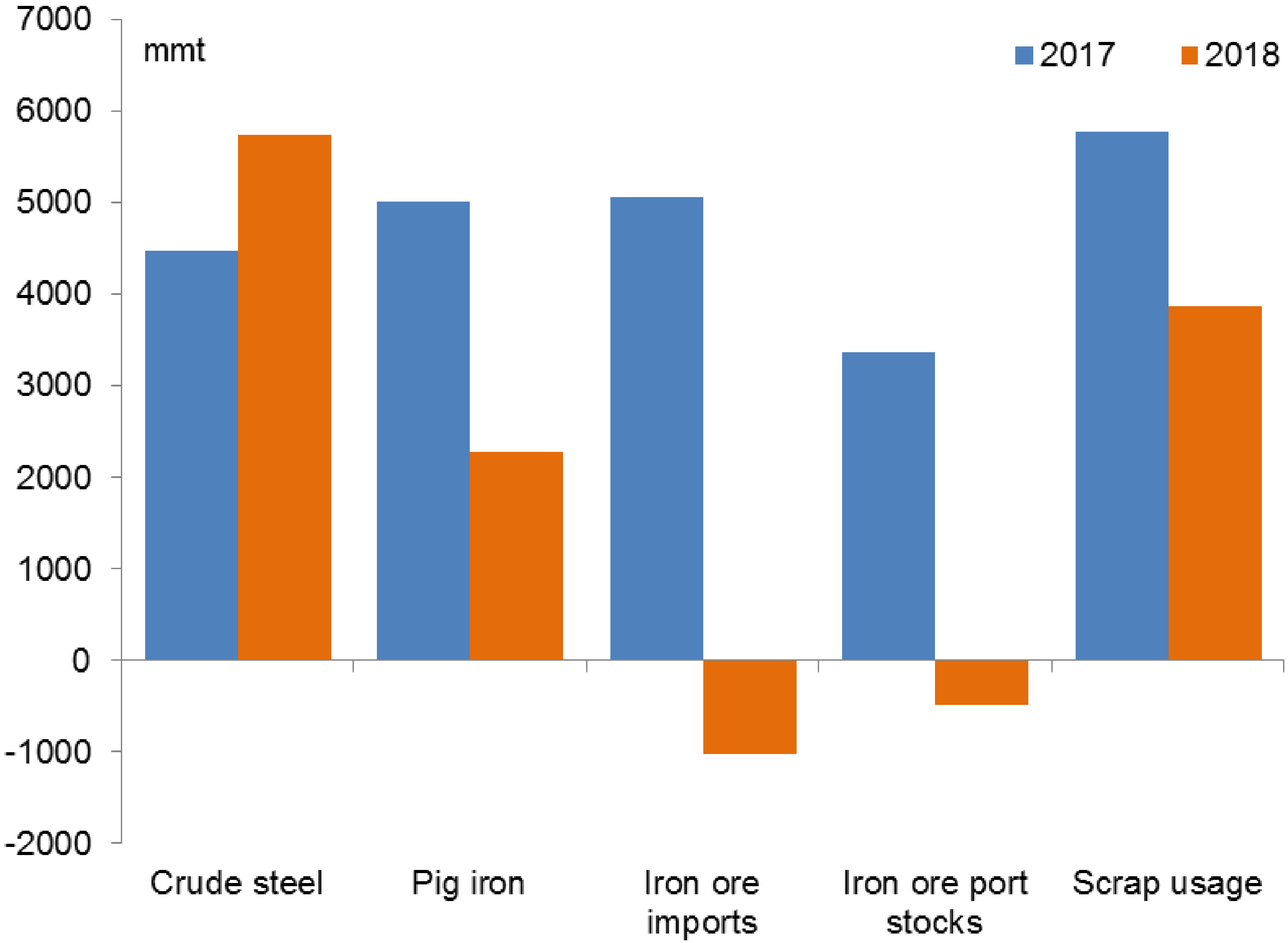


Pig iron output ↑3%, iron ore imports ↓10mmt in 2018 in China



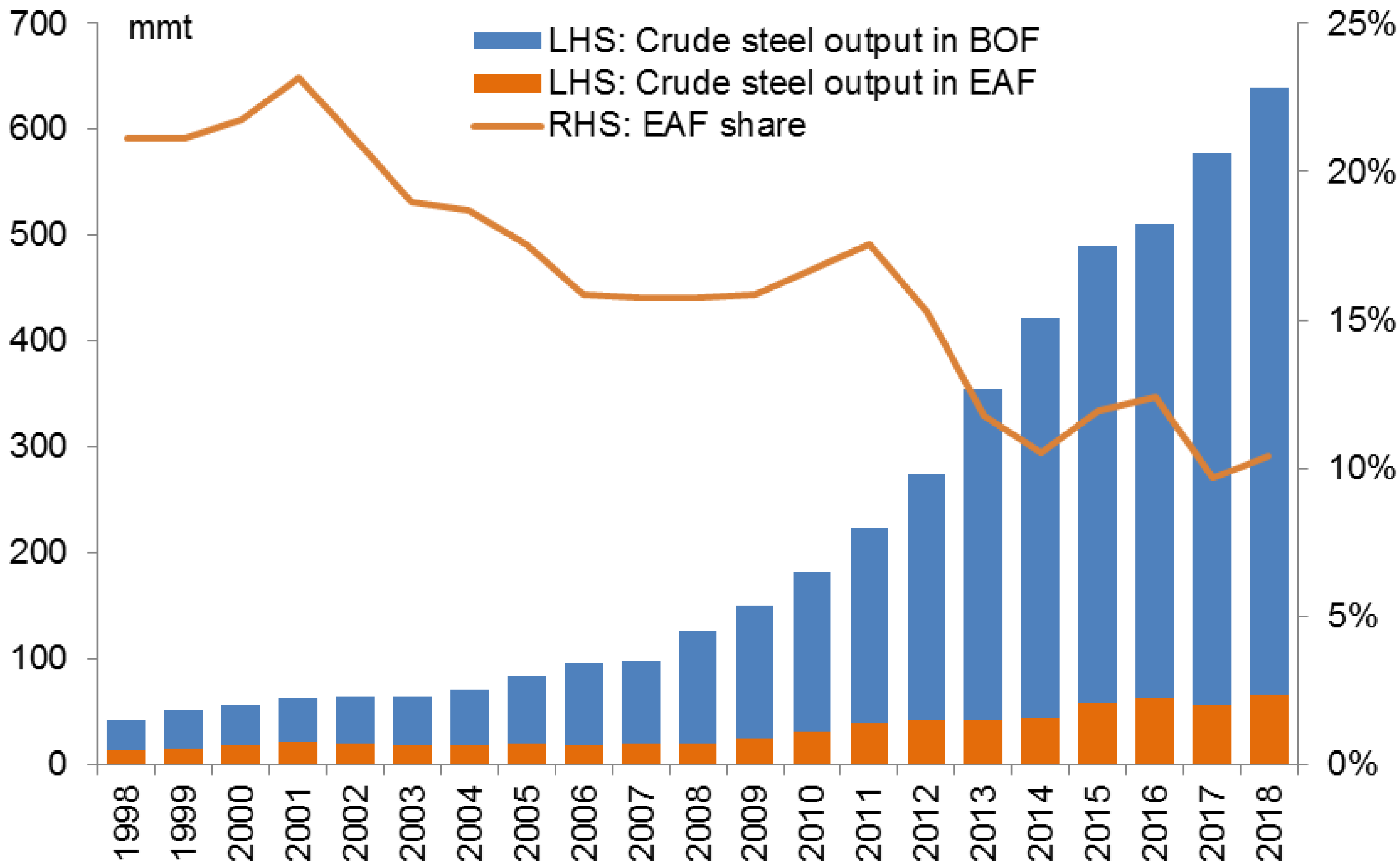
Source: CISA, China customs

…scrap became the swing factor (with poor data quality)



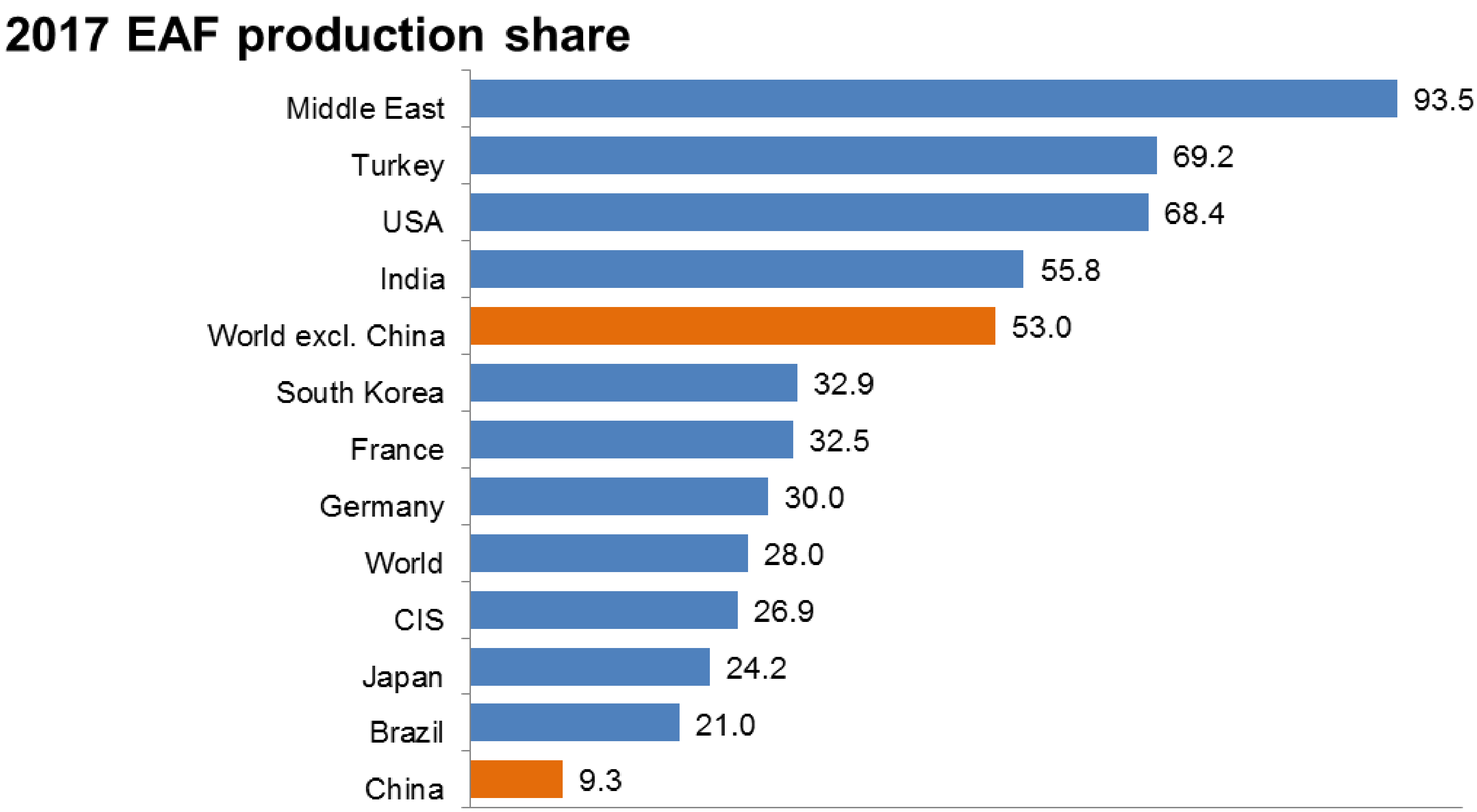
Source: CISA, CAMU

EAF share recovered in 2018…



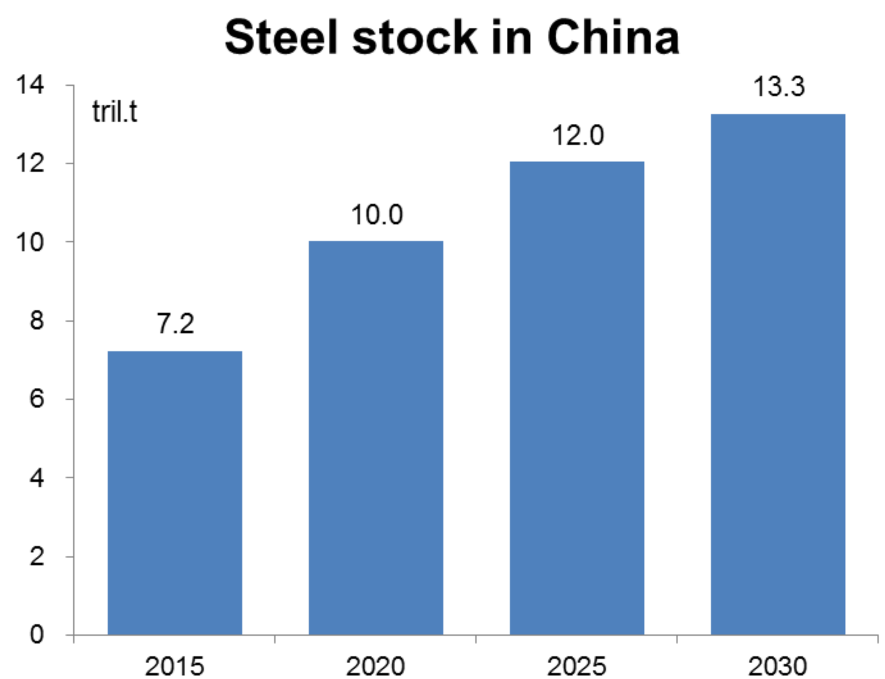
Source: CISA, worldsteel

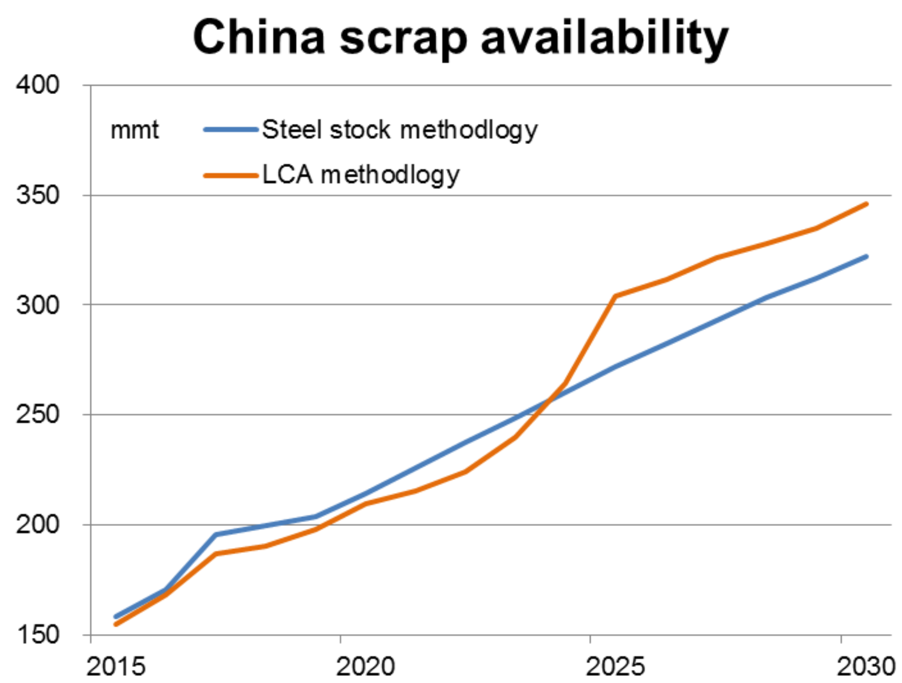
…but still much lower than other regions/countries



Source: worldsteel

Sufficient scrap supply for EAF in the future

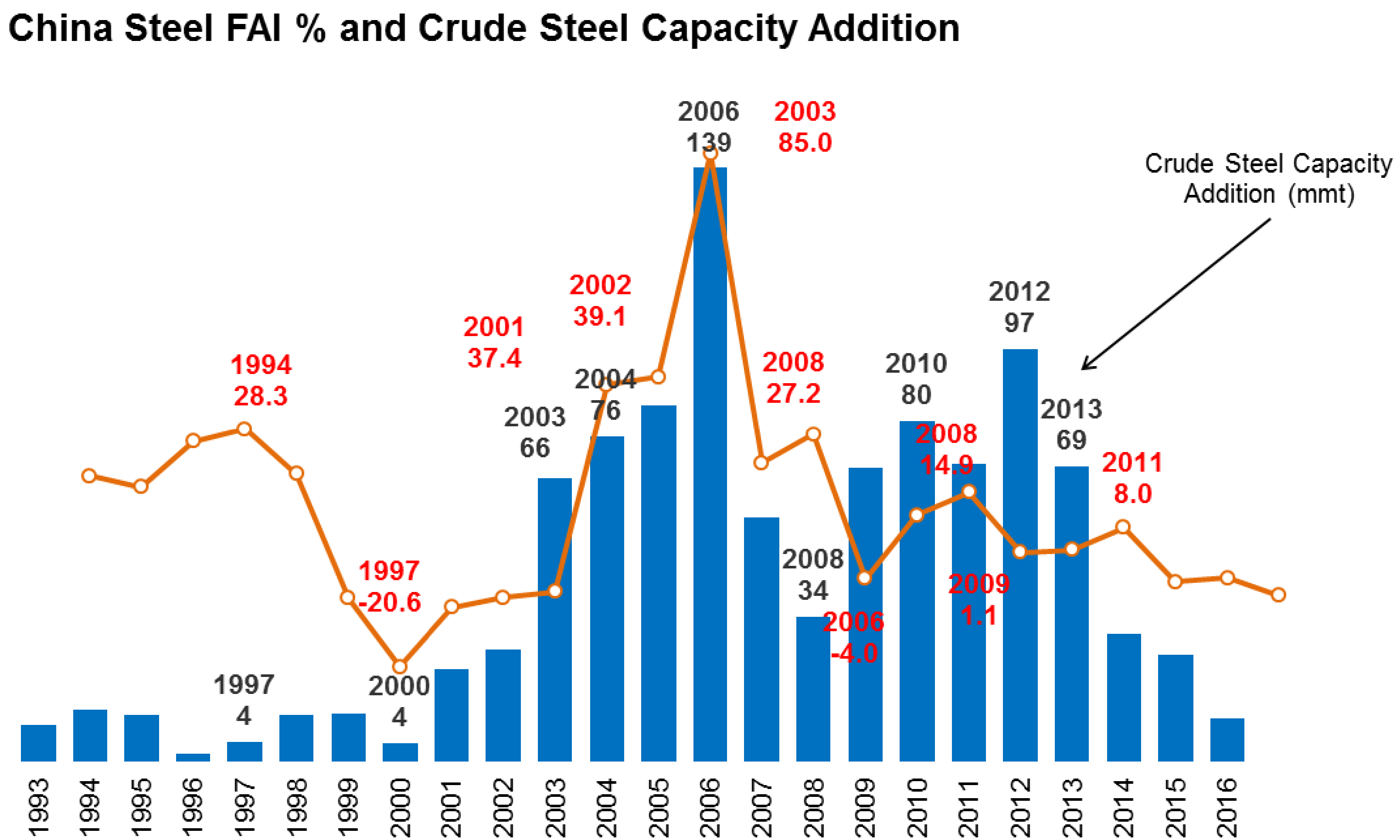




Source: Yin Ruiyu report

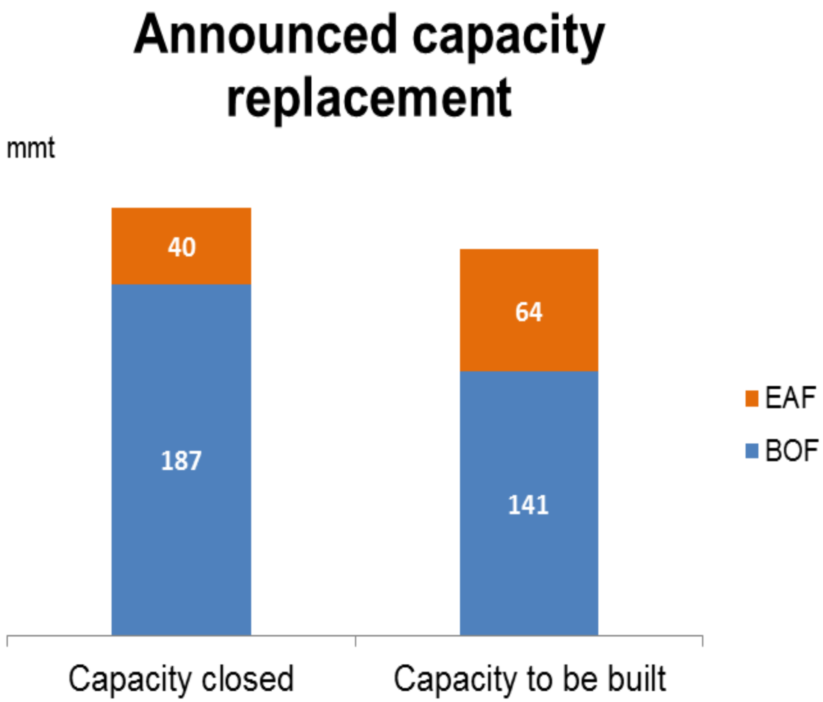
But EAF ratio may not rise quickly for BF too new to be replaced

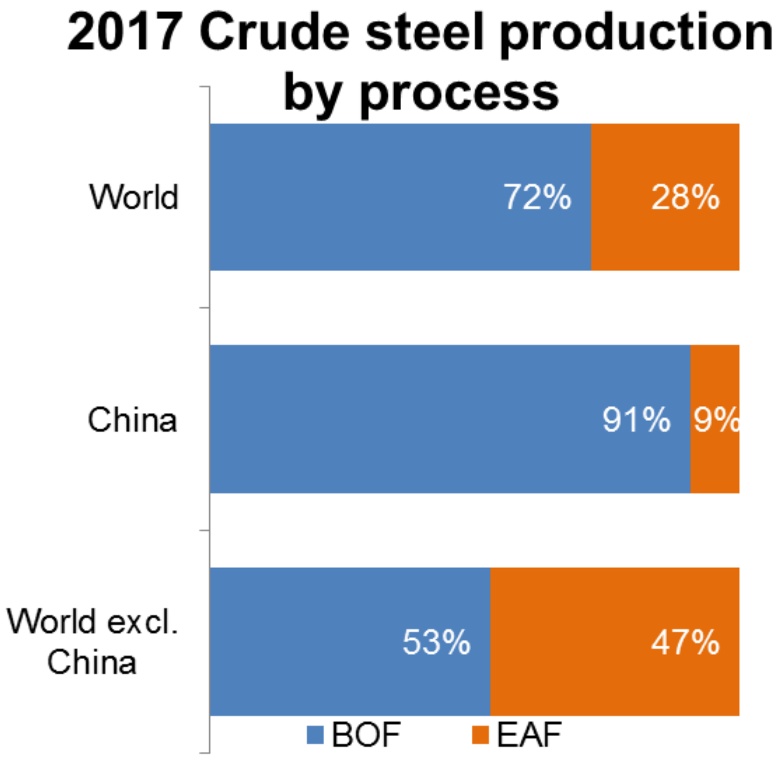
More than 95% of the new crude steel capacity are BF route



Source: NBS, CISA

Evolution of metallics balance in China to be watched closely…





Source: worldsteel, CISA

- High cost caused by Chinese environmental protection regulation has dampened the cost competitiveness of Chinese steel products in global steel export market
- Although manufacturing relocation might restrain indirect steel exports, Chinese steel demand might plateau if new hukou registration policy works
- With sufficient scrap and power supply, and the extremely strict requirement of emission, EAF ratio will gradually rise but may not rise quickly as Chinese BFs are too new to be replaced
- As EAF ratio and scrap charging ratio rise, change of metallics balance in China will have a big impact on iron ore and scrap market

END